BUSINESS ANALYSIS

Third edition

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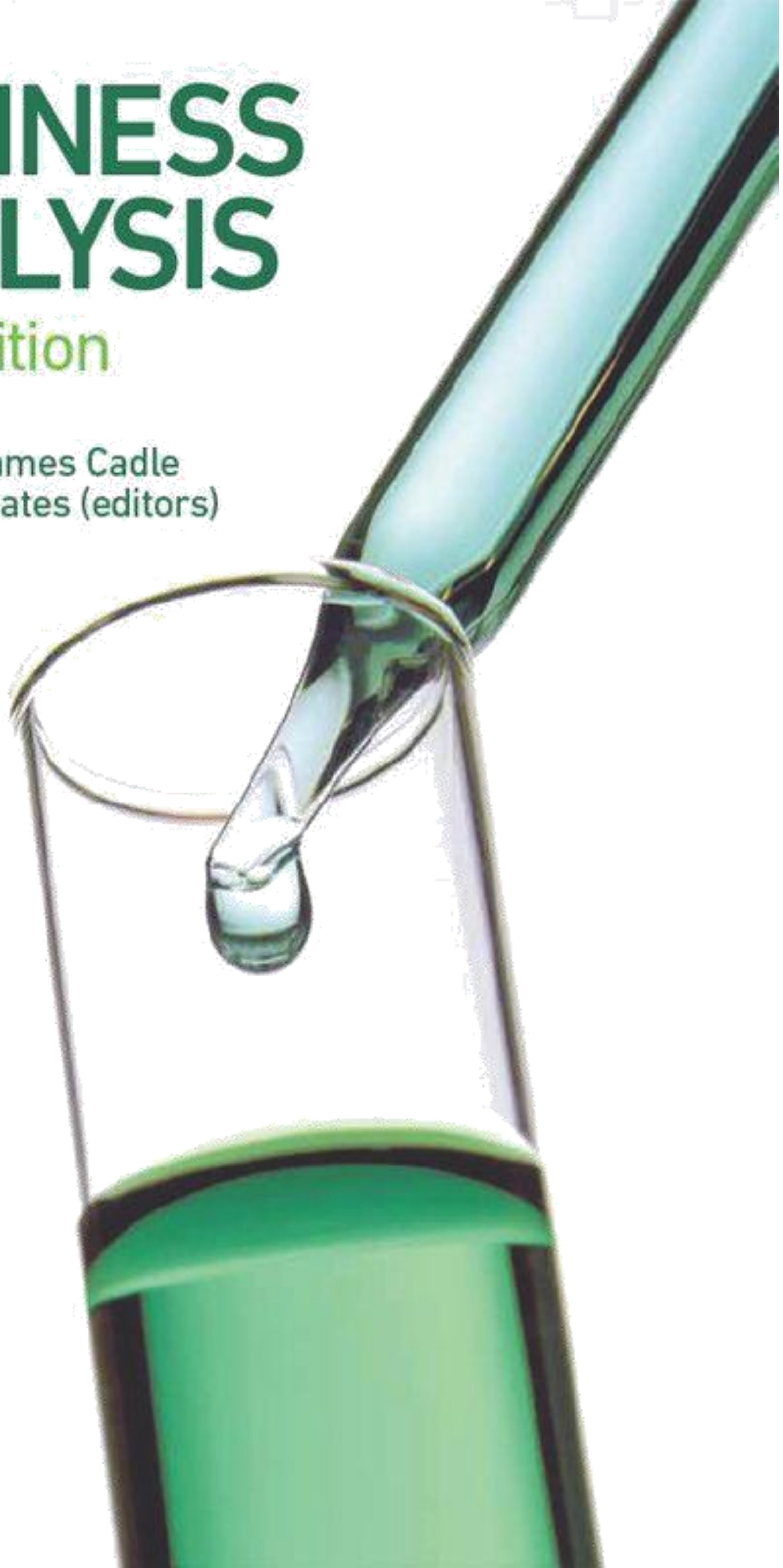


bcs
The Chartered Institute for IT

BA	Business Analyst
BAM	Business Activity Model
BAMM	Business Analysis Maturity Model
BBS	Balanced Business Scorecard
BCS	BCS, The Chartered Institute for IT
BPMN	Business Process Model and Notation
CARDI (log)	Constraints, Assumptions, Risks, Dependencies and Issues (log)
CATWOE	Customer, Actor, Transformation, World view (*Weltanschauung*), Owner,
CBAP	Environment Certified Business Analysis
CEO	Professional Chief Executive Officer
CI	Configuration Item
CIO	Chief Information Officer
CMMI	Capability Maturity Model Integration
COTS	Commercial Off-The-Shelf (software
CSF	solution) Critical Success Factor Database
DBMS	Management System
DCF	Discounted Cash Flow
DMAIC	Define, Measure, Analyse, Improve,
DSDM	Control Dynamic Systems Development
ERD	Method Entity Relationship Diagram
ERP	Enterprise Resource Planning
HR	Human Resources
IET	Institution of Engineering and Technology
IIBA	International Institute of Business Analysis
IMIS	Institute for the Management of Information Systems
IRR	Internal Rate of Return
IS	Information Systems

IT	Information Technology
itSMF	IT Service Management Forum
KPI	Key Performance Indicator
MoSCoW	Must have, Should have, Could have, Want to have but won't have this time
MOST (analysis)	Mission, Objectives, Strategy and Tactics (analysis)
NPV	Net Present Value
OSCAR	Objectives, Scope, Constraints, Authority, Resources
PESTLE	Political, Economic, Sociocultural, Technological, Legal and Environmental
POPIT	People, Organisation, Process, Information and Technology
RACI (chart)	Responsible, Accountable, Consulted and Informed (chart)
RAID (log)	Risks, Assumptions, Issues and Dependencies (log)
RASCI (chart)	Responsible, Accountable, Supportive, Consulted and Informed (chart)
SARAH	Shock, Anger, Rejection, Acceptance, Hope
SBU	Strategic Business Unit
SDLC	Systems Development Lifecycle
SFIA	Skills Framework for the Information Age
SMART	Specific, Measurable, Achievable, Relevant and Time-framed
SSADM	Structured Systems Analysis and Design Method
SSM	Soft Systems Methodology
STROBE	Structured Observation of the Business Environment
SWOT	Strengths, Weaknesses, Opportunities and Threats
UML	Unified Modeling Language
UP	Unified Process

GLOSSARY

Activity sampling An investigation technique carried out to determine the amount of time individuals spend on different aspects of their work. Activity sampling is a form of observation and involves the collection of data that may be used for statistical analysis.

Agile An approach to software development based upon the Agile Manifesto and using evolutionary development and incremental delivery approaches.

Actor A role that performs areas of work within a business system. Actors are modelled on swimlane diagrams and use case diagrams. Actors are usually user roles and show the individual or group of individuals responsible for carrying out the work or interacting with a system. An actor may also be an IT system or time.

APM The Association for Project Management; aims to develop and promote project management.

Balanced Business Scorecard A Balanced Business Scorecard supports a strategic management system by capturing both financial and non-financial measures of performance. There are usually four quadrants – financial, customer, process, learning and growth. The balanced business scorecard was developed by R. S. Kaplan, and D. P. Norton.

BCS, The Chartered Institute for IT BCS is the leading international professional body for the IT industry with over 70,000 members. BCS is responsible for setting standards for the IT profession and advises and informs industry and government on successful IT implementation.

Benefits management A process that is concerned with the delivery of the predicted business benefits defined in the business case. This process includes managing projects such that they are able to deliver the predicted benefits and, after the project has been implemented, checking progress on the achievement of these benefits and taking any actions required to enable their delivery.

Boston Box A technique used to analyse the market potential of the products and services provided by an organisation. The technique was defined by the Boston

Consulting Group.

Business actor Someone who has an interest in a project, either because they have commissioned it, they work within the business system being studied or they will be the users of a proposed new IT system. See *Stakeholder*.

Business analysis An advisory role which has the responsibility for investigating and analysing business situations, identifying and evaluating options for improving business systems, elaborating and defining requirements, and ensuring the effective implementation and use of information systems in line with the needs of the business.

Business Analysis Process Model A framework for business analysis assignments that incorporates the business context and has six stages – investigate situation, consider perspectives, analyse needs, evaluate options, define requirements and deliver changes. The framework places standard modelling techniques in context to help analysts determine the most appropriate technique for individual business situations.

Business architecture A set of artefacts that define several views of an organisation.

Business Activity Model (BAM) A conceptual model that shows the set of business activities that would be expected to be in place given the stakeholder perspective from which it has been developed. There are five types of business activity represented on a business activity model. These are: planning, enabling, doing, monitoring and controlling activities. See *Business perspective*.

Business case A document that describes the findings from a business analysis study and presents a recommended course of action for senior management to consider. A business case would normally include an introduction, management summary, description of the current situation, options considered, analysis of costs and benefits, impact assessment, risk assessment, recommendations, plus appendices that provide detailed supporting information.

Business environment See *External business environment; Internal business environment*.

Business event A business event triggers the business system to do something. Typically this is to initiate the business process that forms the business system response to the event. In effect, the business events tell us when a business activity should be initiated; it fires into life the process that carries out the activity. There are three types of business event: external, internal and time-based business events.

Business option A key step in developing a Business Case is to identify the options available to address the business problem or opportunity. A business option describes the scope and content of a proposed business solution and states what it is intended to achieve in business terms. See *Technical option*.

Business perspective A view of the business system held by a stakeholder. The business perspective will be based upon the values and beliefs of the stakeholder. These values and beliefs will be encapsulated in a defined world view. There may be several divergent business perspectives for any given business situation. See *CATWOE*.

Business process A linked set of tasks performed by a business in response to a business event. The business process receives, manipulates and transfers information or physical items, in order to produce an output of value to a customer. See *Business process model*.

Business process model A diagram showing the tasks that need to be carried out in response to a business event, in order to achieve a specific goal. See *Swimlane diagram*.

Business rule Business rules define how business activities are to be performed. It is important that these rules are considered when modelling the processing to carry out the activity. There are two main types of business rule: constraints that restrict how an activity is performed; operational guidance that describe the procedures for performing activities.

Business sponsor A senior person in an organisation who is accountable for delivering the benefits from a business change. The sponsor is also responsible for providing resources to the project team.

Business strategy A strategy describes the long-term direction set for an organisation in order to achieve the organisational objectives.

Business system A set of business components working together in order to achieve a defined purpose. The components of a system include people, information, technology processes and the organisation. See *IT system*.

Business user An individual member of staff working within the business who is involved in a business change project. A business user may adopt a number of business roles including business sponsor, domain expert and end user for a solution.

Capability Maturity Model Integration (CMMI) A model of five stages, showing increasing maturity of operation. Provides guidance for improving the quality of processes.

CATWOE A technique from the Soft Systems Methodology that provides a framework for defining and analysing business perspectives. The mnemonic stands for: C – customer, A – actor, T – transformation, W – world view, O – owner, E – environment. See *Business perspective*, *Soft systems methodology*.

CBAP® The Certified Business Analysis Professional awarded by the International Institute of Business Analysis (IIBA®). IIBA® publishes the Business Analysis Body of Knowledge® (BABOK®).

Change control A process whereby changes to requirements are handled in a controlled fashion. The change control process defines the process steps to be carried out when dealing with a proposed change. These steps include documenting the change, analysing the impact of the change, evaluating the impact of the change in order to decide upon the course of action to take, and deciding whether or not to apply the change. The analysis and decisions should be documented in order to provide an audit trail relating to the proposed change.

Class A class is a definition of the attributes and operations shared by a set of objects within a business system. Each object is an instance of a particular class. See *Object*.

Class model A technique from the Unified Modeling Language (UML). A class model describes the classes in a system and their associations with each other.

Cloud computing A general term for the delivery of hosted services over the internet.

Competency (or Competence) A competency is a skill or quality an individual needs to perform his or her job effectively.

Computer-Aided Software Engineering (CASE) An automated toolset that provides facilities to support requirements engineering and software development. These facilities will include the production and storage of documentation, management of cross-references between documentation, restriction of access to documentation and management of document versions. Sometimes known as Computer-Aided Requirements Engineering (CARE).

Consensus model The definitive, agreed BAM derived from the individual stakeholder BAMs.

Cost–benefit analysis A technique that involves identifying the initial and ongoing costs and benefits associated with a business change initiative. These costs and benefits are then categorised as tangible or intangible and a financial value calculated for those that are tangible. The financial values are analysed over a forward period in order to assess the potential financial return to the organisation. This analysis may be carried out using standard investment appraisal techniques. See *Payback period (or break-even analysis)* and *Discounted cash flow/net present value analysis*.

Critical success factors The areas in which an organisation must succeed in order to achieve positive organisational performance.

Discounted cash flow An investment appraisal technique that takes account of the time value of money. The annual net cash flow for each year following the implementation of the change is reduced (discounted) in line with the estimated reduction in the value of money. The discounted cash flows are then added to produce a net present value. See *Net present value*.

Document analysis A technique whereby samples of documents are reviewed in order to uncover information about an organisation, process, system or data.

DSDM DSDM is a project delivery framework that emphasises continuous user involvement and the importance of delivering the right solution at the right time.

Entity relationship diagram A diagram produced using the entity relationship modelling technique. The diagram provides a representation of the data to be held in the IT system under investigation. See *Entity relationship modelling*.

Entity relationship modelling A technique that is used to model the data required within an IT system. The technique models the data required to describe the 'things' the system wishes to hold data about – these are known as the 'entities' – and the relationships between those entities.

Ethnographic study An ethnographic study is concerned with spending an extended period of time within an organisation in order to obtain a detailed understanding of the culture and behaviours of the business area under investigation.

Explicit knowledge The knowledge of procedures and data that is foremost in the business users' minds, and which they can easily articulate. See *Tacit knowledge*.

External business environment The business environment that is external to an organisation and is the source of forces that may impact the organisation. Types of forces may include the introduction of new laws, social trends or competitor actions. See *PESTLE analysis, Five Forces analysis*.

Force-field analysis A technique to consider those forces inside and outside the organisation that will support adoption of a proposal and those that will oppose it. This technique was developed originally by Kurt Lewin and may be used in evaluating options for change and in change management.

Functional requirement A requirement that is concerned with a function that the system should provide, i.e. what the system needs to do.

Gap analysis The comparison of two views of a business system, the current situation and the desired future. The aim of gap analysis is to determine where the current situation has problems or 'gaps' that need to be resolved. This leads to the identification of actions to improve the situation. The business activity modelling technique may be used to provide an ideal future view which can then be compared with a view of the current situation. An alternative, more detailed approach is to use the business process modelling technique, using 'as is' and 'to be' process models.

Holistic approach The consideration of all aspects of a business system and their interactions. This incorporates the people, process and organisational areas, in addition to the information and technology used to support the business system.

IMIS The Institute for the Management of Information Systems.

Impact analysis The consideration of the impact a proposed change will have on a business system and on the people working within it.

Intangible benefit A benefit to be realised by a business change project for which a credible, usually monetary, value cannot be predicted. See *Tangible benefit*.

Intangible cost A cost incurred by a business change project for which a credible, usually monetary, value cannot be predicted. See *Tangible cost*.

Internal business environment The internal capability of the organisation that affects its ability to respond to external environment forces. Techniques such as MOST analysis or the Resource Audit may be used to analyse the capability of the internal business environment. See *MOST analysis and Resource audit*.

Internal rate of return A calculation that assesses the return on investment from a project, defined as a percentage rate. This percentage is the discount rate at which the Net Present Value is equal to zero and can be used to compare projects to see which are the better investment opportunities. Alternatively, this rate may be used to compare all projects with the return that could be earned if the amount invested was left in the bank.

Interview An investigation technique to elicit information from business users. An interview agenda is prepared prior to the interview and distributed to participants. The interview is carried out in an organised manner and a report of the interview is produced once the interview has been concluded.

IT system A set of automated components hosted on a computer that work together in order to provide services to the system users. See *Business system*.

itSMF An internationally recognised forum for IT service management professionals

Institution of Engineering And Technology (IET) One of the world's leading professional bodies for engineering and technology.

Key Performance Indicators (KPIs) These are specific areas of performance that are monitored in order to assess the performance of an organisation. Key performance indicators are often identified in order to monitor progress of the critical success factors. Measurable targets are set for KPIs. See *Critical success factors*.

McKinsey 7-S A framework developed by the McKinsey consultancy organisation. The 7-S model identifies key areas for the implementation of business change.

MoSCoW An approach to prioritising requirements. MoSCoW stands for:

- Must have – A mandatory requirement without which the system has no value.
- Should have – A mandatory requirement that must be delivered, but, where time is short, could be delayed for a future delivery. This should be a short term delay.
- Could have – A requirement that would be beneficial to include if it does not cost too much or take too long to deliver, but it is not central to the project objectives.
- Want to have (but Won't have this time) – A requirement that may be needed in the future but is not required for this delivery.

MOST analysis An analysis of an organisation's Mission, Objectives, Strategy and Tactics to identify any inherent strengths or weaknesses, for example from a lack of strategic direction or unclear objectives. See *Internal business environment*.

Net present value The amount an investment is worth once all of the net annual cash-flows in the years following the current one are adjusted to today's value of money. The net present value is calculated using the discounted cash flow approach to investment appraisal. See *Discounted cash flow, Internal rate of return*.

Non-functional requirement A requirement that defines a constraint or performance measure that the system or the functional requirements must comply with.

Object An object is something within a business system for which a set of attributes and functions can be specified. An object is an instance of a class. See *Class*.

Payback calculation An investment appraisal technique where a cash-flow forecast for a project is produced using the current values of the incoming and outgoing cash flows; no attempt is made to adjust them for the declining value of money over time. See *Discounted cash flow*.

PESTLE A technique used to analyse the external business environment of an organisation. The technique involves the analysis of the political, economic, socio-cultural, technological, legal and environmental forces that may impact upon an organisation. See *External business environment*.

Porter's five forces A technique used to analyse the industry or business domain within which an organisation operates. See *External business environment*.

Project initiation document (PID) A document that defines the business context for a project and clarifies the objectives, scope, deliverables, timescale, budget, authority and available resources.

Process See *Business process*.

Process model See *Business process model*.

Protocol analysis A technique used to elicit, analyse and validate requirements. Protocol analysis involves requesting the users to perform a task and describe each step as they perform it.

Prototyping A technique used to elicit, analyse and validate requirements.

Prototyping involves building simulations of documents, processes or systems in order to enable the business users to visualise any proposed changes and hence increase understanding about the system requirements.

Questionaires See *Survey*.

RACI or RASCI Linear responsibility matrix charts that identify stakeholder roles and responsibilities during an organisational change process.

Requirement A feature that the business users need the new system (business or IT) to provide.

Requirements catalogue An organised set of requirements where each individual requirement is documented using a standard template.

Requirements elicitation A proactive approach to investigating requirements required to resolve a business problem or enable a business opportunity. Involves working with the business users and helping them to visualise and articulate their requirements.

Requirements management A governance approach that aims to ensure that each requirement is tracked from inception to implementation (or withdrawal) through all of the changes that have been applied to it.

Resource audit A technique to analyse the capability of an organisation. The resource audit considers five areas of organisational resource: tangible resources – physical, financial and human; intangible resources – know-how and reputation.

Rich picture A pictorial technique offering a free-format approach that allows analysts to document whatever is of interest or significance in the business situation. This technique originated from the Soft Systems Methodology. See *Soft systems methodology*.

Risk A problem situation that may arise with regard to a project or business situation. Potential risks are identified for each option in a business case, the probability of the risk occurring and the likely impact of the risk are assessed, and suitable countermeasures are identified. See *Business case*.

Risk management The identification, assessment, monitoring and control of significant risks during the development, design and implementation of IT systems.

Scenarios A technique used to elicit, analyse and validate requirements. A scenario traces the course of a transaction from an initial business trigger through each of the steps needed to achieve a successful outcome. Alternative scenarios, for example, where specific conditions are not met, are also traced.

SFIA and SFIAplus The Skills Framework for the Information Age (SFIA) and the extended version provided by BCS (SFIAplus). Standard frameworks setting out the definition of skills and levels of competency for anyone working in the Information Systems industry.

Shadowing A technique used to find out what a particular job entails. Shadowing involves following a user as they carry out their job for a period such as a day or two days.

Six thinking hats A thinking tool developed by Edward de Bono for individuals and for groups to improve the thinking process.

SMART A mnemonic used to ensure that objectives are clearly defined in that they are specific, measurable, achievable, relevant, time-framed.

Soft Systems Methodology A methodology that provides an approach to analysing business situations devised by Peter Checkland and his team at Lancaster University.

Special purpose records A technique that involves the business users in keeping a record about a specific issue or task. Typically the record is based on a simple structure, for example a five bar gate record.

Stakeholder An individual, group of individuals or organisation with an interest in the change. Categories of stakeholder include customers, employees, managers, partners, regulators, owners, suppliers and competitors.

Stakeholder analysis The analysis of the levels of power and interest of a stakeholder in order to assess the weight that should be attached to their views. This technique provides a means of categorising stakeholders in order to identify the most appropriate stakeholder management approach.

Stakeholder management The definition of the most appropriate means to be adopted in order to engage with different categories of stakeholder. The approach to each stakeholder will be different depending on (a) their level of interest in the project and (b) the amount of power or influence they wield to further or obstruct it.

Strategic analysis The application of techniques in order to analyse the pressures within an organisation's external business environment and the level of internal organisational capability to respond to these pressures.

Strategy The direction and scope of an organisation over the longer term. The strategy is defined in order to achieve competitive advantage for the organisation through its configuration of resources within a changing business environment. The strategy also needs to fulfil the stakeholders' expectations.

STROBE A technique that represents a formal checklist approach to observation, where the analyst is investigating specific issues. STROBE stands for STRuctured Observation of the Business Environment and is used to appraise a working environment.

Survey A technique used to obtain quantitative information during an investigation of a business situation. Surveys are useful to obtain a limited amount of information from a large group of people.

Swimlane A row on a business process diagram/model that indicates who is responsible for a given process or task. Typical swimlanes represent departments, teams, individuals or IT systems.

Swimlane diagram A technique used to model business processes. A swimlane diagram models the business system response to a business event. The model shows the triggering event, the business actors, the tasks they carry out, the flow between the tasks, the decisions and the business outcome. See *Business process model*.

SWOT Analysis A technique used to summarise the external pressures facing an organisation and the internal capability the organisation has available to respond to those pressures. The mnemonic stands for Strengths, Weaknesses, Opportunities and Threats.

Tacit knowledge Those aspects of business work that a user is unable, or omits, to articulate or explain. This may be due to a failure to recognise that the information is required or to the assumption that the information is already known to the analyst. See *Explicit knowledge*.

Tangible benefit A benefit to be realised by a business change project for which a credible, usually monetary, value can be predicted. See *Intangible benefit*.

Tangible cost A cost incurred by a business change project for which a credible, usually monetary, value can be predicted. See *Intangible cost*.

Task On a Business process model or Swimlane diagram, a piece of work carried out by a single actor at a specific moment in time.

Task modelling The technique for developing a model which describes the human activities and task sequences required by a business system. The task model elaborates the tasks identified by mapping business processes onto specific individuals or workgroups.

Technical option A technical option describes how the business solution may be implemented using information technology.

Unified Modeling Language The Unified Modeling Language (UML) is a suite of diagrammatic techniques that are used to model business and IT systems.

Use case A use case is something that an actor wants the IT system to do; it is a 'case of use' of the system by a specific actor and describes the interaction between an actor and the system.

Use case description A use case description defines the interaction between an actor and a use case.

Use case model A technique from the Unified Modeling Language (UML). A use case model consists of a diagram showing the actors, the boundary of the system, the use cases and the associations between them, plus a set of use case descriptions.

Value chain A concept developed by Michael Porter to identify the primary and support activities deployed within organisations to deliver value to customers.

Value proposition A clear statement of the value that an organisation believes a product or service delivers, or is perceived to deliver, to the organisation's customers.

Workshop An investigation technique whereby a meeting is held with business actors from a range of business areas in order to elicit, analyse or validate information. An agenda is prepared prior to the workshop and distributed to participants. The workshop is run by a facilitator; actions and decisions are recorded by a scribe.

PREFACE

This is an exciting time for business analysis. There are now practising business analysts working at all levels of seniority in most organisations and the role is recognised increasingly by professionals from other disciplines, both within the IT function and the business units. The sixth BA Conference Europe is scheduled, with increasing numbers attending year on year. There are numerous publications on business analysis, and social media abounds with (mostly relevant!) BA blogs, videos and debates. Many business analysts hold certifications; at the time of writing, BCS had issued over 75,000 certificates. Business analysis is taught in universities. Need we go on? It definitely feels like we have arrived!

This book was written originally to provide a breadth of information and guidance to practising business analysts at all levels – and that continues to be the case. As a result, it offers a wide-ranging source of practical guidance on how to approach business analysis and how to apply concepts and techniques. The book also supports anyone wanting to achieve professional certifications in business analysis especially those studying for the BCS International Diploma in Business Analysis.

We have included material drawn from research, discussions, and conversations with practitioners in business analysis in the UK, Europe, Australia, the USA and Canada. However, we have been struck by the number of people who are not within this group but have told us that they have found the book helpful. These include students across IS-related disciplines, and managers and staff from various organisational departments, including marketing and HR. Ultimately, it offers information for anyone wishing to improve their understanding of business analysis.

Some important changes in this edition include:

- an expanded discussion on the philosophy and use of Agile;
- a new chapter that looks at using gap analysis to identify potential improvements and the application of business architecture to ensure the alignment of proposed business changes;
- a new chapter looking at the role of the business analyst through the business change lifecycle;
- additional approaches and techniques in areas such as situation

investigation and business process modelling.

The challenges facing organisations have increased since we wrote the first edition of this book. The advent of the economic crisis that affected many countries is still being felt. As a result, organisations need to spend money wisely and the need for good analysis to help ensure this has never been greater. In this third edition, we have once again extended the toolkit required of a good business analyst. But we make no apologies for this such an important role will always need to develop and extend its reach.

Thanks must go to Alan Paul husband of Debbie for reviewing much of the book and improving it. Thanks also to Rachel Bellman for interpreting Debbie’s jottings and creating an excellent rich picture.

Matthew Flynn and his team at BCS have made it all come together in the end. Once again, their help and support was invaluable.

Debra Paul
James Cadle
Donald Yeates

1 WHAT IS BUSINESS ANALYSIS?

Debra Paul

INTRODUCTION

This is a book about Business Analysis, a discipline that has evolved over the last two decades and has the potential to offer great benefit to organisations by ensuring that there is alignment between business needs and business change solutions. Many solutions involve the development of new or enhanced information systems but this is unlikely to be the extent of the business change, and it is probable that solutions will have a broader scope incorporating changes to areas such as business processes and job roles. The reason for producing this book is to provide guidance about business analysis that reflects the breadth of the role and the range of techniques used. While many organisations employ business analysts, there persists a lack of clarity about what the role really involves and this often creates more questions than answers. What do business analysts do? What skills do they require? How do they add value to organisations? Recognition in the broader business community is also an issue with many misconceptions regarding business analysis and a lack of appreciation of the contribution business analysts might make. Also, in the absence of a standard definition of business analysis and a standard set of business analysis activities, problems have arisen:

- Organisations have introduced business analysis to make sure that business needs are paramount when new IT systems are introduced. However, recognising the importance of this in principle is easier than ensuring that it is achieved. Many business analysts still report a drive towards documenting requirements without a clear understanding of the desired business outcomes.
- Some business analysts were previously experienced IT systems analysts and proved less comfortable considering the business requirements and the range of potential solutions that would meet the requirements.
- Many business analysts have a business background and have a limited understanding of IT and how software is developed. While knowledge of the business is invaluable for business analysts, problems can occur where IT forms part of the business solution and the analyst has

insufficient understanding of IT. This may cause communication difficulties with the developers and could result in failure to ensure that there is an integrated view of the business and IT system.

- Some business analysts, as they have gained in experience and knowledge, have felt that they could offer beneficial advice to their organisations but a lack of understanding of the role, and a focus on ensuring governance rather than understanding the need, has caused organisations to reject or ignore this advice.

This chapter examines business analysis as a specialist profession and considers how we might better define the business analyst role. In Chapter 4 we describe a process model for business analysis and an overview of two aspects: how business analysis is carried out and the key techniques to be used at each stage. Much of this book provides guidance on how the various stages in the business analysis process model may be carried out. Business analysis work is well defined where there are standard techniques that have been used in projects for many years. In fact, many of these techniques have been in use for far longer than the business analyst role has been in existence. We describe numerous techniques in this book that we feel should be within any business analyst's toolkit, and place them within the overall process model. Our aim is to help business analysts carry out their work, improve the quality of business analysis within organisations and, as a result, help organisations to adopt business improvements that will ensure business success.

THE ORIGINS OF BUSINESS ANALYSIS

Developments in IT have enabled organisations to create information systems that have improved business operations and management decision-making. In the past, this has been the focus of IT departments. However, as business operations have changed, the emphasis has moved on to the development of new services and products. The questions we need to ask now are 'What can IT do to exploit business opportunities and enhance the portfolio of products and services?' and 'What needs to change in the organisation if the benefits from a new or enhanced IT system are to be realised?'

Technology has enabled new business models to be implemented through more flexible communication mechanisms that allow organisations to reach out to the customer, connect their systems with those of their suppliers and support global operations. The use of IT has also created opportunities for organisations to focus on their core processes and competencies without the distraction of the peripheral areas of business where they do not have specialist skills. These days, the absence of good information systems would prevent an organisation from developing significant competitive advantage and new organisations can gain considerable market share by investing in an IT architecture that supports service delivery and business growth. Yet for many years there has been a growing dissatisfaction in businesses with the support provided by IT. This has been accompanied by a recognition by senior management that IT investment often fails to deliver the required business benefit. In short, the technology enables the development of information systems but these rarely meet the requirements of the business or deliver the service that will bring competitive advantage to the organisation. The *Financial Times* (Mance 2013) reported that this situation applies to all sectors, with IT projects continuing to overrun their budgets by significant amounts and poor communication between business and technical experts remaining problematic. The perception that, all too frequently, information systems do not deliver the predicted benefits continues to be well founded.

THE DEVELOPMENT OF BUSINESS ANALYSIS

The impact of outsourcing

In a drive to reduce costs, and sometimes in recognition of a lack of IT expertise at senior management level, many organisations have outsourced their IT services rather than employ their own internal IT staff. They have handed much of this work to specialist IT service providers. This approach has been based upon the belief that specialist providers, often working in countries where costs are lower than the UK, will be able to deliver higher quality at lower cost. So, in organisations which have outsourced their IT function, the IT systems are designed, constructed and delivered using staff employed by an external supplier. This undoubtedly has advantages for both the organisation purchasing the services and the specialist supplier. The latter gains an additional customer and the opportunity to increase turnover and make profit from the contractual arrangement. The customer organisation is no longer concerned with all staffing, infrastructure and support issues and instead pays the specialist provider for delivery of the required service. In theory this approach has much to recommend it but, as is usually the case, the limitations begin to emerge once the arrangement has been implemented, particularly in the areas of supplier management and communication of requirements. The issues relating to supplier management are not the subject of this book, and would require a book in their own right. However, we are concerned with the issue of communication between the business and the outsourced development team. The communication and clarification of requirements is key to ensuring the success of any IT system development but an outsourcing arrangement often complicates the communication process, particularly where there is geographical distance between the developers and the business. We need to ask ourselves how well do the business and technical groups understand each other and is the communication sufficiently frequent and open? Communication breakdowns usually result in the delivered IT systems failing to provide the required level of support for the business.

The outsourcing business model has undoubtedly been a catalyst for the development of the business analysis function as more and more organisations recognise the importance of business representation during the development and implementation of IT systems.

Competitive advantage of using IT

A parallel development that has helped to increase the profile of business analysis and define the business analyst role, has been the growing recognition that three factors need to be present in order for the IT systems to deliver competitive advantage. First, the needs of the business must drive the development of the IT systems; second, the implementation of an IT system must be accompanied by the necessary business changes and third, the requirements for IT systems must be defined with rigour and accuracy. The traditional systems analyst role operated primarily in the last area; today's business challenges require all three areas to be addressed.

Successful business change

During the last few years, organisations have adopted a broader view – from IT projects to business change programmes. Within these programmes, there has been recognition of the need for roles and skill sets that enable the successful delivery of business change initiatives. The roles of the programme manager and change manager are well defined, with a clear statement of their scope and focus within the business change lifecycle. However, we now need to ensure that the business analyst role – one that uncovers the root causes of problems, identifies the issues to be addressed and ensures any solution will align with business needs has a similar level of definition and recognition.

The early part of the business change lifecycle – Alignment and Definition – is concerned with the analysis of the organisation, its business needs and requirements in order to determine new ways of working that will improve the organisation's efficiency and effectiveness. Later business change activities are concerned with change design and development, business acceptance testing and, post implementation, benefits review and realisation. Clearly, extensive analysis is required throughout the lifecycle if the changes are to be successful in order to deliver the desired benefits. The analysis work falls within the remit of business analysis yet, in many organisations, a coherent approach to business change, that includes business analysts in the business change lifecycle, is still awaited. As a result, it is often the case that the definition of the business needs and the requirements to ensure they are met are often unclear or not aligned. All too often the focus almost from the outset is on the solution rather than understanding what problem we are trying to address. The lack of clarity and alignment can result in the development or adoption of changes that fail to deliver business benefits and waste investment funds.

The importance of the business analyst

The delivery of predicted business benefits, promised from the implementation of IT, has proved to be extremely difficult, with the outsourcing of IT services serving to add complication to already complex situations. The potential exists for organisations to implement information systems that yield competitive advantage and yet this often appears to be just out of reach. Organisations also want help in finding potential solutions to business issues and opportunities, sometimes where IT may not prove to be the answer, but it has become apparent that this requires a new set of skills to support business managers in achieving this. These factors have led directly to the development of the business analyst role.

Having identified the relevance of the business analyst role, we now need to recognise the potential this can offer, particularly in a global economic environment where budgets are limited and waste of financial resources unacceptable. The importance of using investment funds wisely and delivering the business benefits predicted for business change initiatives, has becoming increasingly necessary to the survival of organisations.

Business analysts as internal consultants

Many organisations use external consultants to provide expert advice throughout the business change lifecycle. The reasons are clear – they can be employed to deal with a specific issue on an 'as-needed basis', they bring a broader business perspective and can provide a dispassionate, objective view of the company. On the other hand, the use of external consultants is often criticised, across all sectors, because of the lack of accountability and the absence of any transfer of skills from the external consultants to internal staff. Cost is also a key issue. Consultancy firms often charge daily fee rates that are considerably higher than the charge levied for an internal analyst and whilst the firms may provide consultants with a broad range of expertise steeped in best practice, this is not always guaranteed. The experiences gained from using external consultants have also played a part in the development of the internal business analysis role. Many business analysts have argued that they can provide the services offered by external consultants and can, in effect, operate as internal consultants. Reasons for using internal business analysts as consultants, apart from lower costs, include speed (internal consultants do not have to spend time learning about the organisation) and the retention of knowledge within the organisation. These factors have been recognised as particularly important for projects where the objectives concern the achievement of business benefit through the use of IT and where IT is a prime enabler of business change. As a result, while external consultants are used for many business purposes, the majority of business analysts are employed by their organisations. These analysts may lack an external viewpoint but they are knowledgeable about the business domain and crucially will have to live with the impact of the actions they recommend. Consequently, there have been increasing numbers of business analysts working as internal consultants over the last decade.

THE SCOPE OF BUSINESS ANALYSIS WORK

A major issue for business analysts is the definition of the business analyst role. Discussions with several hundred business analysts, across a range of business forums, have established that business analysis roles do not always accurately represent the range of responsibilities that business analysts are capable of fulfilling.

The range of analysis activities

One way in which we can consider the business analyst role is to examine the potential extent of analysis work. There are always unclear aspects where the three areas overlap. For example, consultants may specialise in strategic analysis but also get involved in business process redesign to make a reality of their strategies, and good systems analysts have always understood the need to understand the overall business context of the systems they are developing. However, it is useful to examine them separately in order to consider their relevance to the business analyst role.

Strategic analysis and definition is typically the work of senior management, often supported by strategy consultants. Some business analysts may be required to undertake strategic analysis and identify business transformation actions, but it is more likely that they will have a role to play in supporting this activity. In the main, we believe that strategic analysis is mostly outside the remit of business analysis. We would, however, expect business analysts to have access to information about their organisation's business strategy and be able to understand it, as their work will need to support the execution of this strategy. Business analysts often have to recommend and design the tactics that will deliver the business objectives and strategy, typically the process and IT system solutions. Hence, it is vital that they are able to work within the strategic business context. It may also be the case that some business analyst roles will require strategic level thinking. The use of IT to enable business improvements and the opportunities presented by technology will need to be considered during any strategy analysis and the business analysts are the specialist team that should be able to advise on the use of technology to drive business change. Given these issues, we feel that, while strategic analysis work is not core to business analysis, business analysts will need a good understanding of how strategy is developed and the impact upon the work of the IT and business change functions. In view of this, Chapter 3 explores a range of strategic analysis techniques and provides an overview of the strategic planning process.

IT systems analysis

At the other end of our model, there is the traditional IT discipline called systems analysis. The systems analyst role has been in existence for over 40 years although the term 'systems analyst' tends to be used less often these days. Systems analysts are responsible for analysing and specifying the IT system requirements in sufficient detail to provide a basis for the evaluation of software packages or the development of a bespoke IT system. Typically, systems analysis work involves the use of techniques such as data modelling and process or function modelling. This work is focused on describing the software requirements, and so the products of systems analysis define exactly what data the IT system will record, the processing that will be applied to that data and how the user interface will operate. Some organisations consider this work to be of such a technical nature that they perceive it to be completely outside the province of the business analyst. They have identified that modelling process and data requirements for the IT system is not part of the role of the business analyst and have separated the business analysis and IT teams into different departments, expecting the IT department to carry out the detailed IT systems modelling and specification. Other organisations differentiate between IT business analysts and 'business' business analysts, with those in IT often performing a role more akin to that of a systems analyst. In order to do this, the business analysts need a detailed understanding of IT systems and how they operate, and must be able to use the approaches and modelling techniques that fell historically within the remit of the system analyst role. The essential difference here is that a business analyst is responsible for considering a range of business options to address a particular problem or opportunity; on the other hand an IT business analyst, or systems analyst, works within a defined scope and considers options for the IT solution. In some organisations, there is little divide between the business analysts and the IT team. In these cases the business analysts work closely with the IT developers and include the definition of IT system requirements as a key part of their role. This is particularly the case where an Agile approach has been adopted for a software development project; the business analyst will work closely with the end users and development team to clarify the detailed requirements as they evolve during the development process.

Business analysis

If the two analysis disciplines described above define the limits of analysis work, the gap in the middle is straddled by business analysis. This is reflected in Figure 1.2 which highlights the potential scope and extent of business analysis work. Business analysts will usually be required to investigate a business system where improvements are required but the range and focus of those improvements can vary considerably.

- It may be that the analysts are asked to resolve a localised business issue. In such a case, they would need to recommend actions that would overcome a problem or achieve business benefits.
- Perhaps it is more likely that the study is broader than this and requires investigation into several issues, or perhaps ideas, regarding increased efficiency or effectiveness. This work would necessitate extensive and detailed analysis of the business area. The analysts would need to make recommendations for business changes and these would need to be supported by a rigorous business case.
- Another possibility is that the business analyst is asked to focus specifically on enhancing or replacing an existing IT system in line with business requirements. In this case the analyst would deliver a requirements document defining what the business requires the IT system to provide. This document may define the requirements in detail or may be at a more overview level, depending upon the approach to the system development. Where an Agile approach is to be used, the business analyst may also be involved in prioritising the requirements and identifying those to be input into the next development iteration.
- More senior business analysts may be involved in working cross-

functionally, taking a value delivery approach. This work is likely to require analysis of a workstream comprising various activities and systems. In this case, the analyst will need to have wide-ranging skills not only in analysis but also in stakeholder relationship management, and they will also require extensive business domain knowledge.

Whichever situation applies, the study usually begins with the analyst gaining an understanding of the business situation in hand. A problem may have been defined in very specific terms, and a possible solution identified, but in practice it is rare that this turns out to be the entire problem and it is even less the case that any proposed solution addresses all of the issues. More commonly, there is a more general set of problems that require a broad focus and in-depth investigation. Sometimes, the first step is to clarify the problem to be solved as, without this, any analysis could be examining the wrong area and, as a result, identifying unhelpful solutions. For any changes to succeed the business analyst needs to consider all aspects, for example, what processes, IT systems, job roles, skills and other resources will be needed to improve the situation. In such situations, techniques such as stakeholder analysis, business process modelling and requirements engineering may all be required in order to identify the actions required to improve the business system. These three topics are the subject of later chapters in this book.

Realising business benefits

Analysing business situations, and identifying areas for business improvement, is only part of the process; the analyst may also be required to help develop a business case in order to justify the required level of investment and ensure any risks are considered. One of the key elements of the business case will be the identification and, where relevant, the quantification of the business benefits. Organisations are placing increasing emphasis upon ensuring that there is a rigorous business case to justify the expenditure on business improvement projects. However, defining the business case is only part of the picture – the focus on the management and realisation of these business benefits, once the solution has been delivered, is also growing. This is largely because organisations have limited funds for investment and need to ensure that they are spent wisely. There has been a long history of failure to assess whether or not business benefits have been realised from change projects but this is becoming increasingly unacceptable as the financial pressures mount on organisations and the calls for transparency grow. The business analyst will not be the only role involved in this work. However, ensuring that changes are assessed in terms of the impact upon the business case and, at a later point, supporting the assessment of whether or not predicted business benefits have been realised, is a key element of the role.

Taking a holistic approach

There appears to be universal agreement that business analysis requires the application of a holistic approach. Although the business analyst performs a key role in supporting management's exploitation of IT to obtain business benefit, this has to be within the context of the entire business system. Hence, all aspects of the operational business system need to be analysed if all of the opportunities for business improvement are to be uncovered. The POPIT™ model in Figure 1.3 shows the different views that must be considered when identifying areas for improving the business system.

This model shows us the different aspects, and the correspondences between them, that business analysts need to consider when analysing a business system. For each area, we might consider the following:

- **The processes** : are they well defined and communicated? Is there good IT support or are there several 'work-arounds' in existence? Does the process require documents to be passed around the organisation unnecessarily? Is there the potential for delays or the introduction of errors?

- **The people** : do they have the required skills for the job? How motivated are they? Do they understand the business objectives that they need to support?
- **The organisation** : is there a supportive management style? Are jobs and responsibilities well defined? Is there collaborative cross-functional working?
- **The information** : do the staff have the information to conduct their work effectively? Are managers able to make decisions based on accurate and timely information?
- **The technology** : do the systems support the business as required? Do they provide the information needed to run the organisation?

We need to examine and understand all of these areas to uncover where problems lie and what improvements might be possible, if the business system is to become more effective. Taking a holistic view is vital as this ensures not only that all of the aspects are considered but also the linkages between them. It is often the case that the focus of a business analysis or business change study is primarily on the processes and the IT support. However, even if we have the most efficient processes with high standards of IT support, problems will persist if issues with staffing, such as skills shortages, or the organisation, such as management style, have not also been addressed.

It is vital that the business analyst is aware of the broader aspects relating to business situations such as the culture of the organisation and its impact on the people and the working practices. The adoption of a holistic approach will help ensure that these aspects are included in the analysis of the situation.

Business analysis places an emphasis on improving the operation of the entire business system. This means that, while technology is viewed as a factor that could enable improvements to the business operations, other possibilities are also considered. The focus should be on business improvement, rather than on the use of automation per se, resulting in recommendations that improve the business. Typically, these include the use of IT but this is not necessarily the case. There may be situations where a short-term non-IT solution is both helpful and cost-effective. For example, a problem may be overcome by developing internal standards or training members of staff. These solutions may be superseded by longer term, possibly more costly, solutions, but the focus on the business has ensured that the immediate needs have been met. Once urgent issues have been addressed, the longer term solutions can be considered more thoroughly. It is important that our focus as business analysts is on identifying opportunities for improvement with regard to the needs of the particular situation. If we do this, we can recommend changes that will help deliver real business improvements and ensure that funds are invested prudently.

Agile systems development

Agile is a software development approach which emerged in the late 1990s in the wake of approaches such as Rapid Application Development (RAD) and the Dynamic System Development Method (DSDM). The use of such approaches evolved as a reaction to the linear waterfall lifecycle, with its emphasis on completing a stage before moving on to the next stage. The Agile philosophy is to deliver software increments early and to elaborate requirements using approaches such as prototyping. The Agile Manifesto stated:

> We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:
>
> **Individuals and interactions** over processes and tools
>
> **Working software** over comprehensive documentation
>
> **Customer collaboration** over contract negotiation
>
> **Responding to change** over following a plan
>
> That is, while there is value in the items on the right, we value the items on the left more.

So, what does this mean for the business analyst? In essence, where a business analyst is working on a project where an Agile software development approach has been adopted, the analyst will be involved in supporting the business users in clarifying, elaborating and prioritising the requirements during the development process. While some early business analysis work will have been required to uncover the problems to be addressed and define the business requirements, at a solution level the more detailed requirements will be elaborated during timeboxed iterations where collaborative teams comprising users, analysts and developers work together to develop part of the software required product. The business analyst brings domain expertise and analytical ability to the development team, assisting the users by assessing the impact of proposed functionality in the light of the strategic business context. The role of the business analyst in an Agile environment is explored further .

Supporting business change

It is often commented that, even when the business analysts have defined excellent solutions that have been well-designed and developed, business improvement initiatives can fail during implementation. The business analyst may be required to support the implementation of the business changes. also offers an effective structure for identifying the range of areas to be considered. One aspect may concern the business acceptance testing – a vital element if business changes are to be implemented smoothly. The business analyst's involvement in business acceptance testing can include work such as developing test scenarios and working with the business users as they apply the scenarios to their new processes and systems. Further, the implementation of business change may require extensive support from the business analysts, including tasks such as:

- writing procedure manuals and user guides;
- training business staff in the use of the new processes and IT systems;
- defining job roles and writing job role descriptions;
- providing ongoing support as the business staff begin to adopt the new, unfamiliar, approaches.

The role of the business analyst throughout the change lifecycle is explored further.

THE ROLE AND RESPONSIBILITIES OF A BUSINESS ANALYST

So where does this leave us in defining the role and responsibilities of a business analyst? Although there are different role definitions, depending upon the organisation, there does seem to be an area of common ground where most business analysts work. These core responsibilities are:

- **Investigate business systems** taking a holistic view of the situation; this may include examining elements of the organisation structures and staff development issues as well as current processes and IT systems.
- **Evaluate actions** to improve the operation of a business system. Again, this may require an examination of organisational structure and staff

development needs, to ensure that they are in line with any proposed process redesign and IT system development.
- **Document the business requirements** for the IT system support using appropriate documentation standards.
- **Elaborate requirements,** in support of the business users, during evolutionary system development.

In line with this, we believe the core business analyst role should be defined as:

> An advisory role which has the responsibility for investigating and analysing business situations, identifying and evaluating options for improving business systems, elaborating and defining requirements, and ensuring the effective implementation and use of information systems in line with the needs of the business.

Some business analysis roles extend into other areas, possibly the strategic analysis or systems analysis activities described above. This may be where business analysts are in a more senior role or choose to specialise. These areas are:

- **Strategy implementation** – here the business analysts work closely with senior management to help define the most effective business system to implement elements of the business strategy.
- **Business case production** – more senior business analysts usually do this, typically with assistance from Finance specialists.
- **Benefits realisation** – the business analysts carry out post-implementation reviews, examine the benefits defined in the business case and evaluate whether or not the benefits have been achieved. Actions to achieve the business benefits are also identified and sometimes carried out by the business analysts.
- **Specification of IT requirements** – typically using standard modelling techniques such as data modelling or use case modelling.

The definition of the business analyst role may be expanded by considering the rationale for business analysis. The rationale seeks to explain why business analysis is so important for organisations in today’s business world and imposes responsibilities that business analysts must recognise and accept.

The rationale for business analysis is:

- **Root causes not symptoms**
  - To distinguish between the symptoms of problems and the root causes
  - To investigate and address the root causes of business problems
  - To consider the holistic view
- **Business improvement not IT change**
  - To recognise that IT systems should enable business opportunity or problem resolution
  - To analyse opportunities for business
  - improvement To enable business agility
- **Options not solutions**
  - To challenge pre-determined solutions
  - To identify and evaluate options for meeting business needs
- **Feasible, contributing requirements not meeting all requests**
  - To be aware of financial and timescale constraints
  - To identify requirements that are not feasible and do not contribute to business objectives
  - To evaluate stated requirements against business needs and constraints
- **The entire business change lifecycle not just requirements definition**
  - To analyse business situations
  - To support the effective development, testing, deployment and post-implementation review of solutions
  - To support the management and realisation of business benefits
- **Negotiation not avoidance**
  - To recognise conflicting stakeholder views and requirements
  - To negotiate conflicts between stakeholders

THE BUSINESS ANALYSIS MATURITY MODEL

As the Business Analysis Practice has developed within organisations, a progression for business analysis itself has emerged reflecting this development. The Business Analysis Maturity Model™ (BAMM) shown in Figure 1.4 was developed by Assist Knowledge Development Ltd to represent the development and maturity of business analysis.

This model reflects discussions with several hundred, if not thousands, of business analysts working for numerous organisations across the UK, Europe and beyond. These business analysts have come from different backgrounds – some from IT, many from business areas – and have brought different skills and knowledge to their business analysis teams. The BAMM uses two axes: the scope of the work allocated to the business analyst and the authority level of the business analyst. The scope may be very specific if an initial study has identified the required course of action and the analyst now needs to explore and define solution in greater detail. Alternatively, the scope may have been defined at only an overview level, or may be very ambiguous, with the business analyst having to carry out detailed investigation to uncover the issues before the options can be explored. The level of authority of the business analyst can also vary considerably, from a limited level of authority to the ability to influence and guide at senior management level.

The BAMM shows three levels of maturity during the development of business analysis. The first level is where the business analysis work is concerned with defining the requirements for an IT system improvement. At this level, the scope is likely to be well-defined and the level of authority limited to the project on which the business analyst works. The next level is where the business analysis work has moved beyond a specific IT development so that the analysts work cross-functionally to improve the business processes that give rise to the requirements.

The third level is where the scope and authority of the analysts are at their greatest. Here, the business analysis work is concerned with improving the business and working with senior management to support the delivery of value to customers.

These levels of maturity apply to three perspectives on business analysis: the individual analysts, the business analysis community within an organisation, and the business analysis profession as a whole. At each level, the application of techniques and skills, the use of standards, and the evaluation of the work through measures, can vary considerably. One of the points often raised about the BAMM is the link to the Capability Maturity Model Integration (CMMI) represented in Figure 1.5. The CMMI was developed by the Software Engineering Institute (SEI) at Carnegie Mellon University and is an approach used for process improvement in organisations. If we consider the BAMM in the light of the CMMI, we can see that the five levels of the CMMI apply at each level.

An organisation that is developing its Business Analysis Practice may employ business analysts who are chiefly employed on requirements definition work. In doing this, the analysts may initially have to develop their own process and standards for each piece of work. Therefore, they would be at the Systems Improvement level of the BAMM and the Initial level of the CMMI. By contrast, an organisation that has employed business analysts for some time may have analysts that can work at all three levels of the BAMM. The analysts working at the Business Improvement level may have a defined process, standards and measures that are managed for each assignment. These business analysts are working at the Managed level of the CMMI.

It is also useful to consider a version of CMMI, specifically developed to evaluate the maturity of the Business Analysis Practice. Figure 1.6 shows a possible approach to this maturity assessment.

PROFESSIONALISM AND BUSINESS ANALYSIS

Business analysis has developed a great deal over the last 25 years, to the extent that it is often referred to as a 'profession' and many practitioners view themselves as having a career in business analysis. The factors that support professionalism in business analysis are as follows:

- **Qualifications** – qualifications that determine the standard of skills and abilities of the individual professional that are recognised by employing organisations. Many business analysts hold qualifications such as the BCS

International Diploma in Business Analysis certifications. The seniority of some business analysts has also been recognised by the introduction of the Expert BA Award offered by the BA Manager Forum. It is increasingly the case that organisations require business analysts to hold qualifications.

- **Standards** – techniques and documentation standards that are applied in order to carry out the work of the profession. Organisations typically have templates for documents and standardise on modelling techniques such as those provided by the Unified Modeling Language. Books such as this one are also used in many organisations as a foundation for standards of business analysis practice.
- **Continuing Professional Development** – recognition of the need for the continuing development of skills and knowledge in order to retain the professional status.
- **Professional Body** – a body with responsibility for defining technical standards and the code of conduct, promoting the profession and carrying out remedial action where necessary. This may require the removal of members where they do not reach the standard required by the code of conduct. The major professional bodies for business analysts are BCS, the Chartered Institute for IT and IIBA.

We have come a long way in twenty-five years. Gradually, the business analyst role is being defined with increasing clarity, individuals with extensive expertise are developing and enhancing their skills, best practice is gaining penetration across organisations, and a business analysis profession is becoming established.

THE FUTURE OF BUSINESS ANALYSIS

Business analysis has developed into a specialist discipline that can offer significant value to organisations, not least by assuring the delivery of business benefits and preventing unwise investments in ill-conceived solutions. Business analysis offers an opportunity for organisations to ensure not only that technology is deployed effectively to support the work of the organisation, but also that relevant options for business change are identified that take account of budgetary and timescale pressures. Business analysts can offer objective views that can challenge conventional wisdom, uncover root causes of problems and define the changes that will accrue real business benefits. Business analysts are passionate about their work and the contribution they can make. They continually develop their skills and extend the breadth of work they can undertake. Not only are they able to bridge IT and ‘the business’ but they can also offer guidance on how to approach business change work and where priorities might lie. Where outsourcing initiatives operate across departmental boundaries and sometimes have impacts upon the entire organisation, the work carried out by business analysts is vital if the new part in-house, part outsourced processes and technology are going to deliver value to customers. The challenge for the analysts is to ensure that they develop the extensive toolkit of skills, behavioural, business and technical, that will enable them to engage with the problems and issues facing their organisations, and assist in their resolution. The challenge for the organisations is to support the analysts in their personal development, recognise the important contribution they offer, ensure they have the authority to carry out business analysis to the extent required by the situations they face, and listen to their advice. This book has been developed primarily for the business analysis community but it is also intended to help business professionals face the challenges of today's business environment; we hope anyone involved in defining and delivering business change will find it useful.

2 THE COMPETENCIES OF A BUSINESS ANALYST

Craig Rollason

INTRODUCTION

Good business analysts can make the difference between a poor and a great investment in business and IT improvements. They can also help to resolve issues without jumping to premature conclusions. But what exactly is a good business analyst? This chapter aims to address this question by identifying and describing the competencies that business analysts need in order to be effective in the modern business environment. Competence has been described as 'the ability to do a particular activity to a prescribed standard' (Working Group on Vocational Qualifications, 1986). For the purposes of this chapter, we shall define a competence as an ability a business analyst needs to perform his or her job effectively. The set of BA competencies can be divided into three broad groups, illustrated in Figure 2.1.

Figure 2.1 The competencies of a business analyst

Personal qualities are concerned with how you think and how you interact with the people around you. They are not specific to business analysis but are general skills that are important for developing and progressing in any business environment. Behavioural skills are arguably more important than technical or business skills as they are a prerequisite for working with other people. It is often said that it is easier to give a person with good behavioural skills the techniques they need for their job than to graft behavioural skills onto a good technician. One of the main reasons for this is that good behavioural skills take many years to develop. We discuss the development of competencies later in this chapter. A business analyst also requires **business knowledge** which helps to develop a good understanding of their organisation and the business domain or sector within which it operates. This knowledge is vital if the business analyst is to offer advice and insights that will help improve the organisation's performance. The primary source of business knowledge is through the experience of working in a variety of organisation and project environments. Additional business knowledge can be developed through reading relevant literature or studying for business qualifications. The **professional techniques** are those specific to the business analyst role and differentiate business analysts from other roles. Each of the competencies shown in Figure 2.1 is discussed in the sections that follow and others indicated are covered in more detail in later chapters of this book.

PERSONAL QUALITIES

These are the interpersonal skills and characteristics that are useful for a business analyst.

Communication

Communication is perhaps the most important skill an individual can possess; it encompasses a wide range of areas such as building rapport, listening, influencing and building empathy. Much analysis work involves collecting and analysing data and then presenting back information that brings new perspectives on the project so as to propose a course of action. Poor communication skills are often cited as the root cause of problems during discussions between business and IT staff. The key issues involve the use of technical and business jargon, and failing to understand the other party's point of view during such discussions.

It is vital that we communicate with business colleagues in a language and style they are comfortable with and avoid unfamiliar terms and references. From the analyst perspective, it is important to understand the business, possibly by doing some prior research, and avoid using technical language that is likely to confuse. Spending time with the business team will help you to understand what the communication norms are and what will be effective. It is also important to adjust your communication to align with the other people in the discussion. We need to be aware of the interests and responsibilities of the participants and frame questions accordingly.

Relationship building

This is an extension of communication skill and concerns the ability to get on well with people, at a working if not social level. Some people seem to possess this ability naturally, others have to work at it but either way it is essential for a business analyst. As a business analyst you need to get people to impart information and share opinions with you, and also to discuss ideas for change. All of these things will be very much easier if the people concerned like and trust you. Those who seem best able to build good working relationships demonstrate a genuine interest in the other person and offer open discussions which build mutual trust and respect. This is the basis for successful relationship building.

Influencing

Business analysts are often involved in suggesting options and, possibly, recommending a course of action. If that conclusion is at odds with preconceived ideas about what is required or if it calls for radical or unexpected action, then the ability to influence is essential. Successful influencing requires careful consideration and a concerted effort. We need to understand the stakeholders and factors that will play a part in the decision. Some are obvious such as the project sponsor, project manager, governance committees, project boards and other steering groups. Some are hidden – networks of colleagues, personal agendas, hidden information. Identifying the stakeholders and understanding the amount of power they exert over the decision-making processes will allow you to target and influence the decision-makers most effectively. Once decision-makers have been identified, you can then define a course of action to take the decision forward. This may involve briefing other colleagues – more senior or representatives on decision-making groups – or influencing business colleagues directly.

The influencing activities need careful consideration and prior planning. Business analysts have to develop an understanding of where the other party stands on their proposal, any likely resistance and the influencing style needed to approach the person or group. For example, some managers might defer all decisions to another group, require all information at a very detailed level or prefer just a high-level summary. Some are interested in all the technicalities, others in just the 'vision' or the 'big picture'. Tailoring the approach is vital for a successful outcome.

The analysis itself may be questioned requiring the business analysts to take or suggest another course of action. This may involve facilitating a round table discussion or seeking support from senior colleagues on the best course of action. This is especially true when the business analyst is caught in the middle of opposing views. It also suggests that another personal quality that business analysts need from time to time is the ability to withstand pressure.

Team working

Business analysts often work in teams. The nature of business analysis work requires collecting information from and collaborating with many groups such as business colleagues, suppliers, project team members and management. As a result, the ability to work in a team is very important. An appreciation of what makes successful teams work will benefit the business analyst who should be able to make use of their analytical skills to identify any issues and opportunities that will improve how the team works. Key factors for consideration are vision, commitment, trust, capability, accountability, principles, creativity, responsiveness and recognition.

Political awareness

This is a bit like an elephant – hard to describe but you know it when you see it! One way of defining such awareness is to use the words ‘nous’ or ‘streetwise’; they both capture elements of political awareness. Essentially, this means the ability to work out what is and is not politically acceptable in an organisation and being able to use the right organisational levers to get things done. This requires an analyst to know the sources of power and information within the organisation, understanding what is acceptable or not, and tailoring the approach accordingly. Having political awareness, emphatically does *not* mean accepting the status quo; it does mean being astute and using resourcefulness to get results, even in the face of opposition.

Analytical skills and critical thinking

Since the role we are talking about here is that of business analyst, it is clear that analytical skills form a major part of the job but what does this mean in practice? It means not settling for the obvious, not accepting things at face value and not jumping to premature conclusions. It means digging deeper and deeper until the true situation is uncovered and the real problem has been defined. It involves sifting through often-conflicting data and determining which is relevant and which are not, and presenting the results of the analysis in a form suitable for the relevant stakeholders. And it involves challenging received wisdom at every turn: Why do you do this? What value does it add? Where is it done? How is it done? Who is or should be responsible? When should it happen? Is there another way to do this? Some analysts seem to believe that the job simply consists of recording what the users say they want but this will not reap the potential rewards without the active and critical intervention of the analyst. Over time the analyst will be able to assess the level of analysis required for a specific situation. One maxim often used is to conduct 20 per cent of the analysis in order to achieve 80 per cent of the right answer – and then be 100 per cent convincing when influencing the outcome. This doesn’t mean taking shortcuts on the analysis; it does mean recognising the key factors and the imposed constraints rather than trying to analyse everything.

Attention to detail

Several aspects of the business analyst’s work require detailed investigation. Whether it is uncovering the root causes of problems, defining the costs and benefits associated with a proposed option, defining business requirements and rules or identifying the impacts of proposed changes, the business analyst has a responsibility to ensure that key information is not missed. The key competence here is to have an attention to detail when necessary and to be able to identify when this is required.

Problem solving

Too often business analysts complain that a solution is decided upon without there being a full appreciation of the problem to be addressed. This focus on understanding the problem before rushing towards a solution is a key tenet of business analysis, – this is where significant value can be delivered. It could be said that a business analyst is at heart someone who likes to solve business problems. There are many techniques and frameworks associated with creative problem solving, and Chapter 4 provides an overview of one such approach, but problem-solving competence requires more than just an understanding of how to approach a problem. There is a need for a problem-solving mindset, requiring curiosity, tenacity and analytical ability plus an open mind that seeks out and evaluates options. Pragmatism is also key to successful problem solving.

Leadership

Leadership is a skill that is often associated with management. However, the fundamental characteristics of leadership – developing a vision, taking ownership of that vision and ensuring the actions to achieve that vision are implemented – can be applied to all types of work. Thus, leadership is highly applicable to business analysis and in this context may be defined as creating a vision of the approaches and options available to address a business issue, advising stakeholders in order to obtain agreement about the vision and then driving the business and IT change process towards the achievement of that vision.

No two projects are the same. Each project has different objectives, constraints and stakeholders, and hence the required approach, skills and resources will differ. It is important to assess each situation on its own merits, decide what is needed and then design the analysis process. This should be within the broader context of analysing business systems not just IT systems. The business analyst needs to consider all aspects of the organisation or business area within which they work, including people, culture, processes, commercial and technical aspects. Getting the vision and actions right requires holistic thinking and rigorous analysis, and positions the project for success with key business stakeholders.

In recent years, the business analyst as a leader has emerged as a common theme in the business analysis and wider business and IT community. For example, the 'expert BA' award developed by the BA Manager Forum requires candidates to demonstrate significant experience in leading analysis initiatives. The potential of business analysis to innovate and transform has in some organisations propelled the role to senior levels with executive level reporting. Different levels of leadership – self, project, organisation and wider world – have been recognised with regard to the business analyst role (Pullan and Archer 2013).

Self-belief

This last quality is one that is often overlooked but is extremely important. It means having sufficient self-confidence – in yourself, in the quality of your analysis, in the relevance of your approach – to be able to withstand pressure, challenge proposals, analyse impacts and sustain your arguments. Self-belief is a key competence for working effectively with stakeholders across the broad range of situations likely to be encountered by business analysts. One lens that may be used to think about self-belief is the concept of 'locus of control'. This is the degree to which individuals themselves believe they control events and affect them. A strong internal locus of control means the individual believes they can influence the events that happen. This may be compared with a strong external locus of control, in which events happen which the individual feels they cannot control. A business analyst with an external locus could have difficulty in gaining credibility with stakeholders and convincing them of the value they can deliver.

Professional development

A continuous improvement mindset is also critical for the business analyst. This should apply to personal development as well as enabling colleagues and the organisation to develop. This will assist the organisation to focus on ongoing learning, enabling it to adapt to new challenges in today's fast moving business and IT environment. This competence may be demonstrated through various activities such as coaching, mentoring, training delivery, contribution to professional forums and applying for business analysis awards.

BUSINESS KNOWLEDGE

This section considers the range of business knowledge and understanding which is essential as a background and foundation for the business analyst's work.

Business finance

The universal language of business is finance. Whether the business analyst is working in the commercial, government or non-profit sectors of the economy, finance plays a key role in deciding what funds are available and what can and cannot be done. As a result, the business analyst needs to have a good working knowledge of the basics of business finance. This includes a general understanding of aspects such as the balance sheet and income statement (profit and loss account), financial analysis tools like ratio analysis, budgeting and cash flow, the nature of profit or surplus, and the principles of costing products and services. Without this understanding, it is not possible for an analyst to evaluate suppliers, deliver well thought through process improvements or evaluate options in business cases.

Business case development

Much of the business analyst's work will be to assess the costs and benefits of delivering a project to the organisation. So, when communicating analysis findings, it is important to ensure that you have a view on the financial impact that the project will have. In its own right, IT is only an enabling tool for business benefits to be achieved and a business analysis project may involve other specialists, such as management accountants, to model the business activities and determine how IT can deliver financial benefit. To develop the business case, a basic understanding of finance, as described above, is required. Business analysts involved in business case preparation will need to understand investment appraisal techniques such as break-even analysis and discounted cash flow; these techniques are explained in Chapter 9. Over recent years many business analysts have developed a greater understanding of the benefits and costs of technical solutions. This is a positive development as it enables analysts to disregard costly options quickly, and ensure that they deliver value from their analysis work.

Domain knowledge

Domain knowledge involves a good general understanding of the business domain, or sector, in which your organisation operates. Apart from the general domain, there is more specific domain knowledge, for instance, supermarkets within the retail domain and social care within local government. The reasons why this knowledge is required are threefold:

- It enables you to communicate with the business people involved in the project, using language with which they are familiar – the personal qualities of communication and relationship building also help here.
- It will help you to understand what would, and would not, be acceptable or useful to this business domain; issues of profit, for instance, are unlikely to be of interest when working in a social security department.
- It may enable you to use ideas and experiences – particularly those relating to best practice from an organisation, typically but not necessarily within the same business domain, and apply them elsewhere.

Subject matter expertise

Subject matter expertise is more specific, taking the domain knowledge to a lower level of detail. If working on a particular area such as a specific product line or service, a good understanding of the terminology, processes and constraints is important to establish credibility with the customer. Business analysts may be specialists in particular business domains and have a strong understanding of the subject area. This will enable them to communicate more easily with the business staff and identify potential areas for change or further analysis.

Principles of information technology

Many business analysts do not come from an IT background and say – rightly – that their job is not to be expert in IT-related issues; that, after all, is why there are technical architects, developers and testers. However, the original conception of business analysis was as a ‘bridging’ role, enabling the communication between the business and IT staff. Given that the majority of business analysis projects result in the use of software applications, a general understanding of IT and software development approaches is necessary so that business analysts can communicate meaningfully with the IT professionals and appreciate their role and contribution to the systems development process. The increasing use of Agile approaches has placed a greater responsibility on business analysts to understand IT and related issues.

The extent to which you will need technical knowledge will depend on the nature of the analysis work being undertaken. Whilst strong technical knowledge is often useful this may be better obtained from those with specialist skills, for example, solution and enterprise architects, developers or external suppliers. The key requirement is that the business analyst can understand the technical terms used by IT specialists and help the business users to appreciate any impacts on the organisation. However, as IT solutions are often investigated by business analysts they should also possess an understanding of IT fundamentals, including areas such as:

- how computers work including operating systems, application software, hardware and networks;
- systems development lifecycles, for example the unified process or the ‘V’ model;
- systems modelling approaches such as the Unified Modeling Language (UML);
- systems development approaches, for example, the Dynamic Systems Development Method (DSDM) and Scrum;
- the relative pros and cons of developing systems instead of buying them off the shelf;

- trends and new opportunities that IT brings such as big data, software as a service, visualisation, mobile technologies, and how these impact systems and business development.

Organisation structures

As well as improving processes and IT, many business analysis projects involve restructuring divisions or teams – to a greater or lesser degree – in order to remove hand-offs, centralise tasks or improve the customer service. For these reasons, it is important for a business analyst to have a good understanding of the various organisation structures that may be encountered – functional, project, matrix and so on – and of their relative strengths and weaknesses.

Supplier management

Many organisations use external suppliers to deliver their IT systems, either on an ad-hoc basis or perhaps through a more comprehensive outsourcing arrangement which may cover whole business processes or even an entire business function. For example, many organisations have outsourced their payroll for several years but some have now extended this to cover much of the human resources work from recruitment to record keeping. The selection and contracting of suppliers tends to fall within the domain of the procurement function. However, for some outsourcing contracts the business analyst may be involved in this work so needs a broad understanding of procurement and supplier management processes. As a minimum, business analysts should be aware of the different contractual arrangements that are available, for example:

- Time and materials – where the contracted party is paid on the basis of the time worked; this is not the elapsed time on the project but the amount of effort employed.
- Fixed price delivery – where the contracted party is paid the price that they agreed for the delivery of the work in line with the original specification.
- Risk and reward – where the contracted party has agreed to bear some or all of the risk of the project, for example, by investing resources such as staff time, materials or office space, but where the potential rewards are greater than under other contractual arrangements.

Business analysts should also understand the supplier management process and should be able to engage with suppliers to ensure that they deliver their services effectively.

Business architecture

Business architecture concerns the knowledge and understanding of how organisations behave with particular emphasis on the systems, processes, management structures, culture and people. Often used in the role of business architects, this ‘big picture’ insight helps set the overall strategic context and vision within which business and IT change projects operate. This is explored further in Chapter 8.

PROFESSIONAL TECHNIQUES

This section considers the range of business analysis techniques that may be applied during assignments.

Project management

The PMI (Project Management Institute) publishes a body of knowledge that lists several areas of project management activity: the project management context and processes; scope management; integration management; time management; cost management; quality management; human resource management; communications management; risk management; procurement management. Similarly, the Association for Project Management (APM) has a body of knowledge that comprises four sections describing the work of a project manager. Where the project team is small, the business analyst may be required to undertake the project manager role and so needs an awareness of project management techniques and approaches, and have project management skills. Larger projects often employ a specialist project manager but even in these cases, there are some project skills that an analyst should have. For example, understanding project initiation is vital as it allows the analyst to understand, or even define, the terms of reference for the project. It is also important that the analyst understands project management planning approaches – as they will have to work within a plan – and is aware of particularly relevant aspects such as dependencies between tasks, quality assurance and risk management.

Strategy analysis

This covers a range of techniques that can be used to understand the business direction and the strengths and weaknesses of an organisation – or part of an organisation. Strategy analysis is explored in more detail in Chapter 3.

Stakeholder analysis and management

Stakeholder management is a key element of business analysis. It involves the ability to identify, analyse and develop management strategies for stakeholders. For example, the business analyst needs to determine the stakeholders in a business analysis project, understand their views and work out how their interests are best managed. Stakeholder analysis and management is the subject of Chapter 6.

Investigation techniques

Clearly, to get to the root of a business issue, the analyst will have to have a range of techniques within their toolkit in order to undertake an effective analysis of the area. Investigation techniques are reviewed in Chapter 5.

Requirements engineering

This is the set of practices and processes that lead to the development of a set of well-formed business requirements, from which the business and IT solutions can be developed. The topic is examined in Chapters 10, 11 and 12.

Business modelling

Business modelling is an approach to visualising business systems through the creation of conceptual models. Whereas a business system model looks at the entire business system in overview, more detailed process models are used to map and analyse how the business processes actually work and to help identify opportunities for process improvement. The business activity modelling technique is described in Chapter 6 and business process models in Chapter 7.

Data modelling

Analysing the data held and used within a business system affords valuable insights into how a business system operates. For example, what are the data items that are held about our customers and what are the relationship between customers, products and suppliers? The Entity Relationship Modelling and Class Modelling techniques are discussed in Chapter 12.

Gap analysis

The ability to conduct gap analysis is core to the business analyst role. There are many situations where gap analysis is required. For example, comparing ‘as is’ and ‘to be’ process models or higher level business activity models with the current situation, evaluating an off-the-shelf package against the defined requirements, and evaluating capability needs against those currently available. This topic is described further in Chapter 8.

Facilitation skills

The interpersonal skills required for effective facilitation – usually exhibited within the context of a workshop – are those described above. However, there are other qualities that provide the basis for effective facilitation including an awareness of the facilitation process, in particular workshop preparation, plus the ability to apply a range of relevant techniques. The techniques include such approaches as dialogue mapping, day in the life of (DILO), open space technology, brainstorming, mind-mapping, the various uses of 'Post-It' notes, Edward de Bono's (2009) *Six Thinking Hats* and so on. An introduction to the key techniques is provided in Chapter 5. In addition, the 'Further Reading' section at the end of this chapter identifies some useful publications to consult. Effective facilitation usually results from a combination of good preparation, an effective facilitator, clear understanding of the objectives, 'buy in' from senior stakeholders and the use of helpful techniques given the task, the participants and the organisation context of the situation.

A recent trend is the emergence of visualisation techniques to engage the business audience ranging from strategy level definition through to screen design. In some cases specialist visual authors are used to capture the discussions and create a story. Visual approaches are quick to understand, quicker to explain. Automated tools are available to model different scenarios to avoid redrawing. While the written Business Requirements Documents are still prevalent, a combination of visual and written requirement are becoming more common.

Portfolio management

Portfolio management concerns the development of a management delivery framework through evaluation, prioritisation and delivery of a portfolio of projects required to deliver business strategies. Analysis skills come to the fore here in assessing how portfolios of work fit together, and where the priorities lie, to deliver benefits to the organisation.

Benefits management

Benefits management is concerned with the active planning, monitoring and evaluation of benefits predicted in a business case for a business change initiative. Ultimately, business analysis has the objective of delivering business value which involves ensuring investment is spent wisely, products that deliver value to the organisation are delivered and predicted returns on investment are realised. Benefits management provides structure and insight to projects and programmes, ensuring that the delivery of benefits is planned and monitored so that the value to the organisation is delivered.

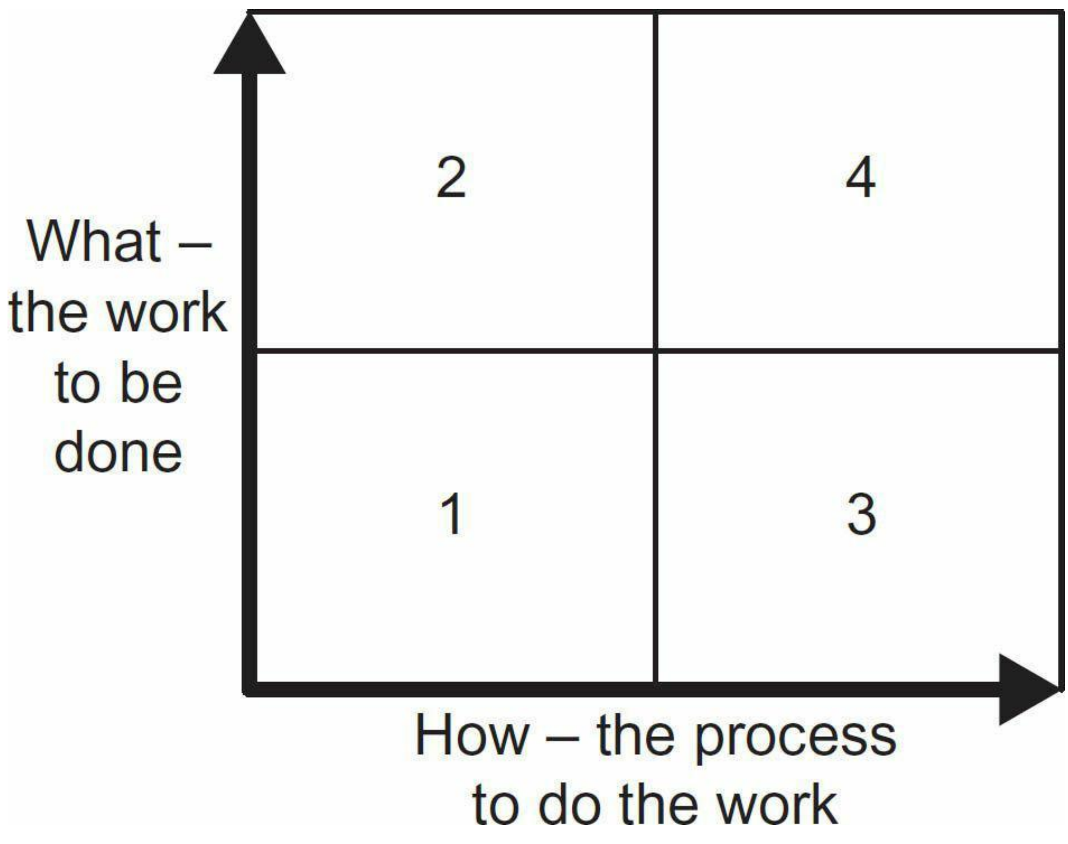
Agile thinking

The development of Agile software development approaches has highlighted the need for business analysts to develop competency in supporting projects where Agile has been adopted. However, there is an additional skill required of business analysts; the ability to enable business agility in order to support the effective use of resources and the delivery of value by their organisations. In essence, business analysts have the potential to provide an agile response to identified problems and opportunities through their focus on understanding what is to be addressed and the evaluation of options. To do this requires a mindset that is focused on addressing issues not following methods, and on selecting the right approach for the situation.

THE RIGHT SKILLS FOR THE RIGHT SITUATION

A key task for the management of business analysts is to ensure that there is a good fit between the skills needed for the analysis to be carried out. Putting a junior analyst in a situation where higher level skills are required can be demotivating and the reverse is also true where an analyst is over-skilled for the work. Figure 2.2 offers a simple model for thinking about the situation and the competencies and skills levels required.

Figure 2.2 Skills analysis matrix



In quadrant 1, the analysis work to be done is well understood as is the process for doing it. So this would be the starting point for a new or inexperienced analyst. For example, defining the requirements for a system where the scope has already been agreed. This may equate to level 3 or 4 in the SFIA framework (see section on Industry skills frameworks).

In quadrant 2, the analysis that needs to be done is not clearly understood although there is a standard approach setting out how it should be done;this would be allocated to a more experienced analyst. For example, a new collaborative/social media technology might be introduced into the organisation which has a pre-defined way of being deployed. However, the organisation is not sure which are the high value areas in which it should be deployed and have engaged a business analyst to conduct a feasibility study. This may equate to level 4 or 5 in the SFIA framework (see section on Industry skills frameworks).

In quadrant 3, the analysis that needs to be done is understood although it is not clear how it is to be done. As with quadrant 2, this would be work for a more experienced analyst. For example, the organisation may want to move from a variety of packaged systems solutions to a single ERP system, however, the way to achieve this may not be clear if the organisation has never attempted this before. This may equate to level 4 or 5 in the SFIA framework.

In quadrant 4, neither the analysis to be done nor how it is to be done are understood. This type of work is for the highly experienced and skilled business analyst and may require the analyst to adopt a consultancy role. In this example, the brief can be as vague as ‘we need to reduce costs’, ‘we need to improve sales’, ‘we need to innovate more’ etc. As a result, the analyst may need to define how the work is to be performed, manage senior stakeholders through the process and facilitate the organisation to think about what it is trying to achieve. This would equate to level 6 in the SFIA framework.

HOW CAN I DEVELOP MY SKILLS?

Earlier sections of this chapter have identified a wide range of skills that a business analyst will eventually want to master and the list may appear to be rather daunting. The first step in developing as a business analyst is to understand the skills required of a business analyst in your organisation. This should include an assessment of both the current and future skills required. Your HR department or line management may be able to provide an outline definition of the requirements for the business analyst role; there may be an internal career development framework available that sets out the skill requirements for different roles and grades. Alternatively, an existing framework such as The Skills Framework for the Information Age (SFIA) can be very helpful. This framework is described more fully in the next section.

Essentially, there are four ways in which business analysts can develop their competencies:

Training

This is particularly useful in developing professional techniques, business knowledge and, to some extent, personal skills. Classroom-based training can be an efficient approach to acquiring skills and knowledge and enables learners to practise their application in a relatively safe environment, with a tutor on hand to offer support, guidance and encouragement. It also allows participants to share knowledge and experience which helps to enrich the learning experience. Some training courses lead to industry qualifications, such as those offered by BCS, The Chartered Institute for IT. Industry qualifications are discussed later in this chapter. A recent development in the UK is the 'Expert BA Award', an award that recognises the business analysts operating at senior levels within their organisations and is assessed against many of the skills identified within this chapter.

Self-study

Self-study is an excellent way for analysts to develop their business and professional knowledge. There is a wide variety of reference books available, including many on topics relevant to business analysis such as process modelling and requirements analysis. Publications that help develop business knowledge include the *Financial Times*, the *Economist* and the *Harvard Business Review*. Such self-study will help broaden and deepen the analyst's understanding of the business world. The internet also provides a wealth of resources including specialist websites, articles and blogs.

Workplace experience

This provides an opportunity to use and improve techniques and to deepen business knowledge and it is also the best arena for a business analyst to develop their personal skills. The performance of most analysts improves over time as their experience grows but this can be heightened and accelerated if working within an organisation that operates a formalised skills development programme using coaching or mentoring. If this is not available, it is useful to identify more experienced business analysts, possibly from other organisations, whose work you respect and who might be able to spare some time to support you.

Industry engagement

The business analysis profession has expanded rapidly in recent years resulting in the development of professional bodies that offer services to support business analysts. BCS has offered certifications in business analysis since 1999 and published the first book (Business Analysis, 1st edition) on the subject. The International Institute for Business Analysis (IIBA®)is a professional body providing certifications and networking opportunities. Representatives from BCS, IIBA and AssistKD organised the first conference dedicated to business analysis. Both BCS and IIBA run frequent events where business analysts can engage with their peers and each organisation runs an annual industry award to celebrate the work of business analysts, further raising the profile of the individual, organisation and profession. Attending events and conferences, obtaining certifications and promoting the business analysis profession through presentations and articles, are excellent ways to develop skills and acquire knowledge.

INDUSTRY SKILLS FRAMEWORKS

SFIA is the major framework setting out the definition of skills, and levels of competence, for the information systems industry. The framework includes six categories of skill including strategy and architecture, business change, and solution development and implementation. Each category contains definitions of relevant skills with between one and seven competency levels for each skill; these definitions can be used to build descriptions of the skills required by a job role such as business analysis, at the required number of levels. The levels are numbered 1 to 7: level 1 is Follow, 2 is Assist, 3 is Apply, 4 is Enable, 5 is Ensure, Advise, 6 is Initiate, Influence, 7 is Set Strategy.

Skills Framework for the Information Age (SFIA)

SFIA is owned and maintained by The SFIA Foundation, a not-for-profit organisation whose members are:

- BCS, The Chartered Institute for IT (BCS);
- e-skills UK – the Sector Skills Council for Business and Information Technology;
- Institution of Engineering and Technology (IET);
- Institute for the Management of Information Systems (IMIS);
- the IT Service Management Forum (itSMF).

SFIA is used worldwide in all sectors of industry and government as the preferred framework for defining the skills required of IT professionals. The licence to use the framework is free of charge, though the Foundation requires a royalty from those using it to support a commercial offering such as consultancy services. The SFIA Foundation accredits consultants and partners, and provides training in the use of the framework.

The Business Analysis skill

The Business Analysis skill in SFIA is part of the 'Business Change' skill category of the SFIA framework. The SFIA description of the Business Analysis skill is:

> The methodical investigation, analysis, review and documentation of all or part of a business in terms of business functions and processes, the information used and the data on which the information is based. The definition of requirements for improving any aspect of the processes and systems and the quantification of potential business benefits. The creation of viable specifications and acceptance criteria in preparation for the construction of information and communication systems.

Business analysis skill levels are defined at levels 3, 4, 5 and 6. SFIA provides a more detailed definition of the skill requirements for each competency level of a given skill. For example, Business Analysis level 5 is described as follows:

- takes responsibility for investigative work to determine business requirements and specify effective business processes, through improvements in information systems, information management, practices, procedures and organisation change;
- applies and monitors the use of required modelling and analysis tools, methods and standards, giving special consideration to business perspectives;
- conducts investigations at a high level for strategy studies, business requirements specifications and feasibility studies;
- prepares business cases which define potential benefits, options for achieving these benefits through development of new or changed processes, and associated business risks;
- identifies stakeholders and their business needs.

Other skills in the SFIA framework that are likely to be used to describe the skill requirements for business analysts include:

- business process improvement;

- stakeholder relationship management;
- requirements definition and management.

INDUSTRY QUALIFICATIONS

There are two examination bodies offering professional qualifications in Business Analysis in the UK. These are BCS and IIBA.

BCS, The Chartered Institute for IT

BCS offers a range of certifications for business analysts covering the subjects of business analysis, change management and consultancy. There are three levels of certification and those particularly relevant to business analysts are described below:

Foundation Certificate in:

- Business Analysis (described below);
- Business Change;
- Commercial Awareness.

Practitioner Certificate in:

- Business Analysis Practice;
- Requirements Engineering;
- Benefits Management and Business Acceptance;
- Modelling Business Processes;
- Systems Modelling Techniques.

Higher qualification:

- Diploma in Business Analysis (described
- below); Diploma in Consultancy.

BCS Foundation in Business Analysis

The Foundation in Business Analysis covers the broad range of BA principles and techniques and is based upon a subset of topics contained within this book.

BCS International Diploma in Business Analysis

Candidates will be awarded the Diploma once they have passed written examinations in four subjects, two of which are compulsory and two selected specialist modules, and have passed an oral examination covering the Business Analysis Diploma syllabus.

IIBA CBAP/CCBA

The International Institute of Business Analysis (IIBA*) has created the Certified Business Analysis Professional™ (CBAP®), a designation awarded to candidates who have successfully demonstrated sufficient experience in business analysis and have passed the IIBA® CBAP® multiple-choice examination. The CBAP® may be used towards the BCS International Diploma in Business Analysis as an exemption towards two of the modules. IIBA also offer the CCBA® certification which requires candidates to pass a similar examination but demonstrate a lower level of experience.

SUMMARY

Competence development is the most important aspect of career development for any professional. This chapter has sought to categorise and describe the most common skills required of a successful business analyst. Every organisation will have a different interpretation of what a business analyst does and the levels of business analysis work. If you wish to develop and improve your performance it is important to understand the range of required skills, identify your competence in each skill area and then take the relevant learning opportunities.

Historically, business analyst jobs and qualifications have focused on the construction of systems that ‘meet business requirements’. This has meant that the focus is on collecting requirements in an organised and logical fashion that are then used to select or build systems which meet those needs. The need for people who can do this is now a lot wider and there is much more emphasis on the importance of this task, often as a result of the sourcing options available to organisations. Where external suppliers are used, defining IT requirements is even more important, particularly where they are located in another country – offshore sourcing as this is known. Critically, the stakes are being raised higher for IT projects; IT departments that cannot show or communicate how they add value are becoming an endangered species as more and more IT-aware people enter business organisations. Business analysts can only survive and evolve if they offer a broad set of skills that demonstrate how they can identify, analyse and develop options for adding value to their organisation.

It is in the area of personal skills that perhaps the biggest challenges lie for business analysts. Anyone working in business change is only too aware of the apprehension, and even resentment, that change projects engender. So, business analysts face a major challenge; they need to use all of their personal skills to invalidate the stereotypes and overcome opposition, and work with their business colleagues to deliver the business improvements their organisations demand.

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USEFUL WEBSITES

www.baleadership.com

www.bamanagerforum.org

www.batimes.com

www.bcs.org

www.iaf-world.org

www.iiba.org

www.sfia-online.org

APPENDIX 2A

SFIA and SFIAplus description of Business Analysis skill Levels 3/4/5/6

Level 3

Investigates operational needs and problems, and opportunities, contributing to the recommendation of improvements in automated and non-automated components of new or changed processes and organisation. Assists in defining acceptance tests for these recommendations.

Level 4

Investigates operational requirements, problems, and opportunities, seeking effective business solutions through improvements in automated and non-automated components of new or changed processes. Assists in the analysis of stakeholder objectives, and the underlying issues arising from investigations into business requirements and problems, and identifies options for consideration. Identifies potential benefits, and available options for consideration. Works with clients/users in defining acceptance tests.

Level 5

Takes responsibility for investigative work to determine business requirements and specify effective business processes, through improvements in information systems, information management, practices, procedures, and organisation change. Applies and monitors the use of required modelling and analysis tools, methods and standards, giving special consideration to business perspectives. Conducts investigations at a high level for strategy studies, business requirements specifications and feasibility studies. Prepares business cases which define potential benefits, options for achieving these benefits through development of new or changed processes, and associated business risks. Identifies stakeholders and their business needs.

Level 6

Takes full responsibility for business analysis within a significant segment of an organisation where the advice given and decisions made will have a measurable impact on the profitability or effectiveness of the organisation. Establishes the contribution that technology can make to business objectives, defining strategies, validating and justifying business needs, conducting feasibility studies, producing high-level and detailed business models, preparing business cases, overseeing development and implementation of solutions, taking into account the implications of change on the organisation and all stakeholders. Guides senior management towards accepting change brought about through process and organisational change.

APPENDIX 2B

The list of skills related to the Business Analysis skill provided by SFIAplus:

- benefits management;
- business modelling;
- business process improvement;
- change implementation, planning and
- management; data analysis;
- organisation design and implementation;
- requirements definition and management;
- stakeholder relationship management;
- system design;
- usability requirements analysis.

3 STRATEGY ANALYSIS

Donald Yeates

INTRODUCTION

This chapter is about four aspects of strategy analysis:

- understanding what strategy is and why it is important, the assumption being that strategy is important;
- exploring some ideas about how strategy is developed;
- implementing strategy;
- working out what all of this means for business analysts.

There is no intention to try to turn you into strategic planners but instead to enable you to understand the process of strategy development, be comfortable with the tools that managers use and be able to use them yourself as you explore how new or different information systems could push forward the activities of the organisation that employs you.

THE CONTEXT FOR STRATEGY

Why do organisations bother about strategy? What advantage do they hope to gain? Let us look at what is happening in the world. Most of us would probably support the idea that business is becoming increasingly unpredictable and changes are more turbulent, with international mergers and acquisitions once again becoming regular features of business life as economies come out of the post-banking crisis recession. The information revolution and the digital economy have caused much of this dramatic change and barriers between previously separate businesses are falling like dominoes. For example, who will be the big financial players in the future? It could be the global banks, retail outlets like Tesco or Walmart, strong brands like Amazon or Virgin. If you are working in the finance sector how do you know where to move next? What are the longer term implications of government shareholdings?

There are some big changes that organisations face and that strategy development tries to moderate:

- There are the changes to the ways that we are employed. There is much more use of part-time and contract employees who may have little long-term loyalty to their employer and who have their own individual career and work/life balance plans. The growth of knowledge-based industries and the continuous change experienced by organisations means that individual employees, consultants or contractors – permanent, full-time or part-time – have become valuable assets. This is more than ever the case as organisations everywhere, in both Government and commercial sectors, flatten their organisation structures, decentralise decision-making and give more freedom to individuals to make decisions, deal with customers and resolve problems. There are no longer jobs for life and attitudes to work have changed. We all now want great job satisfaction, higher rewards, more personal recognition and flexible working environments.
- Society has changed. There is greater freedom of expression and of thought. Freedom of information legislation means that individuals have access to evidence and decisions taken by government that were previously hidden. There is less respect for authority and office unless it has been earned. Our attitudes to change, direction, reorganisation and other people knowing better than we do have shifted and the development and implementation of new strategies need to take this into account.
- Organisations are responding to these changes by doing everything they can to increase their flexibility and responsiveness. This means that they seek to reduce employment costs and without trade unions to apply a brake we see central government and European institutions taking this role.
- The world is full of contradictions. Some of these are:
  - Global versus local. Globalisation creates the largest markets ever known and until we have intergalactic businesses this will remain the case! But it also means that the players in a global market can be small. Having a global reach does not mean being the biggest. The scarcity of the product, its brand reputation and its distribution channels make the difference. All the paparazzi know this; one paparazzo, with access to a camera, the right moment and the internet, sells his product across the world in less than a day.
  - Centralised versus decentralised organisation structures. Finance may be a central process but prices and discounts are set locally.
  - Hard and soft management. Developing strategy is seen as a 'hard'

discipline like finance and technology but the creativity and change skills that make strategy work are the ‘soft’ skills.

Finally there are two questions. How can anyone create, formulate or build a strategy if the future is inherently unknowable and unpredictable, and how can it be implemented in a coherent way in decentralised structures with delegated authorities and an ever-changing environment? This makes it appear very difficult for a business analyst to understand the nature and permanence – or impermanence – of the business strategies against which IS strategies are to be built. However, as we shall see, through an examination of the nature of strategy and the use of some well-tried tools, effective steps can be taken to deal with this difficulty.

WHAT IS STRATEGY?

The concept of strategy begins in a military context and the word strategy is derived from the Greek word ‘strategia’ which means ‘generalship’. It has a ‘getting ready for battle’ sense to it and the deployment of troops, weapons, aircraft and ships before engagement with the enemy begins. Once the enemy is engaged then battlefield tactics determine the success of the strategy. The transfer of these ideas into business is easy to make, therefore, and we expect to deal with:

- The goal or mission of the business. In strategy terms this is often referred to as the direction.
- The time frame. Strategy is about the long term. The problem here is that it differs widely across industries, with petrochemicals and pharmaceuticals at the really long end and domestic financial services products at the short end.
- The organisation of resources such as finance, skills, assets and technical competence so that the organisation can compete.
- The environment within which the organisation will operate and its markets.

A popular definition appears in Johnson, Scholes and Whittington (2008):

> Strategy is the direction and scope of an organisation over the long term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations.

However, writers and gurus have offered their own definitions for at least the last 40 years including George Steiner (1979) who did not so much define it as paint a picture of it by saying that strategy is:

- what top management does;
- about direction;
- the process that sets in motion the important actions necessary to achieve these directions;
- what the organisation should be doing.

But finally, Johnson, Scholes and Whittington (2008) provide a helpful definition of the issues to be considered during strategy analysis. These are:

- the long-term direction of an organisation; the
- scope of an organisation's activities; advantage
- for the organisation over competition; strategic
- fit with the business environment; the
- organisation's resources and competences; the
- values and expectations of powerful actors.

Strategies exist at different levels in an organisation ranging from corporate strategies at the top level affecting the complete organisation down to the operational strategies for product/services offerings. Typical levels of strategy could be:

- Corporate Strategy that is concerned with the overall purpose and scope of the business. Strategies at this level are influenced by investors, governments and global competition, and by the context set out earlier in this chapter. It is the basis of all other strategies and strategic decisions.
- Business Unit Strategy. Below the corporate level are the strategic business units (SBUs). These are organisational units for which there are distinct external markets that are different from those of other SBUs. SBU strategies address choice of products, pricing, customer satisfaction, and competitive advantage.
- Operational Strategy focuses on the delivery of the corporate and SBU strategies through the effective organisation and development of resources, processes and people.

STRATEGY DEVELOPMENT

This section begins with some fundamental questions: How do I start to develop a strategy? Where does strategy development come from? How do I know what kinds of strategy to develop? There are many different drivers for strategy development and strategy may be formulated in different ways. For example:

- Strategy associated with an individual, often the founder of a business. Examples of founders who set strategy include Mark Zuckerberg and Richard Branson. Where a business is already established but needs a new direction, a new CEO may brought in to change the strategy in order to move the organisation forward.
- Alternatively, strategy may develop from the experiences and views of internal managers. Groups of managers may meet regularly to review trends in the market and their own business progress; they plan new actions and try them out. Strategy then evolves in an incremental, negotiated way.
- Another possibility is to enable the generation of innovative ideas from within the organisation so that the strategy emerges from the people who do the work.
- It is also possible to formulate strategy by adopting a formal, carefully planned, design process. Some organisations find this to be essential, especially those for which strategy is truly long term.

So far the development of strategy has been considered as a rational, logical and organised process. It often is developed like this, and in this chapter we will consider many of the tools that are used to inform the strategy process. However, another force that may drive strategy formulation is the politics within the organisation. We can view an organisation as a political system that manipulates the formation of strategy through the exercise of power. Different interest groups form around different strategic ideas or issues and compete for resources and the support of stakeholders to achieve the dominance of their ideas. On this basis, strategic direction is not achieved through a universally accepted, rational analysis but through the promotion of specific ideas of the most powerful – and usually highly political – groups. This power comes from five main sources:

- Dependency – departments are dependent on those departments that have control over the organisation's resources. The power of the human resources (HR) department increases if all new staff requisitions have to be authorised by HR.
- Financial resources – where are the funds to invest in the development of new ideas, product or services? Who has these funds? What financial

frameworks constrain or give freedom to different groups?

- Position – where do the actors live in the organisation structure and how does their work affect the organisation's performance?
- Uniqueness – no other part of the organisation can do what the powerful group does.
- Uncertainty – power resides with people and groups can cope with the unpredictable effects of the environment and protect others from its impact.

Whichever approach is adopted and whatever the internal politics, the development of strategy always needs to incorporate some external analysis, for instance 'what is happening out there?', some internal analysis, such as 'where do we fit in to what's happening out there?', plus some consideration of how new strategies could be executed.

Once a strategy has been developed, it is important to provide a written statement of the strategy. This written statement is needed for many reasons:

- it provides a focus for the organisation and enables all parts of it to understand the reasons behind top-level decisions and how each part can contribute to its achievement;
- it provides a framework for a practical allocation of investment and other resources;
- it provides a guide to innovation, where new products, services or systems are needed;
- it enables appropriate performance measures to be put in place that measure the key indicators of our success in achieving the strategy;
- it tells the outside world, especially our outside stakeholders and market analysts, about us and develops the expectations that they hold.

EXTERNAL ENVIRONMENT ANALYSIS

Most organisations face a complex and changing external environment of increasing unpredictability. Let us take as an example a retail electrical and electronics store which faces some or all of the following external changes:

- The state of the national and local economies. Product demand is influenced by local employment and incomes and the cost of credit.
- Product cost. Price competition is high and there is a continuing shift to

move manufacturing to lower cost economies with the possible impact on supply and after sales support.

- Changes in consumer lifestyles and tastes. The high cost of housing leads to a greater incidence of smaller houses and a growth in the supply of flats calling for smaller furniture and kitchen equipment. Streaming films replaces DVD or Bluray and streaming music replaces digital downloads.
- Changes in technology. There is a greater demand for smaller devices, flatter screens and multi-purpose devices.
- New marketing approaches with consumers buying over the internet or from catalogue retailers.

With a little thought it would have been possible to identify these kinds of environmental trends but many of the more dramatic changes have come from surprising places. For example, the Sarbanes-Oxley Act of 2002 (SOX) was introduced in response to a number of major corporate and accounting scandals, most notably at Enron and Tyco International. Although it was clear that something had to be done, critics have claimed that SOX places US firms at a disadvantage compared to overseas competitors and imposes high additional costs on business. More dramatic and unexpected are the activities of environmental or animal rights campaigners or a sudden change in technology that changes generally accepted business models.

There is a framework to help organisations assess their broad environment. It is the **PESTLE** analysis – sometimes called a PESTEL or just PEST analysis – but whatever the acronym it is an examination of the political, economic, socio-cultural, technological, legal and environmental issues in the external business environment. Some of the influences which may be identified in these categories are shown below.

Political influences

- The stability of the government or political situation
- Government policies – such as on social
- welfare Trade regulations and tariffs

Economic influences

- Interest rates
- Money supply
- Inflation
- Unemployment

- Disposable income
- Availability and cost of energy
- The internationalisation of business

Taken together these economic factors determine how easy – or not – it is to be profitable because they affect demand.

Socio-cultural influences
- Demographics – such as an ageing population in Europe
- Social mobility – will people move to find work or stay unemployed where they are and rely on state support? This may also be seen as a political issue with an enlarged Europe enabling a freer movement of labour across the community
- Lifestyle changes – such as changes in the retirement age and general changes in people's views about work/life balance

Technological influences
- Technological developments
- Government spending on research, the quality of academic research, the 'brain drain'
- The focus on technology; demand for invention and innovation
- The pace of technological change, the creation of technology enabled industries

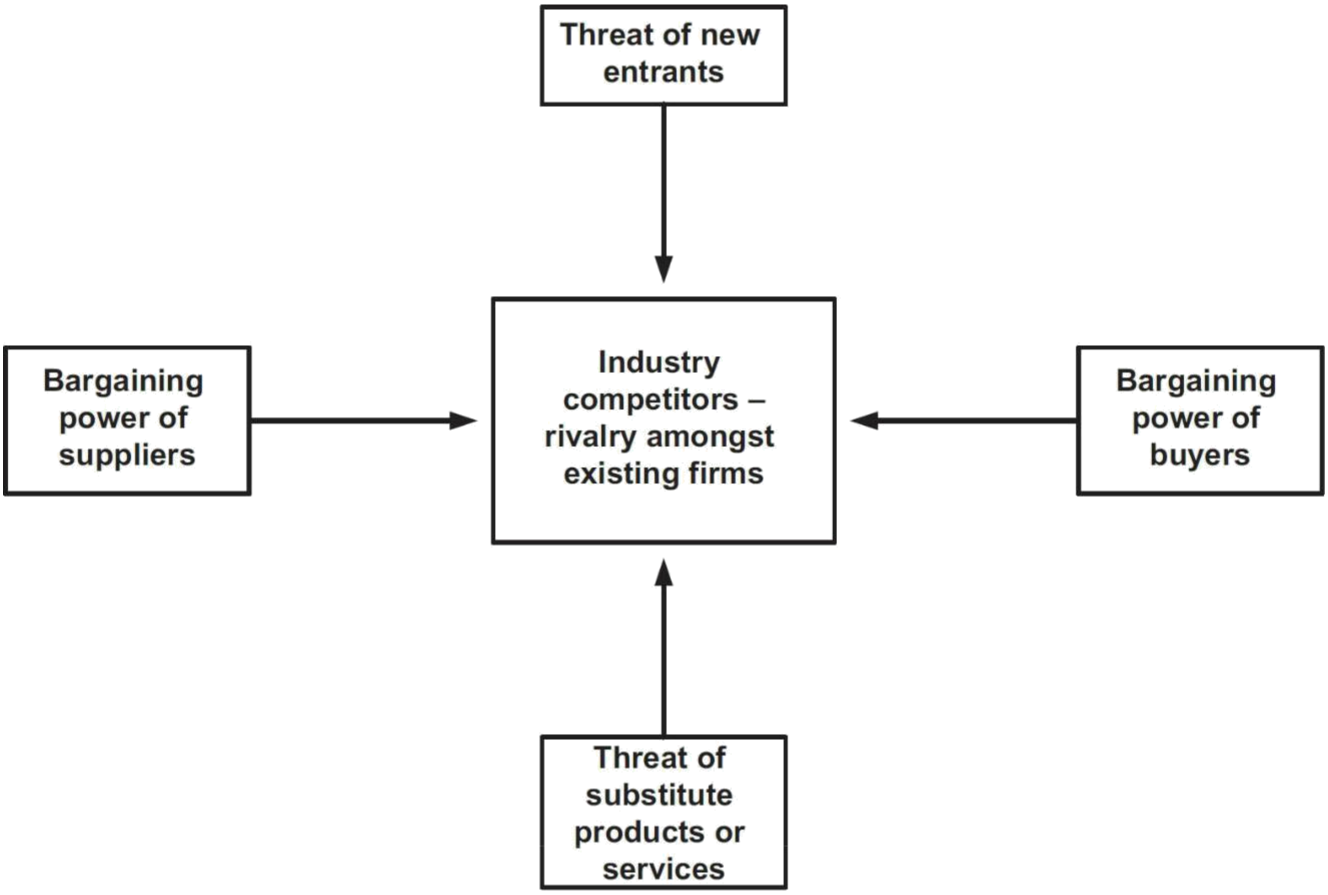
Legal influences
- Legislation about trade practices and competition
- Employment law – employment protection, discrimination etc
- Health and safety legislation
- Company law
- Financial regulation

Environmental influences
- Global warming and climate change
- Animal welfare
- Waste, such as unnecessary packaging
- Environmental protection legislation such as new laws on recycling and waste disposal industries

It is important that we do not view PESTLE analysis as a set of checklists as these are not of themselves useful in making a strategic assessment. The key tasks are to identify those few factors that will really affect the organisation and to develop a real understanding of how they might evolve in the future. In some cases a few issues may be so important that they provide a natural focus. It may also be helpful to get external expert opinion.

Having examined the external environment we should now consider the competition our organisation faces. Few businesses have no competition, even those in the not-for-profit sector, and most seek to develop and keep a competitive advantage over their rivals. They aim to be different or better in ways that appeal to their customers. An analysis tool that helps to evaluate an industry's profitability and hence its attractiveness is Michael Porter's **Five Forces model** (Porter 1980). This is shown in Figure 3.1 below. In the centre is the competitive battleground where rivals compete and where competitive strategies are developed. Organisations need to understand the nature of their competitive environment. Additionally, they will be in a stronger position if they understand the interplay of the five forces and can develop defences against the threats they pose.

Figure 3.1 Porter's Five Forces model



New entrants may want to move into the market if it looks attractive and if the barriers to entry are low. Globalisation and deregulation both give new entrants this opportunity but there are barriers to entry that organisations build. These include:

- **Economies of scale.** This may be difficult to achieve for a new entrant.
- **Substantial investment required.** A new entrant may have difficulty in obtaining sufficient funds for investment.
- **Product differentiation.** If existing products and services are seen to have strong identities, which are supported by high expenditure or branding, then new entrants may be deterred from entry.
- **Access to distribution channels.** Existing distribution channels may be booked by existing suppliers requiring new entrants to find new and different distribution channels.
- **The existence of patented processes.**
- **The need for regulatory approval,** for example, in the financial and defence sectors.

Supplier power limits the opportunity for cost reductions when:

- there is a concentration of suppliers and when supplying businesses are bigger than the many customers they supply;
- the costs of switching from one supplier to another are high. This may be because of clauses in supply contracts, interacting IT systems between the organisation and its suppliers, supply logistics or the inability of other suppliers to delivery;
- the supplier brand is powerful, for example, the power of 'Intel Inside';
- customers are fragmented so do not have a collective influence.

Customer power – or the bargaining power of buyers as Porter called it – is high when:

- there are many small organisations on the supply side. For example, in the supply of food products to supermarkets;
- alternative sources of supply are available and easy to find;
- the cost of the product or service is high encouraging the buyer to search out alternatives;
- switching costs are low.

The threat from substitute products is high when:

- product substitution from new technologies is more convenient;
- the need for the product may be replaced by meeting a different need;
- it is possible to decide to 'do without it'!

All of these forces impact on the competitive battleground in some way. There may also be high competitive rivalry when:

- there are many competing firms;
- buyers can easily switch from one firm to another;
- the market is growing only slowly or not growing at all;
- the industry has high fixed costs and responding to price pressure is difficult;
- products are not well differentiated or are commoditised so there is little brand loyalty;
- the costs of leaving the industry are high.

Porter's framework is simple to use and understand and it helps to identify the key competitive forces affecting a business. It is widely used in the development of strategies. There are, however, some weaknesses of which the most often mentioned is that government is not treated as the sixth force. Porter's response is that the role of government is played through each of the five forces – for example, legislation affects entry and rivalry – and so it has not been ignored. There are also views that it is difficult to apply the model to not-for-profit organisations and that since the 1980s the increasing development of international businesses has led to a more complex set of competitive and collaborative relationships. Nonetheless it is widely accepted as a useful analytical tool.

Having used PESTLE and Porter to analyse the external environment, we will have much useful data about the external conditions the organisation may face. However, even with this information, the world springs surprises on organisations from time to time. There is a high level of uncertainty and some different approaches are needed to understand potential future impacts. Scenarios may be used to do this. They look at the medium- and long-term future and, by evaluating possible different futures, prepare the organisation and its managers to deal with them. They begin by identifying the potential high impact and high uncertainty factors in the environment. It is tempting to choose just two scenarios – good and bad – when doing this, but really four or more are needed and they should be plausible and detailed. Next, the future scenarios these factors could construct are considered, possibly by looking at the possible steps and asking 'what if?' questions. In doing this we are concerned with predetermined events such as predicted demographic changes, key uncertainties – often political and economic, including regulation and world trade – and driving forces such as technology and education. This information comes from the PESTLE analysis.

INTERNAL ENVIRONMENT ANALYSIS

The external environment creates opportunities and threats and can give an 'outside/in' stimulus to the development of strategy. Successful strategies depend on something else as well; it is the capability of the organisation to perform. Can an organisation continue to change its capability so that it constantly fits the environment in which it operates? Can it always be innovative in the way it exploits this capability? Two techniques that help in the analysis of the internal organisation are discussed in this section – the resource audit and portfolio analysis using the Boston Matrix. All of this begins, however, with an understanding of the current business positioning, and for this we will use the consider the **MOST** analysis technique. MOST analysis examines the current mission, objectives, strategy and tactics and considers whether or not these are clearly-defined and supported within the organisation. We can define the MOST terms as follows:

- **Mission** A statement declaring what business the organisation is in and what it is intending to achieve.
- **Objectives** The specific goals against which the organisation's achievements can be measured.
- **Strategy** The medium to long-term approach that is going to be taken by the organisation in order to achieve the objectives and mission.
- **Tactics** The detailed means by which the strategy will be executed.

A clear mission driving the organisation forward, a set of measurable objectives and a coherent strategy will enhance the capability of the organisation and be a source of strength. On the other hand, where there is a lack of direction, unclear objectives and an ill-defined strategy the internal capability is less effective and we have a source of weakness. When considering the MOST analysis as a means of identifying strengths and weaknesses, it is useful to think about the following aspects:

- Is the MOST clearly defined? For example, are the objectives well-formed and SMART (Specific, Measurable, Achievable, Relevant and Time framed)?
- Is there congruence between elements of the SWOT (strengths, weaknesses, opportunities, threats)(see below)? For example, is the strategy aligned with the objectives?
- Has the MOST been communicated to the managers and staff of the organisation?

Reflecting on core competences starts the strategy process from inside the organisation so it is an 'inside/out' approach based on the belief that competitiveness comes from an ability to create new and unexpected products and services from a set of core competences. The **Resource Audit** can help us to identify core competences or may highlight where there is a lack of competence that could undermine any competitive moves. There are five key areas to examine, the first three being sets of tangible resource:

- The first area relates to the **physical** resources that the organisation owns or has access to and includes features such as buildings, plant and equipment, land and so on. These may be modern and cost-effective or old-fashioned, unreliable and incur high maintenance costs.
- Second, there are the **financial** resources that determine the organisation's financial stability, capacity to invest in new resources and ability to weather business fluctuations and changes.

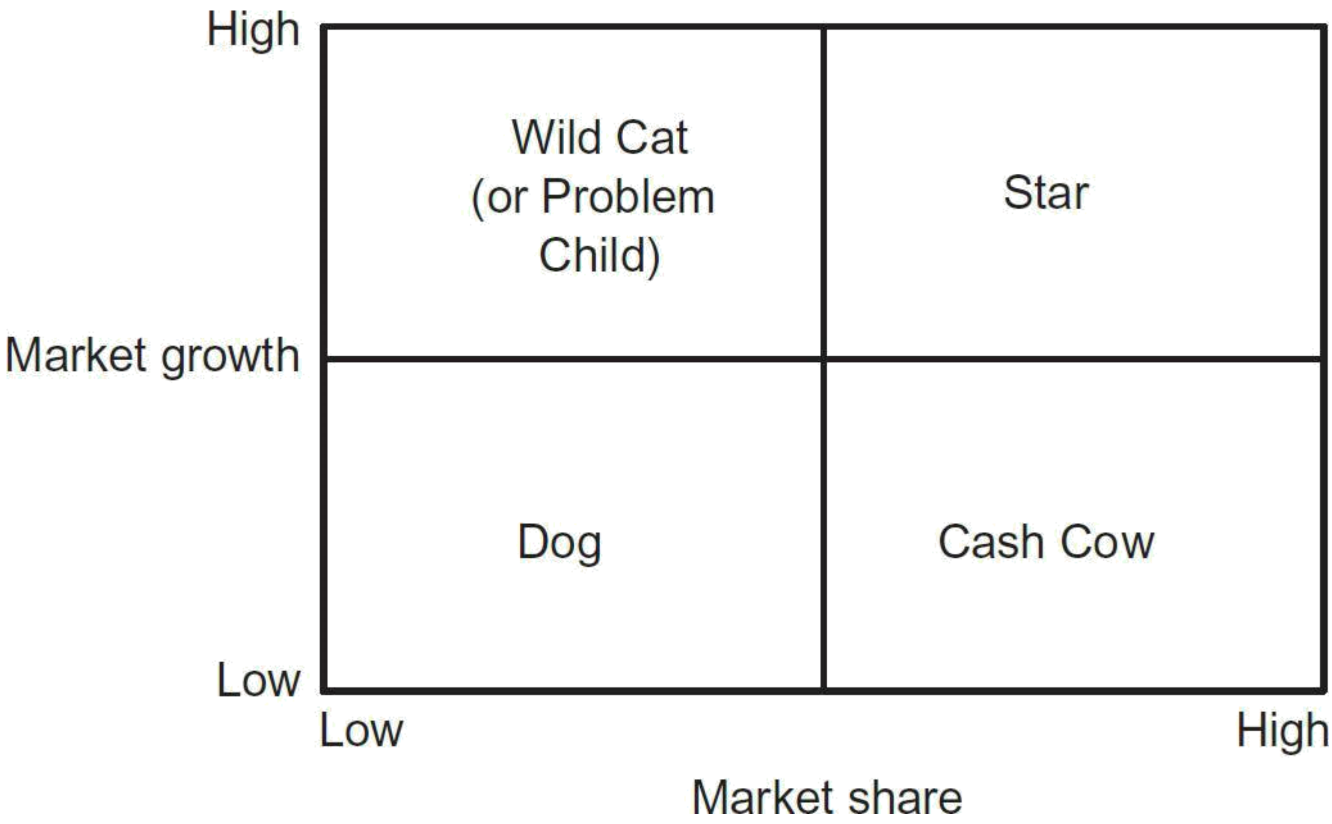
- Then, there are the **human** resources and their expertise, adaptability, commitment, etc.

There are then the intangible resources such as the **know-how** of the organisation which may include actual patents or trademarks, but this may also be derived from the use made of resources such as information and technology; many organisations hold a large amount of information but it is not available when required or not in a format that can be used easily. Another intangible resource is the **reputation** of the organisation, for example the brand recognition and the belief that is held about the quality of the brand, and the goodwill – or antipathy – that this produces. An analysis of the organisation's resources will identify where these provide a source of competence – strengths, or where there is a lack of capability – weaknesses.

The portfolio of business units, each offering their own products and services, may also be a source of strength or weakness for an organisation. Organisations need to review their portfolio on a regular basis in order to take decisions about the resources to be invested into each business unit or even each product or service. Portfolio analysis was developed to address this problem.

The original portfolio matrix – the **Boston Box** – was developed by the Boston Consulting Group and provides a means of conducting portfolio analysis. A company's strategic business units (SBUs) – parts of an organisation for which there is a distinct and separate external market – are identified and the relationship between the SBU's current or future revenue potential is modelled against the current share of the market. The Boston Box uses these two dimensions to enable organisations to categorise their SBUs and their products/services, and thereby consider whether and how much to invest. Put simply as in Figure 3.2, the cows are milked, the dogs are buried, the stars get the gold and the wild cats are carefully examined until they behave themselves or join the dogs and die.

Figure 3.2 The Boston Box



A successful product or SBU starts as a Wild Cat and goes clockwise round the model until it dies or is revitalised as a new product or service or SBU. The Wild Cats (or Problem Children) are unprofitable but are investments for the future; the Stars strengthen their position in a growth industry until they become the big profit earners. The Cash Cows are the mature products or services, in markets with little, if any, growth. The Stars and Cash Cows provide the funding for the other segments of the matrix. The Dogs have low market share in markets with low growth and are often the areas that are removed or allowed to wither away.

SWOT ANALYSIS

The **SWOT** (strengths, weaknesses, opportunities, threats) analysis is often used to pull together the results of an analysis of the external and internal environments. However, too often it is used as the first analytical tool before enough preparatory analysis has been done. When this approach is adopted the results are usually weak, inconclusive and insufficiently robust to be of much use. A more robust approach is to use the techniques described earlier as they help identify the major factors, both internal and external to the organisation, that the business strategy needs to take into account. Hence, the SWOT analysis is where we summarise the key strengths, weaknesses, opportunities and threats in order to carry out an overall audit of the strategic position of a business nd its environment. A SWOT analysis is often represented as a two-by-two matrix as hown in Figure 3.3.

Figure 3.3 Format of a SWOT matrix

Internal	Strengths	Weaknesses
External	Opportunities	Threats
	Positive	Negative

The language of a SWOT is important. It needs to be brief, with strengths and weaknesses related to critical success factors. Strengths and weaknesses should also be measured against the competition. All statements should be specific, realistic and supported by evidence. Some examples – not for the same organisation – could be:

- **Strengths** Strong product branding – market research shows a high awareness of our brands compared with the competition. We secure ‘best space’ in all branches of the top five retailers.
- **Weakness** We have poor cash flow. Against industry benchmarks we are in the bottom quartile. We exceed our overdraft limits on 19 days every quarter.
- **Opportunity** Demographic change in Europe and the US will provide a greater market for our products.
- **Threat** Low market growth will see increased concentration of business through acquisition. The poorest performing businesses will fail.

A key point that emerges from these examples is that strengths and weaknesses are found within the organisation (and hence discovered via the resource audit or the Boston Matrix) whereas opportunities and threats arise from outside the organisation (and hence can be found using PESTLE or the Five Forces model).

It is important to get right the balance between the external and the internal analysis. Completely changing the nature of the organisation because of the external analysis may lead to radical change but without any assurance that capability exists to deliver this successfully. Basing everything on an internal analysis may lead to little or no change, or changes that are internally focused and ignore the desires of the customers. Using both analyses is more balanced and is likely to contribute towards the creation of a more robust strategic direction.

EXECUTING STRATEGY

Executing new strategies implies risk because it involves change. There are three particular aspects of implementing strategy – the context for the strategy, the role of the leader and two tools that we can use – the Balanced Business Scorecard and the McKinsey 7-S Model.

There are five contextual issues to be considered.

- **Time** – how quickly does the new strategy need to be implemented? What pace of change is needed?
- **Scope** – how big is the change? Is the new strategic direction transformational or incremental?
- **Capability** – does the organisation have the required resources for the change? is the organisation adaptable and able to change? Are the experiences of change positive or negative?
- **Readiness** – is the whole organisation, or the part of it to be affected, ready to make the change?
- **Strategic leadership** – is there a strategic leader for the change?

In this context, the strategic leader will have the key role. Typically, the strategic leaders we read about are the top managers but strategic leadership does not have to be delivered from the top; there are many successful strategic changes that have been driven from other parts of the organisation. The leader needs to demonstrate the following key characteristics:

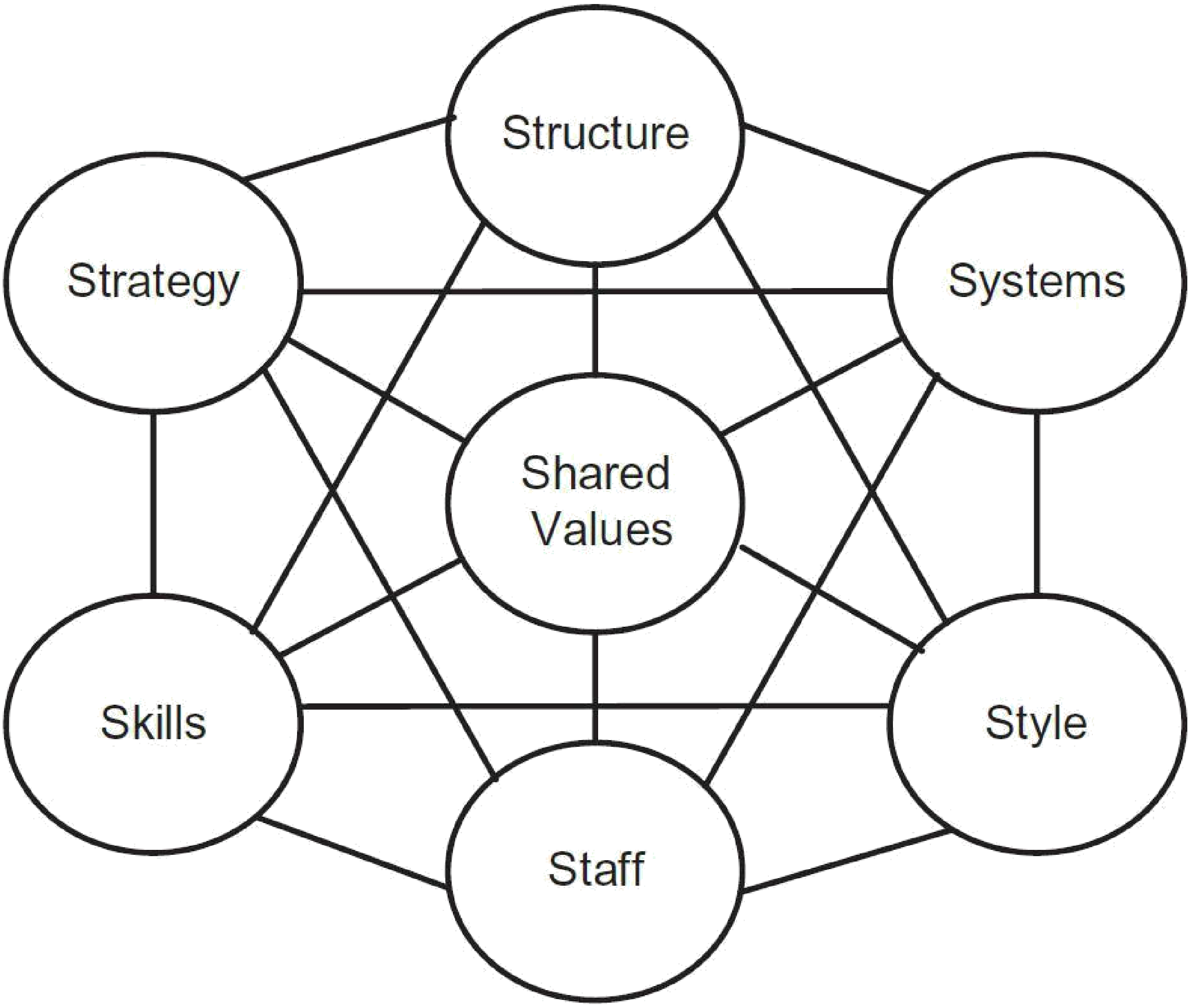
- Challenges the status quo all the time and sets new and demanding targets, never being prepared to tolerate unsatisfactory behaviour or performance.
- Establishes and communicates a clear vision of the direction to be taken, why it has to be taken and how the journey will be made. This means

establishing the new mission, setting out objectives, identifying the strategies for achieving them and defining the specific tactics to deliver them. The leader also clearly communicates the values that underpin the business.

- 'Models the way' or 'Walks the walk'. He or she demonstrates through their behaviour how everyone else should behave and act in order to deliver the strategy.
- Empowers people to deliver their part of the strategic change within the vision, values and mission that have been set out. The leader cannot be everywhere, so others need to play their part.
- Celebrates success with those who achieve it.

Two tools that help in the execution of strategy are the McKinsey 7-S Model shown in Figure 3.4 below and the Balanced Business Scorecard shown in Figure 3.5.

Figure 3.4 McKinsey's 7-S Model



The 7-S model supposes that all organisations are made up of seven components. Three are often described as ‘hard’ components – strategy, structure and systems, and four as ‘soft’ – shared values, style, staff and skills.

These are the seven levers that can be used in the implementation of strategic change and they are all interlinked. All seven need attention if the strategy is to be executed successfully, because if there is a change with one, others will be affected. Changing one element, such as the strategy, means that all of the others have to change as well.

- The structure – the basis for building the organisation will change to reflect new needs for specialisation and coordination resulting from the new strategic direction.
- Formal and informal systems that supported the old system must change.
- The style or culture of the organisation will be affected by a new strategic direction. Values, beliefs and norms, which developed over time, may be

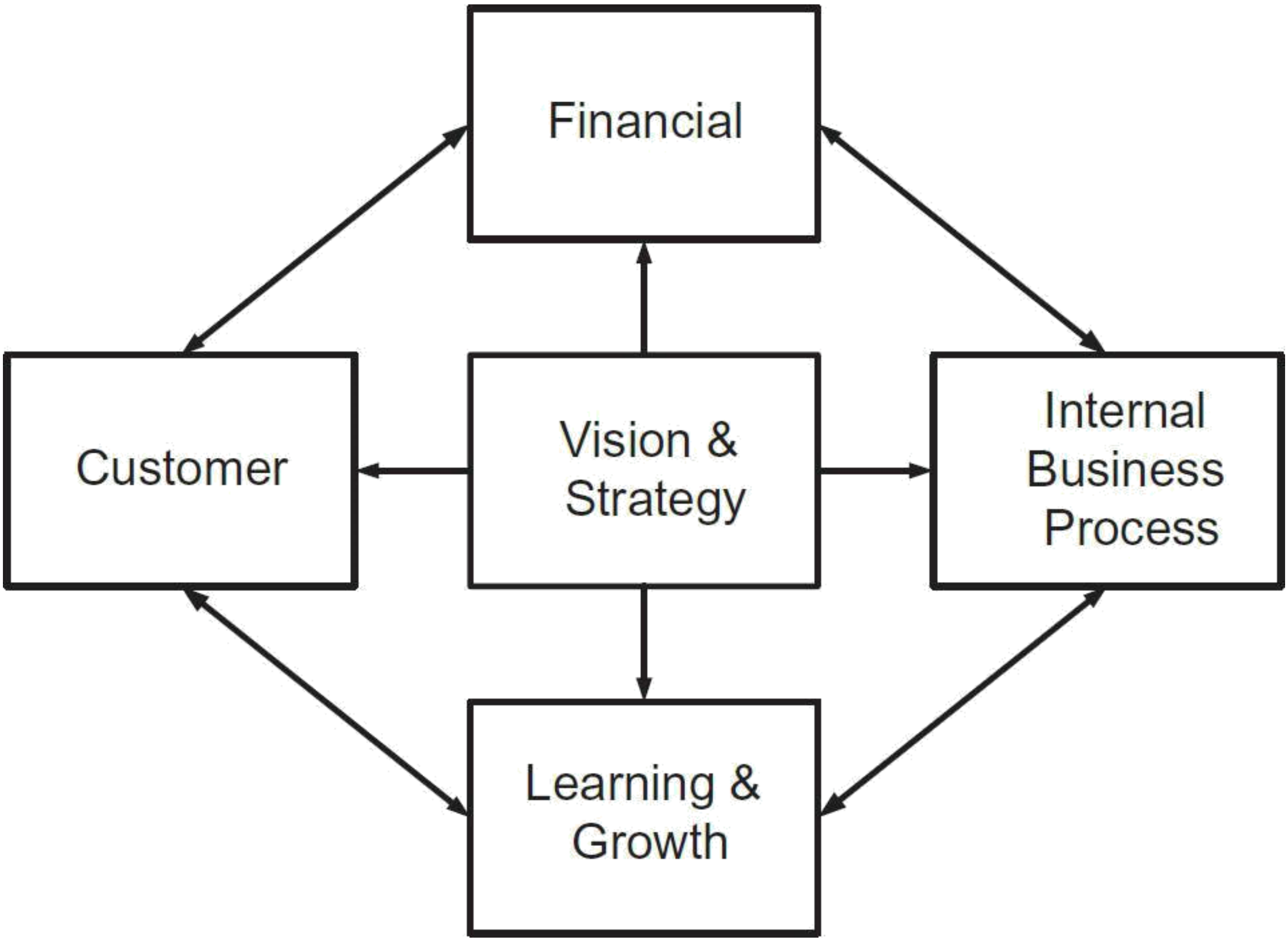
revised or even swept away.

- The way staff are recruited, developed and rewarded may change. New strategies may mean relocating people or making them redundant.
- Skills – competences acquired in the past may be of less use now. The new strategy may call for new skills.
- Shared values are the guiding concepts of the organisation, the fundamental ideas that are the basis of the organisation. Moving from an ‘engineering first’ company to a ‘customer service first’ company would change the shared values.

As important as the individual elements of the 7-S model, are the connections between them. The execution of strategy will be flawed if, for example, there is a disconnect between the style adopted by management and the shared values of the organisation.

The Balanced Business Scorecard (BBS) can be thought of as the strategic balance sheet for an organisation as it captures the means of assessing the financial and non-financial components of a strategy. It therefore shows how the strategy execution is working and the effectiveness with which the levers for change are being used. The BBS supplements financial measures with three other perspectives of organisational performance – customers, learning and growth, and internal business processes. Vision and strategy connect with each of these as shown in Figure 3.5.

Figure 3.5 The Balanced Business Scorecard



The emphasis of the scorecard is to measure aspects of performance in a balanced way. In the past, managers have perhaps paid more attention to the financial measures but the BBS shows it is important to consider all of the four aspects. The customer perspective measures those critical success factors that provide a customer focus. It forces a detailed examination to be made of statements like ‘superior customer service’ so that everyone can agree what it means, and measures can be established to show the progress being made. It also identifies the need to consider how the customers view the organisation and its products or services. The delivery of value to the customers is likely to affected by the internal processes so the process effectiveness also needs to be measured. The learning and growth perspective could generate a need for new products or new internal processes if the organisation is to continue to perform well. All of these aspects are important when evaluating organisational performance.

Each perspective answers questions like these:

- **Financial** – what level of income has been generated? How profitable is the business?
- **Customer** – how will we assess our customer satisfaction?

- **Learning and Growth** – how will we measure our ability to change and improve so that we constantly keep ahead of the competition?
- **Internal Business Processes** – how effective are the business processes that we must excel at to deliver customer value?

The BBS helps in the definition of two components which are vital to assess business performance; these are Critical Success Factors (CSFs) and Key Performance Indicators (KPIs).

The concept of CSFs was initially developed in the late 1970s when they were defined as 'the few key areas where "things must go right" for the business to flourish and for a manager's goals to be attained' (Rockart in the Harvard Business Review, March/April 1979). The important words here are 'few', key' and 'must'. Not every activity is a key area; they are fewer in number than people think and success with them is critical but the CSFs mean that there are *some* goals that *must* be reached. However, it is of little use setting goals and then realising too late that you won't make it. This is where KPIs are required. KPIs are the measures that show whether or not progress is being made towards the achievement of a CSF. KPIs measure specific areas of performance so also limit the amount of data that managers have to consider and act upon.

Let us see how this could work for a healthcare organisation, such as a hospital, using the BBS as a framework. First, the CSFs in the financial area will be considered. The hospital management might state that income must be greater than expenses, perhaps by a set percentage. It is important that the hospital sets this CSF specifically for its own circumstances rather than using a national target. CSFs must be our CSFs or there would be little identification with the effort required to achieve them. Generated from this CSF might therefore be strict cost control on the purchase of drugs and of treatment equipment. So, we would set financial KPIs to monitor and control the prescription of drugs and treatments; each KPI would have a set target which, in this case, could be a defined budget for expenditure of drugs and treatments each year. This is also an example of where CSFs in one area can affect CSFs in other areas; if the low cost drugs and treatments we use mean that it takes longer to get better with us, then how does that impact on a customer service CSF of reducing the waiting time for treatment?

It's important that KPIs are defined such that they are SMART and that they are monitored regularly. If the drugs budget is exceeded within the first few months, what action will be taken to bring it back to budget before the overspend becomes too difficult to manage?

Other parts of the BBS can also generate CSFs so long as they *are* critical; for our hospital it is tempting to regard patient satisfaction as a critical success factor. Is it really critical or should the goal be to improve people's health, provide life-saving surgery and so on? It can be difficult to determine the truly *critical* success factors. It is an excellent discipline to ensure that only those that are critical are identified; it is not possible to monitor too many factors at one time. There is a suggestion later in Chapter 6 about how CSFs and KPIs could be used in the construction of Business Activity Models.

SUMMARY

This chapter has looked at the reasons why organisations develop strategies and how they might do this. We have explored the complexity of this process and offered ideas about how strategies are developed taking account of entrepreneurial approaches and formal planning. The chapter has also described the external factors influencing strategy – the outside/in approach – and an internal analysis approach – the inside/out approach. Finally we looked at the execution of strategy and IS strategy considerations such as performance measurement using the BBS, CSFs and KPIs.

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4 THE BUSINESS ANALYSIS PROCESS MODEL

Debra Paul

INTRODUCTION

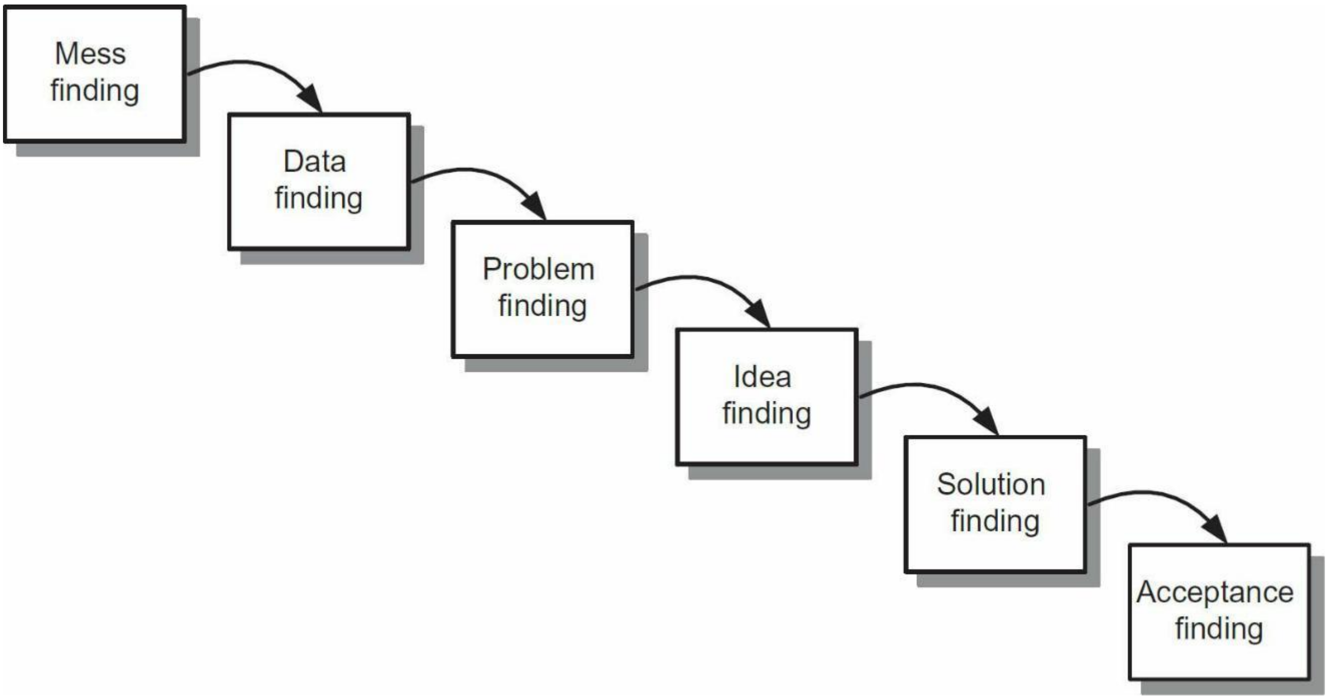
There are many tools and techniques available for the business analyst to use and, because of the nature of business analysis work, an overview framework is useful to place these in context and help determine the most appropriate technique for each individual situation. In this chapter we have set out a Business Analysis Process Model as a framework within which both standard modelling techniques and organisational templates can be used. This approach also incorporates the principles of Requirements Engineering to highlight best practice when defining system requirements.

AN APPROACH TO PROBLEM SOLVING

One of the requirements of business managers is that business analysts examine the entire business area and take a thoughtful, even creative, approach to developing ideas for solutions. Creative problem solving is vital in the business world as, increasingly, organisations need to develop innovative ideas in order to respond to changes in the business environment including actions from competitors. However, many people find this difficult; often because they feel under pressure to produce ideas very quickly. In this context, Isaksen and Treffinger's (1985) original creative problem solving model, shown in Figure 4.1, provides a useful framework for understanding problems and developing creative solutions, particularly as the model emphasises the need to investigate and analyse rather than leap to quick, possibly premature, solutions.

This model proposes an approach that may be applied usefully to business analysis. In this section we describe the implications and suggestions the model has for you as a business analyst. The first stage, **mess finding,** is where we often begin when undertaking a problem investigation. In business analysis this stage is concerned with finding out about the complexity of the problem situation. Many problems are poorly defined or ambiguous, and each problem situation is likely to be complex and contain various issues and concerns. In other words, there is likely to be a 'mess' and different situations will have different components to that mess. Identifying this as the starting point in this model helps to emphasise that you need to gain some understanding about the complete situation before diving into options and solutions. The rich picture diagram, described in Chapter 5, is particularly useful to help document and analyse the 'mess' in problematic business situations. Rich pictures do not use a defined notation set and the flexibility this offers enables us to use them to represent any situation. Mind maps and fishbone diagrams are also described in Chapter 5 and are similarly helpful.

Figure 4.1 A problem solving model (after Isaksen and Treffinger,1985)



Data finding, the second stage of the model, is concerned with analysing the opinions, concerns, knowledge and ideas uncovered in the previous stage, in order to identify where this information can be quantified and supporting data obtained. It is often useful to examine the rich picture, mind map or fishbone diagram to clarify our thinking about the situation. It is particularly important to consider which information is factual and which is based on opinion. This can help lead us to the aspects that we can, and should, verify and also emphasises the need to divorce opinion, whilst useful, from fact. Chapter 5 explains some techniques that will help you to obtain quantitative data, such as surveys and activity sampling.

Problem finding then uses the work of the previous two stages to help uncover the heart of the problem. We now know the complexity of the situation facing us and have been able to quantify some data whilst appreciating that other information represents personal views or opinions. We may have been presented with a statement of the problem at the outset but at this point, having carried out the previous two stages, it is important to revisit this in order to understand fully where the problems lie. Finding the right problem to solve is often a necessary part of business analysis, as analysts are often pointed at symptoms and they have to dig deeper in order to find out where the real problems lie.

So, these first three stages are concerned with understanding the problem and they provide a structure for doing this. The next two stages focus on developing solutions.

First, there is **idea finding** during which business analysts try to generate a wide range of ideas. Analysts often use brainstorming approaches to uncover ideas but this can be difficult as it requires a group to generate ideas ‘cold’. Sometimes this works but often different approaches need to be used with brainstorming to stimulate ideas and so during this stage it may be useful to use some creative thinking techniques. Two examples of techniques that can provide stimuli for creative ideas are ‘Assumption Reversal’ – where assumptions about a situation are listed and reversed – and ‘Random Words or Pictures’ – where unrelated words or pictures are used to generate different ideas about a situation. More information about these techniques can be found in the creative thinking texts mentioned in the references and further reading.

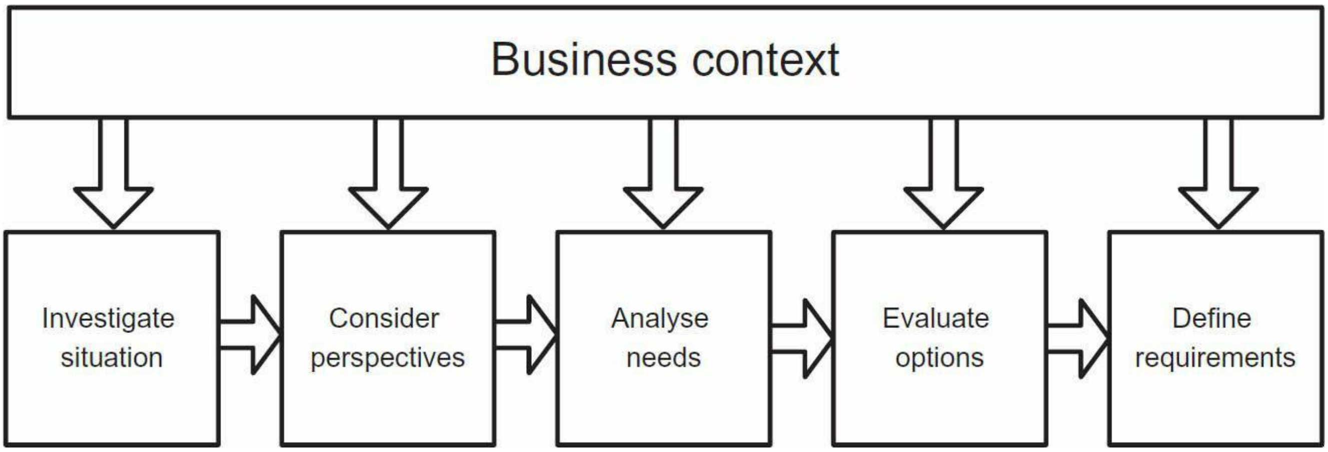
Once some ideas have been identified, they can be evaluated and we can focus on those that could provide solutions to the problem(s). This is the **solution finding** stage and it is significant that this stage appears so late in the model. Business analysts are often expected to deliver solutions quickly, yet here we can see that it is important to resist the pressure to develop solutions at too early a stage; there are other aspects that need to be considered first. Also, Isaksen and Treffinger (1985) stress the importance of identifying criteria to help evaluate potential solutions and this would not be possible without the earlier work. Therefore, it is important to work through the earlier stages as they will help you to develop better, more appropriate solutions that will be more beneficial for the business situation.

The final stage in the model is **acceptance finding** which is concerned with gaining business acceptance of the solution. This aspect is critical to the success of any change project. Chapter 8 considers the importance of ensuring changes align with the business architecture. Chapter 9 considers how the feasibility of proposed solutions may be evaluated and how a robust business case may be made in order to obtain approval from the business.

THE BUSINESS ANALYSIS PROCESS MODEL

One of the aspects that makes business analysis work so interesting is the range and nature of business analysis projects. The business systems under consideration can be very varied; for a particular project business analysts may need to apply several techniques and analyse a number of different stakeholder views. Sometimes the project may be to investigate a problematic part of the organisation and produce outline recommendations for ways forward. Other projects may require the business analyst to analyse and document specific business or system requirements. So, the challenges faced in developing a process model are to offer something that is sufficiently flexible while providing a framework that will help people to carry out their work. The process model shown in Figure 4.2 is intended to meet these challenges.

Figure 4.2 The Business Analysis Process Model



The top stripe of the process model shows the importance of understanding the business context. Within this context, we need to be aware of the Mission, Objective, Strategy and Tactics (MOST), as described in Chapter 3. However, there is a more fundamental aspect of which we should also be aware and this concerns the underlying values of the organisation. For example, does the organisation genuinely value aspects such as quality and customer service? Or, are low costs more important? Does it comply where necessary with legislation regarding equality of access or really embrace the importance of accessibility for all? Recognising the values of the organisation and being aware of the MOST, will help us to have a clearer understanding of the stakeholders and their priorities.

The process model sets out the key stages for a business analysis project with each stage representing the areas that need to be considered. However, it should be noted that whilst some projects may require a detailed exploration of all of the stages, other projects may focus on a subset of the model, possibly just one stage. One of the most important aspects of a business analysis project is to decide what the focus is and which areas need to be investigated. For example, on some projects the focus may be to explore possible improvements to how part of the organisation works. In this case, we might begin by examining all of the current working practices, including the staffing and job roles, and the work may focus on analysing and evaluating the options for the future business system. Another project may focus on the IT system needs and whilst understanding the situation and all of the stakeholder perspectives is important, the potential for the use of IT to improve the business system will dominate the analysis. The rest of this chapter describes the stages of this process model.

INVESTIGATE SITUATION

This stage is concerned with uncovering issues and problems. The terms of reference for the project, or possibly a more detailed project initiation document, are needed in order to set out the context within which the business analysis work will take place. The OSCAR mnemonic can be very useful when clarifying the terms of reference if none exist. This stands for the following:

Objectives	The business and project objectives to be achieved.
Scope	The area of the business to be investigated and the required deliverables.
Constraints	The time, budgetary and policy constraints within which the work must be conducted.
Authority	The person who is responsible for receiving the deliverables and agreeing that the work has been completed.
Resources	The resources, both human and physical, available to the project.

A key area for the analyst is to clarify the objectives of the study and tailor the approach accordingly – often a task that requires a good deal of skill. During the initial period of business analysis work the analyst may be presented with a statement of 'the problem' but this statement may not be correct. It is important to investigate the situation further in order to determine where the real problems lie, and ensure that symptoms of the problems are not confused with the real issues. It is also vital that the analyst does not make false assumptions or accept all of the information provided without question. To perform this work effectively, it is important that the business analyst has an understanding of the business context during the investigation stage. Once the analyst has begun to understand the situation and clarify some of the ambiguity that exists, it will be necessary to create documentation recording the findings. This will be required for future reference and also to help other members of the team understand the situation.

Investigation techniques

There are many investigative approaches that business analysts can use and these are explored in detail in Chapter 5. It is important that we consider the range of possible investigative approaches and choose those that are most appropriate to the work in hand.

The level of detail required during this stage may vary considerably depending on the focus of the business analysis work. If the analyst is trying to gain an overall appreciation of the business area, for example, to identify the key stakeholders and acquire an understanding of their views and opinions, or to appreciate the nature of the work and the range of people and skills, then often the techniques used will be those that provide an overall perspective and generalised view; interviewing, observation and workshops would be particularly useful. However, if the work is concerned with eliciting more detailed information such as data requirements or the flow of a business process then the most appropriate fact finding techniques are those that focus on the detail such as document analysis, scenario analysis or prototyping. Much of the information gained during the initial investigation may be subjective, so should be quantified through more detailed analysis. In this case, techniques such as record searching or surveys may be very useful in order to quantify some of the information put forward.

Documenting business situations

There are a number of useful techniques for documenting and visualising the initial investigation of a business system. It is typical that a high-level overview of the situation will be required during the initial investigation, particularly where the issues are complex and originate from different causes. As we mentioned earlier, a ‘rich picture’ can be very useful in capturing the essence of a situation. An alternative, but similar approach, is the ‘mind map’; this also allows for a degree of structuring of the information. Fishbone diagrams can also be very useful during investigation as they help to uncover the root causes of problems. These techniques are described in further detail in Chapter 5. Other techniques may also be useful where specific issues have been identified. For example, if there are issues with the business processes then process modelling (described in Chapter 7) will be relevant.

Stage summary

Procedure

- Study background material – project initiation document, terms of reference
- Carry out initial investigation with key stakeholders
- Document the results of the investigation – using meeting reports plus diagrams such as a 'rich picture', mind-map or fishbone diagrams

Inputs

- Terms of reference or project initiation document
- MOST, statement of business values

Outputs

- View of the existing business situation, including meeting reports and diagrams such as rich pictures, mind maps and fishbone diagrams
- List of issues/problems

Techniques

- Investigation techniques such as interviewing, observation and workshops
- Quantitative investigation techniques such as surveys, sampling and document analysis
- 'Rich pictures' (from Soft Systems Methodology, developed by Checkland (1999))
- Mind maps (Buzan and Buzan, 2009)
- Spaghetti maps
- Fishbone diagrams (Ishikawa – these are also known as Ishikawa diagrams after their inventor Kaoru Ishikawa (1985))
- Business process models

CONSIDER PERSPECTIVES

This stage is concerned with analysing stakeholders and their perspectives on the business situation. Many stakeholders hold very strong views about why problems exist, what needs to be done to improve the situation and where the focus of the business system should lie. Where some of the issues arise from differences in stakeholder views it is vital that they are explored and where possible taken into account when making recommendations for the way forward.

Stakeholder identification and analysis

Every business situation will affect a range of individuals and organisations. Among this group there will be people or groups with varying levels of interest and power. Some stakeholders may be directly affected by any recommendations and may hold strong views on how the systems and working practices should be changed. Others may be affected only indirectly and, whilst having opinions, may be less concerned about the nature of the new system. The range of possible stakeholders and mechanisms for stakeholder analysis and management are discussed in detail in Chapter 6.

Stakeholder perspectives

Stakeholders often have different views on what is important about a business system and, as a result, have different ideas about the improvements that are needed. These views are often contradictory and can lead to hidden agendas, conflicts and inconsistent priorities. As business analysts it is important that we are aware of the potential for such conflicts and are alert to situations where these might arise. We can often detect where the different stakeholder conflicts might originate by considering the underlying set of values and beliefs they hold. For example, we might reflect on what an individual stakeholder considers to be the main focus of the business system and, critically, why this is the case. Understanding these values and beliefs allows the analyst to approach issues and problems from an informed position and hence have an improved chance of resolving the situation. Chapter 6 considers the importance of analysing stakeholders and their perspectives and explains how they may be analysed by considering the world view of each stakeholder. This includes an explanation of the CATWOE technique, originally developed by Checkland (1999).

Business activity modelling

The stakeholder perspectives can be analysed further by considering the business activities that would be required to fulfil a particular perspective. This approach, developed from Checkland's work, and extended by Wilson (1990), allows analysts to build a conceptual model of a business system as envisaged by a particular stakeholder. For example, where a manager believes an events organisation should focus on quality then there would be an emphasis on activities such as:

- the recruitment and development of highly-skilled
- staff; the introduction of customer-focused processes;
- monitoring of customer satisfaction levels.

An alternative view could be that the focus should be on ‘no frills’ events and in this system the emphasis would be on the following activities:

- keeping costs low;
- monitoring the number of attendees at events.

This approach allows business analysts to consider where the priorities lie and what the focus of the new, improved business system should be. One stakeholder’s view may take precedence over the others or several models may be synthesised to provide an agreed business activity model. The business activity modelling technique is explained further in Chapter 6.

Stage summary

Objectives

The objective of this stage is to take stock of the range of stakeholder perspectives about the business system under investigation. These perspectives may then be analysed to uncover stakeholder values and beliefs, and developed into business activity models. However, where there is a narrow remit for the business analysis work, for example if we are concerned primarily with improving a particular process, while it will be important to identify and manage the stakeholders, consideration of the entire business system may be beyond the scope of the business analysis work.

Procedure

- Identify key stakeholders whose perspectives are important to the business analysis project
- Investigate the values, beliefs and priorities of the key
- stakeholders Develop and analyse the stakeholder perspectives
- Build conceptual models of activities to fulfil the stakeholder perspectives
- Explore and resolve conflicts between stakeholder perspectives
- Synthesise conceptual models into one view of the desired business system

Inputs

- Terms of reference or project initiation document
- Business values and MOST
- Identified stakeholders (from the documentation of the existing business

system)

Outputs

- Power/Interest grid
- Stakeholder perspectives
- Business activity models based upon stakeholder perspectives
- Consensus business activity model

Techniques

- Investigation and negotiation techniques
- Stakeholder identification and analysis
- CATWOE
- Business Activity Modelling

ANALYSE NEEDS

The focus of this stage is to identify where improvements can be made to the business system. The approach used is known as 'gap analysis' whereby a current or 'as is' view is compared with a desired, future or 'to be' system. This method contrasts with the traditional, more systematic approach to business or systems improvement where new features are added on to an existing set of procedures or IT system functions. With gap analysis the emphasis is on understanding where we want to be and, by looking at where we are now, identify what needs to change to take us there.

Analysing activities

Where you have developed a business activity model from a stakeholder perspective, this can be used to carry out a detailed analysis of the desired business system by examining each activity in turn. This analysis allows us to identify where there are issues that need to be addressed in any solution that we recommend. As the model provides a conceptual picture of the desired business activities it allows the business analyst to see where the current business system is lacking. When examining the model, the range and extent of the gaps found will vary from activity to activity. Some activities may be in place and operating satisfactorily. However, others may be inadequate in the current business system and some may not exist at all. There may be good support for the activity from the organisation's information systems or this may be poor and in need of improvement. Identifying the gaps at this level will help us to determine the potential for change to the business system and the degree to which this is required.

The business activity model may identify a range of areas to be considered in the light of the current business situation. However, it is possible that some aspects may be beyond the scope of the business analysis work.

Analysing business processes

At a more detailed level, gap analysis focuses on the business processes that are applied within the business system. Whereas the activities modelled on the business activity model shows conceptual view of *what* activities should be within the desired business system, the business process models allow us to consider *how* the work is carried out. Therefore, the analysis is conducted at a more specific level of detail and, rather than being conceptual, is much closer to the physical reality of the business system. A business process is initiated by a business event, which is sometimes called a ‘trigger’, and concludes when the goal of the process has been achieved. This view of the business situation cuts across departments and job roles in order to show a more results-oriented view that is focused on meeting customer needs. The approach we take to this work is to model the current business process and then to consider possible changes to the process before finalising the required process. Hence, we develop a current or ‘as is’ model that provides a basis for developing the required or ‘to be’ model. When redesigning a process we can look for small changes that affect one or two process steps or we might decide to design a completely new process. The business process modelling technique is explored in further detail in Chapter 7.

Gap analysis is conducted as a comparison between the current and desired business systems. The objective is to identify areas where action is needed to deal with the gaps. This may require changes to the organisation structure, people skills, processes or technology. Chapter 8 considers gap analysis and the importance of aligning any changes with the business architecture for the organisation.

Stage summary

Objectives

To explore the differences between the current and desired situations. To identify the opportunities for business change by analysing these differences or ‘gaps’.

Procedure

- Examine the activities on the business activity model
- Consider how well each activity is carried out in the current business system and how well it is supported by the organisation’s information

systems

- Identify the key business events to be handled within the business system; develop ‘as is’ business process models for the key business events
- Develop ‘to be’ business process models for the key business events
- Analyse the gaps between the existing and the desired business systems. Use these as a basis for identifying potential business system improvements
- Ensure any potential improvements align with the business architecture

Inputs

- Agreed business activity model
- View of the existing business system
- Business values and MOST

Outputs

- Analysis of activities, including identified areas of weakness
- ‘As is’ and ‘to be’ business process models
- List of potential improvements to the business system

Techniques

- Gap analysis
- Activity analysis
- Business process modelling

EVALUATE OPTIONS

This stage is concerned with examining the potential improvements identified so far, developing some business options and evaluating them for acceptability and feasibility. The analysis of the gaps between the existing and desired systems will have produced some ideas for improvements and the work now is to develop these ideas into business options. These options may include options for changes in a number of areas; for example, they may change the business processes, the job roles, the management structure or the IT systems. At this point, the changes are likely to be defined in outline only, but in sufficient detail so that a business case may be developed to support the recommendations and provide a basis for decision-making. Once the work to define the changed areas begins in earnest, there may be a need for further consideration of options. For example, where changes are required to the supporting IT systems, this may be agreed in principle at this stage but it is likely that the detailed options for the new IT system will need to be evaluated, and the business case revisited, at a later date.

Identify potential options

The first step is to identify possible options by considering where improvements might be made and which ones would result in the greatest potential benefits. Once a number of options have been identified these can be reduced to a shortlist of options to be defined in further detail. The business values, MOST and business architecture need to be considered as part of the development and evaluation of options as they must be supported by, and aligned with, any changes.

Assess feasibility

All of the options that are to be considered in detail need to be evaluated for business, technical and financial feasibility. Chapter 9 explores these aspects of evaluation in further detail. In addition, areas such as the impact of options on the organisation, and the risks that may be associated with an option, also need to be considered as they will affect the acceptability of the option. Impacts and risks may give rise to additional costs that need to be fed into the cost–benefit analysis for the option. Consideration of the business values and MOST should also form part of this work as any new business system will need to be aligned with the values and strategy, and support delivery of the business objectives.

Stage summary

Objectives

The objective of this stage is to collect together the range of potential changes into packages of improvement actions. These packages form the basis for developing a set of options that are then developed and documented in further detail. They are then presented to business managers for consideration.

Procedure

- Identify range of business options
- Explore acceptability of options and reduce to a shortlist
- Develop and document each option in detail. In particular, consider the business, technical and financial feasibility of each option
- Develop business case, including presenting options and recommendations to business managers

Inputs

- Project initiation document/terms of reference
- Business values and MOST
- List of potential improvements to the business system

Outputs

- Shortlist of business options
- Business case including options, feasibility assessment and recommendations

Techniques

- Business options identification
- Cost-benefit analysis, including quantification of costs and benefits; investment appraisal techniques
- Impact analysis
- Risk analysis

DEFINE REQUIREMENTS

This stage is concerned with gathering and documenting the detailed requirements for changes to the business system. These changes may be to any (or all) of the four aspects of a business system described in Chapter 1: the business processes, the supporting IT systems, the people carrying out the work and the organisation structure. Where the changes are to the business processes, the modelling techniques described in Chapter 7 should be used to define how the new processes should look. If the recommendations include the implementation of redesigned processes, this is likely to require changes to the structure of the organisation and the job roles, plus development of the staff skills. It is sometimes the case that the improvements to the business system can be made through limited changes such as improved job definitions or additional training for the staff. However, more extensive change is usually required, for example to the business processes, and it is likely that this will necessitate enhancements to existing IT systems, or even the introduction of a new IT system. Business analysts have a responsibility to define the requirements accurately, as their documentation will form the basis for the development of the new processes and system. If the requirements are not documented clearly then this is likely to cause problems not only during the development of the system but also once the system has been implemented. It is vital therefore that the requirements may be related directly to a business need and will support the business objectives.

Requirements engineering

The requirements engineering approach has been developed as a response to the lack of rigour often found in requirements documentation. Requirements engineering proposes a framework to help analysts improve their requirements work by highlighting the need for proactive analysis, organisation, documentation and management of stated requirements. The requirements engineering approach is described in Chapters 10 and 11.

Modelling systems

There are many modelling techniques available to business analysts. These techniques originate mainly from systems analysis and design approaches such as the Unified Modeling Language (UML). Each modelling technique provides insight into a particular aspect of the IT system. For example, techniques such as class modelling and entity relationship modelling provide a clear and unambiguous means of documenting the system data; techniques such as activity diagrams provide a clear representation of processes. Business analysts find such techniques extremely useful when exploring requirements as they help to build rigour into the requirements analysis activity. Building and comparing models of a system will help generate additional questions, and uncover omissions, errors and inconsistencies. Chapter 12 provides an overview of some of the more popular modelling techniques used by business analysts. There are many books devoted to explaining systems modelling techniques in detail, some of which are listed in the further reading for Chapter 12.

Stage summary

Objectives

The objective of this stage is to produce a well-formed requirements document setting out the business requirements for the new business system. This document must include clear textual descriptions of the requirements and sufficient information to trace each requirement from its origin through to its resolution. Modelling techniques may be used to represent the process and data requirements diagrammatically and hence improve the rigour and clarity of the requirements definition.

Procedure

- Gather the requirements:
  - elicit and analyse the business requirements for the new business
  - system; document and manage the requirements;

    - validate the documented requirements.
- Document the requirements for the new business system, including as appropriate:
    - business process models;
    - catalogue of business requirements;
    - models of the IT processing and data;
    - glossary of terms.

Inputs

- Selected option for revised business system
- Business values and MOST
- Terms of reference/project initiation document

Outputs

- 'To be' process models
- Job definitions
- Revised organisational structure
- Validated requirements document including:
    - requirements catalogue;
    - models of business process and system requirements;
    - glossary of terms.

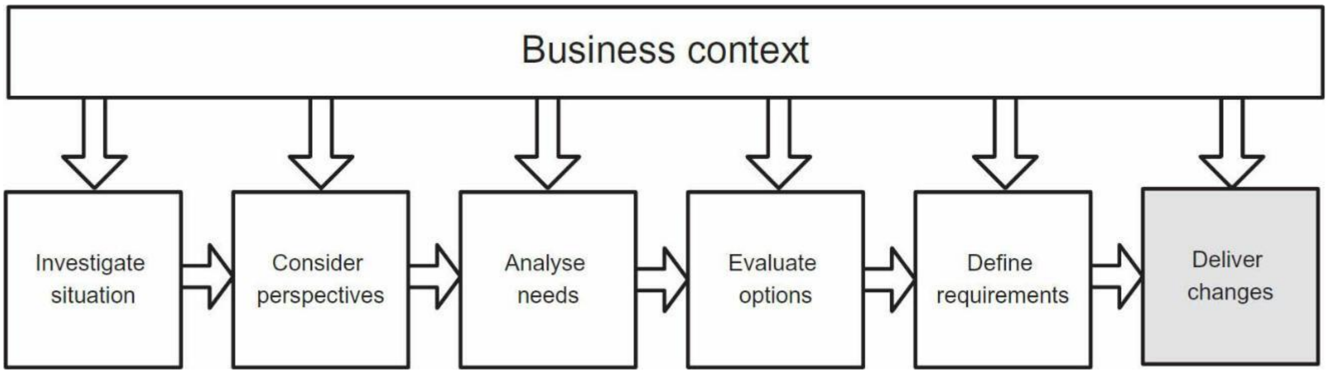
Techniques

- Business process modelling
- Job design
- Investigation techniques
- Requirements elicitation, analysis and validation
- Requirements documentation and management
- IT systems modelling techniques

DELIVER CHANGES

Once the business analysts have investigated and analysed the situation, considered the stakeholders and their perspectives, developed options for improvement and defined the requirements to be fulfilled, it is important to consider how the business changes will be delivered and implemented, and the business benefits realised. In the main, this work is not solely the responsibility of the business analyst but some tasks, such as providing support to the stakeholders, does fall within our remit. Figure 4.3 shows this extended version of the business analysis process model including where the business analyst works to support the delivery of business change.

Figure 4.3 Extended Business Analysis Process Model



Delivering the requirements

The requirements will need to be developed into the business change solution. This solution may include process, people, organisational and IT system change. The lifecycle and approach to be adopted to develop and deliver the changes will need to be determined. This decision will have an impact upon the roles of the project team, the deliverables to be produced and the techniques to be used. Chapter 13 discusses these issues. The extent of the business analyst role will depend upon the lifecycle and approach adopted on the project.

Implementing the business changes

The delivery of the business solution will need to consider aspects such as the emotional impact of change and the realisation of the business benefits. These issues are discussed in Chapter 14. The business analyst may be heavily involved in tasks such as designing and documenting the new tasks and procedures, supporting user acceptance testing and reviewing benefits to assess their realisation.

Stage summary

Procedure

- Decide the lifecycle and approach to be adopted

- Design and develop the business change solution
- Support the planning and implementation, in particular the development of the required learning materials and the delivery of training for the business staff
- Review the predicted benefit
- Identify any actions required to realise the benefits

Inputs

- Business change process and organisation design
- IT software solution
- Business case

Outputs

- Business change plan
- Communication plan
- Training approach and materials
- Revised job roles and descriptions
- Benefits plan
- Benefits review document

Techniques

- Use case descriptions
- Decision tables
- State charts
- Benefits planning

SUMMARY

Business analysis projects are usually concerned with improving the working practices within business systems. This may involve changes to a range of aspects that form the business system including staff capability, business processes or the supporting information systems. Increasingly, business analysts are also required to support the development of solutions, delivery of business changes and realisation of business benefits. The business analysis process model is intended to help business analysts in deciding how to structure and conduct their assignments. The model also includes references to some of the techniques in popular use and

identifies when these techniques may be particularly useful.

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5 INVESTIGATION TECHNIQUES

Debra Paul and Malcolm Eva

INTRODUCTION

When business analysts first enter an area of study, they need a range of tools and techniques to help them understand the breadth and depth of issues. While they will be making use of background research, workshops, one-to-one interviews and quantitative methods of verification of data, they must also use diagnostic tools for understanding a problem area, and different approaches to documenting their findings, according to the focus. This chapter will look at a range of techniques used to investigate business areas and document the findings.

The assumption behind this chapter is that the analyst will be responsible for performing a broad study that begins with a general understanding of the situation, then produces a diagnosis of the underlying causes and subsequently understands the requirements for a solution. The terms of reference for most analysis studies will be significantly narrower than that; nevertheless, all the techniques to be described in this chapter will be useful at one time or another. We advocate a toolbox approach to analysis rather than a strict checklist method, and the more tools available, the more flexible and responsive the analyst can be.

PRIOR RESEARCH

When an analyst first approaches their client organisation, (or division or department), they should first spend time gathering as much background information as they can. There are various sources available, but the internet has made access to such background information much simpler than before.

Study website

This is the quickest and simplest way to get a view of what the organisation does, what its values are, how it brands itself and how it wants to be perceived. Depending upon the nature of the organisation the website should provide access to information about the products and services, opportunities to interact with the site and give feedback, and offer details about the company.

At this stage you will be looking particularly at its branding, its apparent values and priorities, how easy it is to navigate and interact with the site. If it gives feedback or reviews from customers, it is worth looking at those, particularly if any are less than whole-heartedly positive. However, such reviews are likely to be selected to show the company in its best light. It may be worth exploring customer reviews on other sites such as those that review hotels or restaurants.

One useful inference from the design of the website is how the company views its place strategically, in terms of the balance between the cost and the perceived quality of its products. The design of the website will often give an indication of the level of quality it aims at: primary colours, flashing icons, liberal use of exclamation marks and free use of suggestive words like 'Bargain!' imply a more populist approach, while a quieter background, carefully composed photographs, moderated colours, all imply a concern for a perception of quality. Interpreting a website in this way can provide an early insight into the business imperatives for the organisation.

We can also evaluate the ease of navigating around the site, placing an order or making an enquiry. These things will give an idea of the level of professionalism of the site and expected standards of technology presentation and achievement. This in turn can provide clues about the technological maturity of the company – is the technology aligned to the business intention, or are the developers showing off their skills at the expense of the company's message?

Study company reports

If we are approaching a commercial company in the role of an external consultant, it is useful to look at company reports to confirm the health of the company. Companies with limited liability are required to file statutory documents reporting on their financial position. For example, UK companies are required to file the Income Statement (Profit and Loss Account) and Balance Sheet with Companies House, from where they may be accessed by the public. These documents can provide much rich information about the levels of debt, liquidity, gearing, trends in growth or stagnation over the previous years, and a first insight into where there may be problems. The shareholders' reports will also set out the future direction of the company as agreed by the Directors, and state the targets and aims for the next year. Again, the report should explicitly explain the target market and strategy intentions, which will give the analyst insights into the business perspectives.

Studying these reports at the outset of a project can also save later unnecessary effort and avoid financial loss. As an example, following an invitation to carry out consultancy work for a new client, an examination of the company's entry at

Companies House revealed that it was about to be suspended for non-submission of accounts over the previous two years. A failure to carry out this research could have ended with unpaid invoices and wasted effort.

Study procedure manuals and documentation

Many business analysis projects will have a scope that is more local than those suggested above, and more focused on specific sets of processes. The prior research for such projects will include studying current system documentation and any procedures manuals. These are to give an idea of the expected 'as-is' process, but another note of caution – over time such documentation will naturally become unrepresentative of the actual course of the process. It will tell you not so much the 'as-is' description as the 'what-we-thought-it-ought-to-have-been'.

Studying the documentation is never a substitute for proper investigation and analysis; rather it enables preparation, a prior understanding of the domain in question that gives the analyst an entry point for various lines of investigation.

Study the organisation chart

The organisation chart sets out the management structure of the organisation and can offer insights into the style and culture of the organisation. Understanding the job roles and reporting lines are a valuable preparation for the more detailed investigation to follow.

INVESTIGATION TECHNIQUES

There are many reasons that business analysis is required. For example, a study might be to investigate an area of concern, diagnose a weakness in the business processes or compile the requirements for a new system. After the prior research has been done, the analyst needs to consider how to conduct the more detailed investigation. There will be a variety of techniques available, depending upon the size of the domain in question, its location, the numbers of stakeholders to be consulted, and the nature of the information to be ascertained.

The techniques can be categorised broadly as **qualitative,** understanding what is needed, and **quantitative,** concerned with volumes and frequencies. Qualitative techniques can be further broken down into one-to-one sessions and collaborative sessions. The most common of the qualitative one-to-one approaches to investigation are the interview, a meeting with individual stakeholders and shadowing sessions. Collaborative approaches include workshops and focus groups.

INTERVIEWS

The interview is a key tool in the business analyst's toolkit. A well-run interview can be vital in achieving a number of objectives. These include:

- making an initial contact with key stakeholders and establishing a basis for the business analysis work;
- building and developing rapport with different business users and managers;
- acquiring information about the business situation, including any issues and problems;
- discovering different stakeholder perspectives and priorities.

Interviews tend to take place on a one-to-one basis, which is a key reason why they can be invaluable in obtaining personal concerns. They focus on the views of an individual and provide an environment where the interviewee has an opportunity to discuss their concerns and feel that they are given individual attention. However, interviewing can be quite time consuming so the analyst has a responsibility to ensure that the interviewee's time is not wasted, the required information is acquired and a good degree of understanding and rapport is achieved.

There are three areas that are considered during fact-finding or requirements interviews:

- current functions that need to be fulfilled in any new business system;
- problems with the current operations or performance that need to be addressed;
- additional features required from the new business system.

The last point can be the hardest part of an interview, as we are asking business users to think beyond their experience. They may offer vaguely worded suggestions and so the skill of the interviewer is needed to assess the implications of the initial suggestions and draw out more detailed information.

Advantages and disadvantages of interviewing

One of the major benefits of conducting an interview is that it provides an opportunity to build a relationship with the users or clients. Whether we are helping the business to improve operations, solve a specific issue or replace a legacy IT system, it is critical that we understand the perspectives of the people involved with the business system. This means that we need to appreciate what they do, their concerns and what they want from any new processes or systems. For their part, the users need to have confidence in the analysts, to know that we are aware of their concerns, are professional, and are not leaping to implement a solution that overlooks the user's own needs and worries. Taking time to form good relationships early on in the project will increase the opportunities to understand the context and details of the business users' concerns and needs.

The second major benefit is that the interview can yield important information. The focus of the information will vary depending upon the needs of the project but will usually include details about the current operations, including difficulties in carrying out the work, and will help with the identification of requirements for the new business system.

Additional advantages of interviews include:

- providing an opportunity to understand different viewpoints and attitudes across the user group;
- providing an opportunity to investigate new areas previously not mentioned;
- enabling the analyst to identify and collect examples of documents, forms and reports the clients use;
- allowing an appreciation of political factors that may affect how the business performs its work;
- providing an opportunity to study the environment in which the business staff carry out their work.

While interviewing is an effective technique, there are some disadvantages. Interviews take time and can be an expensive approach, particularly if the business users are dispersed around the country. They take up the interviewee's time, which is often difficult to be spared from a busy schedule, and this may mean that they try to hurry the interview or resent the time that it takes. It is also important to realise that the information provided during interviews may be an opinion from just one interviewee's perspective, requiring confirmation by quantitative data before any firm conclusions can be drawn. Where several different interviewees have different views the analyst will also have to coordinate these views and identify any gaps and conflicts. This may create a need for follow-up discussions and further investigative work.

Preparation for interviewing

The interviewing process is greatly improved when the interviewer has prepared thoroughly. This saves a lot of time by avoiding unnecessary explanations and also demonstrates interest and professionalism, which helps to establish a mutual respect and rapport.

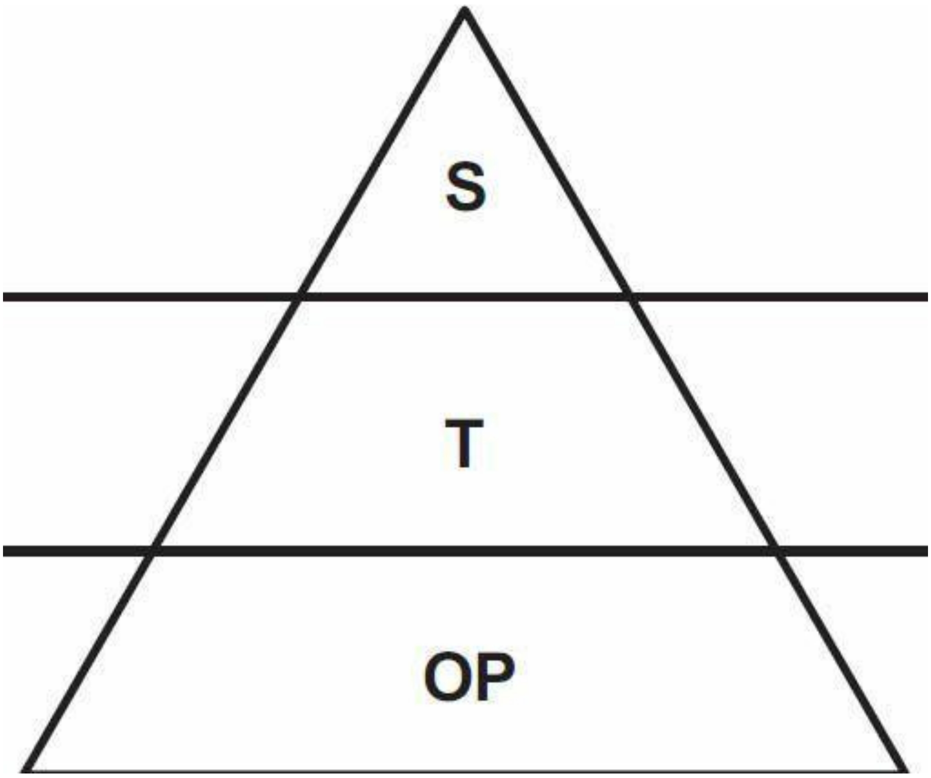
The classic structure of who?, why?, what?, when? and where? provides an excellent framework for preparing for interviews.

Who?

This involves identifying which stakeholders you will interview and considering the order in which they will be interviewed. We usually begin with the more senior stakeholders as this helps us to understand the context for the problem before moving to the details so it is useful to interview someone who can provide an overview. A senior person is also able to identify the key people to see and make any necessary introductions.

The level of authority of the interviewee will dictate the nature of the questioning. The STOP model (Figure 5.1) illustrates a simple hierarchy.

Figure 5.1 'STOP', the organisation hierarchy



- The 'S' represents the strategic level of management. Our concerns at this level are to:

  - confirm the terms of reference;
  - understand any management information needs;
  - agree the approach to the investigation; and
  - ensure at this level that the project is aligned with the business objectives and strategy.
- The 'T' represents the tactical level, or middle management. Here we are concerned with understanding issues of performance, targets and management control. We should be able to understand the Critical Success Factors (CSF) and Key Performance Indicators (KPI) that have been chosen (see description of CSF/KPIs in Chapter 3) and any associated reporting requirements. These interviewees will be able to tell us what processes and functions are carried out in the department, and who the key people are, but we should not expect detailed descriptions of how the processes are executed. The tactical level interviewees should be aware of higher-level strategic decisions and hence able to identify any new business requirements for this area.
- The 'OP' level represents the operational level, the people who perform the actual tasks of the department. These are the people who can describe accurately the existing business situation, and can identify problems and workarounds to deal with the current procedures. They have information about source documents, bottlenecks and the flow of the work, and are likely to provide ideas about the volumes of work (although these need to be treated with caution and should be analysed using quantitative investigation techniques).

The questioning strategy for the interview will depend upon several factors, including where the prospective interviewee sits in the hierarchy, the objectives for the project and the nature of the issues to be discussed.

Why?

This involves considering why a particular interviewee is to be interviewed and the place of the interviewee in the organisation, as described above. The objectives of the interview may range from the detailed elicitation of business needs to just establishing a good rapport and working relationship with a key stakeholder. The forms of questioning and of note-taking will differ significantly depending upon the objectives of the interview.

What?

This involves considering the information that could be provided by an interviewee and the areas you might explore during the interview. Answering the ‘what?’ question helps identify the items to be discussed during the interview and provides the foundation for the agenda. Issuing an agenda two days or so before the interview helps to focus the mind of the interviewer and enables the interviewee to prepare by considering in advance the information required.

When? and where?

These questions involve considering the venue, timing and duration of the interview. Typically, the interviewee will dictate the exact timing and duration, as this will depend upon availability. Limiting interviews to a maximum length of one hour is a good idea since:

- The majority of interviewees will be busy with numerous work commitments so may have trouble finding slots of more than an hour in their diaries.
- It can be very difficult to concentrate for more than an hour so longer interviews are often unproductive. This applies to both interviewer and interviewee.
- The longer the interview the harder it is to write up the notes accurately.

The ‘where’ is restricted to three possibilities: the interviewee’s place of work, the interviewer’s place of work, a neutral third location. The first of these is recommended for the initial interview with a particular stakeholder for the following reasons:

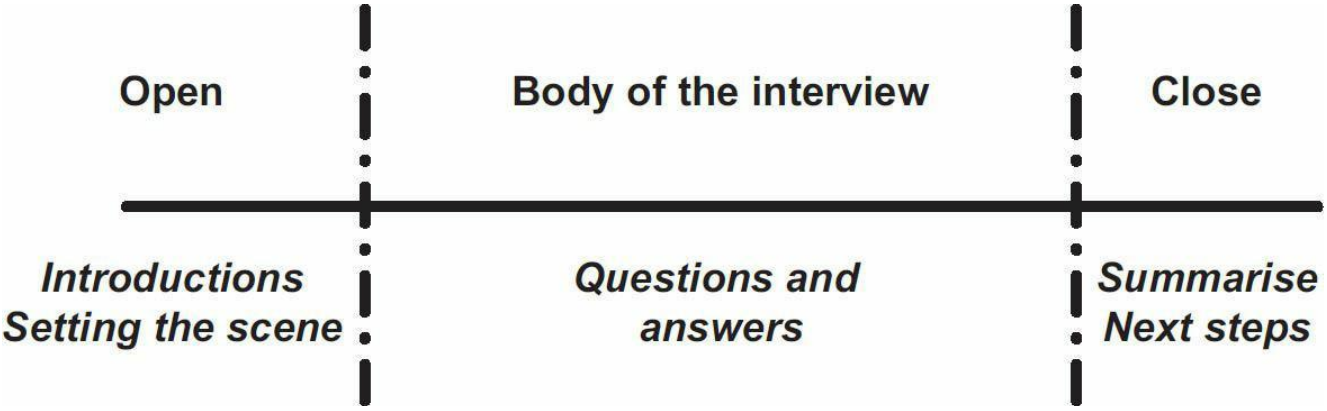
- This is the interviewee’s own territory where he or she is likely to feel at ease and less apprehensive. Meeting interviewees at their place of work also sends a signal of respect.
- The interviewer has an opportunity to informally observe the working environment, the culture of the organisation and the frequency and nature of any interruptions.
- The interviewee should have all relevant source documents, reports and screens to hand, instead of having to take additional actions after the interview.

For subsequent meetings and interviews the two parties can agree on a mutually convenient location. The analyst should have established a good working relationship by the end of the first interview session, so the venue is of less concern.

Conducting the interview

It is important to structure interviews if the maximum amount of information is to be elicited using a basic structure of introduction, body of interview and close, as shown in Figure 5.2.

Figure 5.2 The structure of an interview



The introduction

In addition to making personal introductions, it is also important that the analyst makes sure the interviewee understands the purpose of the project in general and the interview in particular. Ideally, the interviewee should know this but such knowledge cannot be relied upon. Explaining the context helps to put the interviewee at ease and will help them to provide the relevant information. It is important to make sure that the interviewee has received the agenda and that any points they wish to raise are clarified.

Body of the interview

The main part of the interview is where the facts and issues are uncovered. It is useful to think about how you are going to structure this. A good approach is to begin by obtaining a context for the information this interviewee can provide. This context will usually cover the responsibilities of the interviewee, and their range of responsibilities. Once we have a context, we can structure the interview by examining each relevant area separately and in detail. This will enable us to consider the issues, and the impact of those issues, in each area and to uncover any specific problems and requirements.

It is essential to take notes during the interview. Even if you have an excellent memory, you will not remember everything discussed during the interview. If the purpose of the interview is to understand a current procedure, a good way of taking notes can be to draw a diagram, such as a flow chart. If the purpose is to discuss a number of broader issues, including needs for the future, a mind map is a useful way of noting what has been said, and also, if drawn up as part of the preparation, provides an easy visual check on what has been covered and further areas for discussion. This can be important as however well you have structured your questions in your preparation, conversations always take unexpected loops and diversions. It is important to allow the discussion to detour into other areas, as it helps to gain further insights. In these circumstances, using a diagram to help keep the interview structure in mind can be invaluable.

In some situations it is appropriate to use a portable digital recorder to capture the interview in preference to writing notes. This can be very useful to ensure that all of the details are captured. However, many people feel self-conscious when being recorded and the analyst must be sensitive to the interviewee's comfort. It should also be remembered that using a recorder will involve a considerable overhead: it can take up to an hour to transcribe ten minutes worth of conversation.

Closure

It is important to close the interview formally. The analyst should:

- Summarise the points covered and the actions agreed.
- Explain what happens next, both with regard to the particular interview and the project. We will usually want to advise the interviewee that we will send them a copy of the written-up notes so that they can check for any errors.
- Ask the interviewee how any further contact should be made; managing the interviewee's expectations of future behaviour can be extremely useful and will be invaluable if we need any additional information or clarifications at a later point. This also serves to keep the door open for a future interview session if required.

Following up the interview

It is always a good idea to write up the notes of the interview as soon as possible – ideally straight away and usually by the next day. If it is not possible to write up the notes immediately you will find this task easier if you read through them immediately after the interview, and extend them where they are unclear. Once the notes are completed, they should be sent to the interviewee to confirm that they reflect accurately the substance of what was discussed. After they have been approved, they should become a formal part of the project documentation and be filed accordingly.

OBSERVATION

Observing the workplace, and the staff carrying out their work, especially early in an investigation, is very useful in obtaining information about the business environment and the work practices. There are several different approaches to observation, depending upon the level and focus of interest: formal observation, shadowing, protocol analysis and ethnographic studies. These are all explained in more detail below.

It is important that before any work is observed, the person being observed should be reassured that the objective is to understand the task not to judge their performance. Care is needed if you want to observe a unionised work-site to ensure that approval is also gained from the trade union representatives and that any protocols are observed.

Advantages and disadvantages of observation

The views of the stakeholders involved in a project may have been sought during interviews but, to really obtain a feel for the situation, the analyst needs to see the workplace and business practices. Apart from collecting actual facts it is also possible to clarify areas of tacit information and hence increase understanding. This has the following advantages:

- We obtain a much better understanding of the problems and difficulties faced by the business users.
- Seeing a task performed will help us prepare appropriate questions for a more in-depth interview with the person responsible for that task.
- It will help us to devise workable solutions that are more likely to be acceptable to the business.

Conversely, being observed can be rather unnerving and the old saying 'you change what you observe' needs to be factored into the approach taken and resultant findings.

Formal observation

Formal observation involves watching a specific task being performed. There is a danger here of being shown just the standard practice without any of the everyday variances, but it is still a useful tool to understand the environment. It is important that the staff members being observed are prepared beforehand and are aware that this is in order to understand the task not, as many will fear, in order to assess their competence and performance. Self-consciousness can influence how the staff member performs and a lack of prior notice will serve to accentuate this problem.

If the staff members perceive the observer as having been sent by management, they are more likely to perform the task according to the rulebook, rather than how it has evolved over time.

It is perfectly acceptable to ask people being observed about the sequence of steps they are following, so long as:

- The question does not sound critical of the way the person is working, either in words or tone of voice.
- It does not distract from their performance of the job. The analyst must position themselves in such a way that they can see clearly all that is happening, but do not get in the way or otherwise interfere with the task.

To get full value from the observation, it is beneficial to watch the staff members perform the task several times in order to understand the standard sequence, any possible exception situations and how they are handled, timings for the task and any ergonomic factors or physical working conditions that may enhance or hinder performance.

Physical tasks such as handling goods in a warehouse, or despatching consignments to customers are clearly more susceptible to formal observation than, say, data entry. However, observing more sedentary tasks, such as manning a customer services helpline, or telesales can still provide a lot of useful information, for example, to understand where problems are arising or to elicit requirements for a new system. When watching a physical task, it can be helpful to sketch the layout of the workplace and where the various actors in the task are stationed. Having such a sketch will help with later reflection and analysis of the results.

Protocol analysis

Protocol analysis involves asking the users to carry out a task and describe each step they perform. It is a way of eliciting information about the skills required to complete a task that cannot be described in words alone. The higher the level of unconscious skill involved in a task, the harder it is to explain verbally. Protocol analysis uses a ‘performing and describing’ approach which can be extremely helpful for analysts to gain greater understanding. A similar approach may be used to train a new member of staff or someone unfamiliar with a task. For example, rather than teaching new learner drivers in a classroom before they try driving on the roads, the drivers learn by watching the task being both performed and explained simultaneously, and they then perform it for themselves.

Shadowing

Shadowing involves following a user for a period, such as one or two days, to find out what a particular job entails. This is a powerful way to understand a specific user role. When shadowing, we can ask for explanations of aspects such as how the work is done, the information used, or the workflow sequence, so it is a good way of clarifying what the individual actually does to perform the role. It can also be very helpful to uncover some of the taken-for-granted aspects of the work. The longer the analyst spends shadowing a user, the greater the opportunity to build rapport and the better chance there is of capturing the additional details that may not be elicited during a single 45-minute interview. Shadowing key staff is a useful approach during the requirements definition work, since it provides a visual context for processes described during interviews or workshops.

Ethnographic studies

Ethnographic study is often beyond the budget of most business analysis projects but could yield high returns if conducted. It is derived from the discipline of anthropology and involves spending an extended period of time – from a few weeks up to several months – in the target environment. This approach enables the analyst to gain a thorough understanding of the business system as, in a short space of time, the business community becomes used to the analyst's presence and behaves more naturally and authentically. The main value gained from ethnography is an appreciation of intangible aspects such as the organisational culture in which any proposed change must be embedded, including recognising where both formal and informal power and influences reside. This approach can also be very useful when analysing complex business systems, for example, where the staff members are highly expert in conducting their work and the business rules are difficult to assimilate. In this situation, extended interaction with the experts as they perform their decision-making can be invaluable in acquiring sufficient understanding of the work.

WORKSHOPS

Workshops provide an excellent collaborative forum in which issues can be discussed, conflicts resolved and requirements elicited. They are also a useful forum for carrying out other activities, such as compiling process models, understanding data requirements, eliciting critical success factors and key performance indicators or analysing the quality of a requirements set before they are formally documented. This last aspect is explored further in Chapter 10. Given the various reasons for running workshops, they may be used at many different points during the project. Workshops are especially valuable when time and budgets are tightly constrained and several viewpoints need to be canvassed.

Advantages and disadvantages of workshops

The advantages gained from using workshops includes the ability to:

- **Gain a broad view of the area under investigation:** having a group of stakeholders in one room will allow the analyst to gain a more complete understanding of the issues and problems.
- **Increase speed and productivity:** it is less time-consuming to have one extended meeting with a group of people than interviewing them one-by-one.
- **Obtain buy-in and acceptance for the project:** when stakeholders are involved in such collaboration, not only will they be more open to any business changes or features that result but they are more likely to be champions of the change.
- **Gain a consensus view or group agreement:** if all the stakeholders are involved in the decision-making process there is a greater chance that they will take ownership of the results. If two or more stakeholders have different viewpoints at the outset, there is a better chance of helping them move to an agreement in a well-facilitated workshop, as long as they feel that their concerns and views have been listened to respectfully.

Although workshops are extremely valuable, there are some disadvantages to using them including:

- Workshops can be time-consuming to organise. For example it is not always easy to get all the necessary people together at the same time.
- If the workshop is not carefully facilitated, it may happen that a forceful participant will dominate the discussion. In extreme cases, such a participant may be able to impose a decision because the other members of the group feel disempowered and unable to raise their objections.
- It can be difficult to ensure that the participants have the required level of authority – which sometimes means that decisions are reversed after the workshop has ended.

Gaining the advantages, and avoiding the disadvantages, is only possible if a workshop is well organised and run; the means of achieving this is discussed in the rest of this section.

Preparing for the workshop

The success or failure of a workshop session depends in large part upon the preparatory work done by its facilitator and its business sponsor for the workshop. They should spend time before the event planning the following areas:

- **The objective of the workshop:** this has to be an objective that can be achieved within the time constraints of the workshop. If this is a sizeable objective the duration of the workshop will need to reflect this, possibly running to several days. In this case, the objective should be broken into sub-objectives, each of which is the subject of an individual workshop session. For example, a two-day workshop may be broken into four sessions, each of which is focused upon a particular sub-objective.
- **The people to be invited to participate in the workshop:** it is important that all stakeholders interested in the objective should be invited to attend or be represented. It is the facilitator's responsibility to ensure that all stakeholders are able to contribute, which may mean performing many of the key tasks by using breakout groups or other techniques, and reporting back to a plenary session to collate the individual results. It can also be useful to consider in advance, the personalities, concerns and viewpoints of those to be invited to the workshop.
- **The structure of the workshop and the techniques to be used:** these need to be geared towards achieving the defined objective and should take into account the nature of the group, the needs of the attendees and their preferred participation style. For example, a standard brainstorming session may not work very well with a group of people who have never met before and some attendees may prefer to work in smaller groups.
- **Arranging a suitable venue:** it is important to ensure that the venue provides an environment for focused participation. This may be within the organisation's premises but it is sometimes useful to use a neutral venue, particularly if the issues to be discussed are contentious or there is a danger that a participant could be interrupted by a colleague or manager who wants to call them away.

Facilitating the workshop

The workshop should start by discussing the objective and endeavouring to secure the participants' buy-in. Where difficulties are anticipated, it may be useful to invite a senior manager or the project sponsor to open the workshop in order to define some ground rules and set the expectations for behaviour. This also helps to demonstrate a commitment to the process underway. During the workshop, the facilitator needs to ensure that the issues are discussed, views are aired and progress is made towards achieving the stated objective. The discussion may range widely but the facilitator needs to ensure that it does not go completely off the track and that everyone has an opportunity to express his or her concerns and opinions.

A record needs to be kept of the key points emerging from the discussion. This is often done by the facilitator keeping a record on a flipchart, but it is better practice to appoint someone else to take the role of scribe during the workshop. The presence of a scribe allows the facilitator to concentrate fully on the process and the attendees, watching non-verbal behaviour to identify members of the group who may be feeling unhappy or unable to make their points. If the facilitator is spending a lot of time writing or drawing, such cues can be easily missed.

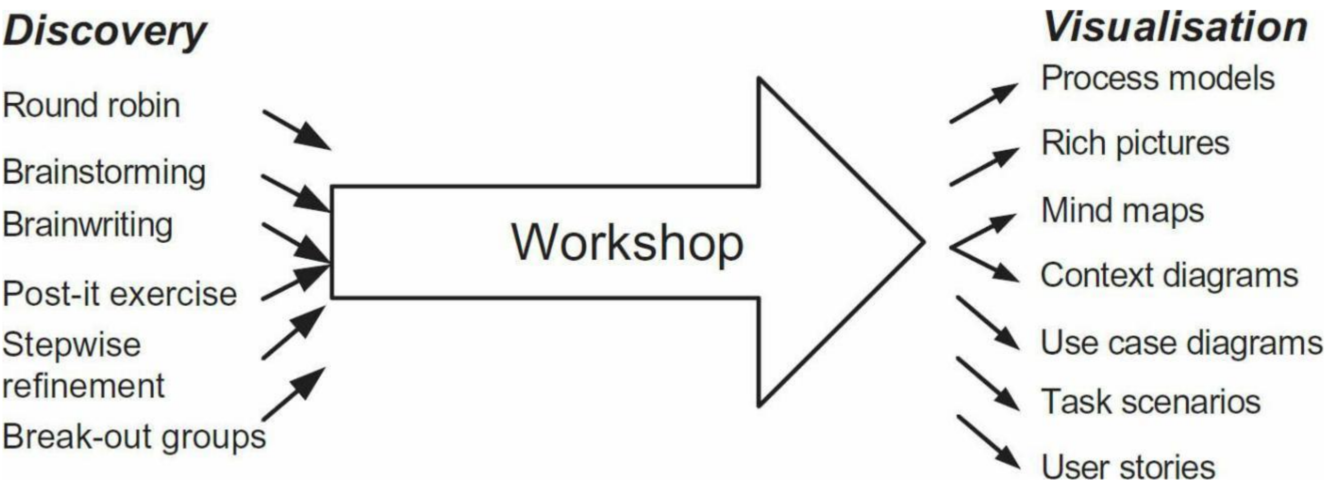
At the end of the workshop, the facilitator needs to summarise the key points and actions. Each action should be assigned to an owner and allocated a timescale for completion.

Techniques

There are two main categories of technique required for a workshop: techniques for discovery and techniques for visualisation.

Discovery techniques are those that help the facilitator to elicit information and views from the participants. It is vital that the facilitator considers which technique would be most suitable for a particular situation and group of participants. Examples of useful techniques (shown in Figure 5.3) are:

Figure 5.3 Workshop techniques



- **Brainstorming** (sometimes known as idea storming), where the participants are asked to call out ideas about a given item, all of which are written on a flipchart or whiteboard. It is important that all of the suggestions can be seen by everyone taking part as this allows the participants to build on each other's ideas. Any evaluation of the ideas is suspended until everyone has finished making suggestions.

- **Round robin** discussions where the workshop participants are asked for their ideas in turn. This can be very useful to encourage participation from those who do not like brainstorming because they are uncomfortable when required to shout out ideas. Round robin discussions provide everyone with an opportunity to speak without fear of interruption or being ignored.
- **Brainwriting** which has similarities with brainstorming but requires participants to write down ideas. Each person writes an idea on a sheet of paper and then puts it in the middle of the table. Everyone then takes another sheet with an idea already written on it, writes down another idea and then returns the paper to the centre. This continues until there are no more ideas being generated. This approach is useful because it overcomes the problem of 'shouting out' while still enabling everyone to build on the ideas of the other workshop attendees.
- **Sticky (post-it) note exercises** also involve writing down ideas but in this case, the participants work individually or in pairs. Each individual or pair writes down their suggestions – one per sticky note – and, once everyone has stopped writing, displays them to the group, usually by sticking them on a wall or board. Once all of the suggestions have been displayed, those that are similar are grouped together and broader themes are developed.
- **Stepwise refinement** is where we take a statement or idea and keep asking 'why?, why?' to every answer until we think we've got to the heart of a problem, idea or situation.
- **Smaller 'break-out' or 'syndicate' groups,** where specific aspects are considered and then reported back to the larger group. This is a powerful way to manage a larger workshop, particularly where there is a range of skills and knowledge. It can also be useful for each break-out group to have its own sub-facilitator.

Many visualisation techniques are suitable for use in a workshop. Visual approaches are quick to understand and to explain, and they help workshop participants to access the information being captured. Several useful pictorial or diagrammatic techniques are explored during the course of this book and include process models, data models, use case diagrams, rich pictures and mind maps; some of these are discussed later in this chapter. These techniques help the business users to visualise the area under discussion. Text-based lists may also be required to keep records of suggestions, agreed action points or issues for further discussion.

Another approach is to structure discussions and capture the outcomes using recognised organisational analysis techniques. For example, if the workshop is concerned with the implementation of the business strategy, a higher-level approach, such as critical success factor (CSF) analysis can be employed. This could begin by agreeing the critical success factors for the part of the organisation under discussion, developing the associated key performance indicators (KPIs) and their associated targets, and then considering the information requirements needed to monitor the achievement of the CSFs and KPIs. This can then lead to the definition of more detailed requirements in areas such as data capture and management reporting.

Following the workshop

After the workshop any key points and actions are written up and sent to the relevant participants and stakeholders. This should be done as quickly as possible as this will help to keep up the momentum and highlight the need for quick action.

Hothouse workshop

A hothouse workshop is a specific type of workshop that applies Lean and Agile principles to a business problem. In Agile environments a project, or phase of a project, may be initiated by a hothouse workshop, bringing the business and development teams together to solve business problems and using prototypes to define the functionality and scope of the solution. The business participants are ideally at executive level. This idea derives from the work of James Martin at IBM in the 1980s, when a Joint Requirements Planning (JRP) workshop brought senior executives and analysts together to define functionality, scope and timeframes for new developments. Hothouses combine this JRP approach with Lean techniques. As its name suggests, it is a very intense experience, often with participants working into the night, to produce prototype models of how the new solution might look. Hothouses typically take place over 2–3 days and are primarily for innovation projects rather than simple administration systems or enhancements to existing systems. The workshop group is typically split into smaller teams who each develop a prototype solution during a series of iterations. At the end of each iteration, the output is reviewed and feedback given which is used during the next iteration and so on. The hothouse may be run as a competition between the groups. Ultimately, the outcome should be a prototype solution to a business problem accompanied by additional analyses of the corresponding metrics, processes, costs and benefits required to enable the delivery of the full solution.

Focus groups

Focus groups tend to be concerned with business and market research. They bring together a group of people with a common interest to discuss a topic. While such a meeting has similarities with a workshop, it is not the same thing. A focus group could be used to understand people's attitudes to any current shortcomings with the business system, for example, the reason why customers are unhappy with a service, or why the website is failing to turn hits into sales. A focus group may be used to suggest ideas for future developments and directions. A focus group will be used as part of an information-gathering exercise, but the findings will need to be evaluated and assessed against the strategy.

Focus-group participants should represent a sample of the target constituency, whether they be external customers or internal staff gathered from multiple sites and branches. They are given an opportunity to express their opinions and views, and to discuss them. In a focus-group, unlike a workshop, there is no intention to form a consensus during the discussion, or for the group to acquire a sense of ownership of any decisions made or solutions identified.

Focus groups can be a cost-effective way of obtaining views and ideas, but are unlikely to offer too much in the way of design, and are not suitable for obtaining quantitative data. As with a workshop, the success of a focus group session depends in large upon the skill of the facilitator in allowing all members to express their thoughts and opinions, and to drill down into whatever may be behind any strong feelings provided as feedback or suggestions.

SCENARIOS

Scenario analysis is essentially telling the story of a task or transaction. Scenarios are useful when analysing or redesigning business processes as they help both the staff member and the analyst to work through the steps required of a business process or system. This will enable them to think through and visualise the steps more clearly. A scenario description will include the business event that triggers the transaction, the set of actions that have to be completed in order to achieve a successful outcome and other aspects such as the actor responsible for carrying out the task, the preconditions and the postconditions. The preconditions are the characteristics of the business or state of the IT system that must be true for the scenario to begin. Postconditions are the characteristics that must be true following the conclusion of the scenario.

One of the key strengths of scenarios is that they provide a framework for discovering the exceptions that require alternative paths to be followed when carrying out the task. The transition from each step to the next provides an opportunity to analyse what else might happen or be true. This analysis often uncovers additional information or tacit knowledge. For these reasons scenarios are extremely useful in requirements elicitation and analysis.

Advantages and disadvantages of scenarios

Scenarios offer significant advantages to the analyst:

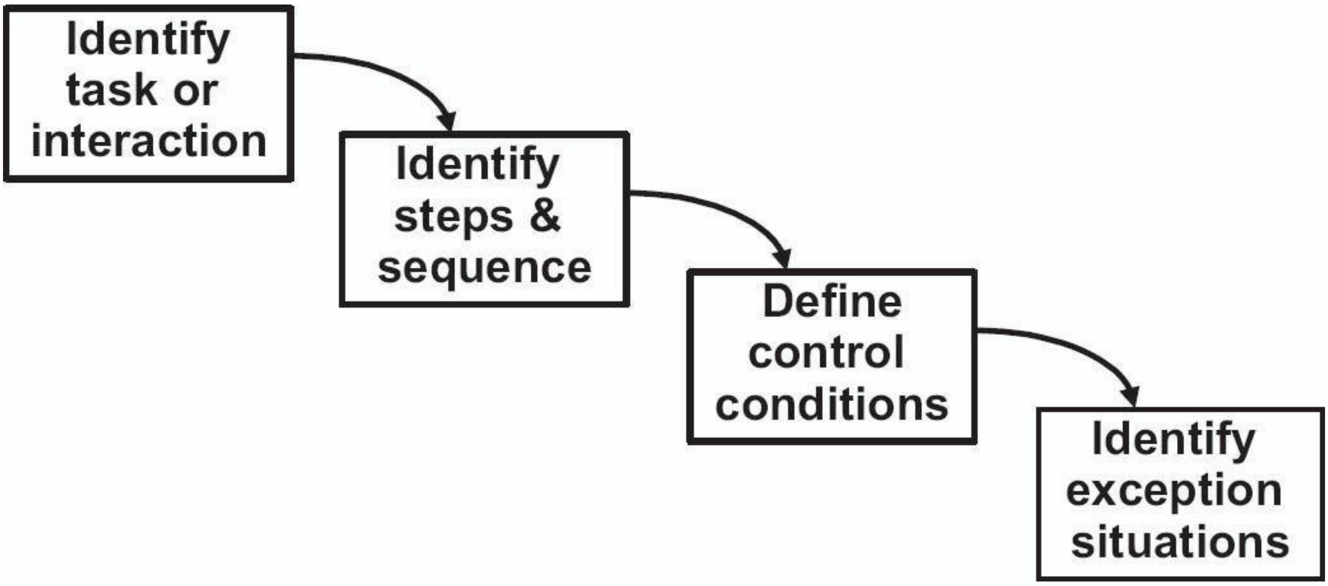
- They require the user to include each step and the transitions between the steps, and as a result remove the opportunity for omissions.
- The step-by-step development approach helps ensure that there are no taken-for-granted elements and the problem of tacit knowledge is addressed.
- They are developed using a ‘top-down’ approach, starting with an overview scenario and then refining this with further detail. This helps the business user visualise all possible situations and removes uncertainty.
- A workshop group refining a scenario will identify those paths that do not suit the corporate culture, or that are not congruent with any community of practice involved.
- They provide a basis for developing prototypes.
- They provide a tool for preparing test scripts.

The disadvantages of scenarios are that they can be time-consuming to develop and some scenarios can become very complex, particularly where there are several alternative paths. Where this is the case, you will find it easier to analyse the scenarios if each of the alternative paths is considered as a separate scenario.

Figure 5.4 shows an overview approach to developing scenarios and includes the following steps:

- Identify the task or interaction to be modelled as a scenario and the trigger, or event, that causes that interaction to take place.
- Identify the steps that will be carried out during the usual progress of the interaction, and the flow of these steps.
- Define the control conditions; the conditions that must be met in order to move from one step to the next, following the typical sequence of steps.
- Identify the alternative paths that would be required to handle the situations where the control conditions are not met.

Figure 5.4 Process for developing scenarios



This approach establishes a default path for the scenario that assumes no complications and everything running as expected. This path is often known as the main success scenario, or sometimes, the 'happy day' scenario. Scenarios are powerful when eliciting information, because they break down each of the default steps to ask the questions 'What needs to be true to continue with this path?' and 'At this point, what might happen instead?' Once the alternatives have been uncovered the analyst can then ask the question 'What should we do if this happens or if this is true?'

Consider an example scenario where a customer wishes to place an order via the telephone.

The precondition might be that for the process to happen the sales clerk is already logged in to the sales system. The default steps for the telesales clerk could then be:

i. enter customer reference number;
ii. confirm customer details;
iii. record order items;
iv. accept payment;
v. advise customer of delivery date.

In order for this scenario to flow in the sequence shown, the control conditions to go from step (i) to step (ii), step (ii) to step (iii), and so on must be true. For example, the order items recorded in step (iii) must be in available for step (iv) to take place. However, if there were insufficient stock then the next step to be followed would not be step (iv) but an alternative step. There may be several possible actions to be taken following this alternative step, such as:

- delay an order fulfilment until stock arrives;
- allocate a substitute item;
- send an order and the customer's delivery details directly to the supplier.

At the (successful) conclusion of the process the postcondition might be: The customer order has been recorded, stock levels have been adjusted and payment has been received.

All of the possibilities should be explored, and documented as alternative paths; these are termed 'extensions' to the default scenario. This process helps to ensure that all possible situations and exceptions are anticipated, and so help satisfy the law of requisite variety.

The example scenario above is described in a generic, abstract manner and some users may find this approach difficult to apply to the reality of their work. Another possible approach is known as a 'concrete' scenario where a specific narrative or story is developed and then tested against the requirements already identified to find the gaps.

Here is an example of a concrete scenario for a vehicle parts system:

> Turpin Coaches calls with an urgent request for 500 Type 2 gaskets. They are a highly valued – and valuable – customer. They tell the clerk that if we cannot satisfy them, they must go elsewhere. The stock records show that there are 150 Type 2 gaskets available. Four hundred were allocated to ZED just 30 minutes previously. Their order will not be processed for another 2 hours. The clerk wishes to amend the ZED order.

Using this concrete scenario, we can see that there is a possible extension in that an order may be prioritised and amended, giving rise to alternative paths through the 'take order' scenario. This will require the analyst to record additional requirements to those reflected in the 'happy day' such as the ability to prioritise orders and to amend orders already accepted. Concrete scenarios such as this example are extremely useful in helping to uncover where all the possible extensions lie and can be used during one-to-one discussions or workshops. It can be helpful for the analyst to present a prepared 'happy day' scenario which is then used as the basis for a discussion. An approach that helps encourage the business stakeholders to contribute wholeheartedly to this process, involves placing them in break-out groups with the instruction to produce a concrete scenario that will break the 'happy day' path. Experience shows that this instruction sharpens their creativity and produces many valid extensions. All extensions, and resultant requirements, that are uncovered are then added to the analysis documentation.

Documenting scenarios

A popular way of documenting scenario descriptions is to develop use case descriptions to support use case diagrams. This technique is part of the Unified Modeling Language (UML) and is a textual method. However, there are a number of graphical methods for documenting a scenario, such as storyboards, activity diagrams, task models and decision tree diagrams.

USER ANALYSIS

It will be evident from the description of scenario modelling that it is important to understand who the actual users of the proposed system are likely to be and this is also true of prototyping which we discuss next. A starting point for understanding these users is to identify them and give them generic titles, like 'customer', 'supplier' or 'regulator'. (There is clearly a relationship here with stakeholder analysis which is discussed in Chapter 6.)

However, sometimes these generic titles do not tell us enough about the business users for us to envisage how and why they might want to use an information system. 'Customer', for example, is a very broad term that may not capture the different sets of characteristics displayed by the actual customers of an organisation. A good way of understanding customers is to create 'personas' for them. For example, for a banking system, we might speculate about three typical customers:

George
George is a man in his mid-70s who has used the bank for 50 years. He is not particularly familiar with computers, which he mainly uses for email to keep in touch with his grandchildren in Australia. He prefers face-to-face contact with the bank to using its online services, though be might be enticed to use these if they could be made intuitive enough.

Emma
Emma is a professional woman in her thirties who combines a fairly high-pressure job with looking after two small children. She is very conversant with computers and prefers to do her banking in spare moments or late in the evening and rarely, if ever, visits a physical bank branch.

David
David is a high-worth businessman who makes extensive use of the bank's wealth management services. He is extremely busy but nevertheless likes to have a personal relationship with his financial advisers. He demands a high standard of service.

Although these personas are archetypes, they nevertheless help us to envisage why and how these different customers might want to access the bank's services and to design processes and services that are suitable for them. Personas can also be useful when analysing the users of the business system who have particular accessibility requirements. For example, we may identify a persona that represents customers who have a specific disability that we need to understand in order to enable access to the available business services.

PROTOTYPING

Prototyping is an important technique for eliciting, analysing, demonstrating and validating requirements. Analysts often complain that the business users do not know what they want, and that as a result it is difficult to define the requirements. However, it can be very difficult for anyone to envisage requirements for the future without having a sense of what is possible. It is much easier to review a suggested solution and identify where there are errors or problems. If business users are unclear about their requirements, prototypes can help them visualise the new system and provide insight into possible requirements. Using a prototype often releases the blocks to thinking, and can result in greater understanding and clarity. Prototypes also offer a way of demonstrating how the new processes or system might work and provide a concrete basis for evaluation and discussion. Agile software development approaches, such as DSDM and Scrum, use evolutionary prototyping as an integral part of their development lifecycle.

Prototyping involves building simulations of a process or system in order to review them with the users to increase understanding about the requirements. There is a range of approaches to building prototypes. They may be built using the organisation's system development environment so that they exactly mirror the future system. Images of the screens and navigations may be built using presentation software packages such as Microsoft PowerPoint or they may be mock-ups on paper. A quick but effective form of prototyping is to use flipchart sheets, pens and packs of sticky notes and work with the users to develop paper prototypes. This will enable the users to develop screens, identify navigation paths, define the data they must input or refer to, and prepare lists of specified values that they know will apply. This approach can also be used to develop prototypes of a business process.

There is a strong link between scenarios and prototyping because scenarios can be used as the basis for developing prototypes. As well as confirming requirements, prototyping can often help the users to identify some that they had not considered previously.

Advantages and disadvantages of prototyping

Prototypes are useful for a variety of reasons including:

- to clarify any uncertainty on the part of the analysts and confirm to the user that we have understood what they asked for;
- to help the user identify new requirements as they gain an understanding of what the system will be able to do to support their jobs;
- to demonstrate the look and feel of the proposed system and elicit usability requirements;
- to validate the system requirements and identify any errors;
- to provide a means of assessing the navigation paths and system performance.

Prototyping has a number of hazards, most of which can be avoided by setting clear objectives for the prototyping exercise and managing the stakeholders' expectations. The hazards include:

- The prototyping cycle can spin out of control with endless iterations taking place.
- If the purpose of the exercise has not been explained clearly, the users may think that when they are happy with the mock-up, the system is now complete and ready for use.
- User expectations can be raised unnecessarily by failing to mimic the final appearance of the system, or its performance; a system that is on a stand-alone machine with six dummy data records to search will be more responsive than a machine that is sharing resources with a thousand other machines on a national network, and has several million records to access. If there is likely to be a delay in the real response time, it is important that you build that into the prototype.

In an Agile software development environment, prototyping sessions are used to elicit and analyse requirements, and to construct and test working functionality. The development work is conducted iteratively, with each iteration using the concept of a timebox or sprint, typically a predefined number of weeks, within which certain functionality is delivered. During the timebox, the selected requirements for that delivery will be validated, coded, tested and released. Contingency is provided by the prioritisation of the requirements, whereby some are designated at a lower level of priority and may be postponed to a later timebox if necessary. In this approach, the tension between time and quality is resolved in favour of time but, because Agile encourages iterative development, the quality – i.e. the scope of functionality – is merely postponed, not sacrificed. The prototyping approach allows the business to receive the most critical pieces of functionality when it needs it, and the less urgent functionality will be delivered in future iterations.

QUANTITATIVE APPROACHES

Quantitative approaches are used to obtain data that is needed to quantify the information that has been provided during interviews, workshops or other qualitative techniques. Examples of the quantitative data we need could be the following: we might want to know the number of workers who use a particular system, the number of complaints received during a set period or the number of orders processed each day.

Surveys or questionnaires

Surveys can be useful if we need to get a limited amount of information from a lot of people and interviewing them individually or running a series of workshops would not be practical or cost-effective. However, surveys are difficult to design and this has to be done with care in order to have any possibility of success.

The exact design of a survey depends upon its purpose but there are three main areas to consider: the heading, classification and data sections.

Heading section

This is where the purpose of the survey is explained and where instructions for returning it are given. It is very important that the heading section sets out clearly the rationale for the survey, the instructions for its return and, where appropriate, any incentive for completing it. A well-formed heading section will help the respondent to understand why the information is needed, and as a result will significantly increase the volumes that are returned.

Classification section

This is where the details about the respondent are captured. This data provides the basis for categorising the respondents using predefined analysis criteria, like age, gender or length of service. Sometimes, surveys are anonymous in that they do not require identification information about respondents. If this is the case – perhaps because some controversial questions are included – you must make sure that the respondents cannot be identified by other means, or confidence in the process will be lost and you will be unlikely to have a truthful response, if you receive one at all. For example, sometimes asking for data such as job role, age and gender would enable the identification of a respondent.

Data section

This is where the main body of questions is posed. It is vital to think carefully about the phrasing of the questions. They must be unambiguous and, ideally, allow for straightforward answers such as 'yes/no', 'agree/neutral/disagree' or 'excellent/satisfactory/inadequate'. It is always better to structure the questions, where possible, so that the same range of answers is the same for each group of questions. It is also important that every set of potential responses is thought through carefully using the MECE approach. MECE stands for 'mutually exclusive, completely exhaustive' and involves checking each set of defined, alternative responses to make sure that only one would apply to each respondent and that they cover every situation.

It is important to design surveys carefully if we are to extract meaningful data from the results. We want to be able to build a summary of the responses, observe patterns and trends, and draw relevant conclusions; online survey products are often helpful in supporting this analysis. However, for the conclusions to be meaningful, the survey must provide clear, unambiguous questions and well-defined responses so that the data can be collated and analysed properly. A frequent error used in surveys involves framing questions that are ambiguous. For example, if the question 'Have you used our website recently?' was posed and the response was 'No', what would that mean? Does it mean that the respondent:

- Is not interested in our products and services and hence has not visited our website?
- Did not know we had a website?
- Is not IT-literate and hence has never used this or any other website?
- Last used the website six months ago and does not consider that 'recently'?

In this example, the term 'recently' is ambiguous and needs to be quantified. Alternatively, the question could be rephrased to ask when the website was last used, and the responses should offer specific time periods that align with the MECE approach.

The key drawback with using surveys is that people will find it difficult to find the time to complete a survey unless it is a topic of interest of significance to them. So, we have to try to clarify the reasons why the survey exists and why their assistance is needed. In some situations, a ‘prize’ or other type of reward may be offered as an inducement to complete the survey. Ultimately, though, it can be very difficult to obtain the desired number of responses and that needs to be factored in to the design when adopting a survey approach.

Special purpose records

Special purpose records are data-gathering forms used by the analyst; the format is usually decided by the analyst and they are not company records. They can be completed either by the analyst during an observation session or given to the business users to complete over a period of time.

If the area under investigation were customer services, the analyst may spend a period of time in the department shadowing one of the staff and compiling a special purpose record in order to record the number of customer approaches per day, and classify them – perhaps using a five-bar gate notation – according to whether they are complaints, queries or returned goods. They may record the nature of customer calls, their duration, how long it takes to retrieve the data needed to answer the query. Such information could help the analyst understand the problems with the business process and where there is scope for improvement.

Another approach is to give the form to the business users to complete as they perform the task. For example, they could keep a five-bar gate record about how often they need to transfer telephone calls – this could provide the analyst with information about the problems with the business process.

There are difficulties with getting people to keep this form of record, chief of which is that it is easy to forget to record each occurrence. So, if getting people to keep special purpose records is to be useful, two important criteria have to satisfied:

- The people undertaking the recording must be induced to ‘buy-in’ to the exercise. This may be by persuading them of the need or benefits, however, another possibility is that they are instructed to do this by their manager.
- The survey must be realistic about what people can reasonably be expected to record.

Notwithstanding this, it can still be useful sometimes to get people to keep such records as they help avoid the problems associated with observation and it can be an effective use of the analyst's time.

Activity sampling

This is a further quantitative form of observation and can be used when it is necessary to know how people divide their work time among a range of activities. For example, how much time is spent on the telephone? How much time spent on reconciling payments? How much time on sorting out complaints?

One way to find out how people spend their time would be to get them to complete a special-purpose record but sometimes the results need to have a guaranteed level of accuracy, for example if they are to be used to build a business case. In situations where accuracy is important, activity sampling may be used in preference to observation or special-purpose records. An activity sampling exercise is carried out in five steps:

1. Identify the activities to be recorded. This list should include a 'not working' activity as this covers breaks or times away from the desk. It might also include a 'not-related' task, such as first aid or health and safety officer duties.
2. Decide on the frequency and timings, i.e. when and how often you will record the activities being undertaken.
3. Visit the study group at the times decided upon and record what each group member is doing.
4. Record the results.
5. After a set period, analyse the results.

The results from an activity sampling exercise provide quantifiable data about the number of times an activity is carried out per day by the group studied. By analysing that figure against other data, such as the total amount of time available, we are able to calculate the total length of time spent on that activity and the average time one occurrence of the activity will take. This information can be useful when developing business cases and evaluating proposed solutions. Also, it will raise other questions such as whether the average time is reasonable for this task or whether it indicates a problem somewhere else in the process.

Document analysis

Document analysis involves reviewing samples of source documents to uncover information about an organisation, process or system.

For each document, we might analyse:

- How is the document completed?
- Who completes the document?
- Are there any validations or controls on the document?
- Who uses the completed document?
- When is the document used?
- How many are used or produced?
- How long is the document retained by the organisation, and in what form?
- What are the details of the information shown on the document?
- Where is the data or information obtained?
- Are other names used in the organisation for any of the items of data?
- Are all the data items on the document still needed, or are any redundant?
- Is there other data that is not entered on the document, but would be useful for this process?

Document analysis is useful to supplement other techniques such as interviewing, workshops and observation. For example, analysing the origin and usage of a document can prove very enlightening when investigating a process. Samples of completed documents or system printouts also help to clarify the key items of data used to carry out the work and can prove an excellent basis for modelling data (see Chapter 12).

SUITABILITY OF TECHNIQUES

Some of the techniques described in this chapter are suitable for general investigation of the problem situation and others more for eliciting requirements for the new system. Of those suitable for requirements, some are more suitable for a waterfall approach and others geared more towards Agile developments. Some techniques are suitable in all situations. Table 5.1 gives a guide to the suitability of these techniques for the different situations.

DOCUMENTING THE CURRENT SITUATION

While the investigation of the current situation is going on, the analyst will need to record the findings, in order to understand the range of issues and the business needs. Meeting reports should be produced for each interview and workshop so that they can be agreed with the participants. It is also helpful to use diagrams to document the business situation. This section suggests five diagrammatic techniques that help the analyst understand the information that has been obtained and find the root cause of any problems.

Rich pictures

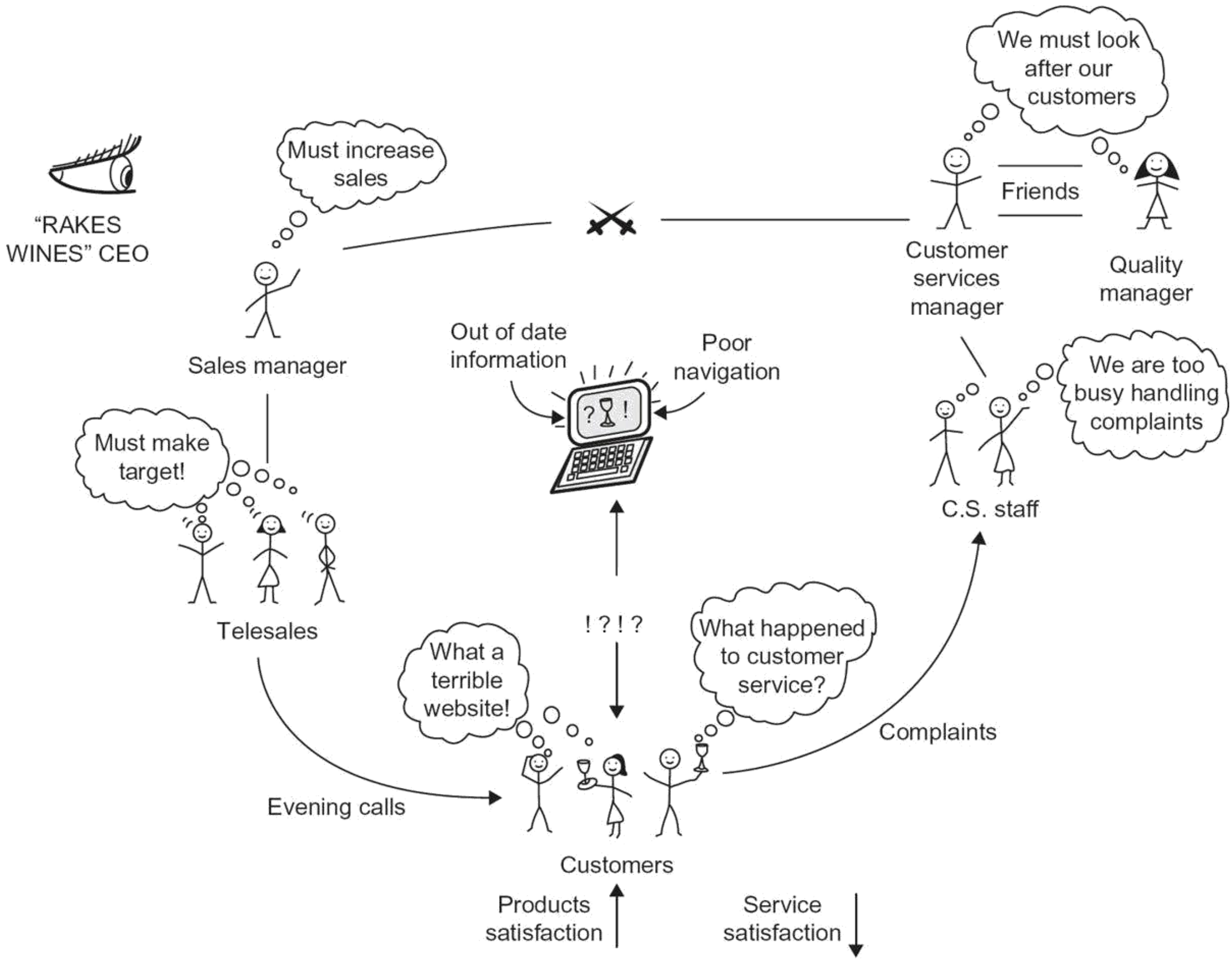
The rich picture technique is one of the few that provide an overview of an entire business situation. Whereas modelling approaches such as data or process modelling provide a clear representation of a specific aspect of a business system, rich pictures show all aspects. The technique does not have a fixed notation, but allows the analyst to use any symbols or notation that are relevant and useful. For this reason the rich picture can show the human characteristics of the business situation and can reflect intangible areas such as the culture of the organisation. Many problems in the current business system may have originated with the people performing the tasks rather than being caused by poor process design or inadequate IT systems. There could be differing viewpoints, misunderstandings, stress from too many tasks, personal differences with co-workers, dissatisfaction with management or frustration at inadequate resources. Any of these factors could impair the performance of a task, but the traditional analysis models would not be able to record them. A rich picture allows the analyst to document all of the human and cultural aspects as well as information flows and information usage. The unstructured nature of the technique allows the analyst to 'brain dump' the information in a simple, pictorial representation. Its strength is that the process of building the rich picture helps the analyst to form a mental map of the situation and see connections between different issues. The rich picture can also be enriched further as more information about the situation comes to light. Figure 5.5 shows an example of a rich picture for a business system called Rake's Wines.

Table 5.1 Suitability of techniques for different situations

Investigation technique	Understanding the situation	Waterfall requirements elicitation	Agile requirements elicitation
Interview	Y*	Y*	Y*
Observation	Y*	Y*	Y
Shadowing	Y*	Y*	Y
Workshop	Y*	Y*	Y*
Hothousing	Y	N	Y*
Scenario analysis	Y	Y*	Y*
Prototyping	Y	Y*	Y*
Questionnaires	Y*	Y*	N
Special purpose records	Y*	Y*	N
Activity sampling	Y*	Y*	N
Document analysis	Y*	Y*	N

Key: Y* = very suitable
Y = suitable
N = not suitable

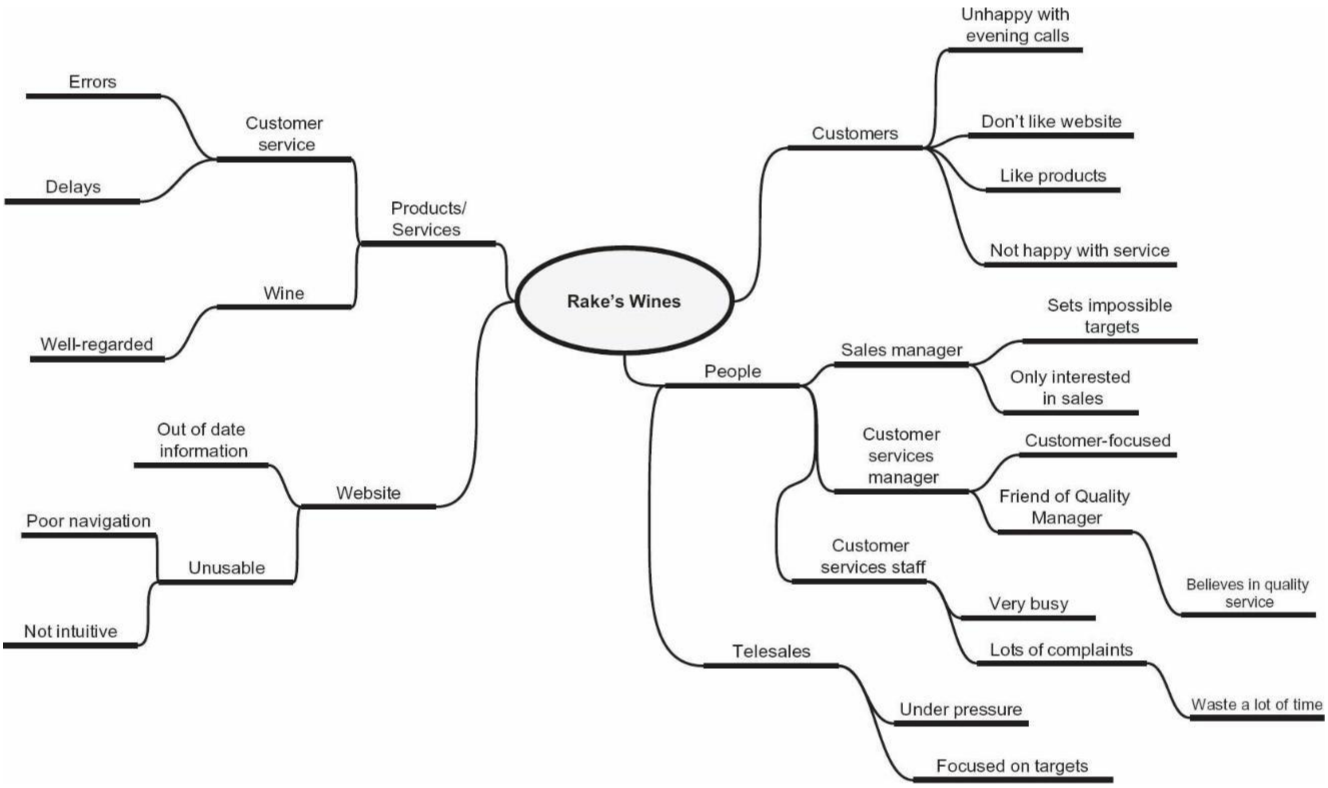
Figure 5.5 Example of a rich picture



Mind maps

Mind maps are a useful tool for summarising a lot of information in a simple visual form that is structured to highlight connections between different ideas and topics. They provide a means of organising information while, in a similar vein to rich pictures, representing all of the issues that have been uncovered about the situation. The business system or problem under consideration is drawn at the centre of the diagram with the main elements shown as first level of branches radiating from the central point. Each of these branches is labelled to indicate the nature of the particular area or issue; the labels should use as few words as possible, ideally one word. The branches might represent such matters as particular processes, the equipment and systems used, relationships between the staff that do the job and so on. These branches can then support second-level branches that are concerned with more detailed areas for each aspect of the situation. For example, the branch for equipment might show problems with the printing or photocopying equipment and the branch for systems might show the key failings of the IT system. A mind map helps structure the information gathered into a recognisable and manageable set of connections. Mind maps are extremely useful in helping analysts to order their thinking, and they work well both on their own and when used in conjunction with rich pictures. The mind map in Figure 5.6 for Rake's Wines relates to the rich picture shown in Figure 5.5.

Figure 5.6 Example of a mind map



Business process models

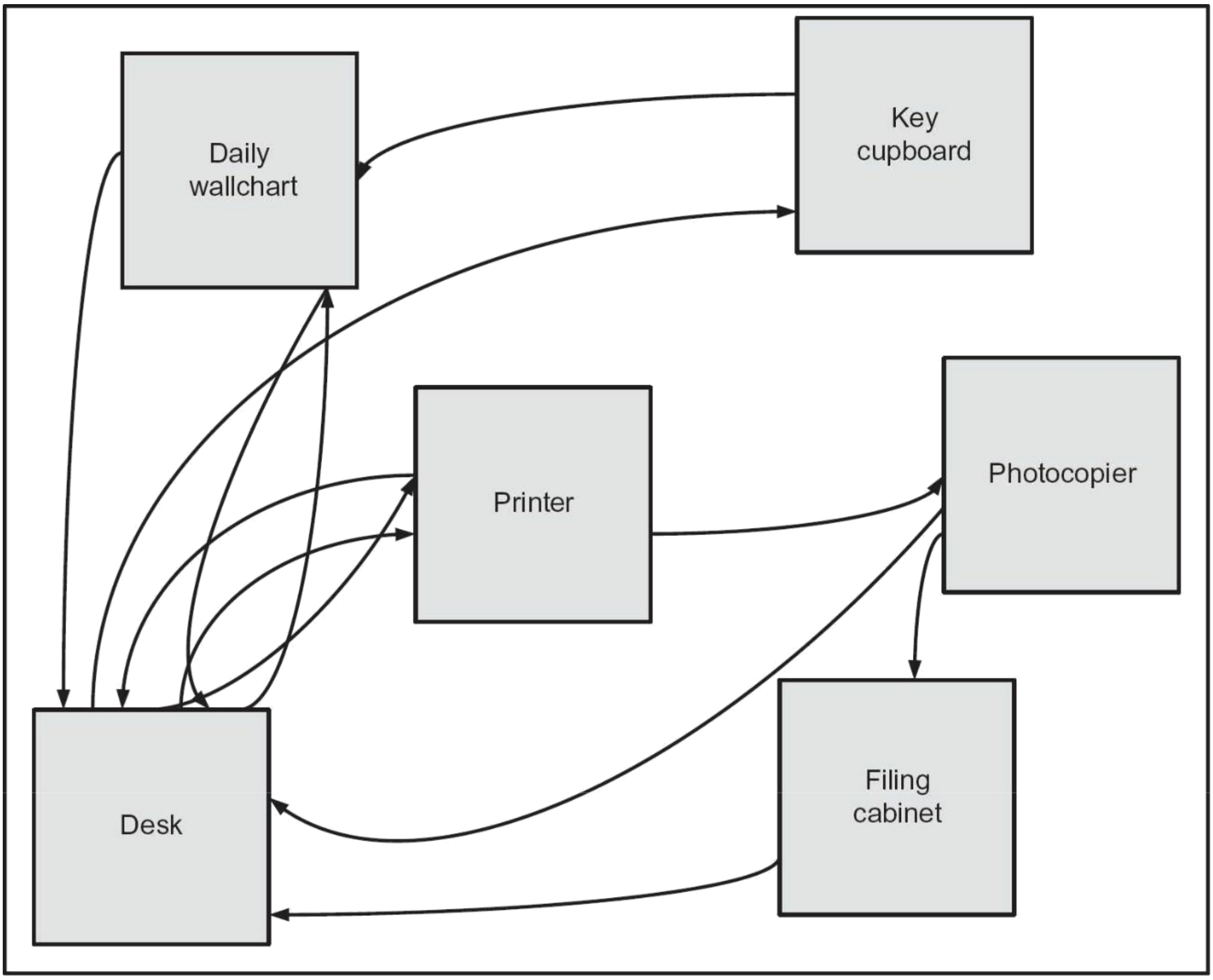
In order to understand fully how a process is carried out, it is helpful to draw a 'swimlane' diagram, which shows the tasks in a process, the actors responsible for carrying them out and the process flow. These models are easy to draw and business stakeholders find them accessible, so they provide a good communication tool between the analyst and the business staff. Business process models are also invaluable as a diagnostic aid since they help identify problems such as delays, bottlenecks and duplicate tasks. They are described in greater detail in Chapter 7.

Spaghetti maps

A spaghetti map is a tool to show the movement and interactions of the stakeholders in a particular environment, when performing particular tasks and processes. It is called a spaghetti map simply because as the movements are drawn, the diagram created resembles a plate of spaghetti, with lines crossing back and forth without any apparent formality or design. Spaghetti maps can be drawn up during an observation session, mapping the movements of users across the room to meet different actors or to use equipment such as printers or photocopiers.

Figure 5.7 shows a spaghetti diagram drawn while observing a clerk in the service department of a garage checking in a car for repair and allocating a courtesy car to the customer. Despite having a computer on her desk she still needed to make use of a printer, a photocopier, a filing cabinet and a wall chart in order to perform the task. Their position on the map is similar to their position in the real office. It is easy to see how much of the clerk's time is taken over the course of a day in accessing these different stations. This diagram represents one person executing one instance of a common task, and makes clear the scope for efficiency gains.

Figure 5.7 Example of a spaghetti map



It is interesting to note that a swimlane diagram would not show the physical movement required for an actor to perform a task, so it would not highlight the potential for improvement. The two diagrams together help identify the scope for improvement in the process.

Fishbone diagrams

One of the major objectives in investigating and modelling a business system is to identify where there are problems and discover their underlying causes. Some of these may be obvious, or the stakeholders may be aware of the root causes of their problems. However, sometimes it is only the symptoms that are highlighted by the stakeholders because the causes have proved difficult to isolate. The fishbone diagram is a problem-analysis technique, designed to help understand the underlying causes of an inefficient process or a business problem. It is similar to a mind map in some ways, but its purpose is strictly diagnostic. The technique was invented by Dr Kaoru Ishikawa (Ishikawa 1985), and the diagrams are sometimes known as Ishikawa diagrams. They are often used in root cause analysis. The name of the problem is documented in a box at the right-hand side of the diagrams.

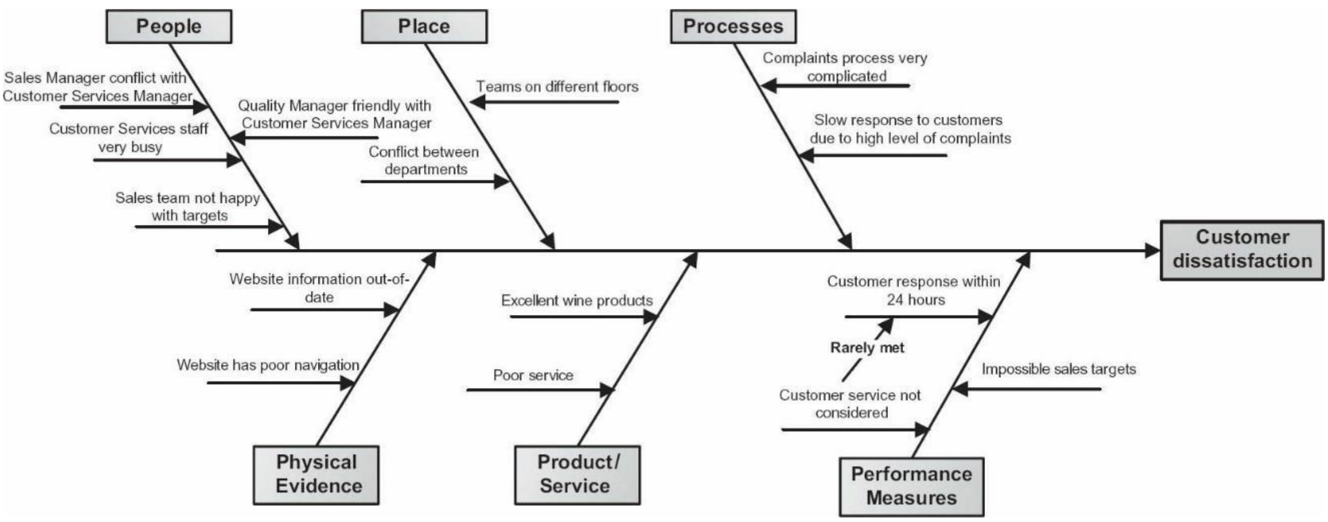
Stretching out from the box towards the left of the page is the backbone of the fish. Radiating up and down from this backbone are spines; the spines suggest possible areas for causes of the problem. A number of approaches may be used when labelling the spines:

- **The four Ms:** manpower, machines, measures and methods.
- **An alternative four Ms:** manpower, machines, *materials* and methods.
- **The six Ps:** people, place, processes, physical evidence, product/service and performance measures.
- **The four Ss:** surroundings, suppliers, systems and skills.

These categories help because they list areas that have been found to be the sources of inefficiencies in many business systems. In practice we often consider a range of categories and might combine the most relevant elements from the approaches above, or even define some categories that are particularly relevant to a given project. Data for this analysis can be found from interviews, workshops, activity sampling, observation and special purpose records. The categories to be used on the fishbone diagrams can also provide a structure to a workshop discussion.

As with mind maps, the spines have more detailed elements associated with them. Each category along a spine is examined, and the factors within that category that may be affecting the problem are added to the diagram. The resultant diagram is shaped like a fishbone – hence the name fishbone diagrams. An example of a fishbone diagram (for the Rake's Wines scenario) is shown in Figure 5.8.

Figure 5.8 Example of a fishbone diagram



Once the diagram has been completed, we can analyse the results by looking for the key causes of problems. These are the items that are listed several times, since they are the ones that are likely to be having a broad impact upon the situation. They should be considered for rapid action in order to help address the issue promptly.

SUMMARY

Any business analysis project will inevitably include investigating business situations in order to clarify the problem to be addressed. To do this effectively, the business analyst needs a toolkit containing a range of investigative and diagrammatic techniques. This toolkit provides the basis for a key competency of a business analyst which is the ability to appreciate when particular techniques are relevant and the ability to apply them effectively.

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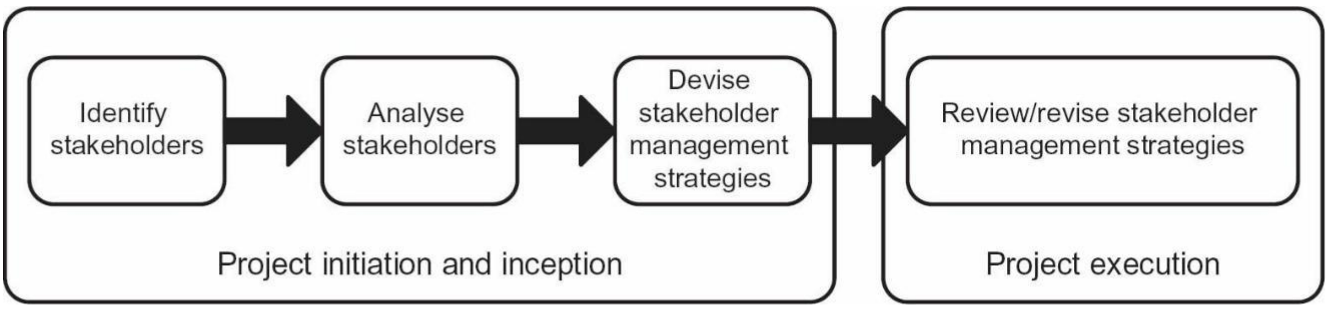
6 STAKEHOLDER ANALYSIS AND MANAGEMENT

James Cadle

INTRODUCTION

Effective stakeholder management is absolutely crucial to the success of any business analysis project. Knowing who the stakeholders are, and understanding what it is they expect from the project and delivered solution, is vital if they are to remain involved and supportive of the undertaking. One of the major reasons why business analysis projects do not succeed – or do not succeed fully – is poor stakeholder management. The project team does not recognise the importance, or even the existence, of a key stakeholder and they find that their plans are constantly frustrated. On the other hand, if the right stakeholders are identified and managed properly, most obstacles can be cleared from the path. In fact, much of the groundwork for stakeholder management takes place before the business analysis project proper begins – during project inception and initiation – and that work must be revisited constantly during the project itself. The basic steps involved are illustrated in Figure 6.1.

Figure 6.1 Stakeholder management in the project lifecycle



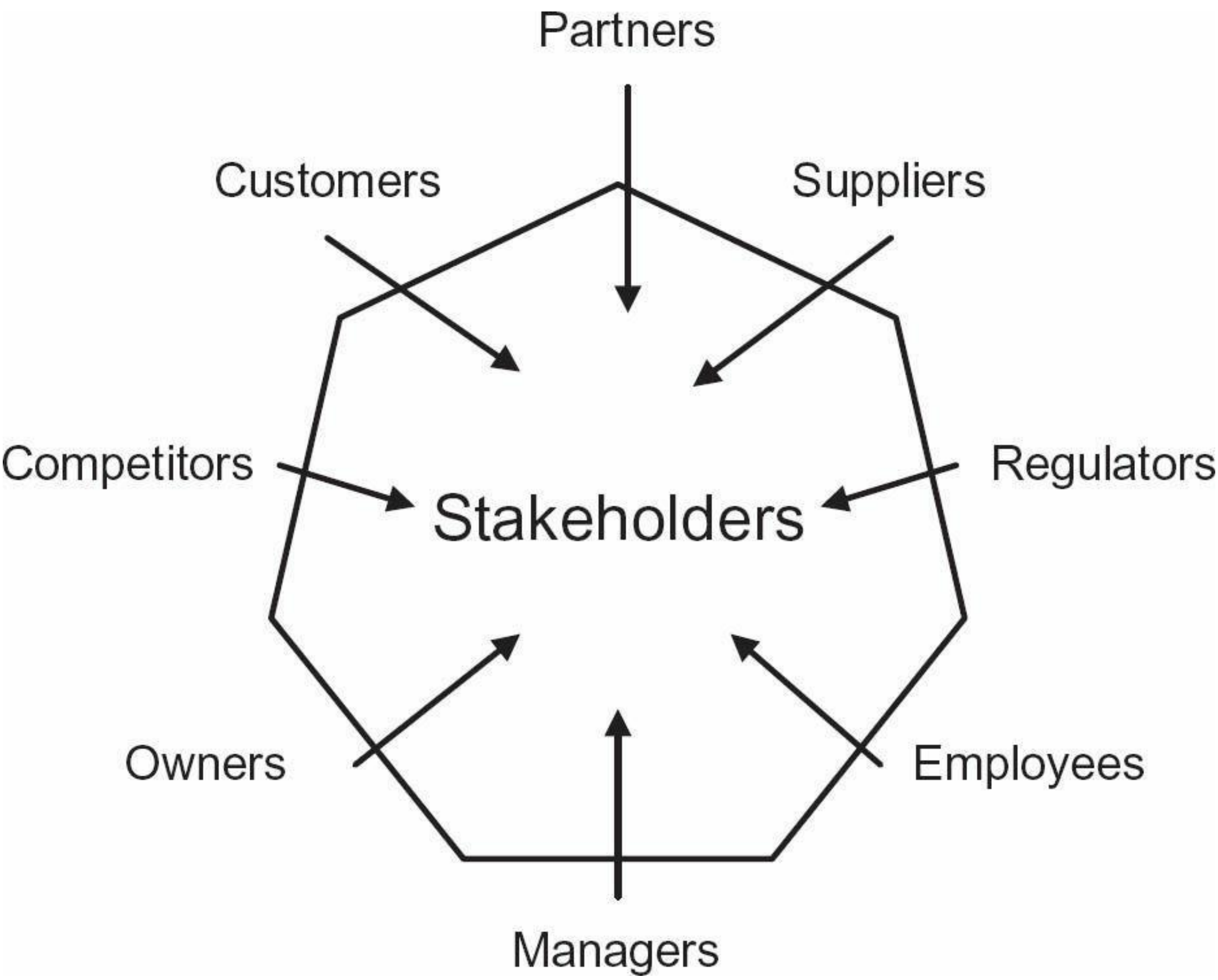
The main responsibility for stakeholder management may rest with the project manager or with a senior business analyst. However, all team members have important roles to play, in identifying stakeholders, in helping to understand their needs and by helping to manage their expectations of the project.

STAKEHOLDER CATEGORIES AND IDENTIFICATION

As Figure 6.1 illustrates, the first step in stakeholder management involves finding out who the stakeholders are. A good working definition of a stakeholder is ‘anyone who has an interest in, or may be affected by, the issue under consideration’. This means, more or less, anyone affected by the project or who may be in a position to influence it.

Of course, each project will have its own distinctive set of stakeholders, determined by the nature of the project and the environment in which it is taking place. However, we can identify some ‘generic’ stakeholder categories that may apply to many projects, as illustrated in Figure 6.2.

Figure 6.2 The stakeholder wheel



Customers

These are the people or organisations for whom our organisation provides products or services. They are stakeholders because anything we do in the way of change has a potential effect on them. We must consider how to manage that change most effectively so as not to lose customers that we wish to retain. It may be useful to subdivide this general category to reveal more detail about the stakeholders, for example into:

- large or small;
- regular or occasional;
- wholesale or retail;
- corporate or private;
- commercial, non-profit or public-sector;
- civilian or military;
- domestic or export.

We may even have different categories that we simply label ‘good customers’ and ‘difficult’ customers’, however we define them.

Partners

These are the organisations that work with our organisation, for example, to provide specialist services on our behalf. Examples of partner organisations may be a reseller of our products or services or an outsourcing company that provides catering services.

Suppliers

These provide us with the goods and services that we use. Again, we may wish to subdivide them, perhaps into:

- major or minor;
- regular or occasional;
- domestic or overseas.

Suppliers are stakeholders because they are interested in the way we do business with them, what we wish to buy, how we want to pay and so on. Many change initiatives have the effect of altering the relationships of organisations with their suppliers and, as with the customers, such changes need to be managed carefully to make sure that they achieve positive and mutually beneficial results.

Competitors

Competitors vie with us for the business of our customers and they therefore have a keen interest in changes made by our organisation. We have to consider what their reactions might be and whether they might try, for instance, to block our initiative or to produce some sort of counterproposal.

Regulators

Many organisations are now subject to regulation or inspection – either by statutory bodies like Ofcom (Office for Communications) and Ofsted (Office for Standards in Education), or by professional bodies like the General Medical Council. These regulators will be concerned that changes proposed by an organisation are within the letter and spirit of the rules they enforce.

Owners

For a commercial business, the owners are just that – the people who own it directly. The business may be, in legal terms, a sole trader or partnership. Or, it could be a limited company, in which case the owners are the shareholders. For public limited companies, the majority of shares are held by institutions like investment companies and pension funds and so the managers of these share portfolios become proxy owners.

Employees

The people who work in an organisation clearly have an interest in the way it is run and in changes that it makes. In a small firm, the employees may be regarded as individual stakeholders in their own right but, in larger concerns, they are probably best considered as groups. Sometimes, employees belong to trades unions, whose officials therefore become stakeholders too.

Managers

Finally, we have the professional managers of the organisation, those to whom its direction is entrusted. In a large organisation, there may be many layers of management and each may form a distinctive stakeholder grouping, for example:

- board-level senior managers;
- middle managers;
- junior managers;
- front-line supervisors.

As with many aspects of stakeholder management, it is an error to assume that a group like ‘managers’ is homogeneous in its views and concerns; junior managers may well have a very different perspective, and a different set of values and priorities, from those on the board who take the major strategic decisions.

Other stakeholders

Of course, the groups shown in Figure 6.2 are generic and, in particular cases, there may well be other stakeholders. For example, the insurers of an organisation may be interested in any areas that could affect the pattern of risk that is covered. Or perhaps the police might be interested in the law and order implications of some actions. In some organisations, the views of staff associations are also significant.

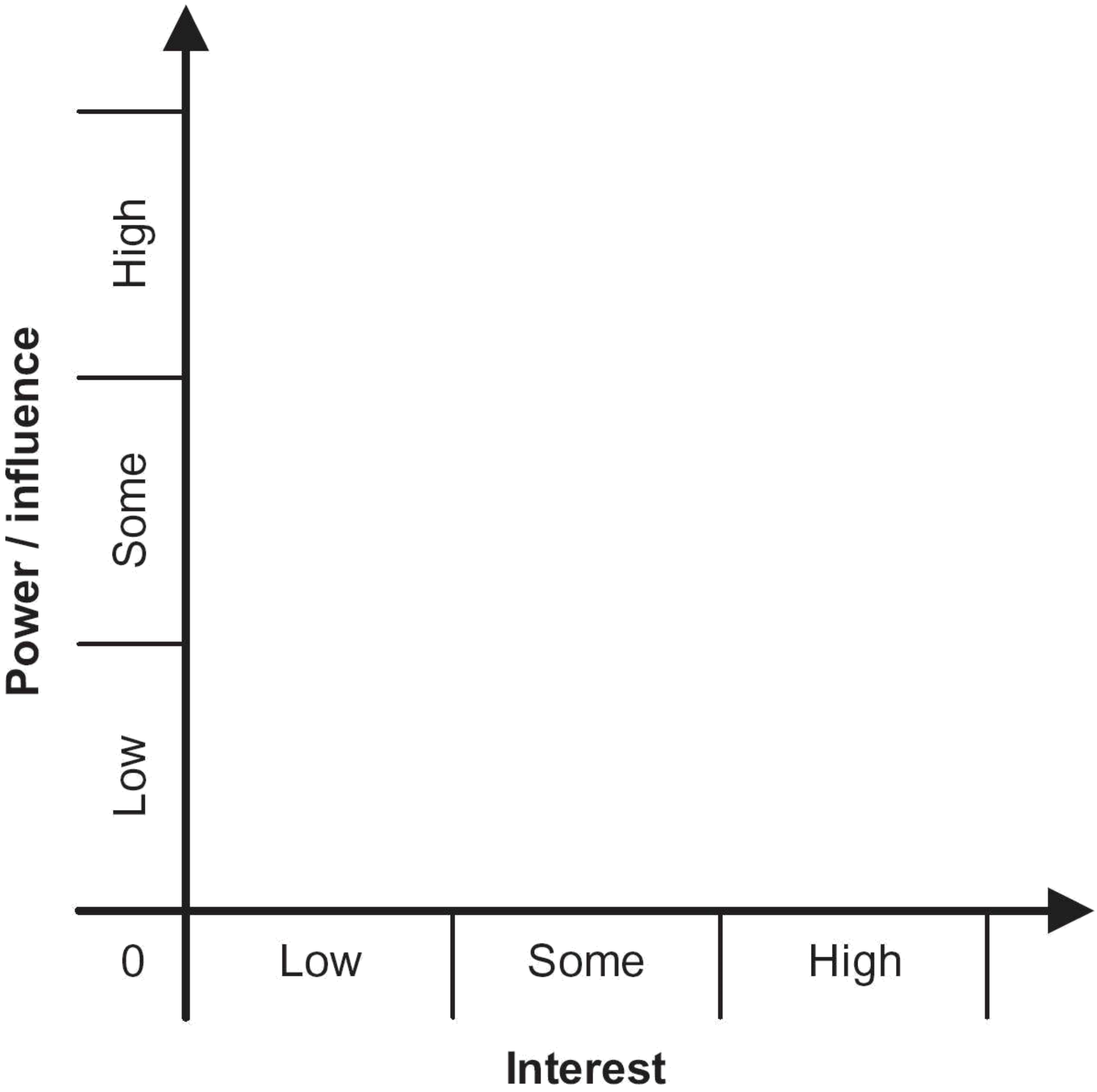
It is important, for each project that the identification of stakeholders is as complete as possible, as it will otherwise be impossible to develop and implement effective management strategies for them. It may be useful to conduct some sort of workshop with people knowledgeable about the organisation and the proposed project to make sure that the coverage of stakeholders is comprehensive.

ANALYSING STAKEHOLDERS

Having identified the stakeholders, the next step is to make an assessment of the weight that should be attached to their issues. No stakeholder should be ignored completely but the approach to each will be different depending on (a) their level of interest in the project and (b) the amount of power or influence they wield to further or obstruct it.

One technique for analysing stakeholders is the power/interest grid illustrated in Figure 6.3.

Figure 6.3 Stakeholder power/interest analysis



In using the power/interest grid, it is important to plot stakeholders where they actually are, not where they should be or perhaps where we would like them to be. We can then explore strategies for managing them in their positions or, perhaps, for moving them to other positions that might be more advantageous for the success of our project.

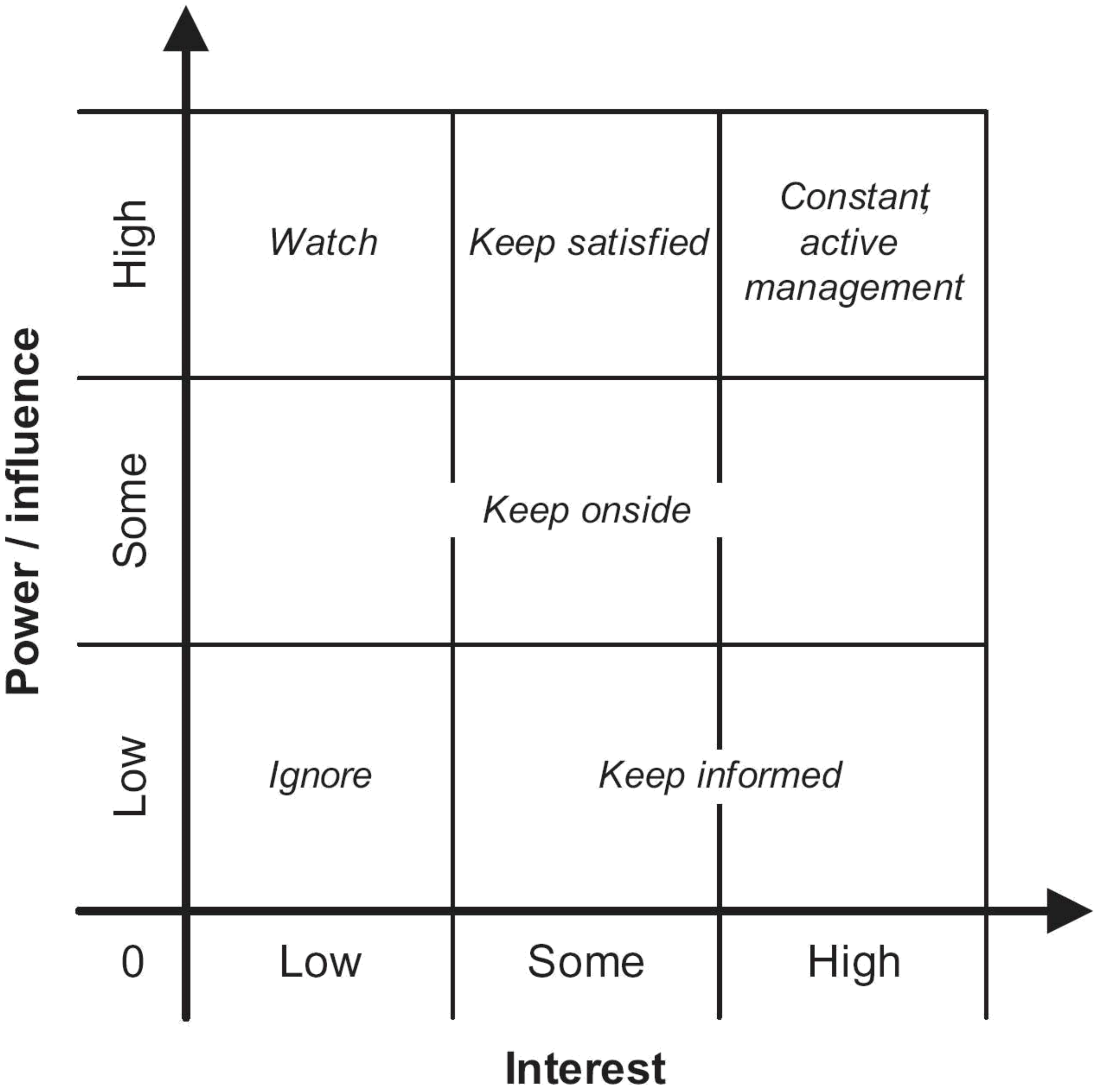
STAKEHOLDER MANAGEMENT STRATEGIES

There is, of course, an infinite number of positions that could be taken on the power/interest grid but it is probably sufficient here to consider the nine basic situations illustrated in Figure 6.4.

No or low interest and no or low power/influence

These are stakeholders who have neither a direct interest in the project nor any real power to affect it. For practical purposes, they can be ignored as regards day-to-day issues on a project and there needs to be no special effort made to 'sell' them its benefits. However, as stakeholders do change positions on the map (discussed below), it is probably wise to inform them occasionally about what is going on – perhaps through vehicles like organisation newsletters.

Figure 6.4 Basic stakeholder management strategies



Some or high interest but no or low power/influence

These groups can be very difficult to manage effectively as, although they may be directly affected by a change project, they feel powerless to shape its direction in any way. This can result in frustration and a passive resistance to change that, though overcome by positional power, can lead to delay and less-than-optimal results.

The basic management strategy here is to keep such stakeholders informed of what is going on and, in particular, of the reasons for the proposed change. But this is a rather passive approach and, in most circumstances, more effort has to be devoted to 'selling' the project. This can best be done by being as honest as possible about the need for change; by highlighting the positive aspects of the change or the negative consequences of not making it; and by frequent and focused communication of progress.

No or low to high interest but some power/influence

This is a rather varied group. It includes some stakeholders like middle or senior managers who do have some power or influence but who, because their interests are not directly affected, are not very concerned about the direction a project is taking. Regulators may also fall into this category and they will only start to get involved if some breach of the rules is suspected when they could, in effect, squash an initiative. The group can also include people with more interest in the project but, again, only some power or influence over it.

The best approach with this group is to keep them supportive of the project, possibly by frequent, positive communication with them but perhaps also by involving them more with the project. As the old saying has it, it is better to have them inside the glasshouse throwing stones out than outside throwing them in.

No or low interest but high power/influence

These are probably very senior managers who, for one reason or another, have no direct interest in the project. This may be because it is too small or unimportant for them to bother with or it may be that it is in an area that doesn't interest them; the Group Marketing Director, for instance, probably will not be concerned about a project to streamline the stationery purchasing procedures. For many purposes, it might be thought that they can be ignored but this is actually a rather risky approach. Our Marketing Director may, for instance, suddenly get very interested in the stationery system if she keeps getting pens that don't work or can't get hold of any sticky notes for a conference! So, if a situation arises that might cause them to take a greater interest in the project, we might want to address their needs directly, via one-to-one meetings perhaps, in order to ensure that they do not start to raise concerns or even decide to exert their influence. In some situations it is possible that we may wish to encourage the increased interest of influential stakeholders, for example, if we felt that their support would help achieve the project objectives. Where this is the case, we may need to highlight any aspects of the project that will have a direct impact upon the stakeholder's business area; some form of discussion will be required which, with very influential stakeholders, would typically involve a meeting.

Some interest and high power/influence

These people have some interest in the project – probably an indirect one as it is happening within or affecting their empire – and they have real power. The usual stakeholder management strategy here is to keep them satisfied and, perhaps, to prevent them from taking a more direct (and hence, possibly, more obstructive) interest in the project. In other circumstances, the strategy may be precisely the opposite – to get the stakeholder more actively involved in a project. For example, if the finance director of an organisation can be persuaded to get positively involved in a project, they will often be a powerful force for success, since they can make resources available that would otherwise be hard to come by.

High interest and high power/influence

These are the key players, the people who are both interested in the project and have the power to make it work or not. Often, the key players are the managers of the functions involved in a project. Initially, it is important to determine if individual key stakeholders are positive or negative in their approach to a project. If positive, then their enthusiasm must be sustained, especially during times of difficulty. It is also important to appreciate the concerns and opinions of key stakeholders and you will need to take these into account when making any recommendations. For example, if one of the key stakeholders has a particular solution in mind it is important to know about this as early as possible in order to ensure that, at the very least, the solution is evaluated as one of the options. It is also vital that the key stakeholders understand the progress of the project and why certain decisions have been made. These are the people to whom any final recommendations will be presented and who will have the final say on any decisions. They need to be kept informed at all stages of the project so that none of the recommendations come as a shock to them.

Those key players who are negatively inclined towards a project can be managed in various ways, depending on the circumstances:

- By far the best approach is to find some personal benefits for them in the proposed course of action. The stakeholder perspective analysis techniques described below can be very useful here.
- Alternatively, a more powerful counterforce must be found to outweigh their negative influence. This may mean engaging the interest of someone in one of the high power areas of the grid.

Individuals and groups of stakeholders

An individual customer may not be of much concern to an organisation such as a big supermarket chain. But if they post a negative review using social media, write to newspapers, organise petitions or complain to consumer groups, they can increase their level of power considerably. A lot of ‘people power’ can damage even large concerns considerably and force them into major reversals of course. The classic example of this is the mighty Coca-Cola being forced to reintroduce its traditional Coke in the face of a massive worldwide customer revolt against a new formula. Similarly, individual employees can be marginalised by an organisation but, if they are members of a trade union, their power is greater. A single government employee who objects to a policy may be relatively powerless but if they ‘blow the whistle’ to national newspapers, they can cause considerable difficulty.

These examples illustrate the dangers of ignoring the weakness of an individual or mistaking individual weakness for collective weakness. Stakeholders must be considered not just as individuals but as potential groups as well. Their ability to gain strength, particularly with the availability of social media mechanisms, should never be underestimated.

SUMMARY OF STAKEHOLDER MANAGEMENT STRATEGIES

The basic strategies for stakeholder management are summarised in Figure 6.4 but individual stakeholders will not fit neatly into one of the nine types and management approaches must be tailored for each. Also, as we shall discuss in the next section, stakeholders do not stay in the same place over time and so the ways they are managed must be adapted accordingly.

MANAGING STAKEHOLDERS

Stakeholders’ positions on the framework in Figure 6.4 do not remain static during the life of a project. At the most obvious level, a manager may get promoted so that, from being in the high interest/low power situation, is now both interested and powerful. Alternatively, the manager may lose interest in a project if promoted into a job with a wider remit. The circumstances of an organisation may change so that senior managers begin to focus more on IT projects. A scandal within a competitor organisation may cause a regulator to take a closer interest in all companies in a sector. This means that stakeholder analysis must be a continuing activity throughout the project – and even afterwards to find out what the stakeholders thought of the final outcome. The project team and project manager should be constantly on the lookout for changes in stakeholders’ positions and should be re-evaluating their management strategies accordingly. Once stakeholders’ initial positions have been plotted, a plan should be drawn up for managing each of them and how to approach it. A one-page assessment can be made for each stakeholder but a more useful approach would be to see all stakeholders at a glance by setting up a spreadsheet using the following headings:

Name of stakeholder

It may also be useful to record their current job titles.

Current power/influence

From the grid.

Current interest

From the grid.

Issues and interests

This is a brief summary of what interests each stakeholder and what we believe their main issues with the project are likely to be.

Current attitude

Here, we need to devise a classification scheme, perhaps using the following descriptions:

- Champion: will actively work for the success of the project.
- Supporter: in favour of the project but probably will not be very active in promoting it.
- Neutral: has expressed no opinion either in favour or against the project.
- Critic: not in favour of the project but probably not actively opposed to it.
- Opponent: will work actively to disrupt, impede or derail the project.
- Blocker: someone who will just obstruct progress, possibly for reasons outside of the project itself.

Desired support

What we would ideally like from this stakeholder, perhaps using a simple scale of high, medium or low.

Desired role

We may wish to get this stakeholder actively involved in the project, perhaps as the project sponsor or as part of a steering committee.

Desired actions

What we would like the stakeholder to do, if at all possible, to advance the project.

Messages to convey

This is where we define the emphasis that should be put on any communications to this stakeholder. For example, we might need to identify and highlight any issues that are of particular interest to this stakeholder. The messages are likely to be tailored to each stakeholder and so the more we know about them and their concerns, the more effective our communications will be.

Actions and communications

This is the most important part of the plan, where we define exactly what actions we will take with regard to this stakeholder. It may be just to keep them informed, in a positive way, about the project and progress to date. Alternatively, it may be a more active approach, for example meeting them to engage their interest in the project. Where a strategy has been devised to change a stakeholder's position – perhaps to encourage someone to take a closer interest – then its success must also be evaluated and other approaches developed if the desired results are not being achieved. As mentioned earlier, the high interest/high power stakeholders are the key players and require positive management, such as frequent meetings and discussions about the direction the project is taking. This will help make sure that they are kept informed about a project and are happy with the approach that we are taking. Perhaps just as important, we will understand when their opinions or issues have changed and will reflect this in the project direction and work as appropriate.

DEFINING STAKEHOLDER INVOLVEMENT – RACI AND RASCI CHARTS

Apart from deciding on the management strategy for the various stakeholders, it can also be very useful in a business analysis project to consider the tasks or deliverables and the extent to which the stakeholders are involved with them. A simple and effective method for achieving this is to create a RACI chart as illustrated in Figure 6.5.

A RACI chart – more formally known as a 'linear responsibility matrix' – lists the main products/deliverables down the side and the various stakeholders along the top. Where a stakeholder intersects with a product, we indicate their involvement using one of the RACI categories, which mean:

Figure 6.5 RACI chart

R = Responsible

A = Accountable

C = Consulted

I = Informed

	Project sponsor	Senior user	Business actor (user)	Domain expert	Project manager	Business analyst
Business case	A	C	I	C	R	C
Project initiation document	A				R	
Interview notes	I	C	C	C	A	R
Notes from workshops	I	C	C	C	A	R
Requirements catalogue	I	C	C	C	A	R
Use case diagram	I	C	C	C	A	R
Use case descriptions	I	C	C	C	A	R
Class diagram	I	C	C	C	A	R

- **Responsible:** This is the person or role responsible for creating or developing the product or performing the task. In Figure 6.5, for example, a business analyst is responsible for creating the interview notes.
- **Accountable:** The person or role who will 'carry the can' for the quality of the product or task. The project sponsor, for instance, must ultimately be accountable for the business case for a project.
- **Consulted:** This person or role provides information that is input to the product or task. In Figure 6.5, the senior user, other business actors and the domain expert are shown as being consulted during the interviews and workshops.
- **Informed:** These stakeholders are informed about a product or task,

though they may not have contributed directly to them. For example, the project sponsor has the right to be kept informed about any of the products being produced during the project.

A RASCI chart, shown in Figure 6.6 uses a similar approach but has an additional category S for ‘support’. This person (or role) will provide assistance, and sometimes resources, to whoever is responsible for the product/deliverable. For example, in Figure 6.6, the business analyst is shown as supporting the project manager in the creation of the project initiation document and the database administrator supports the business analyst in developing the class diagram.

Yet another scheme that could be used on a linear responsibility matrix includes I (initiation), E (execution), A (approval), C (consultation) and S (supervision).

Figure 6.6 RASCI chart

R = Responsible A = Accountable S = Support C = Consulted I = Informed	Project sponsor	Senior user	Business actor (user)	Domain expert	Project manager	Business analyst	Database administrator
Business case	A	C	I	C	R	C	
Project initiation document	A				R	S	
Interview notes	I	C	C	C	A	R	
Notes from workshops	I	C	C	C	A	R	
Requirements catalogue	I	C	C	C	A	R	
Use case diagram	I	C	C	C	A	R	
Use case descriptions	I	C	C	C	A	R	
Class diagram	I	C	C	C	A	R	S

USING SOCIAL MEDIA IN STAKEHOLDER MANAGEMENT

Once upon a time, in stakeholder management, there really was no alternative to coming into an organisation ‘cold’ with little understanding of who was who and where they fitted in. However, the availability of social media offers the business analyst additional resources to learn about stakeholders and to manage the relationships with them.

One obvious way of using social media is to use sites such as LinkedIn to carry out research about stakeholders. What is their role? What have they done previously in their careers? Do we have any contacts in common who could introduce us?

Once the business analysis project is underway, other forms of social media might be considered for communicating with stakeholders. For example, when considering the ‘low/low’ category in Figure 6.4 we said that these stakeholders could effectively be ignored as they have no direct interest in or influence over the project. However, resources such as Facebook and Twitter offer a cost-effective way of communicating with large groups of people on a frequent basis and keeping them informed. This can help to build a sense of community and make people feel involved in what is going on.

UNDERSTANDING STAKEHOLDER PERSPECTIVES

Introduction

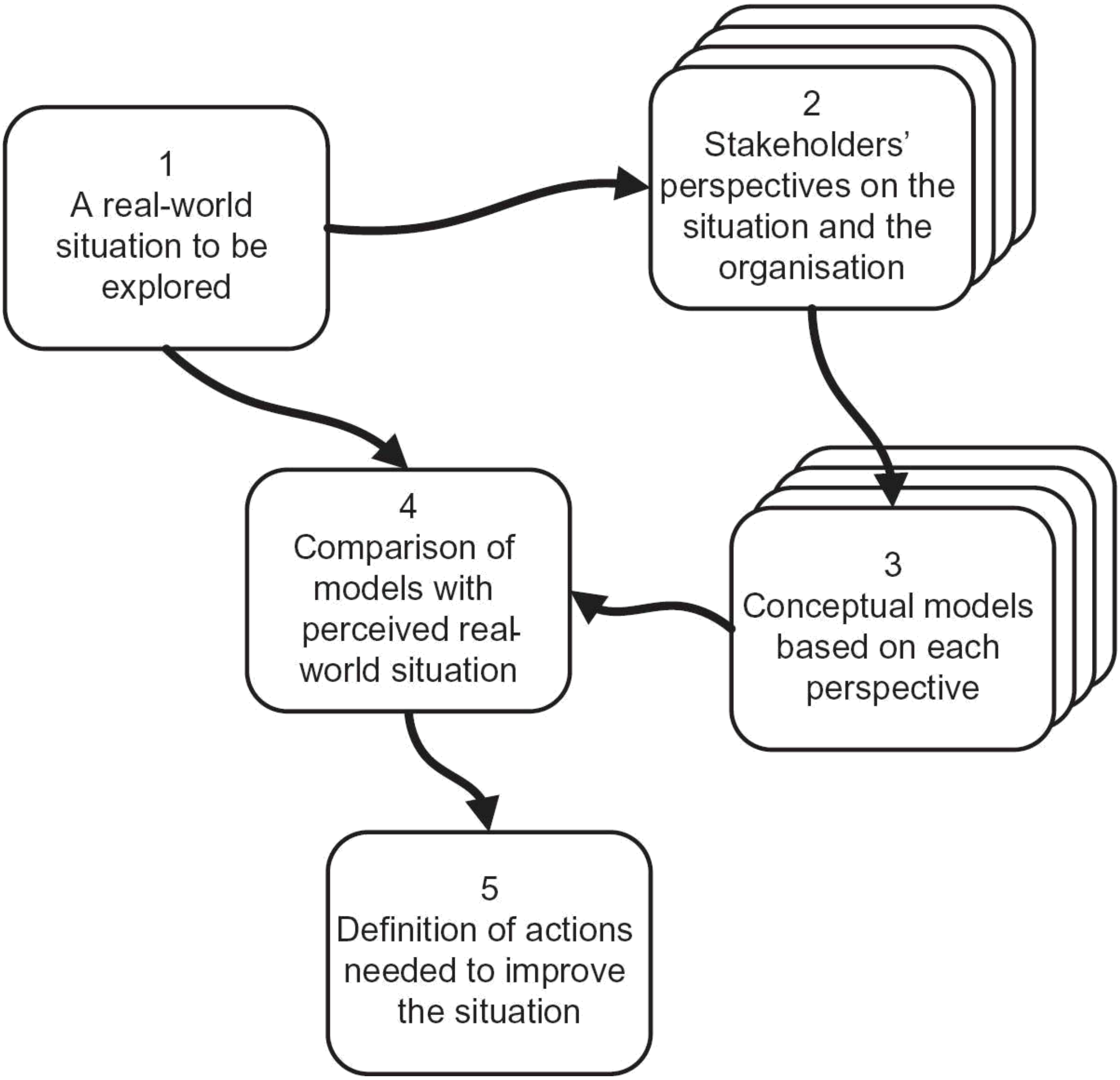
It is all very well knowing who the stakeholders are and what is likely to be their influence on a business analysis project. It is also important to understand their attitude – how supportive are they of what we are trying to achieve? But it is also vital to understand what they think, in other words what are their business perspectives? For example, in a commercial organisation, one stakeholder might feel that any activities are allowable as long as they are not actually illegal, whereas other stakeholders may feel that the organisation has some responsibility towards society at large and therefore conclude that some activities should be avoided on ethical grounds.

To help us understand these stakeholder perspectives, and to model the different business systems that would fulfil them. we can utilise some of the elements from Peter Checkland’s Soft Systems Methodology (SSM; Checkland 1999).

Soft Systems Methodology

Peter Checkland and his team at Lancaster University devised SSM in the 1980s as a way of understanding complex real-world situations. The basic premise underlying SSM is that real-world situations are rarely simple and are often very complex. An approach to business analysis, based upon elements and concepts from the SSM, is illustrated in Figure 6.7.

Figure 6.7 Business analysis using SSM concepts



When investigating business situations, it is often the case that stakeholders have different views about what the 'problem' is and also about what needs to be done. As Figure 6.7 shows, there are five main stages that should be applied:

1. The situation is identified, for example the loss of market share by a company or the poor public perception of a public body, and the issues and causes are investigated.
2. Stakeholders' views – perspectives – are sought about what the organisation is about, what it should be doing and so forth.
3. From each stakeholder's perspective, a conceptual model is created to show what the organisation should do to fulfil the perspective.
4. These conceptual models are compared with the real-world situation and a consensus model is generated, possibly by combining elements

from various stakeholder's perspectives.

5. Actions are defined to address the situation by implementing the consensus model in place of whatever is happening currently in the organisation.

Analysing the perspectives – CATWOE

SSM provides us with a very useful tool that we can use to explore the stakeholders' perspectives. Although the technique is known as CATWOE, experience shows that exploring the CATWOE elements is actually best done in the following order:

- **W = *Weltanschauung*** or **worldview** This summarises a stakeholder's beliefs about the organisation or business system, which explain why it exists and what it should be doing. If we consider the wine merchant business that was discussed in Chapter 5, the newly appointed Sales Manager believes that success in the wine trade results from proactively contacting potential customers and convincing them to buy. However, the Customer Services Manager believes that success results from establishing close links with regular customers and providing them with excellent service.
- **T = Transformation** This is the principal business activity of the business system, in other words what lies at the heart of its operations. (Checkland used the term 'transformation' here because, at the highest level of abstraction, all systems exist to transform some form of input into some form of output.) In the case of our wine merchant, the Sales Manager's worldview leads to a transformation that consists of making one-off 'point sales', whereas the Customer Services Manager thinks that it is about providing a high quality of service throughout the sales process, in order to establish relationships with customers.
- **C = Customer(s)** Stakeholders can differ, too, in their views of who their customers are (or should be). In our example, one view might be 'anyone willing to buy wine from us' whereas another might be 'established regular customers who appreciate a personal touch'. Another way of thinking about customers is to ask 'who is on the receiving end of the transformation?'
- **A = Actor(s)** These are the people who carry out the transformation, for example telesales staff set challenging targets or knowledgeable salespeople and customer services staff capable of establishing long-term relationships with customers.

- **O = Owner(s)** The perspective is someone's view of a business system, so the question is who ultimately controls that system and who could instigate change, or even closure, if necessary. Who, for example, could decide between the two competing worldviews about the wine merchant? In this case, the owner is the business's chief executive but, in other situations, it could be a group, like a board of directors.
- **E = Environment** Finally, all organisations operate within the constraints imposed by their environment. PESTLE – explored in Chapter 3 – can be used to identify the main external factors but, in some situations, things like organisational policies can also feature here.

Figure 6.8 presents CATWOE analyses of our wine merchants from the two stakeholders' perspectives.

Figure 6.8 Contrasting perspectives for Rake's Wines

	Perspective of Karen Thorne, Customer Services Manager	Perspective of Jason Shore, Sales Manager
C	Established regular customers who appreciate a personal touch	Anyone who is willing to buy wine from Rake's
A	Knowledgeable sales and customer service staff who develop long-term relationships with customers	Telesales team set challenging sales targets
T	Repeat selling of wines to long-term customers	Proactive 'point' sales of wines to customers
W	Success in the wine trade results from establishing close links to customers and providing excellent service	Success in the wine trade results from the aggressive selling of wines to a wide customer base
O	Tom Rake, CEO of Rake's Wines	
E	Government concern over drinking and taxes on alcohol (P); fierce competition from supermarkets (E); wine now widely drunk in the UK (S); computers widely used to buy products (T); restrictions on sale of alcohol to, for example, minors (L); pressure to reduce physical resources used (E)	

In Figure 6.8, the owner and environment for both perspectives is the same. This can be the case when using CATWOE, although sometimes different perspectives may yield differences in these areas. For example, we might consider a further environment constraint to be the willingness of people to buy wine on receipt of an unsolicited telephone call.

Illustrating the perspectives – business activity models

Business activity models (BAM) provide a conceptual model of what we would expect to see to fulfil a particular stakeholder perspective. A BAM shows *what* the organisation should be doing, as opposed to a business process model (discussed in Chapter 7) which explores *how* it does these things.

Creating a BAM requires the business analyst to think about the activities that each stakeholder's perspective implies. Initially, there will be one BAM for each distinct perspective. At a later point, these are examined in order to identify where there is agreement or conflict between the BAMs. Ultimately, the aim is to combine them and, in discussion with the stakeholders, achieve a consensus BAM.

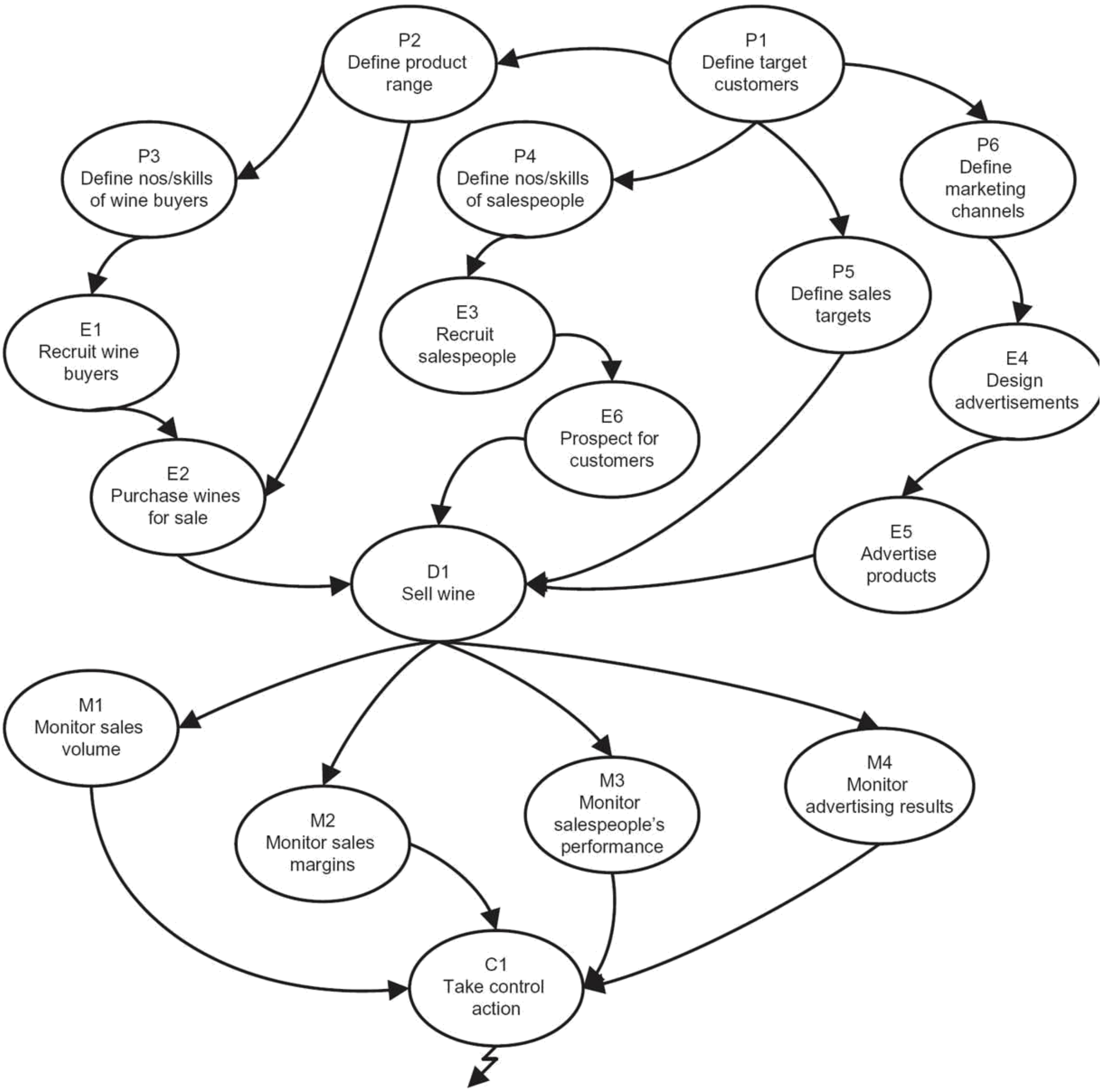
The approach for creating a BAM is as follows and a completed BAM for the wine merchants (drawn from the perspective of the Sales Manager) is shown in Figure 6.9:

1. Identify the DOING activities that are at the heart of the model. These are derived from the transformation of CATWOE and reflect the organisation's principal business activities. In the case of the wine merchant, there is one doing activity 'sell wines'.
2. ENABLING activities are next added. These lead into the doing activities on the model and acquire or replenish the resources needed to carry them out. In Figure 6.9, for example, there are activities to recruit and train salespeople and to advertise the company's products.
3. All of the activities of the organisation should follow from PLANNING activities. Normally, on a BAM, we would not show the strategic planning activities – setting the general direction of the organisation for instance – as we are interested in the planning required within this business system (which will support the strategy execution). In Figure 6.9, we plan how many salespeople are needed, and what skills they require, and we plan how best to market the products to the customers. Planning activities also include setting targets, such as KPIs (discussed in Chapter 3) against which the performance of the business system can be measured.
4. The actual evaluation of the performance is done within the MONITORING activities, for example, in Figure 6.9 monitoring the

performance of the salespeople.

5. Finally, if the monitoring activities reveal that performance is not what was expected in the plans, CONTROL activities may be required to institute the necessary remedial actions.

Figure 6.9 Business activity model for Rake's Wines



With regard to the control activities, two observations are relevant:

1. On a BAM, we could associate a control activity with each monitoring activity and some users of the technique prefer to shown them this way. However, in the real world, managers often take action as a result of a range of measurements so a less cluttered model can be created by feeding all of the monitoring activities into one control activity, as in Figure 6.9.
2. The control actions themselves could feed back into any of the other activities on the model. Since trying to show this would create an impossible-to-understand diagram, the convention is to show a 'lightning strike' symbol emanating from the control activity which

means that it feeds back into the model wherever it is relevant.

The model shown in Figure 6.9 represents Rake's Wines as seen from the perspective of Jason Shore, Sales Manager. As we have seen, though, the Customer Services Manager, Karen Thorne, sees the organisation rather differently. Both managers agree that 'Sell wine' is at the heart of the business but, for Jason Shore, this means proactively contacting new customers and pushing them to buy Rake's wines; Karen envisages selling to existing customers who contact Rake's to ask for advice and guidance on what to buy. If the model had been built from Karen's perspective, it would probably not contain the enabling activity E6 'Prospect for customers' but it would have included activities to recruit and train customer service staff, possibly as wine advisors. There would also have been an activity to monitor the level of customer satisfaction.

Having modelled the organisation from the perspective of each stakeholder (or, at any rate, of each stakeholder with a different CATWOE), it is now necessary to achieve a consensus BAM that represents the agreed or idealised way forward. Ideally, this is achieved through negotiations involving the stakeholders and the business analysts; the aim is for the stakeholders to all 'buy in' to the final BAM. Realistically, however, sometimes the stakeholders just cannot agree and this is where identifying the 'owner' of the business system (as in CATWOE) is important. The owner has to choose between the competing BAMs or perhaps impose one that is a composite of several. This is less desirable than securing all the stakeholders' agreement, as some people may not necessarily accept the agreed BAM but it may be the best that can be achieved in some situations.

The consensus BAM is an extremely valuable product for a business analyst as it provides a model of *what* the business system *should* look like and *should* be doing. Insofar as the actual situation on the ground differs from this conceptual view, this provides a means of considering opportunities for improvement. Examination of the difference between the current situation (perhaps reflected in a range of documents including meeting reports, a rich picture or fishbone diagram – see Chapter 5) and the conceptual view provided by the BAM, is an important part of gap analysis and is discussed in Chapter 8. As part of the gap analysis, the business analyst may wish to explore *how* the activities are currently carried out, and how they should be performed in the future; this can be achieved through business process modelling covered in Chapter 7.

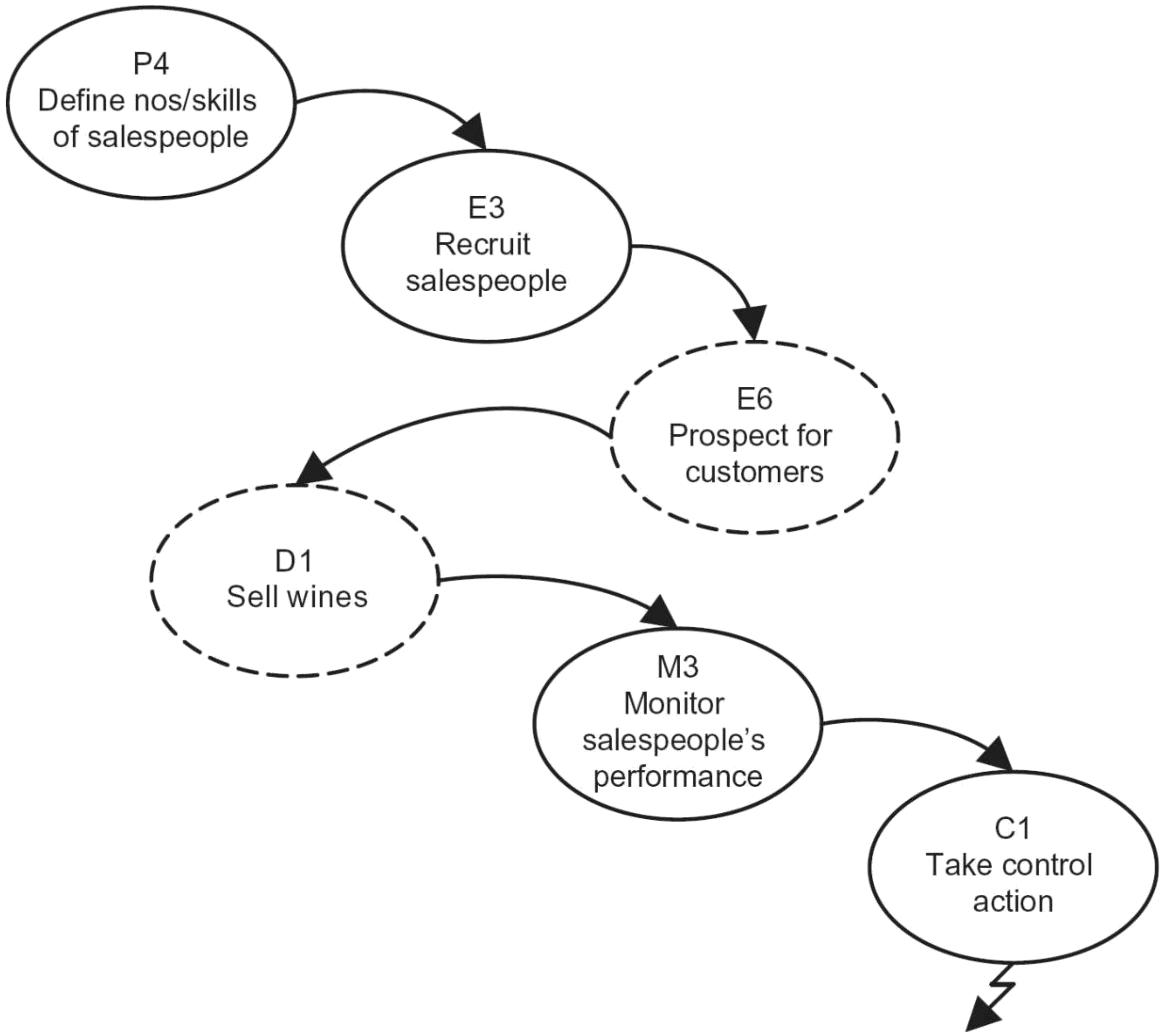
A note on notation for business activity models

There is no universally-agreed notation for BAMs. Many users of the technique like to use 'cloud' or 'thought' symbols to emphasise that this is a *conceptual* model and not a representation of what the organisation looks like now. In Figure 6.9, we have used ovals for the practical reason that they take less space than clouds and are easier to draw free hand. It is probably not a good idea to use boxes, as then the models may be confused with business process models which, as we have shown, illustrate how an organisation works rather than what it does.

Activity 'threads' in business activity models

Sometimes, rather than considering individual business activities, it is more useful to group them into 'threads' of related activities. For example, in Figure 6.10, we have extracted from Figure 6.9 those activities related to the recruitment, training and management of salespeople. (Activities E6 and D1 are shown for completeness but are not relevant to this investigation.) The reason for this is that perhaps we would like to consider the entire way in which the organisation recruits, trains, measures and controls their salespeople (and maybe other staff too). We may find, for example, that the jobs are poorly defined, ineffective recruitment processes are being used, salespeople are being set the wrong targets and so on.

Figure 6.10 Thread of business activities relating to staff management



SUMMARY

Effective stakeholder management is key to the success of any business analysis project. It should begin before the project starts, at the inception stage, and be continued throughout the project – and even afterwards to ensure that the changes are implemented effectively. Although the project manager has the key responsibility in this area, all team members have roles to play. Stakeholders can be assessed in terms of their interest in the project and their power or influence over it and strategies must be defined to actively manage them in accordance with this assessment. The stakeholder perspectives should also be explored in order to uncover strongly-held beliefs and potential conflicts. Techniques such as CATWOE and BAM are extremely helpful in revealing where the stakeholders' values and priorities lie, and exploring what should be done within the business system to fulfil their perspectives.

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7 MODELLING BUSINESS PROCESSES

Keith Hindle

INTRODUCTION

The business processes are the means by which an organisation carries out the internal operations and delivers its products and services to its customers. In this chapter we will look at techniques for modelling business processes covering both the organisational view of process modelling and the more detailed business process models.

There are many reasons for creating business process models:

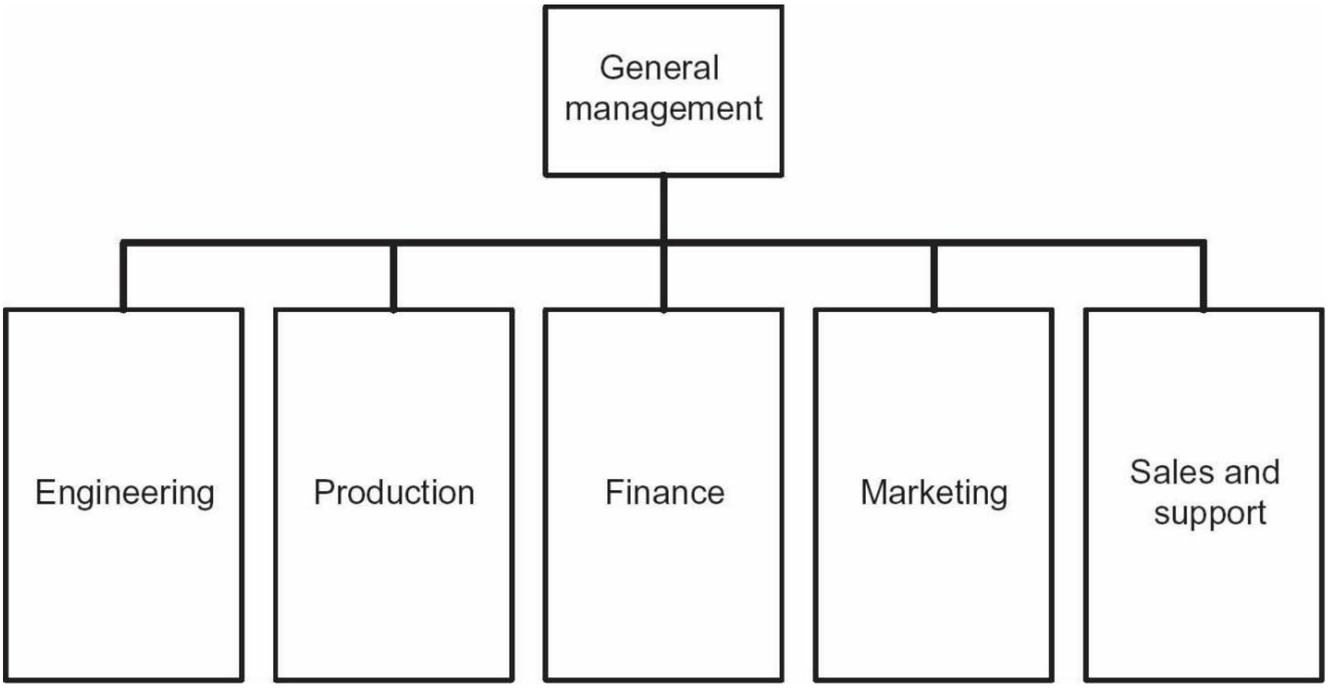
- To understand how the existing process works. This can be particularly useful if the process has 'grown' organically (without any real planning) and no one is quite sure what happens currently in response to an event.
- To explain to those working on the process what they do and how their task relates to the others working on the process. Here, the process model can be a training aid for new staff and an aide-memoire or reminder for more experienced personnel.
- To help ensure consistency of approach, so that everyone follows the same process and customers' experiences are not wholly dependent on who is dealing with them, in other words the 'luck of the draw'.
- To identify the problems and weaknesses of an existing business process with a view to developing and implementing an improved one. A model of an existing business process is often called an 'as is' model and the improved one is known as a 'to be' model.

ORGANISATIONAL CONTEXT

A typical organisation has many processes, many of which could be improved in some way or other. The costs and benefits of such improvement projects will vary enormously and, before embarking on a business process improvement project, it is useful to examine the organisational context in which the business processes take place. An understanding of the context will also help to understand how the process is affected by external environmental factors.

The traditional view of a business is based on the specialist functional areas such as sales, accounts and operations (Figure 7.1). Typically, this is documented on an organisation chart which shows the departments and how they are further subdivided, the reporting lines and the staff that work in the various areas. Individual employees tend to identify with a particular function – ‘I work in IT’ – because that defines not just the job that they do but also their social group, attitudes and culture.

Figure 7.1 Functional view of an organisation



The functional view of an organisation is very useful for the internal management and staff to see how the organisation is structured and where they fit within it. However, there are some limitations with this view. It is predominantly internally oriented, concentrating on the structure of the organisation and the internal reporting lines, aspects that are usually of little interest to the organisation’s customers. Moreover, it defines the formal structure, ignoring the unofficial communication and cooperation between staff that can be just as important for success. The functional view is also ‘static’ as it does not show what the business does over time in order to react to an event such as a customer requesting a service.

The static nature of the functional view contrasts sharply with the process view. The people carrying out the tasks within a process could well belong to several different functions and may need to pass information or products across functional boundaries. For example:

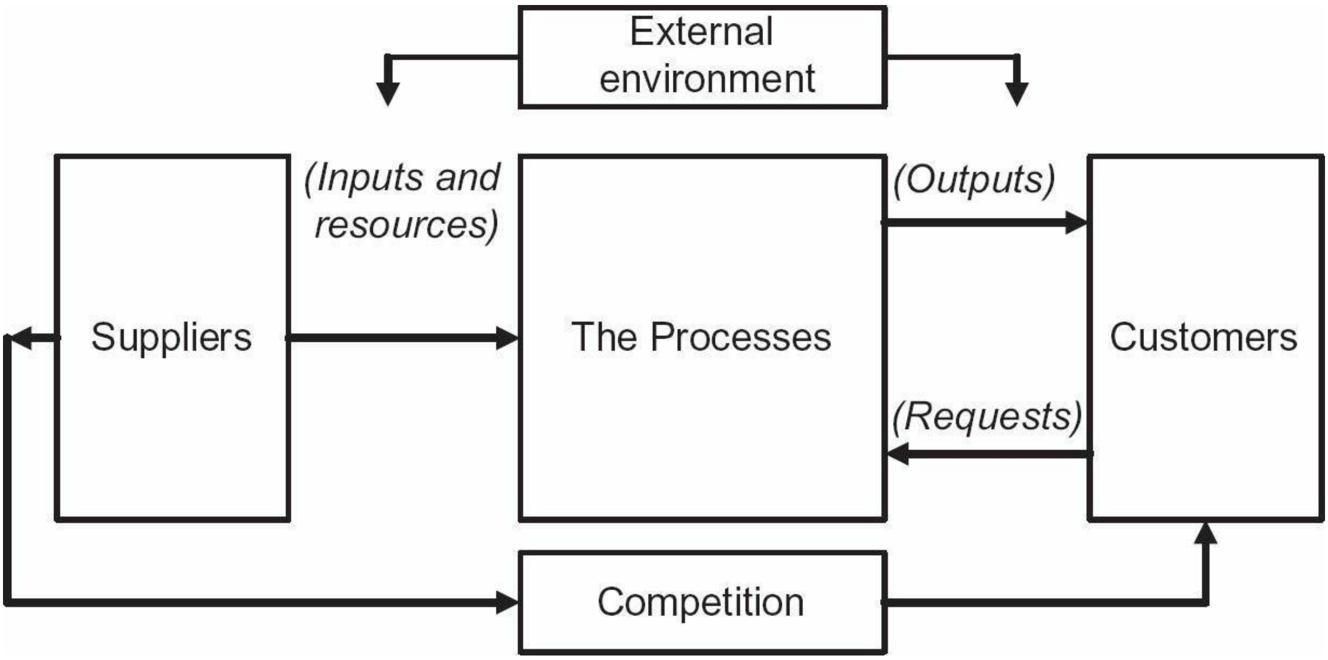
- a customer may first tell a salesperson the details of an order;
- the order is then passed onto warehouse staff to physically make up the order;
- next, it is collected by logistics staff;
- the goods are then delivered to the customer.

The process view emphasises the need for cooperation between all the participants if the desired level of customer service is to be achieved. Thinking of the organisation as separate, autonomous departments may erect barriers and create operational difficulties that a more joined-up approach can overcome.

AN ALTERNATIVE VIEW OF AN ORGANISATION

Paul Harmon (2007) developed the organisation model that provides an alternative view of an organisation, providing a representation of both the internal processes and the external world with which the organisation operates (Figure 7.2). The model is often developed in two stages: firstly, the external factors that influence the organisation are considered and then the internal business process is analysed.

Figure 7.2 Organisation model (after Harmon, 2007)



The four areas shown outside the organisation in Figure 7.2 highlight those aspects of the external environment that need to be considered; they define the context in which the organisation operates. These four areas are:

- The suppliers of the resources required by the business processes. This covers not only the supply of physical materials but also external suppliers of finance, people and ideas.
- The beneficiaries from the organisation. While we always include the customers who purchase the products and services within this group, it is also important to take a broader view and include other types of customer. For example, the owners and senior executives of the organisation, or partner organisations that provide a sales channel to the customers. The owners will vary depending upon the type of organisation. For example, in a commercial business there may be shareholders whereas in a not-for-profit organisation there will be a board of trustees. For each group of beneficiaries, we need to know the outcomes that they would like the organisation to deliver. These outcomes are often in conflict with each other; where customers would like prices to be as low as possible, shareholders would like to have high dividends which they may see resulting from higher prices.
- The competitors operating within the same industry or business domain. Traditionally, this is interpreted to mean other organisations with whom we are competing in specific markets. In the organisational model, we extend the concept further by including those organisations that we are competing with for the supply of finance, services, skilled staff and ideas, as well as those who compete with us for customers.
- The generic factors that may affect the organisation such as changing regulation, economics or green issues. These are the type of factors covered by a PESTLE (political, economic, socio-cultural, technological, legal and environmental) analysis as explained in Chapter 3.

Analysing the external context on the organisation model encourages the business analyst to think carefully about the context for the organisation. For example:

- What resources does it require to operate? Are these plentiful or are they in short supply? Against whom are we competing for scarce resources?
- Who are the major competitors for the purchasing customers? What do their processes offer and can we improve on this?
- What are the factors in the external environment that condition or constrain how we can operate?

- Who are owners of the organisation that we need to satisfy? This is not always an easy question to answer, for example in the case of a state school: Is it the governors? The local education authority? Central government? We may need to consider all of them.
- Who exactly are our customers? What do they require from us? How demanding are they? What are their value expectations?

The organisation's business processes need to operate within this external environment. If we are carrying out a business process improvement project, it is important to understand the business context as this will help us determine the changes that will deliver business success.

THE ORGANISATIONAL VIEW OF BUSINESS PROCESSES

Now that we have understood the circumstances in which the business operates, we can turn our attention to what the business does when reacting to the external environment. Bearing in mind that the organisation model is a high-level view of the processes that operate across the entire business, we need to show the end-to-end set of processes that convert the inputs from the suppliers to the outputs for the customers. It is possible to identify the high-level processes by discussing with the staff and managers of the organisation. However, it is helpful to think about an overview framework such as that shown in Figure 7.3 or Porter's value chain (Figure 7.6).

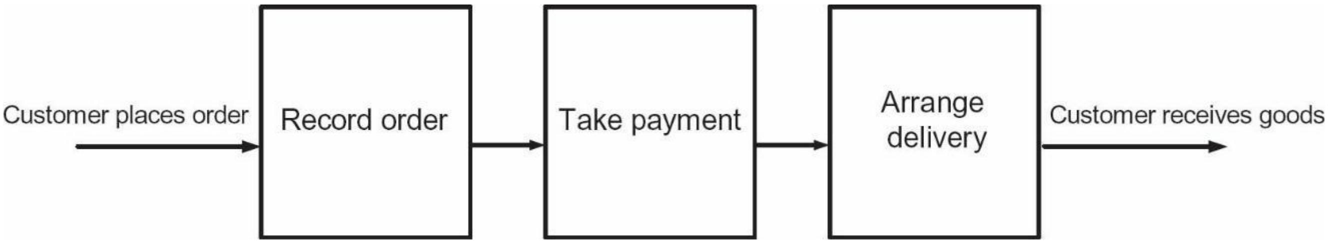
An organisational business process map is formed from a high-level set of activities carried out in order to deliver benefit or value to the customers. As shown in Figure 7.3, the process receives an input and produces an output.

When building business process models, we can begin by producing a business process map that reflects the structure shown in Figure 7.3. Figure 7.4 shows an example of such a model.

Figure 7.3 A process receiving input and producing output

It is useful to distinguish between process maps and business process models. Process maps show sets of related processes, and their interactions, in a single diagram. Each process set is shown as a box and the arrows between them show their interdependencies. Business process models show a more detailed view of each of the processes within a higher level set.

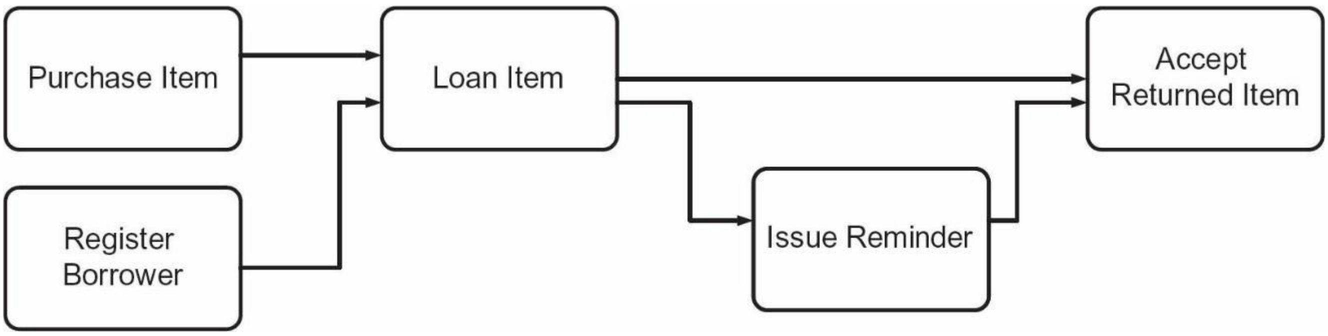
Figure 7.4 Outline process map



It is useful to begin by considering:

- the core operation at the heart of the entire process, for example, taking bookings or selling goods;
- the processes that provide input to the core process, for example, scheduling events or making goods;
- the processes concerned with delivering products or services to the customer, for example, issuing event confirmation or delivering goods;
- any sales, marketing or customer service processes.

Figure 7.5 Overview process map for a lending library



The process map in Figure 7.5 shows the processes for the internal lending library of a consultancy company. The library provides a service to in-house staff (loan item). The loan process cannot take place unless the person requesting the loan is a registered borrower.

Although we will not have full details about each process at this point we can find out the events that trigger each process, the customer of that process and the results required. For example, if we consider ‘Register borrower’:

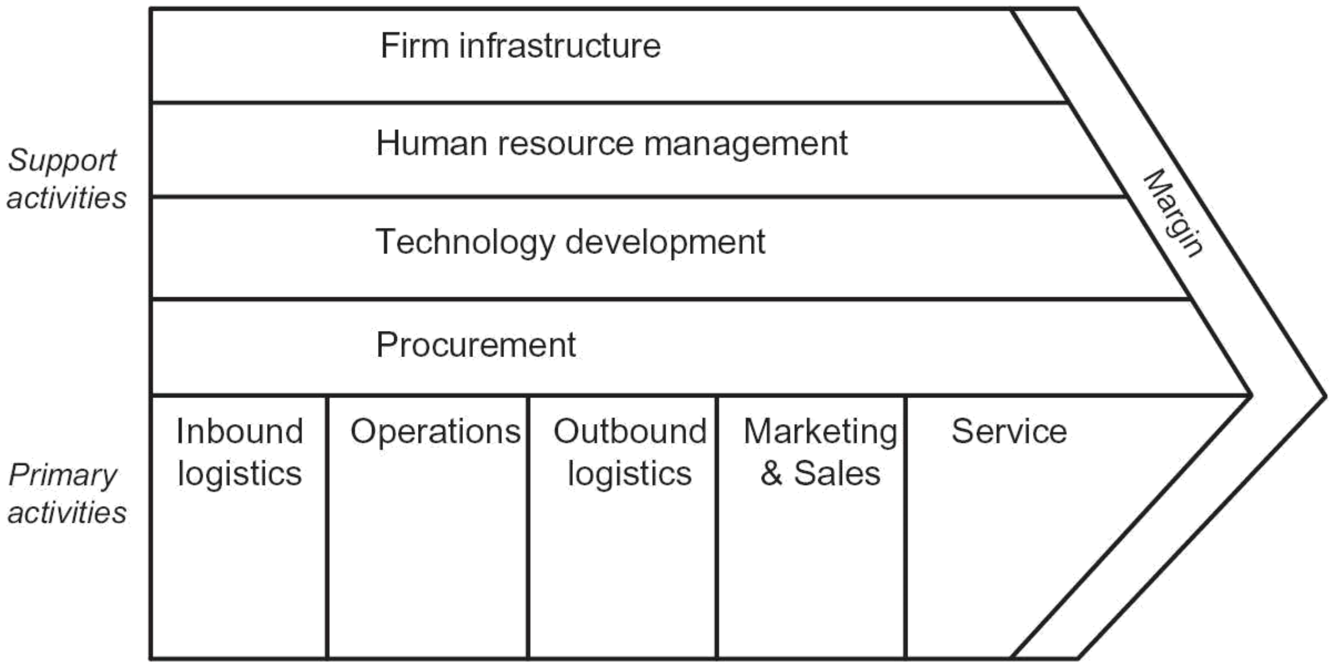
- The process will take place each week on receipt of information from HR detailing all the staff changes. This will allow the library to both add and delete borrowers.
- The customers will be the members of staff who are registered and the HR department who want new employees to be added and employees who have left to be deleted.
- The results required are the successful addition or removal of employees, possibly within a prescribed timeframe.

Once the loan has been made, the subsequent process would normally be ‘Accept returned item’ but failure to do this within the specified time period would result in the process ‘Issue reminder’.

The overview process map is extremely useful when the analyst starts to model a particular process. It helps to identify the boundaries of each process by showing where the process begins and where it ends. If we use the example of the lending library, the ‘Issue reminder’ process concludes with the sending of the reminder, it does not include the acceptance of the returned item. If we consider the ‘Loan item’ process, the customer here is the borrower and the process objective is achieved when the borrower has successfully completed the loan transaction. The measures applied to this process will be typically concerned with the speed and accuracy of the loan transaction.

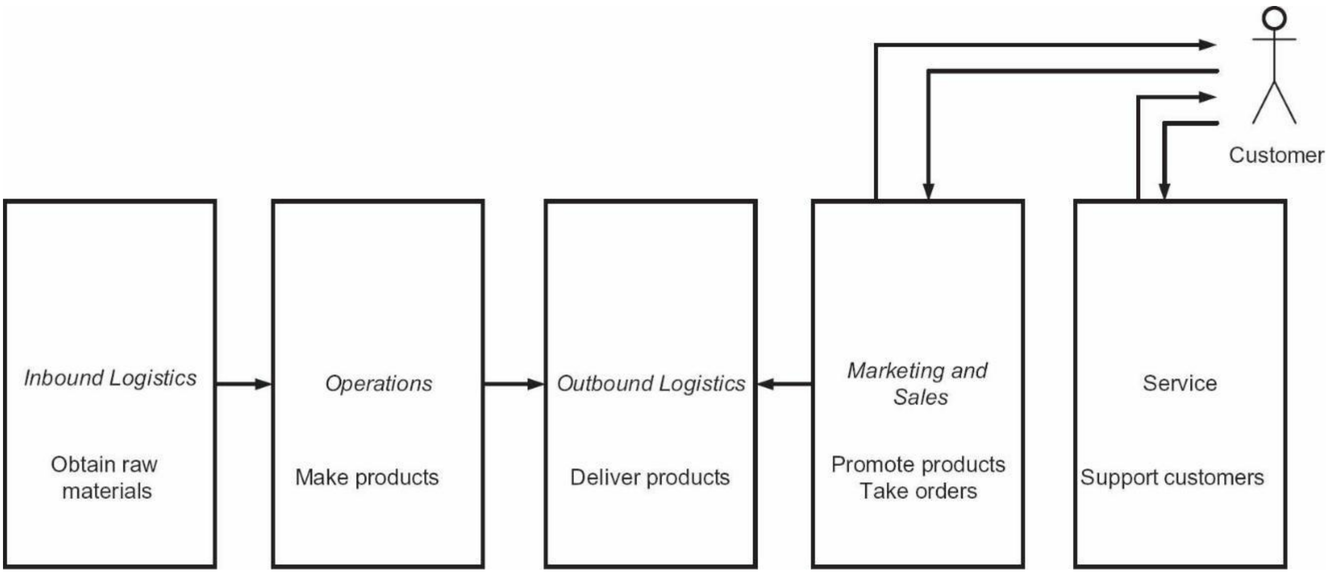
An alternative approach to building a process map is to look at the products and services and consider what processes are required to deliver them. Michael Porter’s value chain is a useful technique here because it helps us to structure our thinking and possibly identify areas of process that we may have missed. The generic value chain is shown in Figure 7.6.

Figure 7.6 Porter’s value chain



The value chain provides a means of analysing the activities performed by an organisation. It identifies key areas of primary and support activity that will be required to deliver value to the organisation's customers and potentially differentiate the organisation from its competitors. We can use the concept of a value chain to develop high-level process maps for the organisation. Figure 7.7 identifies the value chain activities for a manufacturing organisation using each of the primary activity sections of the value chain.

Figure 7.7 Example value chain activities for a manufacturing organisation



When using the value chain, it is usually easiest to start with the operations – the core activity of this value chain – and then consider the other areas. In the example above, we have a manufacturing organisation and the operations primary activity is ‘Make products’. However, we can only do this if we ‘Obtain raw materials’ so this is the inbound logistics activity. The outbound logistics activity concerns delivery to the end customers. In the marketing and sales area, the organisation needs to ‘Promote products’ and ‘Take orders’. Finally, the service activity involves providing support to customers presumably by answering queries and dealing with complaints. While the value chain was originally applied in a manufacturing context, it is possible to apply it to service organisations although this usually involves combining the operations and outbound logistics areas.

VALUE PROPOSITIONS

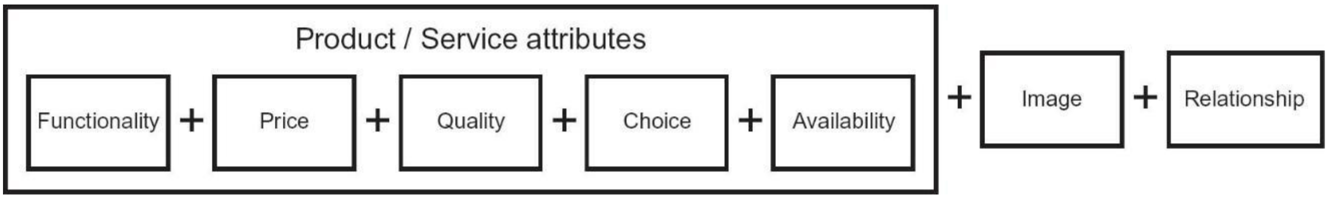
The definition of the value chain assumes that we understand the customers who purchase our goods and know what products or services they want. A value proposition is a definition of an organisation’s product or service that will demonstrate to customers that we understand and can satisfy their needs. Moreover, it differentiates organisations from their competitors. Unfortunately, many organisations produce poor value propositions which are bland descriptions of their products rather than being closely aligned with the needs of their customers.

In order to overcome the problem of inappropriate value propositions, Kaplan and Norton (1992), the architects of the Balanced Scorecard, have identified the main attributes that make up successful value propositions. These are the drivers that lead to increased customer satisfaction, acquisition and retention. The proposition attributes cover three areas:

- product/service attributes that define the product
- itself; customer relationship aspects; image and
- reputation aspects.

The elements of a value proposition are illustrated in Figure 7.8.

Figure 7.8 Elements of a value proposition



The product attributes are:

- Functionality – or what the product does.
- Price – what we charge for the product.
- Quality – or how well the product performs.
- Choice – do we simply provide a standard product or can it be tailored to the specific needs of the customer?
- Availability or timing – for example how quickly can we respond to customer requests and do we introduce new products at the most appropriate time?

The customer relationship aspects will influence how a customer feels about purchasing from the organisation. For example, a supermarket chain may want to emphasise convenient access to their stores as well as knowledgeable staff who have the interests of the customer as their first consideration.

The image may be that of the product, built up through extensive advertising and supported by the product attributes in order to generate customer loyalty. Thus a bottle of lager may be described as 'reassuringly expensive'. Alternatively, a fashion retailer may develop an attractive image of the typical customer. Effectively, their message to their customers is 'buy our clothes and be as attractive and successful as the image in the adverts'.

It is useful to understand value propositions because they define what the organisation believes it needs to deliver to its customers; the business processes being the delivery mechanisms of the organisations' value propositions.

An organisation can differentiate itself in three ways:

- by being the most efficient;
- by having the best products;
- by providing the best customer service.

Efficiency here means high volumes, low costs (and hence, low prices), for example, as provided by budget airlines. Having the best products implies high quality but also innovation and the ability to introduce new products before the competition. Companies like Apple spring to mind here. High levels of customer service rely on flexibility which allows the product to be adaptable to the exact needs of the customer as well as staff that have the attitudes, training and freedom to understand and react to changing customer needs. The clearest examples are in the expensive end of the leisure industry which promises to exceed their customer's needs.

When conducting a business process improvement project, an understanding of the value proposition adopted by the organisation helps the analysts to understand the focus and objectives of the business processes. For example, where an organisation prides itself on excellent customer service, the processes delivering the service need to be designed to ensure that this is what is delivered.

An alternative view of the value proposition is to consider the customer's perspective. Customers usually know what they expect and will survey the industry to find the organisations that will meet their needs. An understanding of the customers' value expectations helps us to consider whether, and if so how, they align with the organisational value proposition and can illuminate areas of the business processes that would benefit from improvement.

BUSINESS PROCESS MODELS

A business process is triggered by a business event and includes five key components: the tasks that make up the process, the process flow, the decision points, the actors that carry out the tasks and the outcome of the business process. Unfortunately, there is no universally agreed set of terms in business process modelling and the terms 'process', 'activity', 'task' and 'step' are often used interchangeably. For the sake of simplicity, we have adopted the following convention here:

- 'Process' refers to an entire set of activities that start with a triggering event and end with some output being delivered.
- 'Task' refers to an individual activity within the overall process; these are usually carried out by an actor at a single point in time.
- 'Step' refers to the activities carried out within an individual task. It is useful to show just the tasks on the process model rather than each individual step as this helps with the readability and clarity of the model. Task descriptions can then be produced where the steps within each task can be defined.

Business events

There are three types of business event:

- External – these business events originate from outside the organisation or the business system under consideration. For example, a customer makes a hotel booking or orders some goods.

- Internal – these business events originate within the business system and typically involve business managers making decisions. For example, the marketing manager makes a decision to reduce prices on a product line or the finance manager decides to review fees charged by suppliers.
- Time-based – these business events occur at a regular point in time. For example, a process to make salary payments to staff is initiated when it is the last working day of the month.

Developing the business process model

Business process models may be developed for many reasons, as we noted in the Introduction. During a process improvement project, it is common for the business analyst to produce an ‘as is’ model to show how the process works at the moment. Analysis of this ‘as is’ model will help to identify problems and weaknesses, leading to an improved version documented in the ‘to be’ process model. Both types of model are documented using the same technique.

There are many standards for modelling business processes. Two of the most popular are the UML activity diagram technique and the Business Process Model and Notation (BPMN). Business process models are often called ‘swimlane diagrams’ because the ‘swimlanes’ showing all of the tasks performed by a defined ‘actor’, form a key element of the models. Here, we will use the notation and structure from the UML activity diagramming technique to build swimlane diagrams.

The swimlane diagramming technique includes the following elements:

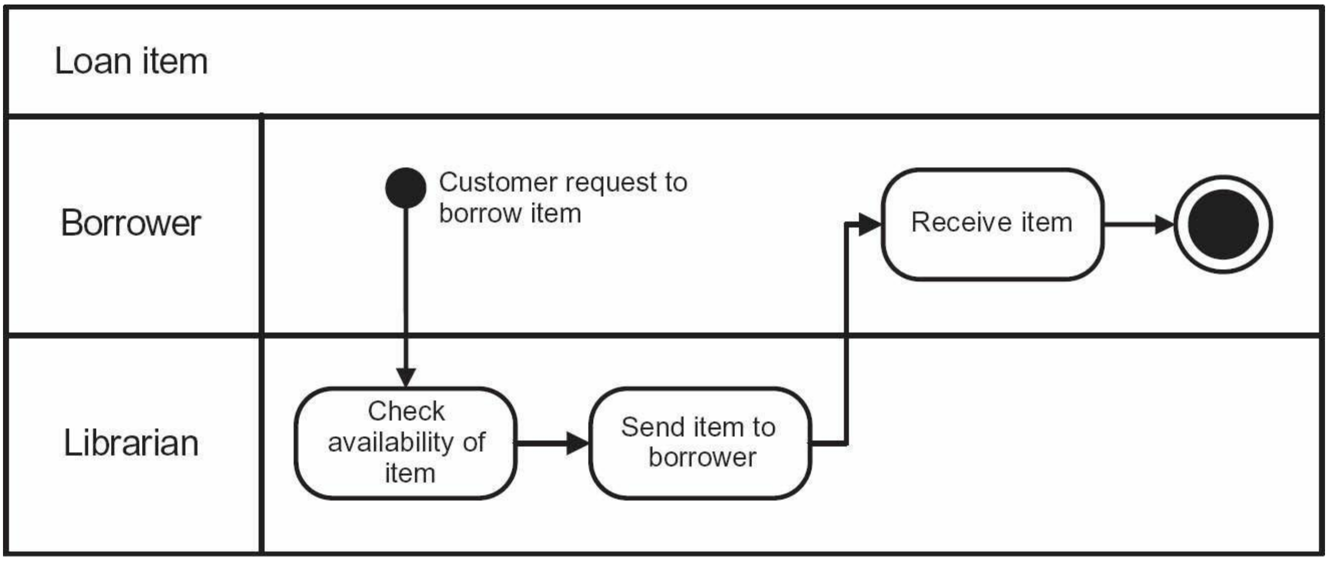
- the overall layout;
- the symbols used;
- the sequencing of the symbols.

To build a business process model, we first identify who takes part in the process. This enables us to identify the business ‘actors’ or ‘roles’. Actors may be individual people, a group of people or an organisation, or may be an IT system. The tasks carried out by each actor are shown in a separate band or ‘swimlane’ and arrows are used to show the flow of the work between the different swimlanes. Swimlanes usually appear on the diagram in the same sequence as the actors’ involvement in the process, although it is an informal convention that the customer swimlane is placed at the top. As a result, the action on the model goes from left to right on a horizontal layout, following the 'time axis' and top to bottom as the different actors get involved. These left to right and top to bottom flows mirror the way that many people read text, at least in the western world, and tends to be intuitive. To reinforce this representation of time, it is useful to show a process flow from Task A to Task B as follows:

- the process flow arrow originating from the right-hand edge of Task
- A; and ending at the left-hand edge of the Task B symbol.

An example of this is shown in Figure 7.9 where there is a process flow from 'Check availability of item' (Task A) to 'Send item to borrower' (Task B). The implied left-to-right flow of time cannot always be shown on the model, however. If, for example, we want to show a task being carried out iteratively, we will have to include process flows going right-to-left or backwards; this does not mean they are going back in time but that the task is being repeated! This example of iteration is one situation where it may be convenient to show process flows going into and out of the upper and lower edges of the task symbol.

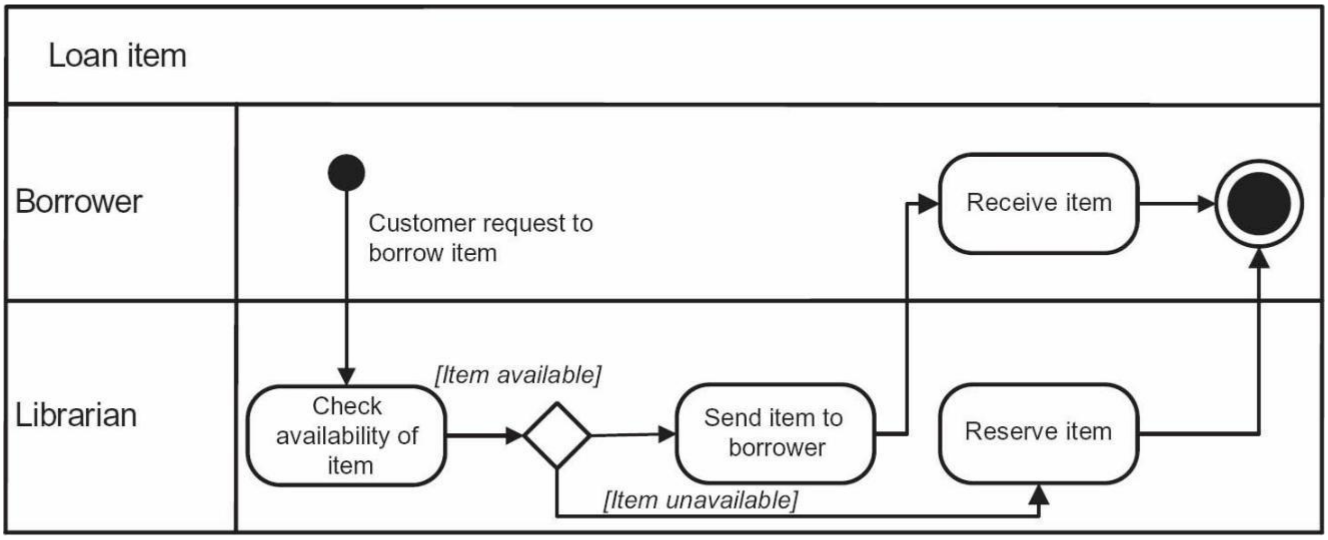
Figure 7.9 Business process model for 'Loan item' process



The diagram in Figure 7.9 shows the expanded process 'Loan item'. This process involves two actors, the borrower and the librarian so we have two swimlanes. We place the borrower (or customer) at the top of the diagram as this is usually where the process begins or ends. The start and end points of the process are shown clearly – the former with the named event and the latter with the bullseye symbol. The first task takes place when the borrower contacts the librarian who checks if an item is available for loan. Once the librarian has carried out the check the process moves to the next task, ‘Send item to borrower’. The final task occurs when the borrower receives the item.

This diagram can be expanded further to show the tasks to deal with a request for an item that is unavailable. Figure 7.10 shows the decision point, the alternative flows with corresponding conditions, and the additional task required to handle this situation.

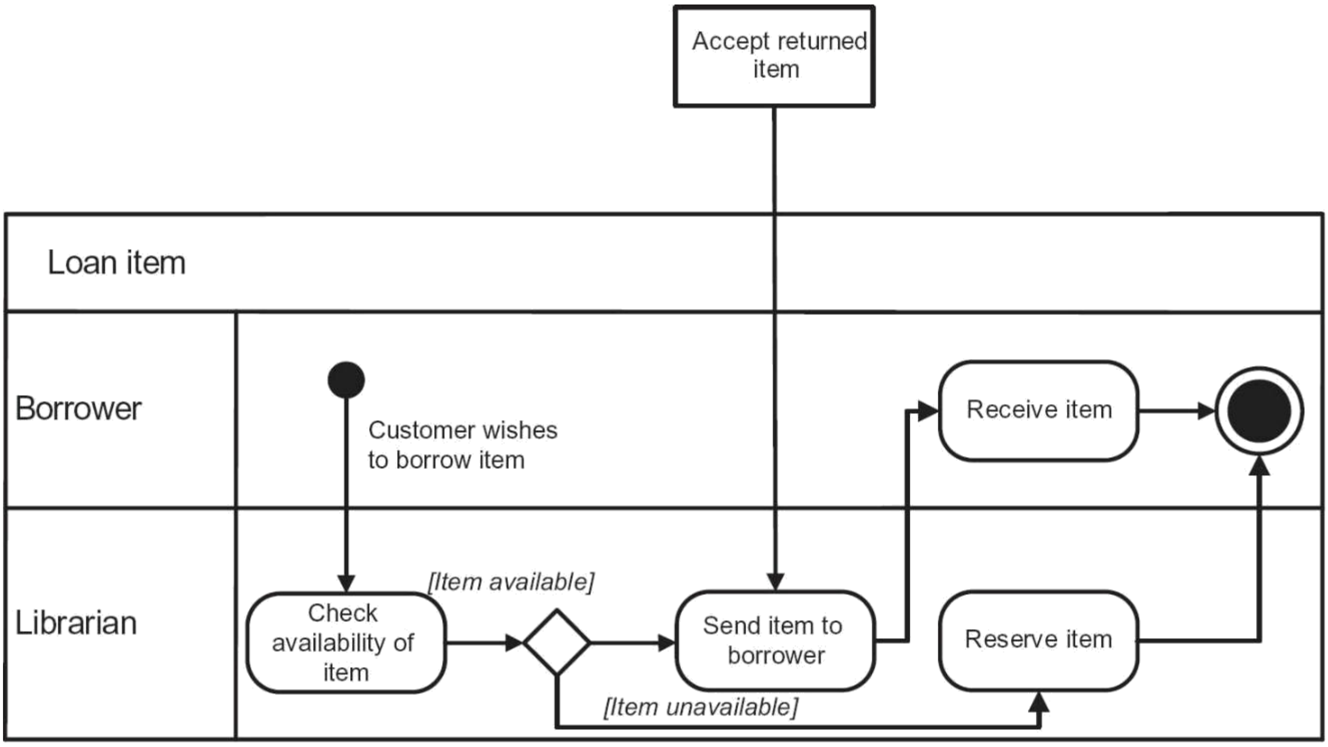
Figure 7.10 Business process ‘Loan item’ with alternative paths



The alternative paths that could be taken are controlled by a diamond symbol (the decision point). The conditions under which the process takes each alternate route are indicated by placing a ‘guard expression’ in square brackets next to the flow lines. For example [item available] is a guard expression used in Figure 7.10.

The action that follows ‘Reserve item’ will be carried out in the ‘Accept returned item’ process from the higher-level model. Within this process there is a check each time a borrower returns an item. The check is made to determine whether or not another borrower has reserved the item. The librarian will recognise that the item is on the reserved list and will trigger the ‘Send item to borrower’ task in the ‘Loan item’ process to issue it to the reserving borrower. This flow is added to the process model as shown in Figure 7.11.

Figure 7.11 Business process model with link from another process



It is always good practice to use a limited set of symbols on a business process model. This will help communication as the model will require minimal explanation when discussing with business stakeholders. An important convention concerns the naming of business processes and tasks. The readability of the model is enhanced if each process and task is named using a standard approach. It is best practice to construct the process or task name using the verb–noun format and the name should also describe what the process or task does. Where possible, use specific verbs, avoiding words such as ‘manage’ or ‘handle’. ‘Find book’ is a good example; it is specific, clearly describes what activity is carried out and indicates the situation after the task has been completed – the book has been found. ‘Handle payment’ is not specific enough; by the end of the task, the payment may have been handled but what does that mean?

Business analysts can fall into a common trap when modelling processes – that of going into too much detail too quickly. The actor who carries out a task often wants to tell you all about their work at the first opportunity. While this detail is important, trying to document it very early on can cause problems. The resulting process model can quickly get out of hand and become difficult for anybody to understand. Initially, it is more appropriate to show the overall structure of the process and leave the detailed description till later on. When we first talk to an actor, we are interested in:

- where they get their input information from;
- in general terms, what they do with it;

- where they forward it after they have completed their work.

Once we have documented the overall flow of the process, then we can go back and fill in the details for each task. This iterative approach means that after we have collected the details, we may then review the overall flow in light of what we have found out.

A major advantage of a business process model is that each actor can easily see their contribution to the overall process. As discussed earlier, we are trying to provide a summarised view of the business process at this stage of the analysis. As a result, the tasks reveal minimum detail. A rule of thumb is to show a separate task for a piece of work done by an actor at a particular point in time. Each task should be shown as a single action, receiving an input from the preceding actor and handing over to the succeeding actor; this flow of work from one actor to another is known as a 'hand-off'. It is important to analyse where this occurs as hand-offs often cause problems. This is discussed later in this chapter.

Analysing tasks

The swimlane diagram shows the work carried out within the business process including actors and the flow of the work. This may be sufficient to identify problems with the 'as is' process but often we have to go into more detail in order to really understand how the process works and what is going wrong. A more detailed approach is to analyse each task (or box) shown on the business process model. We might consider the following aspects for each task:

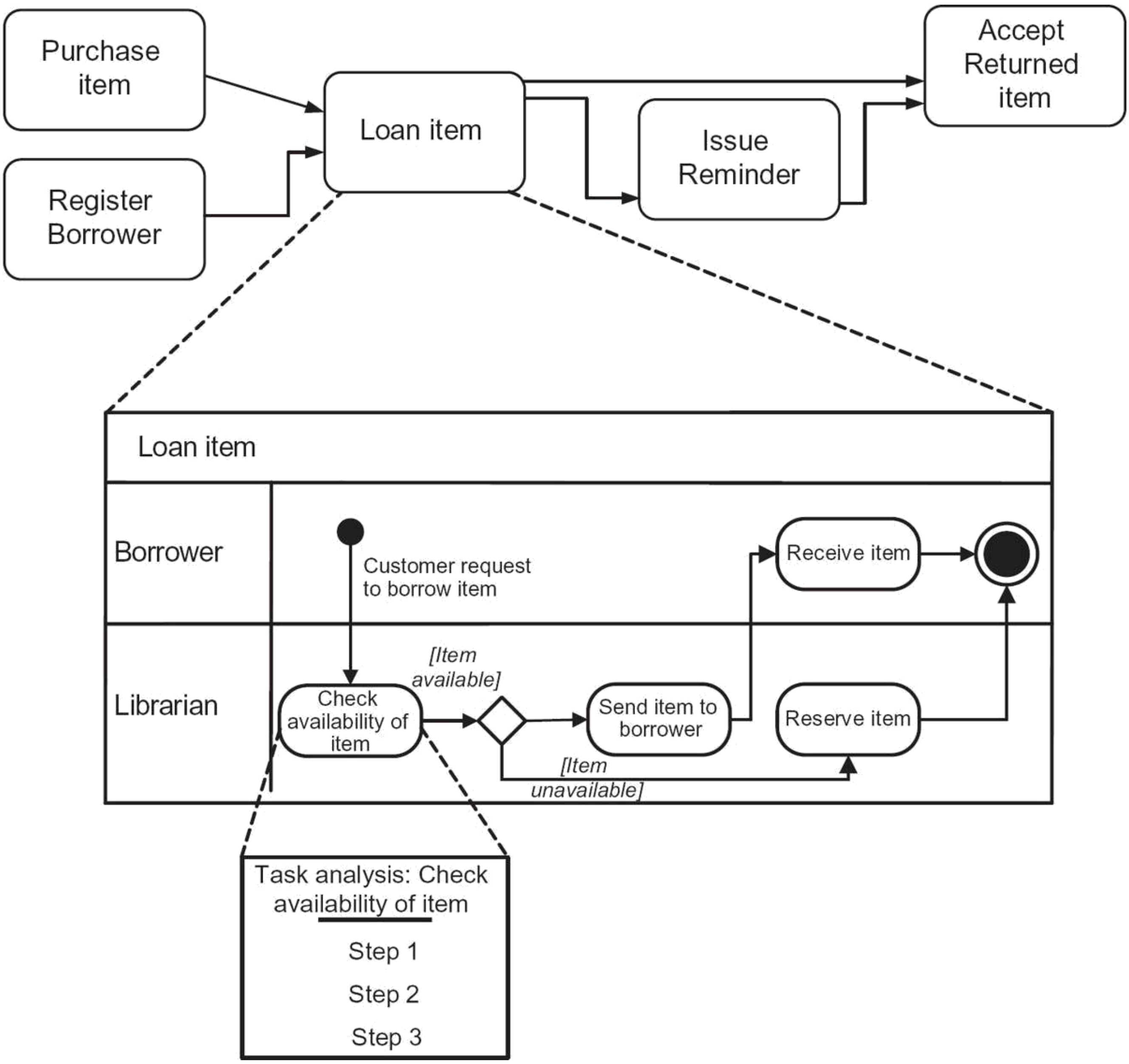
- The trigger or business event that initiates the task.
- Inputs to the task. This may include the trigger but there is also likely to be additional information required to carry out the task.
- Outputs from the task.
- Costs relevant to this particular task.
- Measures and standards applicable to the task.
- Detailed breakdown of steps within the task.
- Business rules to be followed in performing the task.

Documenting these aspects will help in the analysis of the task and in the identification of any problem areas or opportunities for improvement. A textual description may suffice for many tasks but where the steps and business rules are more complex a diagram, such as a flowchart or UML activity diagram (without swimlanes), will be much more useful.

Hierarchy of process models

The set of process models – from organisation-level to swimlane diagram to task analysis – provides an organised, clear definition of the business processes and procedures. Figure 7.12 shows this hierarchy.

Figure 7.12 Process model hierarchy



This multileveled approach to business process modelling will necessitate an iterative approach to the analysis. As the lower level task analyses reveal more detail, it is inevitable that the higher level business process models will have to be updated.

Beginning and ending the process

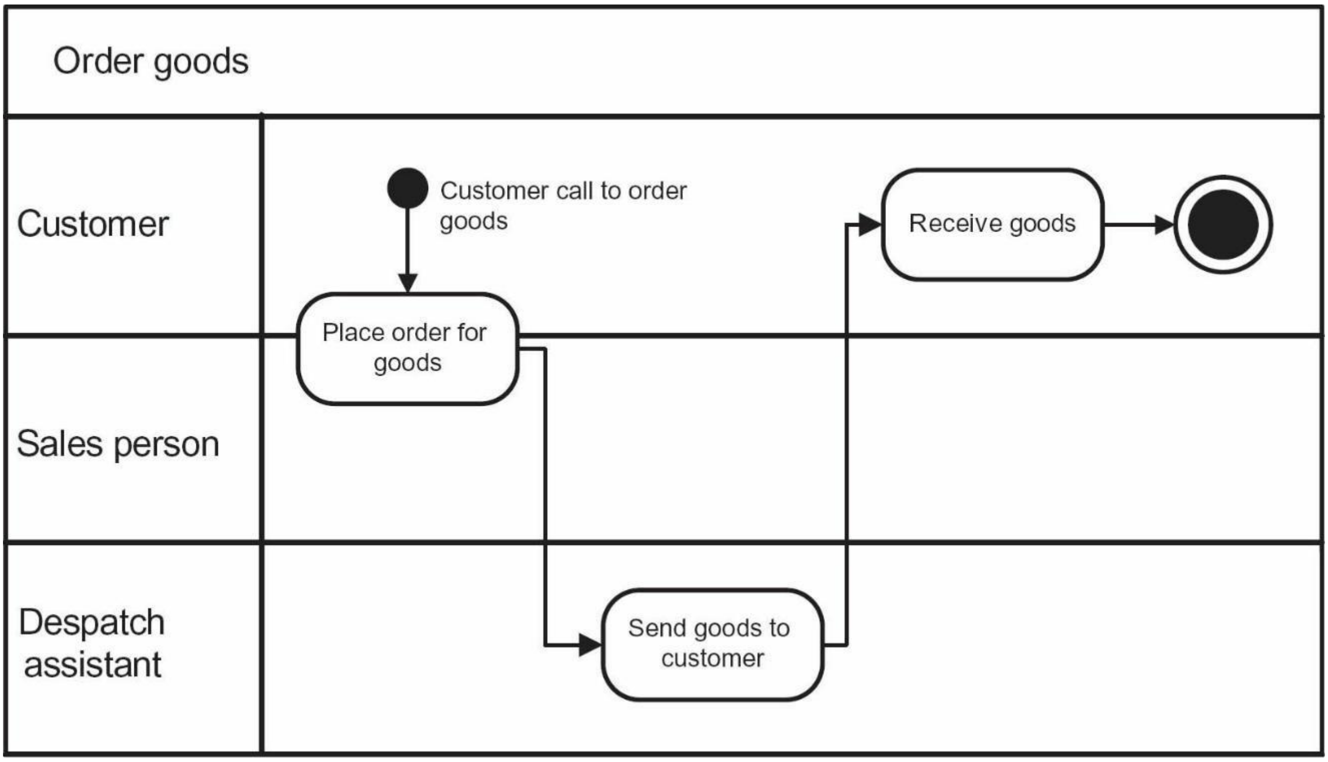
The start of a process can be represented in various ways. It is usual for the swimlane of the process initiator, such as the customer, to be at the top of the model. The variations between the different approaches determine how much detail is shown in that particular swimlane.

The simplest way, as shown in Figures 7.10 and 7.11, shows the initiator, this time the borrower, providing the event or trigger that starts off the rest of the processing.

The business that is receiving and processing the request is treating the borrower as an external stakeholder. It knows nothing about how the borrower creates that initiating request but simply reacts as soon as it receives the input.

In a different situation, the business may work more closely with the initiator. Imagine, for example, a customer ringing up a call centre to place an order. The customer and the call centre sales person are working together to record the order details. This could be represented as a single task involving both actors and thus shown on the boundary between the customer and sales person swimlanes. This situation is shown in Figure 7.13.

Figure 7.13 Task completed by two actors



A third approach may show the initiator, such as a customer, carrying out the task of creating the order on their own. In this situation, the entire task of 'Create order' is shown within a customer swimlane. It can be important to know that the customer completes part of the process without any intervention from the business staff. For example, if the customer is using the organisation's website to place the order, the quality of the website is likely to affect the customer's perception of the process. Therefore, this task needs to be considered as an integral part of the process.

The end of a process is represented by a bullseye symbol. Usually processes have multiple pathways and hence multiple ways in which they can end. A retailing organisation, for example, would normally expect its order process to end with the successful delivery of the order to the customer. The order could, however, be checked and rejected. It is important to know the state of the order when the process ends because that determines what can happen next. If an order has been successfully delivered to a credit customer, for example, the next thing is to invoice them for the order amount. For a rejected order on the other hand, the customer must resubmit it. As a guideline, there should be a separate end for each significant end state. Some modellers label the end symbol with the name of its state.

ANALYSING THE ‘AS IS’ PROCESS

Businesses evolve over time. The internal organisation and people within the business change. The customers and the products we sell them change. As a result, processes are constantly changing to reflect the different environment in which they operate. Unfortunately, many of these changes occur in an ad hoc and uncontrolled way. When we formally model a process, we start to see how messy and incoherent they have become. Many people are surprised when they first see the swimlane diagram of the process on which they work. Whilst they are familiar with their own part of the process, they may have little idea of what the whole process does, how it works and where their work fits within it.

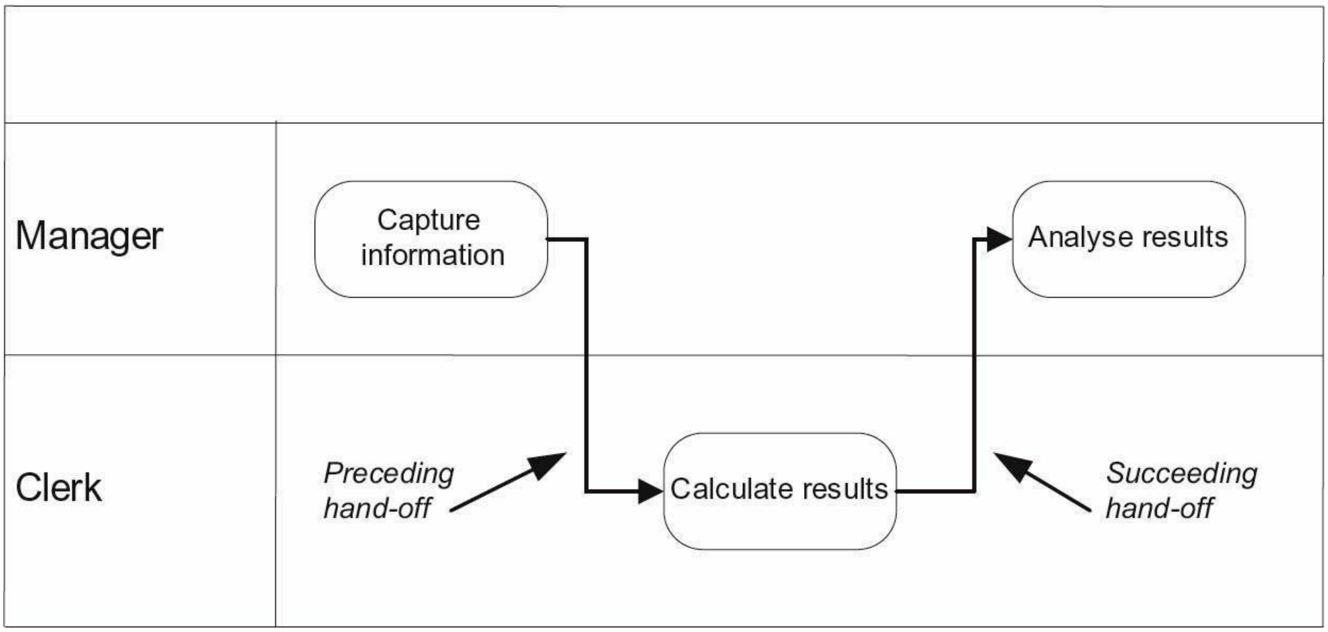
Identifying problems

In order to identify problems with an as is process, we need to find out how well it supports the business. Are the customer-facing processes good enough to satisfy the customers and ensure that they come back and spend more money? The ordering process must be fast, accurate and efficient so that it does not cost too much. For analysis purposes, we need to know exactly what such terms actually mean. How quickly do we need to deliver the goods to the customer if we are to retain their loyalty? How much should it cost the business to handle an order? Once we have determined the required performance levels, the next step is to compare them with the actual performance of the existing process. Information about the required and actual performance levels may not be easily available which can suggest several problems. However, it is worth persevering in order to obtain this information is possible. A gap between the actual and required performance levels indicates the need for improvements. We can use the ‘as is’ model as a basis for analysing why the performance targets are not being achieved. There are two key aspects of the model we need to examine, the hand-offs between the tasks and the tasks themselves.

Analysing the hand-offs

One of the frequent problems found with business processes involve ‘hand-offs’, where one actor passes the work to another actor. Figure 7.14 shows two hand-offs, one from the Manager to the Clerk, and the other from the Clerk to the Manager. The task ‘Calculate results’ has two hand-offs in this diagram, one preceding and one succeeding.

Figure 7.14 Hand-offs on the high-level process model



Clear representation of hand-offs is a major advantage of this diagramming technique and is particularly beneficial when we are trying to improve processes. Hand-offs account for many of the problems experienced by traditional processes as they can cause delays, communication errors and bottlenecks to occur. For example, once a piece of work arrives at its destination it may have to wait in a queue until an actor is free to deal with it. Too often it is assumed that the work is dealt with immediately when this is not the case. Analysis of the ‘as is’ processes commonly shows that transactions spend more than 70 per cent of the elapsed time simply waiting to be processed. It has even been estimated that, in some processes, the transactions are being actively processed for less than 10 per cent of the elapsed time, with more than 90 per cent of the time spent in transit or in queues. Queues form at hand-offs because the two actors have not synchronised their work. In some situations, attempts to optimise work in one task can actually make the performance of the whole process worse. For example, working on batches of transactions may help a particular task to be carried out more efficiently but the delay caused when waiting for each batch to build up may slow down the overall progress of the work.

A further cause of delays at hand-offs is where there is inadequate resource capacity to handle the throughput and queues develop. Queues can behave in an odd way, especially when the transactions arrive in a random fashion. Queuing theory tells us that attempts to increase the utilisation of the workers under these circumstances will cause the queues to build up dramatically. The production system on the shop floor of a factory is a specific example of a process in which the queues, in this case of physical components that are being produced, are very visible as they are handed over to the different machine operations, such as milling and turning.

There are other problems with hand-offs, often occurring because the transaction is going from one IT system to another. These systems could be large information systems or small spreadsheets developed by individuals. Problems occur where the data issued by the sending system needs to be reformatted to suit the needs of the receiving software. This not only takes time and effort but can also introduce errors. Also, subsequent correction of the errors will require additional time and resource.

Hand-offs cause problems in all organisations. Although a process in a bank, for example, may seem very different from one in a factory, they both face the same kinds of problems where hand-offs occur. Hand-offs, and the problems they can cause, are a major source of inefficiencies in processes, so addressing them can be key to business process improvement.

Analysing the processing

The ‘as is’ processes may have been in use for some considerable time and during this period they may have changed in a piecemeal fashion, reacting to changing business needs. As a result, they may contain significant inefficiencies and inconsistencies. When analysing business processes it is important to look for the following possibilities:

- Duplication of work. Some tasks may be carried out despite the fact that they duplicate other actors’ tasks or record the same information.
- Redundancy. Work and/or data that was necessary when the process was first designed may no longer be required.
- Lack of standardisation. Previously, organisations were less aware of the need for effective processes and hence there was less emphasis on carrying out processes in a standard way. Remote locations such as branch offices and depots were allowed flexibility in the way that they interpreted and implemented their processes. This may have worked in a

decentralised business but now that there is greater control and centralisation, all the different parts of the business are expected to operate in an integrated fashion.

- Incompleteness. New requirements may have been identified of the process since its original design. These may have been ignored because they were too difficult or costly to incorporate in the existing process or they may have been handled by a work-around.
- Inconsistent measurement or control. The business process approach has increased the emphasis on measuring the standard of work and the service provided to customers. Where a process has developed over time the measures may not be relevant or may be inconsistent with other measures.

If any of these situations are encountered, the analyst needs to apply business process modelling and improvement approaches in order to rectify the situation.

Other factors causing inadequate performance of a process

This chapter describes the process modelling technique which helps us to analyse the design of an 'as is' process as a stepping stone to improving its performance. Even if a process is perfectly designed, however, this does not guarantee that the process will achieve its performance objectives. There are various reasons why this might be the case:

- The staff working on the process may not have the right skills, training and motivation to produce the desired results.
- The resources made available to run the process may be insufficient to handle the volume of transactions received. This could include both staff and equipment resources.
- The process may not be managed appropriately. This is a particular problem when a process crosses many organisational boundaries and there is no single owner to manage the whole process.

IMPROVING BUSINESS PROCESSES

Improving the business process is about removing the problems that have been identified in the 'as is' process. Before we accept the initial definition of a problem, it may be worthwhile stepping back and asking whether this is the real problem that we should be solving or possibly a symptom of a more fundamental problem. Our initial analysis, for example, might have identified that our invoice production is taking too long and we are missing deadlines for billing our customers. One solution to this could be to allocate more resources to the processing to speed it up. Further analysis, however, might reveal that the real cause of the delay is excessive rework. A more appropriate solution to this situation would be to implement tighter controls, reduce the rework and eliminate the delays without incurring the cost of increased resources.

Business rules

Business process improvement is also about challenging the assumptions and business rules upon which the current process is built and which, in some circumstances, may limit the process. Business rules are categorised in two ways:

- **Constraints** – these are the business rules that have to be applied and restrict how a process or task is performed. The constraints may be enforced upon the organisation, for example they may be legal or regulatory constraints. Alternatively, they may result from internal policies or strategies.
- **Operational guidance** – these are the business rules that determine how procedures are conducted within the organisation. For example, there may be rules governing cancellation fees for hotel bookings or postage charges for delivering orders.

Business rules are often simply accepted – 'It's the way we do business here' – but sometimes it is useful to consider whether there is an alternative approach available. While some rules may have made sense when they were introduced, it can be useful to challenge them to see whether they still make sense now. If they do not, then they need to be changed. A good example is that of a well-known high street wine merchant which for many years sold its wine by the case – customers had to buy 12 bottles at a time. When the wine merchant reduced the unit of orders down to 6 bottles rather than 12, they found a significant increase in sales.

We describe some commonly-used approaches to improving processes below.

Simplify the process

Simplifying a process can be achieved by eliminating unnecessary tasks or hand-offs. Certain tasks within a process may have been required when the process was first introduced but as a result of changes to the business have now become redundant. For example, reports may still be produced despite the fact that nobody uses them any longer. Eliminating these tasks not only reduces the running costs and resources used by the process, it also reduces the hand-offs and their delays. Another example of simplification is where a number of tasks, carried out by different actors, are combined into a single task for one actor only. As well as reducing the number of hand-offs, this can result in other improvements such as a reduction in errors and duplication. There is also greater scope for giving the actor an extended, more meaningful task to carry out.

The general principle that we are applying here is ensuring that all the processing adds value. This can involve delivering direct value to the customer or enabling another part of the process which does itself add customer value. If the task does neither, then eliminate it. We find non-value adding work when we have to correct errors we have made earlier in a process. Rigorous checking, appropriate levels of control and ensuring that errors are corrected as soon as they are discovered will reduce error handling costs and effort.

Extend the processing

Where business scenarios have developed that are not covered by the ‘as is’ process, the likelihood is that workarounds will have been invented. As a result, it is possible that different actors may handle such scenarios in different ways. The process may be improved by adding extra tasks to the process, or further steps to a task, in order to provide a standard way of dealing with these scenarios.

Remove bottlenecks

Bottlenecks result when there is a mismatch in the capacities of related tasks. For example, we have a mismatch if task A can handle 100 transactions per hour and these are passed onto task B that can only deal with 90 transactions per hour. In this example, it is easy to see that the bottleneck could be removed by increasing the resources undertaking task B. However, real life processes are often very complex and require detailed analysis to identify such capacity mismatches. In these cases, it can be useful to use sophisticated process modelling tools as they provide simulation facilities that help us examine the performance and resource requirements of proposed process designs.

Change the sequence of tasks

‘As is’ business processes often reveal their origins. For example, although a current process may be supported by an IT system it may not have been subject to considered process redesign when the system was introduced so is merely an updated version of the original clerical process. In such a situation, the updated process may have unwittingly and unnecessarily perpetuated the limitations of the original process. For example, a process where the tasks are performed in sequence even though this is unnecessary because there is no logical dependency between the tasks. Modern workflow technology can free us from this type of limitation. Even if a transaction begins on paper, it can be scanned and electronic copies sent to several actors simultaneously, so long as they can work independently. As a result, the elapsed time for the overall process can be reduced significantly. This is only one example of using technology to carry out tasks in different ways. Another example is the use of computer systems to automate the flow through a process, removing the need for human intervention.

Redefine process boundary

The boundary of an 'as is' process may be redefined in order to improve the process. This may involve extending or reducing the activities carried out by the organisation. This is a common approach adopted by many organisations where they outsource tasks or even entire processes to specialist organisations. A variant of this approach is to redefine the boundary of processes such that external stakeholders, such as customers, undertake tasks in place of the organisation's employees. Facilities offered by internet access can enable such boundary redefinition by enabling customers to have online access to systems. For example, where order processing staff are replaced with an online booking system or access is provided to electronic documentation. A similar approach may be adopted with regard to suppliers. A distribution company supplying goods to retailers would traditionally require those retailers to submit their replenishment orders as and when their stocks got low. If the distributor were given access to retailers' sales data, they could then maintain the retailers' stock without any action on the retailers part. Not only would this make life easier for the retailer but the distributor would have better information for planning their own stock levels.

Automate the processing

Automation means using computer software to perform tasks rather than carrying them out manually. Automation usually leads to faster, cheaper and more reliable processes and helps with standardising the work practices; this is what many organisations are seeking when improving their processes. It also results in standardisation of the data that supports the processes, which is of great benefit to many businesses.

There are a range of automated solutions that are relevant to process improvement initiatives:

- Bespoke IT development. The definition of the business process provides an excellent basis on which to define the detailed requirements of a bespoke IT solution.
- Packaged applications. These provide best practice processes for specific areas such as Finance or HR. Examples are the ERP packages supplied by organisations such as SAP and Oracle.

- Workflow management systems. Essentially this is software that controls the flow of electronic documents/transactions through the various tasks of a process. It can ‘read’ the process model to determine exactly what should happen during a transaction, depending on particular circumstances.
- Straight through processing (STP). This as a concept from the finance industry that allows transactions to be passed from one ‘party’ to another without any manual intervention and is used to integrate the work of front, middle and back office functions.

Redesign the process

The approach we have covered so far in this chapter could be described as the incremental improvement of an existing process. Hence the sequential steps:

- develop the ‘as is’ model;
- analyse the ‘as is’ process and define its problems;
- identify potential improvements;
- document the ‘to be’ process model.

There are some situations, however, where we cannot adopt this approach. For example, there may be no existing process or it may be so radically different from what the business wants in the future that the ‘as is’ model is next to useless as a starting point. In this situation, we need to adopt an approach that enables the direct creation of a ‘to be’ business process model.

There may well be a lot of high-level information that defines the environment in which the new process will operate. The organisation model, the value chain and the value proposition will reveal the aims of the business and the environment within which the process needs to be implemented. Additional information may also be available from strategic plans, business objectives and relevant KPIs. The outline process map will indicate which other processes the new process is likely to interact with. From these sources we will be able to model the new ‘to be’ process as a black box, defining:

- the expected outcomes from the process;
- the events or triggers that the process will need to react to.

Once we understand the trigger and outcome for a process, we can begin to fill in the detailed tasks and steps. The best way to do this is to work backwards from the expected outcomes, determining the logical tasks required to achieve those outcomes. If we know the planned organisation structure and roles relevant to the new process, we will also be able to allocate the tasks to the appropriate swimlanes.

If there is an existing process, even if it is not relevant to the future business system, it may be worthwhile analysing it for two reasons. First, we may be able to identify the underlying business rules that need to be carried through into the new process. They may not be documented anywhere else. Second, at some time in the future, we will need to plan how we are going to transfer operations from the old to the new process. To do this smoothly, we need to know exactly where we are at the beginning of the changeover and where we want to be at the end. The modelling and analysis of the 'as is' process is essential for this planning activity.

PROCESS MEASUREMENT

When we are designing an improved business process, we must define not only what the process does but also how well that processing is to be carried out. The importance of measurement is illustrated by the oft-quoted statement 'You can only manage what you can measure.' If we want the actors carrying out tasks to achieve the required levels of performance, we need to define the performance measures and ensure the actors carrying out the work are advised of them. When defining performance measures, one of the fundamental points to recognise is that there are two perspectives on performance measurement: measurement for internal management purposes and measurement by our external customers. Organisations sometimes create difficulties when they concentrate on their internal measures at the expense of customer concerns.

Internal measures

Internal measures are often derived from organisational objectives, critical success factors and key performance indicators. These measures are usually defined at an organisational level, cascaded down to departmental level and then further to the operational level. The operational measures should support the higher-level measures, right up to the organisational level. The problem with internal measures is that they are often focused on what the organisation wants to achieve and not on what the customer values. For example, the organisation may set 'low cost of operation' as a critical success factor for the organisation, defining key performance indicators that specify which aspects of low cost should be measured. However, when related performance measures are defined for the business processes, it is possible that the focus on costs can create problems for the successful delivery of the services to the customer.

External measures

The other aspect to performance measurement is concerned with what the customer expects to have delivered. One way of thinking about this is to consider what it is that each customer group will value about the deliverables it receives from the organisation. Having identified this, we can then think about the performance measures that we need to apply internally in order to achieve what our customers require. There are three major areas to think about:

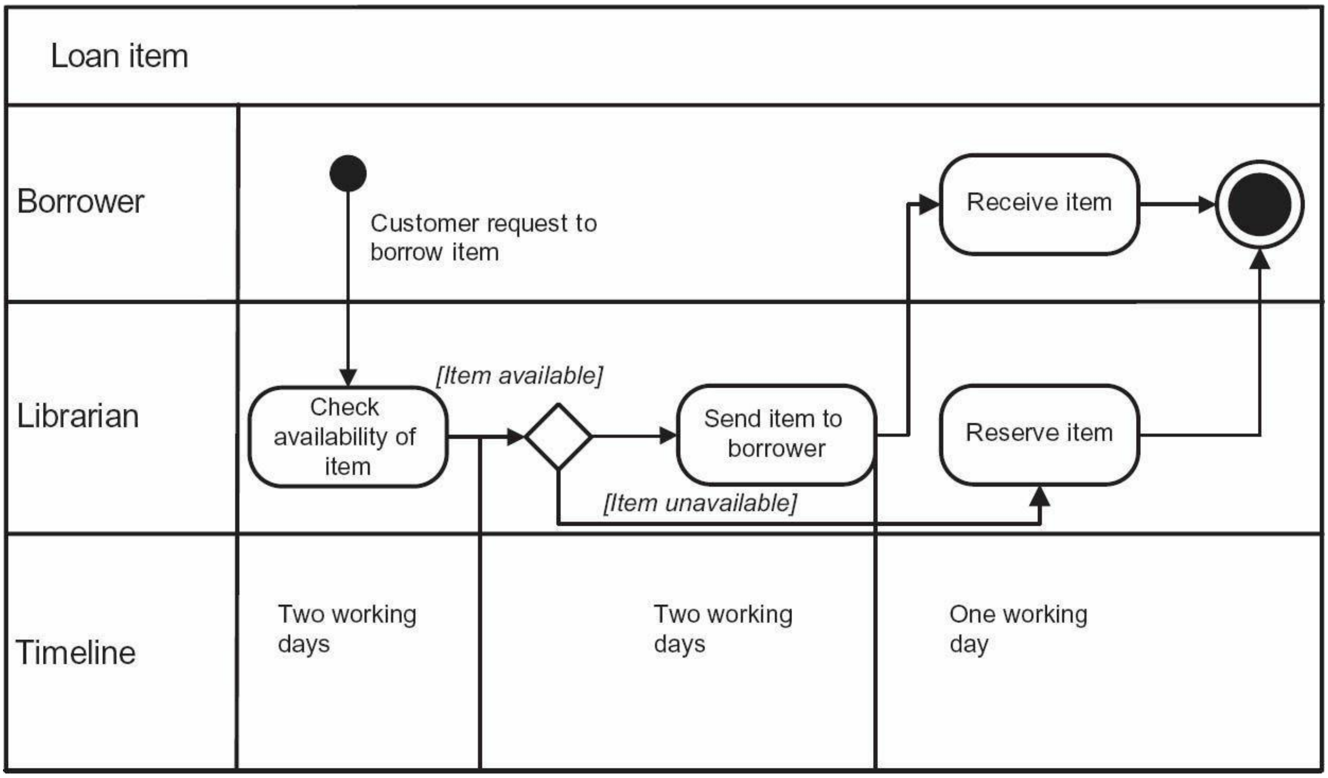
- the time it takes to complete a process or task;
- the financial measures such as costs or prices;
- the quality measures that are concerned with accuracy and effectiveness.

It is important to consider all three areas when improving a business process. If a task is likely to take too long, there will be consequential effects in other parts of the business process leading to poor customer service. If an organisation charges for a particular service but the cost of the process to deliver the service is greater than this charge, then the organisation is going to run into financial difficulties at some point. If the performance measures related to quality are not considered, customers may receive inaccurate information and poor customer service.

Process and task measures

One of the key issues for performance measures is to understand customers' value expectations. The customer has an expectation of the organisation's performance in delivering the product or service. Internally, the process may be made up of several individual tasks, each of which will need to be allocated performance measures. The task-level performance measures should be aggregated such that the product or service is delivered within the overall performance measures for the process. Figure 7.15 demonstrates this principle by showing our loan item example with a timeline added in. This timeline shows that the first task, 'Check availability of item', must take place within two working days of receiving the request from the customer. The second task, 'Send item to borrower', must take place within a further two working days. The customer must receive the item within a further one working day. Therefore, from item request to item receipt should take no longer than five days. These are the internal performance measures but they need to be aligned with the external expectation. If the external performance measure, the customer view, is that the item will be received within five working days then the internal measures are fine. However, if the customer is expecting the item within two working days then these internal measures are likely to ensure that the customer's expectations will not be met.

Figure 7.15 Process model with timeline added



The performance targets set for a particular process have to align with the expectations of the customers. If we design a process that results in a service that does not meet customer expectations then the likelihood of losing customers is very high.

Estimating the timeline for a process is difficult. It will depend on a range of factors including:

- the length of time taken by each task within the process;
- the resources available to support the tasks;
- the number of transactions to be processed and how this varies over time;
- the variety and mix of different transaction types;
- the amount of rework caused by errors;
- the delays and queues at each of the hand-offs;
- the quality and productivity of the staff;
- other work that could interrupt the process.

Some process modelling software provides performance information by using data on the above factors to simulate the behaviour of the process. The value of the simulation results depend on the accuracy of the assumptions and the data fed into the model. However, the information gained can be very helpful when designing the process and defining appropriate performance targets.

Cost and time estimates are interrelated so similar issues apply when setting financial performance measures. The longer the tasks within the process take, the more resource is required and hence the higher the cost. There may also be trade-offs; in order to reduce time, we may be able to increase the expenditure on resources. However, it is important to consider how much the resource will cost and whether or not the reduced time/higher performance will justify that extra expenditure.

Performance issues

Measures and targets need to be chosen with care especially when managers are given incentives to achieve those targets. Targets will change the way that people behave – that is what they are designed to do. It is possible that the behaviour could be inappropriate if we have not thought through the implications of the targets. For example, sales staff are often set sales targets on the assumption that more sales are good for the business as a whole. However, this may not be true if the increased sales are achieved by lowering prices too much. This is an example of sub-optimisation where seemingly better performance in one part of the business can result in poorer performance for the business as a whole.

BUSINESS PROCESS MODEL AND NOTATION

Business Process Model and Notation (BPMN) provides a standardised way of drawing business process models that is comprehensive and unambiguous. It is based on work that first appeared in 2004 as the Business Process Modelling Language. The Object Management Group (OMG), who look after UML as well as other software standards, took over responsibility for BPMN, issuing Version 1.0 in 2006 and Version 2.0 in 2010.

There is a lot of interest in BPMN and many software organisations use and support it. There are two main reasons for this. First, BPMN allows users to represent process models in an industry-standard way so that they are portable across a range of modelling tools. Second, users of BPMN can specify very precise process logic that can be understood and executed by workflow or process engines that control many business processes. The notation used in BPMN is extensive and very powerful.

Process modelling using BPMN is useful in two different, but related, aspects. The first concerns business analysts when working with the business to understand the problems with the current processes and consider how they may be improved. However, once the new processes have been agreed, the second aspect concerns the technical details of how the processes will be implemented. BPMN covers both aspects in a seamless way and provides an extensive notation set. Some symbols are appropriate for process modelling as carried out by the business analyst, while others have more relevance for the technical staff.

The basics of BPMN look similar to UML activity diagrams with tasks shown in swimlanes, and connected by process flows that also link with initiating events and outcomes. There is a great deal of additional notation that could be used by the business analyst, including pools, gateways and messages.

A pool consists of lanes, the BPMN name for a swimlane. A process generally shows the sequence of tasks carried out by different actors, each in its own lane. The customer that initiates the process can be regarded as an external actor and shown as a 'blackbox pool', containing one lane only. No activities are shown in this pool (hence the blackbox title) as the work of the external actor is invisible to the process being analysed.

A gateway controls the flow through the tasks of a process. In BPMN, a gateway is represented as a diamond but it is more than a UML decision point. With a letter O inside the diamond, it can indicate an either/or decision (like the UML decision), whilst a **+** indicates a parallel process flow. Messages show how processes may communicate with each other and hence how they collaborate.

BPMN provides an extensive set of symbols and concepts. As business analysts we need to take care when using BPMN as it is important to recognise that the models we build are a means of communication with the business; too much technical detail would result in a model that was difficult for the business staff to understand. Some BPMN specialists recommend that business analysts only use a subset of the BPMN facilities; Bruce Silver's (2009) *BPMN Methods and Style* provides details of his Level 1 palette of facilities.

SIX SIGMA

An alternative approach to process improvement is embodied in the Six Sigma approach developed by Motorola in the 1970s and based on ideas from statistical process control. First used in manufacturing industries in the reduction of product defects, it is now used in a range of organisations including those in the pharmaceutical industry, local authorities, food processing, hospitals, the military, logistics, NASA and financial services. Its purpose is to eradicate performance deficiencies in processes that are critical to achieving customer satisfaction. These processes might include complaint handling, order fulfilment or delivering a package to a customer's house. To achieve process improvement, Six Sigma follows a five step approach known as DMAIC:

- **D**efine the problem.
- **M**easure the data.
- **A**nalyse the problem.
- **I**mprove the process by removing the root causes of the problem.
- **C**ontrol to prevent the original problem from reoccurring and to maintain the benefits of the changes made.

Let us assume that we are Global Deliveries PLC and we're getting an increasing number of customer complaints about the non-delivery or late delivery of packages; about incomplete deliveries against acknowledged orders, packages delivered to wrong addresses, poor performance from the offices in Denver, Brisbane, Glasgow, Calgary and Swindon. Following the DMAIC approach, we would carry out the following activities:

- **Define** the problem. What is going wrong? Is it one problem or many? What is the visible evidence? Where is it and where does it come from? How serious is it? Is it organisation wide or localised? What will be done about it? What is the objective of this investigation?
- **Measure** the data. This means obtaining the data to identify the symptoms; do they occur all the time or from time to time? Produce a map of the process that is producing the problem. Concentrate on the symptoms doing the most damage.
- **Analyse** the results so far. Be creative and prepare theories about the causes of the problems. Document the theories and test them. Identify the root causes.
- **Improve** the process. Assess alternative improvement methods. Design and test the chosen method. Implement the chosen method.
- **Control** the new process and monitor its effectiveness.

Six Sigma can be seen as a very methodical and structured approach to process improvement that uses data and measurement to identify where the most business benefit can be obtained. The aim is to reduce errors so that all processes meet or exceed customers' expectations and that there are no more than 3.4 defects per million occurrences. In the Global Deliveries PLC example this would translate into performance that delivers the right package to the right place at the right time 99.997 per cent of the time!

SUMMARY

An organised, structured approach to business process improvement will be beneficial for both the organisation and the business analysts carrying out the work. We have described an approach using an organisational view of processes that is then developed further into more detailed business process models. Business process models can be used for many purposes, including business improvement and staff training, but if they are to be useful it is important to produce clear, easily understood diagrams and well-structured supporting documentation.

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www.bpmi.org

8 DEFINING THE SOLUTION

Debra Paul and Paul Turner

INTRODUCTION

One of the key activities conducted by business analysts is the analysis of the gap between where the business is currently and where it needs to be in terms of its processes and systems. However, analysing the gap requires detailed thought and an understanding of the implications associated with implementing the proposed changes. While addressing the problematic areas identified during the analysis process, the selected option will also need to align with the defined business architecture for the organisation.

This chapter looks at two aspects regarding the development of options for business change:

1. Analysing the gap between the current and desired business systems.
2. Ensuring the alignment of any proposed actions with the business architecture.

GAP ANALYSIS

In essence, gap analysis requires the business analyst to explore the differences between a current state and a desired future state. Gap analysis can apply at different levels, depending upon the situation. A Business Activity Model (BAM) provides a conceptual overview of a desired future business system, showing 'what' activities would be needed to fulfil a stakeholder perspective, or where this is a consensus BAM, the agreed perspective. Each of the activities shown on the BAM may be examined in order to identify where deficiencies lie. At a more specific level, gap analysis may be used to examine any of the following areas:

- the 'as is' and 'to be' business process models;
- the competencies held by an individual and those required for a particular role;
- the IT system requirements and the features offered by an off-the-shelf

software package.

Identifying areas of concern

The activities on the BAM should be inspected and categorised in order to identify those requiring further attention. Three categories may be used for the activities:

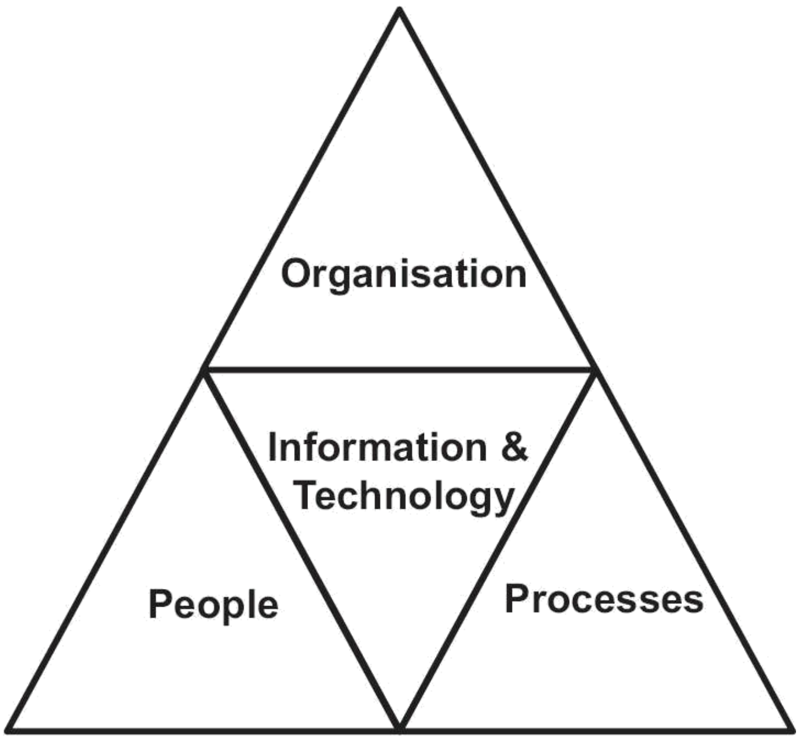
- operating satisfactorily – no immediate action;
- some issues to be addressed – action required;
- not in place – urgent consideration.

Categorising the activities in this way allows us to prioritise the work in line with the original objectives and scope for the business analysis work. Once we have an idea of the areas requiring most attention, we can conduct the gap analysis at a more detailed level, focusing on 'how' the work is conducted.

Framework for gap analysis

In Chapter 5 we discussed the techniques which may be used to investigate and represent a current business area or situation. As explained in that chapter, it is often the case that the initial investigation focuses on modelling the processes or defining the requirements but this can lead to the change proposals being limited or failing to address the real problems. The holistic approach adopted by business analysts helps to avoid such issues. When taking a holistic approach, the analysts ensure that they consider aspects such as the organisation's structure, culture and management style in addition to examining the business processes and IT systems. The POPIT™ model, shown in Figure 8.1, can help considerably with this investigation as it provides a framework and aide memoire that helps ensure that the analysis considers all of the required elements.

Figure 8.1 The POPIT™ model



The POPIT model will be used to organise the gap analysis discussion below.

Processes

The usual starting point for gap analysis is to consider the ‘as is’ and ‘to be’ processes. This is a good place to begin because any changes made to processes inevitably require other POPIT elements to change. This may range from a relatively minor change of a job description to a significant revision of the entire team structure. For example, if a process improvement requires that two roles are to be merged, then there is likely to be a corresponding impact on the structure, job role descriptions, skill requirements and IT systems. The definition of the revised processes will need to be clear and unambiguous which is why using a standard modelling technique, such as that described in Chapter 7, can be extremely helpful. It is also important that a more detailed definition is developed, representing the procedures to be applied when individual tasks are undertaken; this is necessary to support the definition of the IT requirements, clarify any new process documentation requirements, support the development of revised job role descriptions and form the basis for training in the new processes.

Information and technology

Business process improvements are often concerned with the retrieval and distribution of information so gaps associated with this area are often identified. During gap analysis, the information required should be analysed using techniques such as document analysis and modelled using entity relationship models or class diagrams. These help to identify the information needed to perform the business processes, identify where additional information is required and clarify the information requirements.

The technology element of the POPIT model is often the core enabler of the business change. Typically, it will be important to think about the following areas:

IT support

If the 'to be' business processes require additional IT support, the analysts will need to consider the requirements that should be delivered by the technology. This may mean the functional requirements but may also lead to the definition of non-functional requirements. These requirement types are discussed further in Chapter 11. Many organisations are constrained by legacy systems which are not very adaptable to changing business needs or by poor scalability – the capacity of the systems to handle higher volumes. These issues need to be considered when introducing new processes as they can represent a gap that it will be important to address.

Accessibility

When introducing a change to the IT systems used to perform processes, it is important to ensure that the systems are as accessible as possible; this means considering the user population for the systems. If there is poor accessibility, the IT systems may not be used effectively. If business staff are unable to use, or have difficulty in using, a system they will avoid doing so which is likely to lead to them developing unauthorised and undesirable workarounds in order to conduct their work. Other stakeholders, such as customers and suppliers, may decide it is easier to work with other, perhaps competing, organisations.

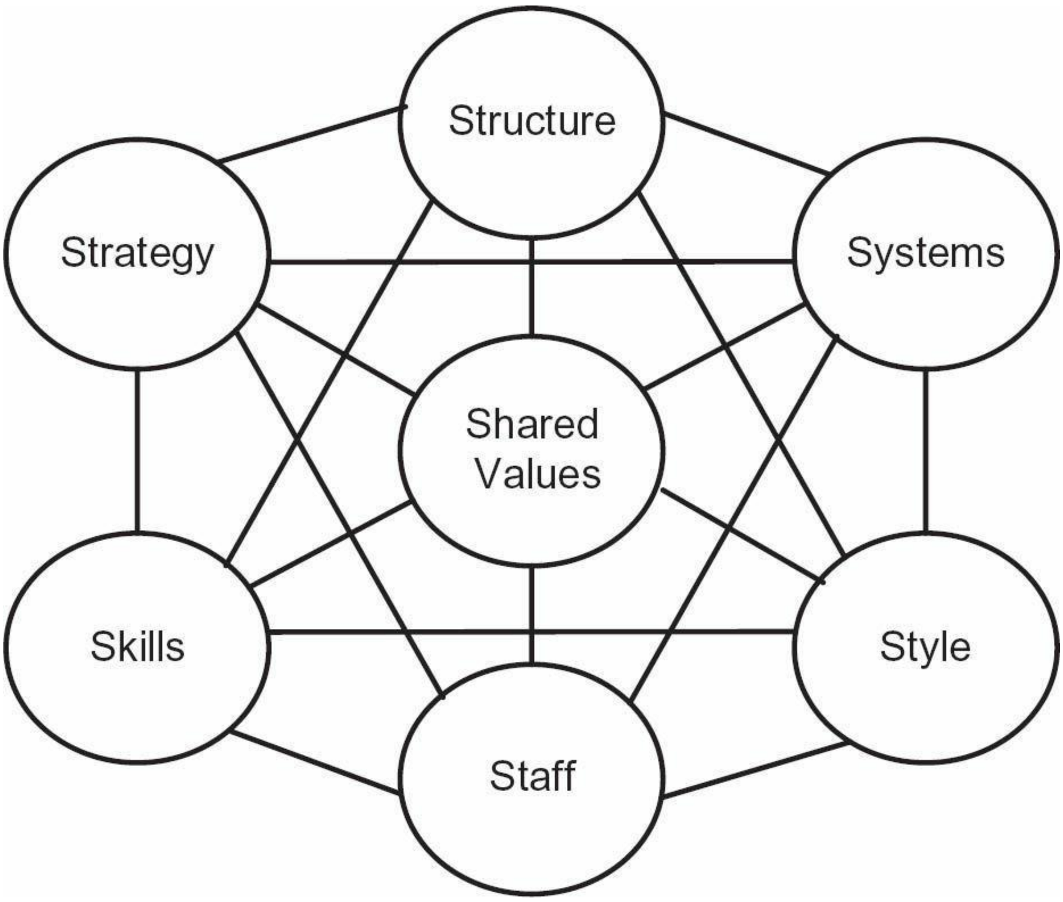
Alignment with the enterprise architecture

A major problem in many organisations is that the IT systems are not well-integrated with each other or with the overall infrastructure that exists for the delivery of the IT services. This can lead to problems such as limited automatic data transfer, which may result in the re-keying of data, inconsistent data formats and definitions, and different systems holding differing values for the same data. During gap analysis, it is critical that such issues are considered. Introducing new IT functionality without considering how this impacts upon, or needs to align with, the existing IT systems and infrastructure may end up introducing additional problems rather than solving those that exist currently.

Organisation

This is often the area that is overlooked during gap analysis and option development. However, it is extremely important as it can be where gaps exist that have the potential to undermine the new business system and processes. One of the reasons why a holistic view is so important during the investigation of the current system, is that it causes us to consider organisational aspects such as structure and culture. McKinsey's 7-S model (Figure 8.2), introduced in Chapter 3, can be useful here, providing a framework for thinking about the different elements that contribute to the organisational view.

Figure 8.2 McKinsey's 7-S model



The 7-S model sets out the aspects of the organisation that need to be considered if a change is to be introduced successfully. If we map this onto the POPIT model, we can see that some of the 7-S elements are already covered:

- 'systems' is analysed from the three views of process, information and technology;
- 'staff' and 'skills' form part of the people view.

So, from the organisation perspective, we need to think about the remaining four aspects: shared values, style, strategy and structure.

The shared values are at the core of the organisation. In undertaking a gap analysis, we need to ask if these shared values are explicit and communicated, and if they really help drive the other areas such as the systems and structures. Moving to a new, desired position, may require us to think about the manifestation of any inconsistent views in the existing business system and the impact of values upon the work practices. We also need to consider the style adopted by management and the culture that exists within the area under consideration. Is this in line with the values and the strategy and will it help in the introduction of the desired changes or will there need to be some work to align this? More tangibly, the structure of the business area may need to be changed. At a micro level, some job roles may need to be combined but there may also be impacts at a broader level whereby whole teams or even departments need to be merged or reorganised. It is also possible that more fundamental change to the structure may be needed such as the change from a regional to a product-based structure.

It is sometimes said that the key aspects of the McKinsey model are not the individual elements but the lines that connect them. Whatever the changes, there must be congruence between the different elements and, where this is not the case, there is some misalignment in the organisation which should be addressed. For example, there may be a difference between what managers say they want (strategy) and the behaviour they expect (style).

People

It is particularly important that any business change proposals set out the approach to deployment that will be adopted, including planning for communicating the changes to any affected staff. The analysis should consider the impact upon the people who will perform the work and identify any gaps to be addressed. The following areas are particularly important:

Skills

We need to think about what skills the new job roles require, how much support will be needed during the transition and what training should be delivered to ensure the smooth implementation of the new business processes. The changes may generate a need for training in the new tasks, the new process flows, the new information or even the new rules to apply when making decisions. The events that trigger the tasks may have changed or the information used may originate from different sources. All of these aspects needs to be considered in order to define the training and support needs. For some business changes, the initial communication and support may have been inadequate so training is required even for tasks that have not changed.

Recruitment

If there is a skills gap, there may be a need for further recruitment of staff. The definition of the required skills will help to provide a basis for any additional recruitment. However, there may be a more significant gap in that there may not be a properly defined recruitment policy and inadequate methods may be used for recruitment. If either of these is the case, problems with the team's skills may result and the business changes may be undermined. Therefore, it is important to consider staff recruitment policies as part of the gap analysis activity; they may cause problems during deployment if we need to change or extend the skills of the team but, in the longer term, may also serve to perpetuate recruitment issues.

Staff development

One of the gaps may concern the approach adopted to career development. It is important to think about questions such as 'Is there an appraisal scheme in place?' and if so, 'Does it appraise the right things and lead to effective skill development?' Sometimes, it is useful to think about how the current personal development processes are working as they may be the root cause of some problems. If so, they are likely to interfere with the successful introduction of changes.

Motivation and reward

It can also be useful to consider the levels of staff motivation and, more tangibly, the reward systems in place. Again, there may be issues here that can be causing problems and undermine the performance of the organisation. For example, if there is a problem with staff motivation, the introduction of a new suite of processes and systems may worsen this. The alignment of reward systems with the objectives of the organisation is vital if the change is to succeed.

FORMULATING OPTIONS

Once we have an understanding of the gaps to be addressed, we can begin to formulate the options for change. As in all business changes, we need to ensure that any proposals are feasible from the financial, business and technological perspectives. The approach to this is considered in Chapter 9. The key is that the options are holistic. It is of no use putting forward proposals that change one or two elements of the POPIT model while not considering the others; the best IT systems in the world will not operate effectively if the people do not know how to use them or cannot access them. Similarly, it is not possible to change a team structure without considering the impact on individuals and ensuring that they are clear about the new way of working.

DEFINING BUSINESS REQUIREMENTS

The outcome from the gap analysis is a list of business requirements that need to be delivered. These requirements are likely to be at the 'what' level rather than dictating the precise ways in which they will be met. However, at this point, there are likely to be some requirements that will need to form part of the IT solution. Chapters 10–12 discuss the definition and management of requirements.

INTRODUCTION TO BUSINESS ARCHITECTURE

Organisations are becoming increasingly aware of the need to hold a formal definition of the architecture of their business. Any proposed business change must align with the business architecture. It is common for even small changes to affect multiple processes, IT systems and databases requiring vast expense, often without the change adding any real value and causing disruption to areas of the business that were working well. In many cases, this is because business analysts usually work in one designated area and do not always have the opportunity to see how the change they propose fits within the broader picture or indeed whether work being undertaken elsewhere may impact upon their work. Without a high-level model or blueprint of the overall business, and its interface with its customers, suppliers and partners, any proposed change will be difficult to assess in terms of the impact and potential disruption.

A business architecture begins to evolve when two or more business areas (including those from outside the scope of the specific business itself) are thought of as an integrated set of capabilities that delivers value. The business architecture helps to provide increased visibility and effectiveness. Once a high level plan or blueprint of the organisation exists, it is possible to evaluate various scenarios for change in terms of their impact and effectiveness, and ensure that any changes to be undertaken can be aligned with this overall business architecture. Therefore, it can be seen that a business architecture provides a bridge between the organisation's defined strategy and the execution of the strategy.

DEFINITION OF BUSINESS ARCHITECTURE

The Business Architecture Guild (2014) defines business architecture as:

> A blueprint of the enterprise that provides a common understanding of the

organisation that can be used to align strategic objectives and tactical demands.

This definition encapsulates the important role that the business architecture plays as an interface between strategy and the implementation of change. Hence, employed effectively, a robust business architecture results in the following:

- the strategy drives changes to the business architecture;
- the business architecture informs and refines the strategy;
- the business architecture translates the strategy for execution;
- the strategy execution enables and generates improvement to the overall business architecture.

A business architecture has three primary objectives:

1. To promote organisational health: to ensure the longevity and well-being of the organisation, generating an ability to be flexible and agile in the delivery of change.
2. To help fulfil unrealised opportunities: promoting appropriate reaction to external influences and proposed initiatives, and identifying the areas of the business which would most benefit from any transformation.
3. To aid organisational performance in a competitive market place: implementing best practice, encouraging reuse, monitoring business metrics and focusing on those areas of the business that deliver the most value to the end customer.

In addition, it is worth keeping in mind the following key points about a business architecture:

- The scope of a business architecture is the scope of the business.
- A business architecture is not prescriptive.
- A business architecture is developed iteratively.
- A business architecture is reusable across business units and businesses.
- A business architecture is not about the deliverables, it is more concerned with reflecting the underlying philosophy and values.

While a business architecture represents the business, its coverage does not begin or end at the boundaries of a specific enterprise. It must also be capable of representing aspects of the business that that are undertaken by external stakeholders such as outsourced suppliers. This is supported by the use of techniques such as value stream analysis and is consistent with a focus on what the business does rather than how it does it.

STRUCTURE OF A BUSINESS ARCHITECTURE

There are many models and documents that could be included as artefacts within a business architecture; in effect they would provide many different views of the business. For example, the artefacts of a business architecture might document any of the following:

- capabilities;
- values;
- information;
- products;
- suppliers and partners;
- motivations;
- business units;
- policies.

It is important to consider the maintenance overhead that may arise if there are numerous artefacts, given that they would all need to be defined and maintained. Also, cross references between artefacts will be required in order to ensure overall consistency. Any artefacts that are included in an organisation's business architecture should always be at a high level of abstraction and subsequently mapped to the detailed artefacts and models more familiar to business analysts. For example, the business architecture artefacts would map onto, and align with, the detailed business process models, but would not contain these processes.

Evolving best practice has shown that the key elements of a business architecture represent the following areas:

- business motivations;
- business capabilities;
- value streams (which can be mapped to more detailed business processes);
- organisational business units;
- information concepts.

From this list, the business capabilities and the value streams that enable them are widely regarded as the essence of an effective business architecture and it is with these that the construction of a business architecture should always begin. Business analysts can use the business architecture artefacts to ensure that any work they undertake, and changes they propose, are consistent with it. Also, the business analysts may add to the business architecture over time in order to extend its coverage. This would be done within a robust governance regime to ensure continued consistency and correctness of the business architecture artefacts.

BUSINESS ARCHITECTURE TECHNIQUES

There is a wide range of techniques that can be employed when defining the business architecture. These techniques vary from those that focus on the bigger picture of the business architecture, such as business model definition, business motivation analysis and capability modelling, through to more detailed techniques such as value stream analysis, value network analysis and information mapping.

The two key techniques from this list that form the essence of an effective Business Architecture are:

- business capability modelling;
- value stream analysis.

Business capability modelling

Capability models represent, at a high level, what the organisation need to be able to do in order to deliver value to customers. While these initial capabilities can be decomposed to a number of levels, they should never reflect how delivery is actually achieved in practice.

A capability is a particular ability to achieve an outcome, i.e. they reflect what a business is able to do that creates value for a customer. A full business capability model usually investigates and models the whole organisation across a number of business strata (layers). The main strata found on a typical business capability model would be:

- strategic or direction setting;
- core or customer facing;
- supporting.

Within each of these strata, Foundation (level 1) capabilities are initially identified and these are then expanded into more detailed capability groups and ultimately standalone reuseable capabilities.

Table 8.1 provides some examples of business capabilities at the Foundation level.

Table 8.1 Examples of foundation level business capabilities

Stratum	**Foundation capabilities**
Strategic	Business planning
	Capital management
	Policy management
Customer facing	Distribution
	Customer service
	Product development
	Account management
Support	Staff recruitment
	Procurement
	Vendor management

It should be noted that the following rules apply when producing a business capability model:

- capabilities should be defined in business terms; capabilities
- should be named as nouns not verbs; capabilities are static
- (value streams show movement); capabilities should be unique
- across the entire capability model; capabilities are enabled via
- value streams.

Organisations that document and maintain business capabilities can change more quickly and effectively than those that do not. It is also invaluable when working with external suppliers or partners if the organisation has a view of the capabilities needed to deliver the required value to customers. For example, if considering working with a partner organisation, the definition of the capabilities required for the services to be delivered by the partner, will help in the evaluation – and possible removal – of prospective partners.

Value stream analysis

There are many techniques that can be used to investigate and represent the delivery of value. The value stream approach is one of the most powerful when used as part of a business architecture.

A value stream is an end-to-end collection of high-level linear stages that create an outcome of value to a specific customer group. This may be either the ultimate customer or an internal end-user of the value stream. Value streams are used to identify, map and analyse the value exchanged between an organisation and various stakeholders (internal and external) that interact with it. They focus on the delivery of value and may not reflect the way the work is done in practice.

The value stream shows the main sequential stages which add value to the customer. It should be noted that the value stream considers all the stages needed, regardless of how many organisations or business units may actually be involved in delivering the value. Figure 8.3 shows an example of a value stream dealing with mortgage applications on behalf of a mortgage lender.

Figure 8.3 Example value stream for mortgage application

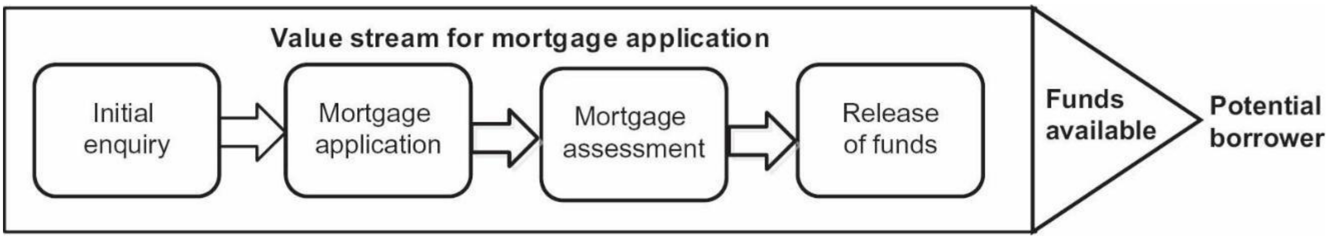


Figure 8.3 shows the value stream for 'Mortgage application' decomposed into its key stages in sequence. The diagram does not show who performs each of the different stages. It can be extended by mapping the business capabilities onto the stages of the value stream, showing how each stage is enabled by these capabilities.

It is common for each of the individual stages within a value stream, such as the one shown here, to be enabled by a number of organisational capabilities identified from the previously defined Business Capability Model. In most cases these would usually be either level 2 or level 3 capabilities rather than at a Foundation level.

When producing a value stream, it is worth noting some key guiding principles. Value streams should:

- be stakeholder focused;
- take an holistic view;
- be customer centric;
- facilitate further decomposition;
- help identify which business capabilities help achieve stakeholder value.

Organisations that understand the value streams that they are part of, and who appreciate their particular role, are well placed to promote the effective delivery of value to the recipients of their products and services.

SUMMARY

Gap analysis is concerned with identifying the differences between the current business situation and the desired future business system. When analysing the gap, we need to take a holistic view, considering elements such as the business processes and people in addition to the processes and IT systems. It is important that any proposed changes are aligned with the business architecture. The overall goal of a business architecture is to enable an organisation to focus on the products and services it delivers to its customers and the value these customers receive. Hence, any business architecture needs to reflect a high level of abstraction, considering what the business needs to do to deliver value to its customers rather than how, who or where this value is delivered. Techniques such as business capability modelling and value stream analysis may be used to represent such an abstraction.

REFERENCE

Business Architecture Guild (2014) *Business Architecture Body of Knowledge*, online resource, available at http://www.businessarchitectureguild.org/ [accessed 20 June 2014].

FURTHER READING

Cadle, J., Paul, D. and Turner, P. (2014) *Business Analysis Techniques: 99 essential tools for success*, 2nd edn. BCS, Swindon.

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9 MAKING A BUSINESS AND FINANCIAL CASE

James Cadle

INTRODUCTION

A business case is a key document in a business analysis project and is the place where the analysts present their findings and propose a course of action for senior management to consider. This chapter considers the purpose, structure and content of a business case and provides some guidance on how to assemble the information and to present the finished product. One thing worth remembering is that, to some extent, a business case is a 'sales' document, aimed at getting people to take a decision. Therefore, some of the key rules of successful selling apply: stress benefits, not features; sell the benefits before discussing the cost; get the 'buyers' to understand the size of the problem – or opportunity – before presenting the amount of time, effort and money that will be needed to implement a solution.

THE BUSINESS CASE IN THE PROJECT LIFECYCLE

A question often asked about the business case is 'when should it be produced?' This issue is addressed in Figure 9.1. As the illustration shows, a business case is a living document and should be revised as the project proceeds and as more is discovered about the proposed solution and the costs and benefits of introducing it. In addition, organisations and the environments in which they operate are not static and so the business case must be kept under review to ensure that changing circumstances have not invalidated it. The initial business case often results from a feasibility study, where the broad requirements and options have been considered and where 'ballpark' estimates of costs and benefits are developed. The ballpark figures must, however, be revisited once more detailed analysis work has been completed and a fuller picture has emerged of the options available. It should also be examined again once the solution has been designed and much more reliable figures are available for the costs of development. The business case should next be reviewed before the solution is deployed, precisely because the costs of deployment are now more reliable. Also, business circumstances may have changed and it may not be worth proceeding to implementation. Finally, once the proposed solution has been in operation for a while, there should be a benefits review to determine the degree to which the predicted business benefits have been realised and to identify actions to support the delivery of these benefits.

Figure 9.1 The business case in the project lifecycle

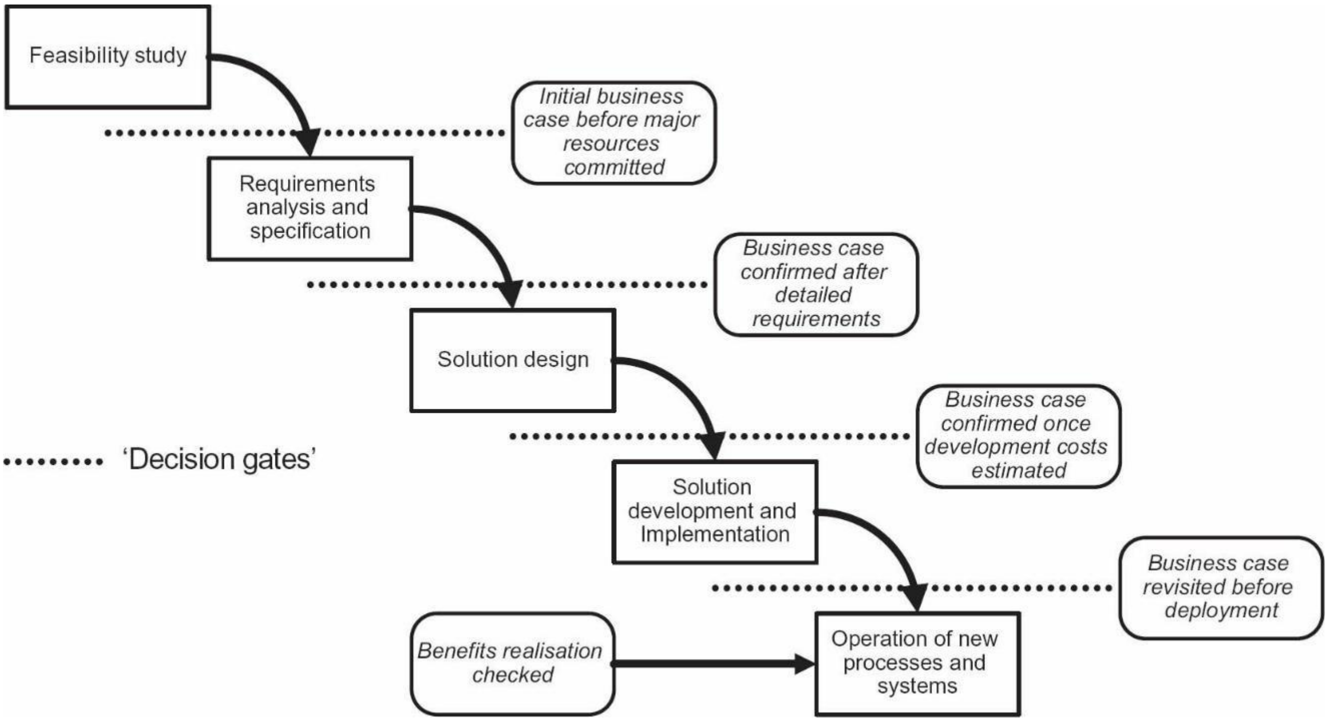


Figure 9.1 refers to each of these review points as 'decision gates'. The concept shown, now widely used in project management, is that projects should pass certain tests – not least those relating to their business viability – before they can be allowed to proceed to the next stage.

IDENTIFYING OPTIONS

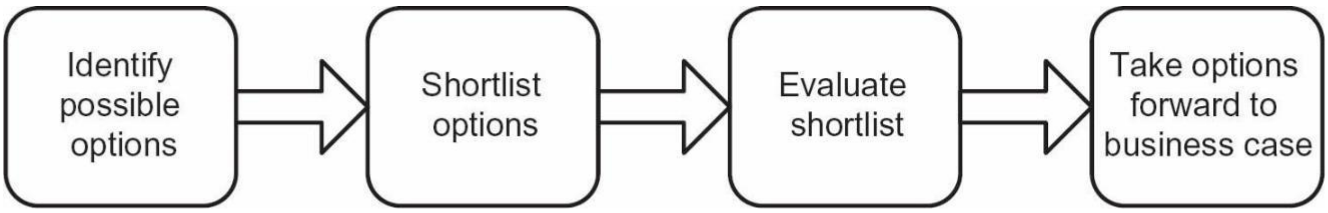
The first step in putting together a business case is to identify and explore the various options that exist for solving the business issue. There are actually two kinds of options:

- Business options that explore *what* the proposed solution is intended to achieve in business terms – for example, 'speed up invoice handling by 50 per cent' or 'reduce the number of people we need to staff our supermarket'.
- Technical options that consider *how* the solution is to be implemented, often through the use of information technology.

At one time, it was considered that these two elements should be considered separately and deal with business first, the aim being to avoid the technical ‘tail’ wagging the business ‘dog’. Nowadays, however, most changes to business practice involve the use of IT in some form and it is often the availability of technology that makes the business solutions possible. For example, one way of reducing the need for staff in a supermarket would be to enable customers to scan their purchases themselves using ‘smart’ bar codes. For this reason, it is a bit difficult to keep business and technical options separate but it remains true that business needs should drive the options process, rather than the use of technology for its own sake.

The basic process for developing options is shown in Figure 9.2. Identifying options is probably best achieved through some form of workshop, where brainstorming and other creative problem-solving approaches can be employed. Modelling techniques such as Business Activity Modelling (Chapter 6) or Business Process Modelling (Chapter 7) are also useful to help generate options. The aim is to get all of the possible ideas out on the table before going on to consider which ones are most promising. Even if some of the ideas seem a bit far-fetched, they may provide part of the actual solution or stimulate other people to come up with similar, but more workable, suggestions. Another way of identifying options is to study what other organisations – possibly your competitors – have done to address the same issues.

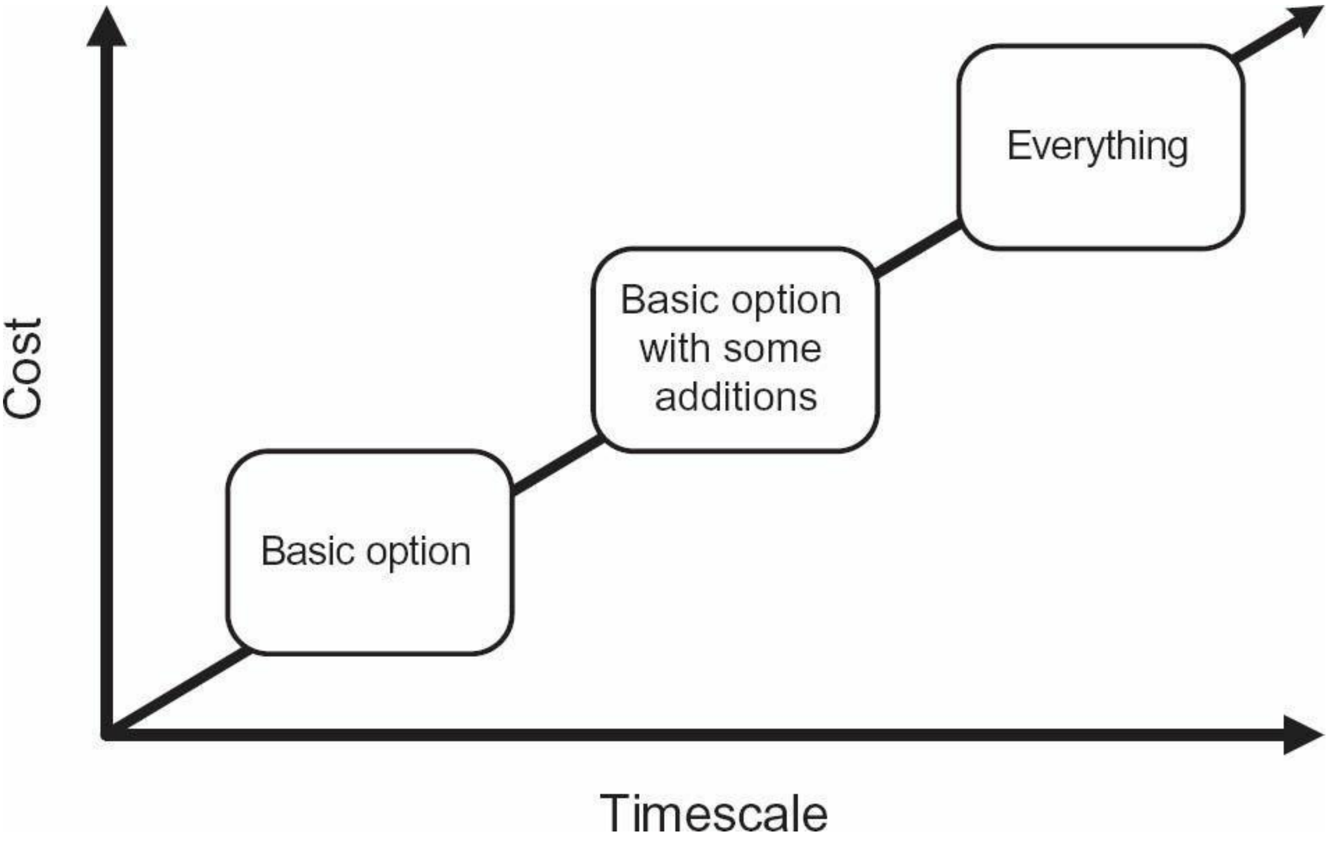
Figure 9.2 Process for developing options



Once all the possibilities have been flushed out, they can be subjected to evaluation to see which ones are worth examining further. Some ideas can usually be rejected quite quickly as being too expensive, or taking too long to implement, or being counter-cultural. The criteria for assessing feasibility are examined in more detail in the next part of this chapter.

Ideally, the shortlist of options should be reduced to three or four, one of which will usually be that of maintaining the status quo, the ‘do nothing’ option. The reason for restricting the list to three or four possibilities is that it is seldom practical, for reasons of time or cost, to examine more than this in enough detail to be taken forward to the business case. Each of the short-listed options should address the major business issues but offer some distinctive balance of the time they will take to implement, the budget required and the range of features offered. Sometimes, though, the options are ‘variations on a theme’, with one just dealing with the most pressing business issues and others offering various additional features. This situation is illustrated in Figure 9.3.

Figure 9.3 Incremental options



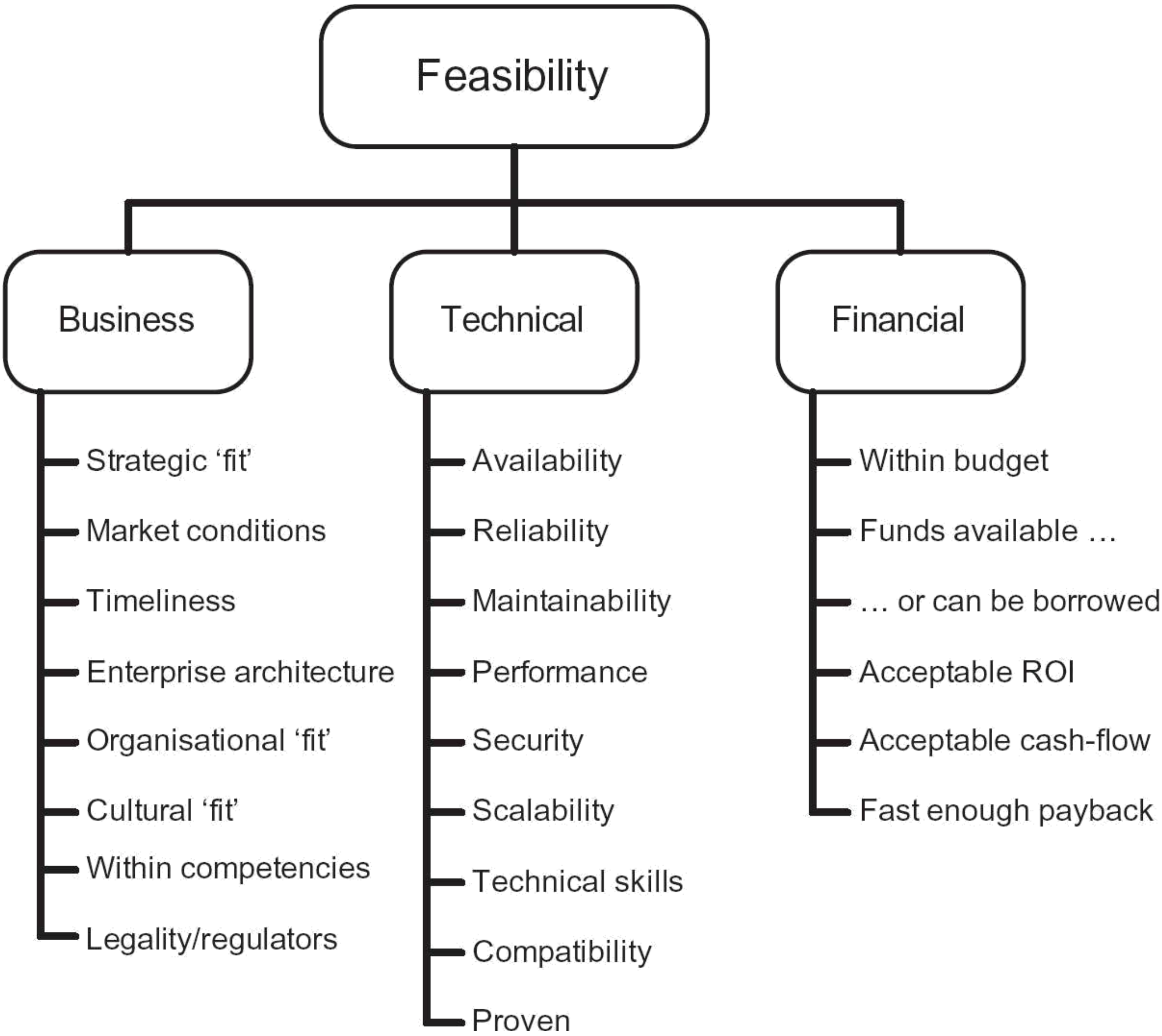
In Figure 9.3, the bottom option just deals with the most pressing issues, as quickly as possible and at minimal cost. The next option adds some additional features to the solution but costs more and takes longer. The last option a comprehensive solution but obviously takes the longest and costs the most.

One option that should always be considered – and which should usually find its way into the actual business case – is that of doing nothing. Sometimes, it really is a viable option and might even be the best choice for the organisation. Often, though, there is no sensible ‘do nothing’ option as some form of business disaster may result from inaction. In this case, the decision-makers may not be aware that action is imperative and so spelling out the risks and consequences of doing nothing becomes an important part of making the case for the other options.

ASSESSING PROJECT FEASIBILITY

There are many issues to think about in assessing feasibility but all fall under the three broad headings illustrated in Figure 9.4.

Figure 9.4 Aspects of feasibility



Business feasibility issues include whether the proposal matches the business objectives and strategy of the organisation and – if it is a commercial firm – if it can be achieved in the current market conditions. There is the question of whether the proposed solution will be delivered in sufficient time to secure the desired business benefits. The proposal must 'fit' with the management structure of the organisation and with its culture, as lack of cultural fit is often a cause of projects not meeting the expectations held for them. The solution must align with the enterprise architecture for the organisation. The proposal may be for major process change so may have to align with other processes, including those that are not changing, so alignment with the processes defined in the business architecture must also be considered. Whatever is proposed must be within the competencies of the organisation and its personnel, or there must be a plan for the development of these competencies. Finally, many sectors are now heavily regulated and the proposed solution must be one that will be acceptable to the regulators and not infringe other law or treaty obligations.

In assessing **technical feasibility**, one is normally – though not necessarily – considering IT. The proposed solution must meet the organisation's demands in terms of system performance, availability, reliability, maintainability and security. It must be asked if the solution is scalable, up or down, if the circumstances of the organisation change. The organisation must possess the technical skills to implement the solution, or supplement these with help from outside. Few IT systems are now completely detached from other systems and so the issue of compatibility must be considered. If the solution involves an off-the-shelf software package, thought should be given to the amount of customisation that would be required and whether this would cause technical difficulties. Finally, consideration is needed regarding whether the proposed solution is a proven one or places excessive reliance on leading edge – that is to say, unproven – technologies. Many organisations would prefer a less ambitious but reliable solution to a more advanced one that comes with a lot of technological risk.

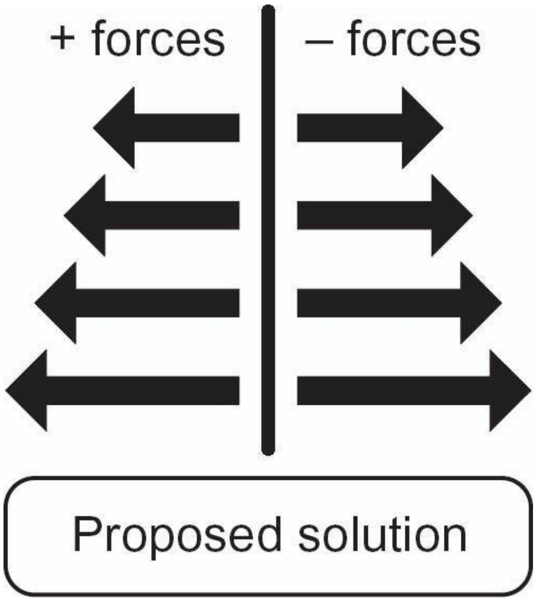
Financial feasibility is about whether the organisation can afford the proposed solution. There may already be a budget imposed. The organisation needs either to have the required funds available or to be in a position to borrow them. Every organisation will have some rules or guidelines about what constitutes an acceptable return on its investment and methods of calculating this are considered later in this chapter. Even if a project pays for itself in the end, it may have unacceptable high costs on the way and so cash flow must also be considered. Finally, all organisations specify some time period over which payback must occur and, in the case of IT projects, the payback periods are often very short, sometimes within the same accounting year as the investment.

Another tool that can be used in assessing feasibility is a PESTLE analysis. PESTLE examines the environment outside an organisation, or perhaps within an organisation but outside the area being studied. It can be used to assess feasibility like this:

- **Political:** Is the proposed solution politically acceptable?
- **Economic:** Can the organisation afford the solution?
- **Socio-cultural:** Does the solution fit with the organisation's culture?
- **Technological:** Can the solution be achieved, technically?
- **Legal:** Is it legal, will the regulator allow it?
- **Environmental:** Does it raise any 'green' environmental issues?

A final tool that can be employed to assess the feasibility of an option is a 'force-field analysis', illustrated in Figure 9.5.

Figure 9.5 Force-field analysis



With a force-field analysis, we consider those forces inside and outside the organisation that will support adoption of the proposal and those that will oppose it; and we need to be sure that the positive forces outweigh the negative. The forces may include the PESTLE factors mentioned above, the elements identified in Figure 9.4 and also the key stakeholders in the organisation (see Chapter 6). If we conclude that the negative forces are just too strong, then the proposal is not feasible and must be abandoned or re-cast in a way that gets more positive forces behind it.

In considering the feasibility of options, we also need to think about their impacts and risks. Because these form part of the business case itself, we discuss them later in this chapter.

STRUCTURE OF A BUSINESS CASE

Organisations differ in how they like to have business cases presented. Some like large, weighty documents with full analyses of the proposals and all the supporting data. Others like a short, sharp presentation of the main points – we have come across one organisation that mandates that business cases be distilled into a single page of A4. If this sounds cavalier, remember that the people who have to make the decisions on business cases are busy senior managers, whose time is at a premium. Whatever their size, however, the structure and content of most business cases are similar and tend to include these elements:

- introduction;

- management summary;
- description of the current situation;
- options considered;
- analysis of costs and benefits;
- impact assessment;
- risk assessment;
- recommendations;
- appendices, with supporting information.

We shall examine each of these elements in turn.

Introduction

This sets the scene and explains why the business case is being presented. Where relevant, it should also describe the methods used to examine the business issue and acknowledge those who have contributed to the study.

Management summary

In many ways, this is the most important part of the document as it is possibly the only part that the senior decision-makers will study properly. It should be written after the rest of the document has been completed and should distill the whole of the business case into a few paragraphs. In an ideal situation, three paragraphs should suffice:

- What the study was about and what was found out about the issues under consideration.
- A survey of the options considered, with their principal advantages and disadvantages.
- A clear statement of the recommendation being made and the decision required.

If you cannot get away with only three paragraphs, try at least to restrict the management summary to one or two pages.

Description of the current situation

This section of the document discusses the current situation and explains where the problems and opportunities lie. As long as these issues are covered to a sufficient level of detail, it is good to keep this section as short as possible; senior managers often complain of having to read pages and pages to find out what they knew already! Sometimes, though, the real problems or opportunities uncovered are not what management thought they were when they instituted the study. In that case, more space will have to be devoted to clarifying the issues and exploring the implications for the business.

Options considered

In this section of the document, the options to be considered are described with a brief explanation of why we are rejecting those not recommended. More coverage should be devoted to describing the recommended solution and why we are recommending it. As represented in Figure 9.3, there may well be a series of incremental options, from the most basic one to one that addresses all of the issues raised.

Analysis of costs and benefits

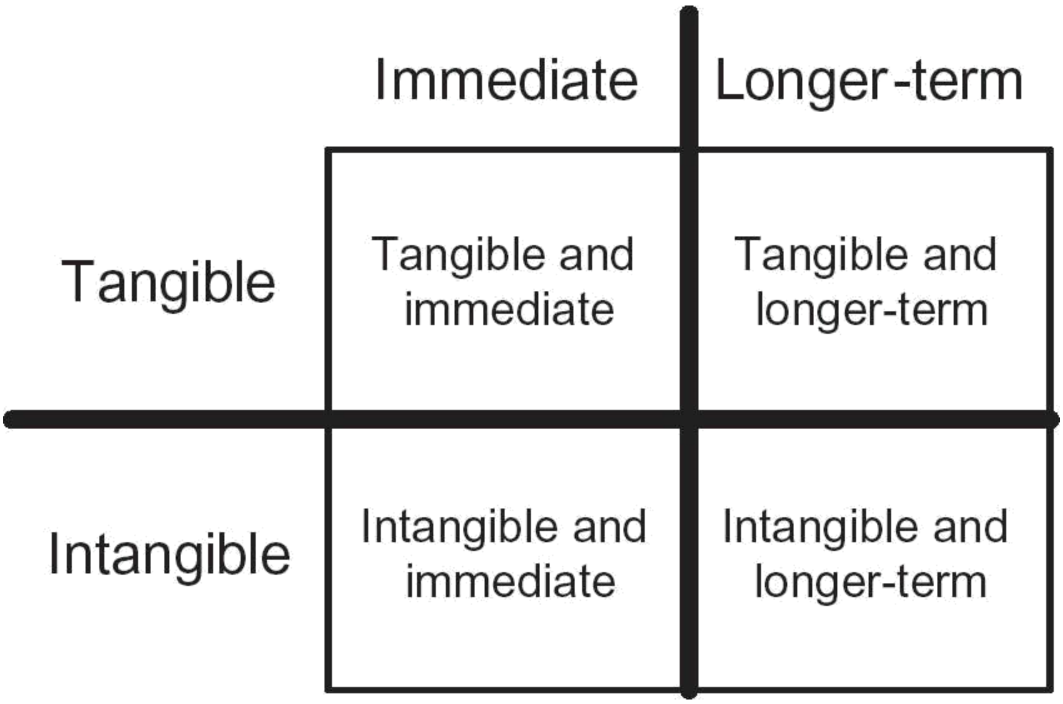
Cost-benefit analysis is one of the most interesting – and also the most difficult – aspects of business case development. Before examining the subject in detail, it is worth mentioning that it is good psychology to present the benefits before the costs. Doing this will increase the expectations of the likely costs and will help the decision-makers to appreciate the benefits before they are told the costs of achieving them. In other words, what we are presenting is actually a benefit–cost analysis even though by convention it is always referred to as a cost–benefit analysis.

Although cost–benefit analysis is interesting, it does pose a number of challenges:

- working out in the first place where costs will be incurred and where benefits can be expected;
- being realistic about whether the benefits will be realised in practice;
- placing a value on intangible elements like ‘improved customer satisfaction’ or ‘better staff morale’.

The last point concerns the types of costs and benefits that need to be considered. Costs and benefits are either incurred, or enjoyed, immediately or in the longer term. They are also either tangible, which means that a credible – usually monetary – value can be placed on them, or intangible, where this is not the case. Combining these elements, we find that costs and benefits fit into one of four categories, as illustrated in Figure 9.6.

Figure 9.6 Categories of costs and benefits



Costs tend to be mainly tangible, whereas benefits are often a mixture of the tangible and intangible. In some organisations, the managers will not consider intangible benefits at all and this often makes it difficult – or even impossible – to make an effective business case. How, for instance, does one place a value on something like a more modern company image achieved through adopting a new logo? In theory, it should be possible to put a numeric value on any cost or benefit; the practical problem is that we seldom have the time, or the specialist expertise – for example, from the field of operational research – to do so.

If intangible benefits are allowed, though, it is very important not to over-state them or, worse, to put some spurious value against them. The danger here is that the decision-makers simply do not believe this value and this then undermines their confidence in other, more soundly based, values. With intangible benefits, it is a much better policy to state what they are and even to emphasise them but to leave the decision-makers to put their own valuations on them.

Another pitfall in cost–benefit analysis is to base them on assumptions. For example, we might say something like ‘If we could achieve a 20% reduction in the time taken to produce invoices, this would amount to 5,000 hours per year or a cost saving of £25,000.’ This will only prove acceptable to the decision-makers if the assumption is plausible. If you can, use assumptions that are common within the organisation and always err on the side of conservatism, which is to under-claim rather than over-claim.

Looking at the four categories of costs and benefits already described, there are some areas where costs and benefits typically arise and there are standard ways of quantifying them.

Tangible costs

- **Development staff costs:** In many projects, particularly those that involve developing new processes or IT systems, these will be a major cost element. To work them out, we need a daily rate for the staff concerned – probably available from HR or Finance – and an outline project plan showing when and how many of the resources will be required. If you are using external consultants, then the costs here will be subject to negotiation and contract.
- **User staff costs:** These are often forgotten but can be significant. User staff will have to be available for the initial investigation and analysis, possibly during the development of new systems, to conduct user acceptance testing and to be trained in the new systems and work practices. Again, daily rates can be used in combination with an outline plan of the amount of user involvement.
- **Equipment:** Where IT is involved, there will often be a need to purchase new hardware. For this, estimates or quotations can be obtained from potential suppliers. Other equipment may also be required such as desks, tables.
- **Infrastructure:** This includes elements like cabling and networks and, again, estimates will be required from suppliers.
- **Packaged software:** Estimates of the cost of this can be obtained from package vendors, probably based on the proposed number of users or licenses. Where tailoring of a package is envisaged, estimates of the effort and cost involved can be requested also.
- **Relocation:** This can be quite difficult to cost. The costs could include those of the new premises, either rented or bought, refurbishment and the actual moving costs. There may also be costs associated with surrendering existing leases and so on.
- **Staff training and retraining:** To work this out, we need to know how many people need to be trained and what they need to learn. Ideally, this requires training needs analysis which examines the skills gaps and identifies the best way of developing the additional skills. If an assessment of the effort required to develop training material is needed, a rough estimate may be developed by multiplying the delivery time for a course by a factor of 10. For example, a 2-day training event will

typically require 20 days development effort.

- **Ongoing costs:** Once any new systems are in place, they will require maintenance and support, and quotations for this can be obtained from the vendors. If this is not possible, a very rough rule of thumb is to allow support costs of 15 per cent of operational costs in the first year after installation and then 10 per cent thereafter. But this is very crude and actual quotations are much to be preferred if they can be obtained.

Intangible costs

- **Disruption and loss of productivity:** However good a new process or system is in the long run, there is bound to be some disruption as it is introduced. The level of disruption is very difficult to predict when implementing any business change. Also, if parallel running of old and new IT systems is used to smooth the transition, there will be a tangible cost involved as well.
- **Recruitment:** This ought to be tangible but organisations often have little idea of the total cost to recruit someone although elements of this cost, such as agency fees, will be tangible. But if new staff or skills are needed, there will be costs involved in getting the new staff and inducting them into the organisation.

Tangible benefits

- **Staff savings:** This is the most obvious saving, though many organisations are now so lean that it is hard to see where further reductions will come from. In calculating the savings, we need the total cost of employing the people concerned – including things like national insurance, pensions and other benefits and sometimes the space they occupy. The HR or accounts departments should be able to supply this information. Do not forget, though, that if people are to be made redundant, there will be one-off redundancy costs that must be set against the ongoing saved staff costs.
- **Reduced effort and improved speed of working:** If staff posts are not completely removed, it may be possible to carry out some tasks in a shorter timescale thus freeing up time for other work. This is a tangible benefit if the effort to carry out the task is measured and compared with the expected situation after the change.
- **Faster responses to customers:** Again, it would be necessary to make a pre-change measurement of the time taken to respond to customers' needs in order to quantify any possible benefits.

- **Reduced accommodation costs:** These may have already been factored into the cost of employing staff (see 'Staff savings' above) but new hardware may also save space and, perhaps, people may be able to work from home some or all of the time. The facilities or finance department should have some idea about the cost of accommodation.
- **Reduced inventory:** New systems – especially 'just in time' systems – usually result in the need to hold less stock. Finance and logistics experts should be able to help in quantifying this benefit.
- **Other costs reductions:** These include things like reduced overtime working, the ability to avoid basing staffing levels on workload peaks, reductions in time and costs spent on travel between sites and in the use of consumables.

Intangible benefits

- **Increased job satisfaction:** This may result in tangible benefits like reduced staff turnover or absenteeism but the problem is that we cannot prove in advance that these things will happen.
- **Improved customer satisfaction:** This, too, is intangible unless we have sound measures to show, for example, why customers complain about our products or services.
- **Better management information:** It is important to distinguish between better management information and an increased amount of management information. Better information should lead to better decisions but it is difficult to value.
- **Greater organisational flexibility:** This means that the organisation can respond more quickly to changes in the external environment, through having more flexible systems and staff who can be switched to different work relatively quickly.
- **More problem-solving time:** Managers freed from much day-to-day work should have more time to study strategic and tactical issues.
- **Improved presentation or better market image:** New systems often enable an organisation to present itself better to the outside world.
- **Better communications:** Many people report that poor communications within their organisation are a problem so improving communications would clearly be beneficial. However, again, it would be difficult to place a value on this.

Avoided costs

One particular form of benefit, which is worth thinking about, is what we might call 'avoided costs'. For example, in the run-up to the year 2000, many organisations were faced with the costs of making their computer systems millennium-compliant. IT departments often instead suggested the wholesale replacement of systems, thereby avoiding the costs of adapting the old systems. In such a case, an investment of, say, £2 million in a new system might be contrasted with an avoided cost of £1 million just to make the old legacy systems compliant. There are often situations where an organisation has to do something and has already budgeted for it; that budget can be offset against a more radical solution that would offer additional business benefits.

Presenting the financial costs and benefits

Once the various tangible costs and benefits have been assessed, they need to be presented so that management can see whether and when the project pays for itself. As this is a somewhat complex topic, it is examined separately in the section 'Investment appraisal'.

Impact assessment

In addition to the costs and benefits already mentioned, for each of the options we need to explore in the business case any impacts that there might be on the organisation. Some of these impacts may have costs attached to them but some may not and are simply the things that may happen as a result of adopting the proposed course of action. Examples include:

- **Organisation structure:** It may be necessary to reorganise departments or functions to exploit the new circumstances properly. For example, to create a single point of contact for customers or more generalist rather than specialist staff roles. This will naturally be unsettling for the staff and managers involved and a plan must be made to handle this.
- **Interdepartmental relations:** Similarly, the relationships between departments may change and there may be a need to introduce service level agreements or in other ways redefine these relationships.
- **Working practices:** New processes and systems invariably lead to changes in working practices and these must be introduced carefully and sensitively.
- **Management style:** Sometimes, the style that managers adopt has to change. For example, if we de-layer the organisation and give front-line staff more authority to deal with customers, their managers' role changes as well.

- **Recruitment policy:** The organisation may have to recruit different types of people and look for different skills.
- **Appraisal and promotion criteria:** It may be necessary to change people's targets and incentives in order to encourage them to display different behaviours, for example to be more customer-focused.
- **Supplier relations:** These may have to be redefined. For example, outsourcing IT services would work much better with a co-operative customer/supplier relationship than with the adversarial situation that too often seems to exist.

Whatever the impacts are, the business case needs to spell them out. It must also make clear to the decision-makers what changes will have to be made in order to fully exploit the opportunities available, and the costs these changes are likely to incur.

Risk assessment

No change comes without risk and it is unrealistic to think otherwise. A business case is immeasurably strengthened if it can be shown that the potential risks have been identified and that suitable countermeasures are available. A comprehensive risk log (sometimes called the risk register) is probably not required at this stage – that should be created when the change or development project proper starts – but the principal risks should be identified. For each risk, the following should be recorded:

- **Description:** The cause of the risk should be described and also its impact, for example 'uncertainty over the future leads to the resignation of key staff, leaving the organisation with a lack of experienced personnel'.
- **Impact assessment:** This should attempt to assess the scale of the damage that would be suffered if the risk occurred. If quantitative measures can be made, so much the better, otherwise a scale of 'small, 'moderate' or 'large' will suffice.
- **Probability:** How likely is it that this risk will materialise? Again, precise probabilities can be calculated but it is probably better to use a scale of 'low', 'medium' or 'high'.
- **Countermeasures:** This is the really important part, the question being what can we do to either reduce the likelihood of the risk occurring or lessen its impact if it does. We may also try to transfer the risk's impact onto someone else, for example through the use of insurance.
- **Ownership:** For each risk, we need to decide who would be best placed

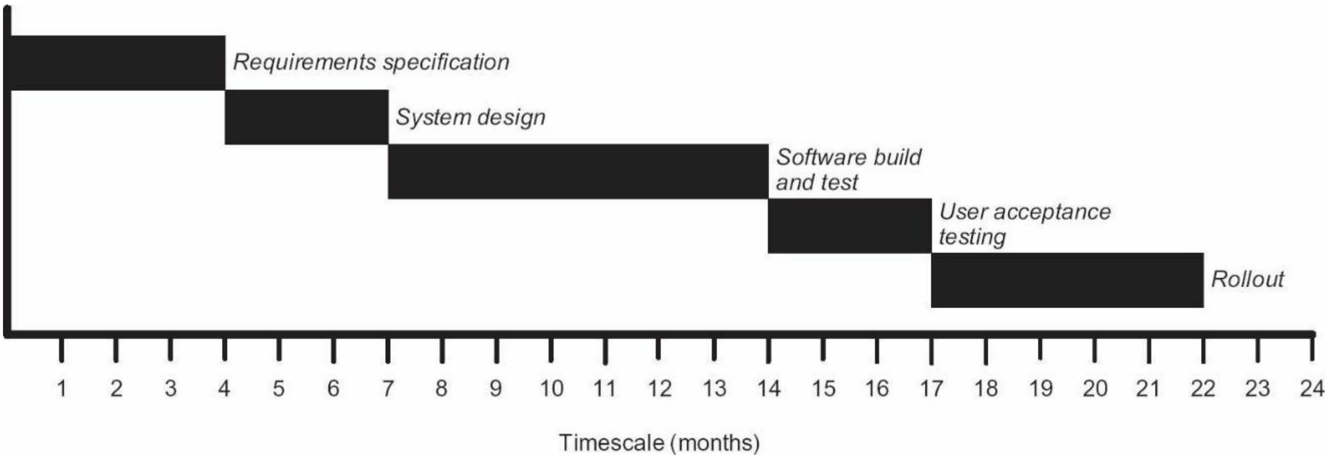
to take the necessary countermeasures. This may involve asking senior managers within the organisation to take the responsibility.

If there seem too many risks associated with the proposal, it is a good idea to document only the major ones – the potential 'show-stoppers' – in the body of the business case and to put the rest in an appendix.

Recommendations

Finally, we need to summarise the business case and make clear the decisions that the senior managers are being asked to take. If the business case is for carrying out a project of some sort, then an outline of the main tasks and timescales envisaged is useful to the decision-makers. This is best expressed graphically, as a Gantt/bar chart as illustrated in Figure 9.7.

Figure 9.7 Gantt/bar chart for a proposed project



Appendices and supporting information

Where detailed information needs to be included in the business case, this is best put into appendices. This separates out the main points, that are put in the main body of the case, from the supporting detail. If supporting statistics have to be provided, they too should go into appendices, perhaps with a summary graph or chart in the main body. The detailed cost–benefit calculations may also be put into appendices.

INVESTMENT APPRAISAL

In this part of the business case, the financial aspects – in other words the tangible costs and benefits – are contrasted so see if, and when, the project will pay for itself. The simplest way of doing this is by using what is called a 'payback' calculation, which is in effect a cash-flow forecast for the project. An example of a payback calculation is given in Table 9.1. It shows immediate costs of £200,000 for hardware and £150,000 for software for a new system, and ongoing costs of £30,000 for hardware maintenance and £30,000 for software support and upgrades. The tangible benefit will be the removal of some clerical posts, valued at £150,000 per year. Note that, in these calculations, the convention is to refer to the year in which the investment is made as 'Year 0'.

Table 9.1 Example of a payback calculation

Item	Year 0	Year 1	Year 2	Year 3	Year 4
Hardware purchase	200,000				
Hardware maintenance	30,000	30,000	30,000	30,000	30,000
Software purchase	150,000				
Software support	30,000	30,000	30,000	30,000	30,000
Staff savings	150,000	150,000	150,000	150,000	150,000
Cash-flow for year (savings less costs)	-260,000	90,000	90,000	90,000	90,000
Cumulative cash-flow	-260,000	-170,00	-80,000	+10,000	+100,000

In Year 0, the costs considerably outweigh the benefits, because of the large capital expenditures but thereafter benefits exceed costs by some £90,000 per year. By working out the cumulative positions, we discover that the accumulated benefits finally exceed the accumulated costs in Year 3 and thereafter build up at £90,000 per year.

Payback calculations have the virtue of being easy to understand and relatively easy to construct, although getting reliable figures can sometimes be a headache. Where interest rates and inflation are low they provide a reasonable forecast of what will happen. However, they do not take account of what accountants call the 'time value of money'. This is the simple fact – which we all understand from our personal experience – that money spent or saved today is not worth the same as it will be next year or in five years' time. In part this is the effect of inflation but, even with low or zero inflation, there are other things that we could do with the money besides investing in this project. We might, for instance, leave it in the bank to earn interest. Or, conversely, we might have to borrow money and pay interest to finance the project.

A method that takes account of the time value of money is known as discounted cash flow (DCF) which leads to a ‘net present value’ (NPV) for the project. This means that all of the cash-flows in years after Year 0 are adjusted to today’s value of money. Management accountants work out the ‘discount rate’ to use in a discounted cash flow calculation by studying a number of factors including the likely movement of money-market interest rates in the next few years. The mechanism for doing this is outside the scope of this book but interested readers are referred to the ‘Further reading’ section at the end of this chapter. Let us suppose, though, that the management accountants decide we should be using a discount rate of 10 per cent. We can then find the amounts by which we should discount the cash-flows in Years 1 to 4 either by using the appropriate formula in a spreadsheet or looking up the factors in an accounting text-book. For a 10 per cent discount rate, the relevant factors are shown in Table 9.2.

Table 9.2 Example of a net present value calculation

Year	Net cash flow	Discount factor	Present value
0	-260,000	1.000	-260,000
1	90,000	0.909	81,810
2	90,000	0.826	74,340
3	90,000	0.751	67,590
4	90,000	0.683	61,470
Net present value of project:			**25,210**

Table 9.2 represents the same project that was analysed in Table 9.1. With the cash flows from Years 1 to 4 adjusted to today’s values by multiplying by the discount factor. We can see that the project is not such an attractive investment as the payback calculation suggested. It does pay for itself, but now only in Year 4 and not by as great a margin as before.

We can perform a **sensitivity analysis** on these results to see how much they would be affected by changes in interest rates. If we had used a discount rate of 5 per cent, for example, we would have got an NPV of £59,140 and a 15 per cent rate would have produced an NPV of –£2960.

One final measure that some organisations like to use is what is called the 'internal rate of return' (IRR). This is a calculation that assesses what sort of return on investment is represented by the project in terms of a single percentage figure. This can then be used to compare projects one with another to see which are the better investment opportunities; and to compare them all with what the same money could earn if just left in the bank. So, for example, if the IRR of a project is calculated at three per cent and current bank interest rates are five per cent, then on financial grounds alone it would be better not to spend the money.

IRR is worked out by standing the DCF/NPV calculations on their head. The question we are asking is, what discount rate would we have to use to get a net present value of zero after five years (or whatever period the organisation mandates should be used for the calculation)? In other words, at what point would financial costs and benefits precisely balance each other? One way of calculating the IRR is by trial and error. For example, setting up a spreadsheet and trying different discount rates until an NPV of zero is produced – Microsoft Office Excel has an automated function to do this. In the case of our example project, the IRR is around 14.42 per cent. If this were being compared with another project offering only five per cent, then our project would be the more attractive one. However, IRR does not take account of the overall size of the project, so that the project with the smaller IRR may produce more actual pounds, or euros or dollars in the end. For this reason, most accounting textbooks agree that DCF/NPV is the best method of assessing the value of an investment, whilst acknowledging that many managers like the simplicity of the single-figure IRR.

PRESENTATION OF A BUSINESS CASE

There are two basic ways in which a business case can be presented and often there is a need for both: as a written document and as a face-to-face presentation. In both cases, the way the business case is presented can often have a major impact on whether it is accepted or not and there are some simple rules that apply to both approaches:

- **Think about the audience:** Readers of reports and attendees at presentations have a variety of interests and attitudes. Some like to have all of the details others prefer an overview. As far as possible, try to address the concerns of each of the decision-makers in the report or presentation. (See the information in Chapter 6 on stakeholder management, for more on this.)

- **Keep it short:** You may have to use a pre-set format or template for your report, in which case the actual sections may force you into a long document. However, try as far as possible to keep the business case concise.
- **Consider the structure:** We have provided here a good basic structure for a written business case. For a presentation, the old rule still holds good:
  - tell 'em what you're going to tell 'em;
  - tell 'em;
  - tell 'em what you've told 'em.

You need to build to a logical conclusion that starts with the current situation and leads to the decision you need made.

- **Think about appearances:** Again, you may be constrained by a template here but, if not, remember you have to induce the decision-makers to read your business case! Use lots of white space, pictures and diagrams instead of tables, and use colour as well. For a presentation, avoid dozens of bullet-point slides, which tend to simply repeat what is in the report anyway; instead use pictures, diagrams and colour to provide a more visual representation for the decision-makers.

RAID AND CARDI LOGS

We have seen that the business case documents the risks of a proposed project and it also may set out any constraints, assumptions or dependencies on which it has been based. Since all of these will have ongoing effects throughout the project, this is a good point at which to set up logs that will assist us in managing these factors. A RAID log documents risks, assumptions, issues and dependencies; a CARDI log includes these elements plus constraints.

A CARDI log therefore contains sections that document:

- **Constraints:** The main constraints on any project are those of the 'iron triangle' – time, cost (or resources) and product/quality. But other constraints may need to be taken into account as well, such as the need to comply with certain legislation, to use certain standards or to make sure an IT solution runs on a specific platform.

- **Assumptions:** The business case, and thus the project, may rest on certain assumptions, for example that government funding may be available for part of the project. These assumptions should be documented and actions identified to test whether they are valid.
- **Risks:** The risks documented in the business case form the start of the overall risk log for the project and will be added to as more is known about it. The log should document the risks themselves, their probability of occurrence and scale of impact, the actions proposed to avoid or mitigate them and who should own each risk. As well as new risks arising during the project, others will change and still more can be retired if they do not, in fact, occur.
- **Dependencies:** Because modern organisations are so complex, an individual project often has dependencies on other projects, or may be depended upon by other projects. For instance, a project to introduce a new IT system may depend on a project to recruit people to operate it and vice versa. Capturing details of these dependencies makes sure that they are kept in mind at all times.
- **Issues:** An issue is something that has occurred on a project which could have an effect on it (for good or ill) and which therefore needs to be managed. Some issues are risks which have materialised. For example, if it is known at the outset that the project team is inexperienced, this is an issue rather than a risk because it has 100 per cent probability of occurring. As with risks, the issues part of the CARDI log documents what each issue is, what should be done about it and whose responsibility this is.

Since a CARDI/RAID log is established at the time the initial business case is created, its entries will probably be at a high-level at this stage and then gain detail as the project proceeds and more is known about its complexities.

SUMMARY

A coherent and well-researched business case should be an important guiding document for any change project. Developing a business case starts by identifying the possible options and then assessing their feasibility. The business case itself follows a fairly clearly defined format, leading to clear recommendations to the decision-makers. There are several approaches to investment appraisal, which assesses the financial costs and benefits of a proposed change project. A CARDI/RAID log can be used to document important information about factors that could affect the success of the project. At a designated point after the project has been completed, the business case should form the basis for a review to determine whether the expected benefits have been realised in practice and to identify any actions required to support the delivery of those benefits; this is discussed in Chapter 14.

FURTHER READING

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10 ESTABLISHING THE REQUIREMENTS

Malcolm Eva

INTRODUCTION

> When I actually meet users … I find that they certainly have needs, but that these do not appear in an organised form at all. The needs come out in a rush, a mixture of complaints, design decisions, interface descriptions, current situations, and from time to time specific human–machine interface requirements. It is sometimes possible to isolate chunks of this as definite functions. In short, there seems to be a gap between theory and practice. Theory says that on the one hand we'll find people who state what they want, and on the other, people who make things to please the first bunch of people. Instead, all the people and tasks and documents seem to be muddled up together.
>
> Ian Alexander (2004)

Most analysts involved in defining user requirements will probably recognise Alexander's description. Requirements, apparently regarded by business users as the uncomplicated area of a new systems development, are actually the most problematic aspect, and yet, the time allocated is often far less than for the other phases. Requirements Engineering (RE) is the Information Systems (IS) industry's response to the problem of requirements for new systems not being met, or even not being offered clearly in the first place. Tight timescales and tight budgets – both the result of constraints on the business – place pressures on the development team to deliver a product. However, without sufficient time to understand and define the requirements properly, the product that is delivered on time may not provide the solution that the business thought had been requested. Applying the process of requirements engineering should help to rectify these problems.

As many organisations are adopting an Agile mode of software development, there are new pressures on the requirements phase, where an IT systems forms part of the solution. Agile works to a completely different philosophy from the linear waterfall-based methods, and the approach chosen must be tailored accordingly. While the stages set out in the RE framework are still applicable, the level of detail defined about the requirements may be varied. Agile development adopts the principle of ‘just in time’ requirements. So although high-level requirements are required right from the start, the level of detail for those requirements evolves just in time. For example, at the beginning of a project, the requirements document may contain some high-level process models and a set of general business and technical requirements, supplemented by a use case diagram showing the scope of the proposed IT system. Once initial requirements have been prioritised, outline use case descriptions can be developed for the high-priority requirements and then more detailed requirements regarding the solution can be elaborated later during development. In essence, the level of detail defined for the requirements, and the approach to the documentation, should be tailored according to the philosophy and approach to be adopted for the solution. Agile does not mean ‘just do it’, and an equal rigour must be enforced when working in this environment.

A similar approach to requirements definition may be adopted when the solution is to be an off-the-shelf software package. It may not be worthwhile documenting the requirements in exhaustive detail as the package will impose some constraints. However, it will be important to produce a requirements document that has enough information to evaluate the package and ensure that there is sufficient ‘fit’ with the requirements.

THE PROBLEMS WITH REQUIREMENTS

Studies carried out into IS project failures over the last 30 years tell a common story. The problems highlighted included:

- a large proportion of errors (over 80 per cent) are introduced at the requirements analysis stage;
- very few faults, (fewer than 10 per cent) are introduced at the development stage – developers are programming things right, but frequently not programming the right things;
- most of the project time is allocated to the development and testing phases of the project;
- less than 12 per cent of the project time is allocated to the requirements analysis phase;
- there is poor alignment of the developed system to business strategy and objectives;
- there is poor requirements management.

These findings are particularly significant because the cost of correcting errors in requirements increases dramatically if they are discovered as the work progresses further through the development lifecycle. And yet, the studies quoted above identify requirements analysis as the most error-prone stage of the development lifecycle.

Walia and Carver (2009) identified over 90 causes of requirements errors in a meta-study they carried out on 149 papers. Typical problems with requirements that these causes have brought about include:

- lack of relevance to the objectives of the project;
- lack of clarity in the wording;
- ambiguity;
- duplication and overlap across requirements;
- conflicts between requirements;
- requirements expressed in such a way that it is difficult to assess whether or not they have been achieved;
- requirements that assume a solution, rather than stating what is to be delivered by the system;
- uncertainty amongst business users about what they need from the new system;
- business users failing to identify all
- requirements; inconsistent levels of detail;
- business users and analysts taking certain knowledge for granted and failing to ensure that there is a common understanding.

The first point often results from a lack of terms of reference for the project. Clearly defined terms of reference are essential to ensure that everyone involved in defining the requirements understands the objectives, scope and constraints within which the project is to be carried out. A useful mnemonic for the terms of reference is OSCAR. This stands for:

- **Objectives** – both business and project objectives should be defined.
- **Scope** – the aspects to be covered, typically defined by specifying the activities and deliverables of the project, as well as the functional areas to be included. It is equally important to specify those areas NOT to be covered, in order to guard against scope creep during the exercise.
- **Constraints** – the budget, timescale and standards to which the project must adhere.

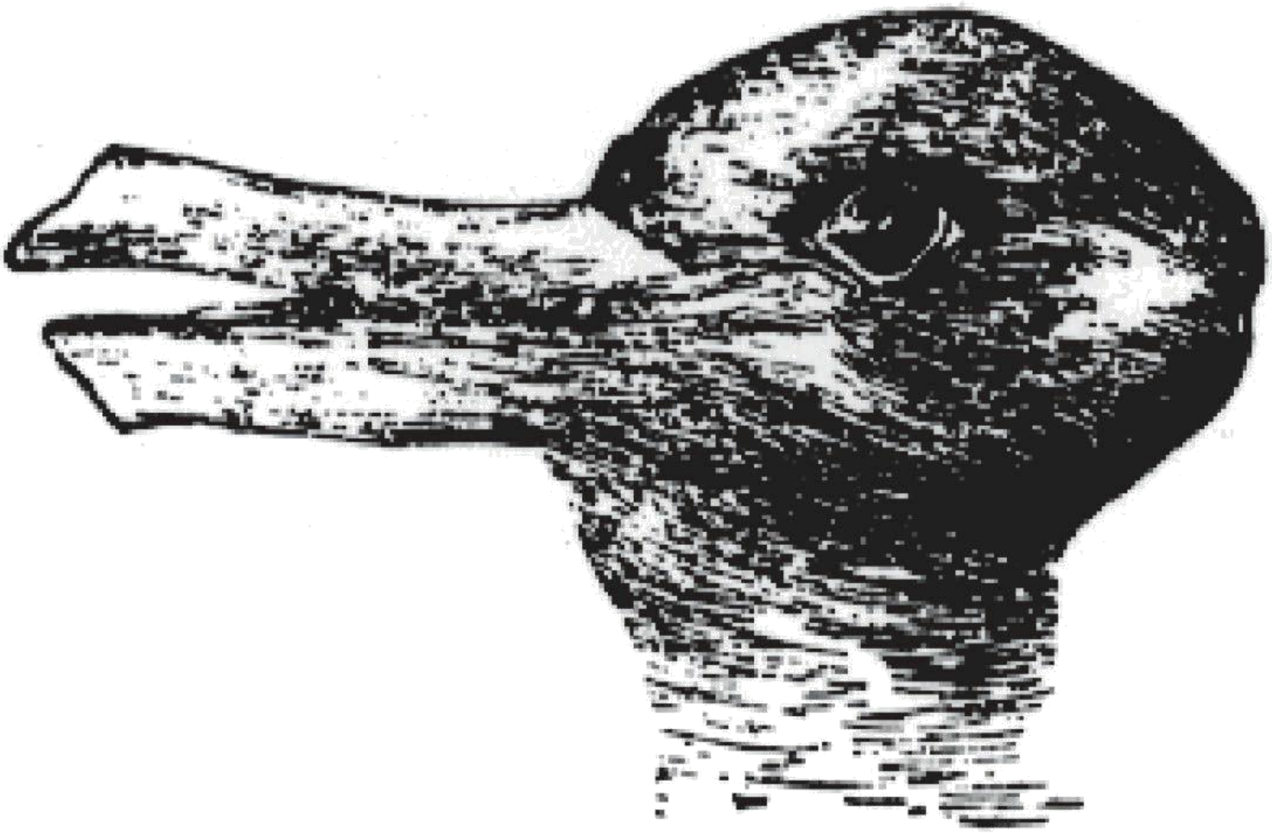
- **Authority** – the business authority for the project, thus ensuring that there is an ultimate arbiter to handle any conflicts between business users and their requirements. The authority is also responsible for accepting the deliverables from the project.
- **Resources** – the people and equipment available to the project.

Requirements are often overlooked because they are omitted by the business user. This is usually an oversight rather than mischief, and results from a belief that the need is so self-evident they take it for granted that the analyst will understand that. The difficulty associated with taking some knowledge for granted is by no means trivial, and in a world of new business practices, business processes and new technology, by no means uncommon. The business analyst is the person who must help the business staff to visualise precisely what they need the new system to perform, and then to articulate it.

Another source of difficulties for the business analyst is recognising the different stakeholder viewpoints. Depending upon their role in the organisation, one person might see the business system as supporting the product, while another may think in terms of finding a 'marketing solution'; a third may see the system as being customer-focused. All three are describing their perceptions of the same system, but each sits in his or her own silo, viewing the business from that one viewpoint. It is up to the business analyst to draw the threads together to view the system as a whole, and to meet all three perspectives as well as possible. Chapter 6 discusses the CATWOE technique and its use in analysing stakeholder perspectives.

Figure 10.1 illustrates the problem of perspectives with an illustration taken from Wittgenstein's Philosophical Investigations.

Figure 10.1 The duckrabbit



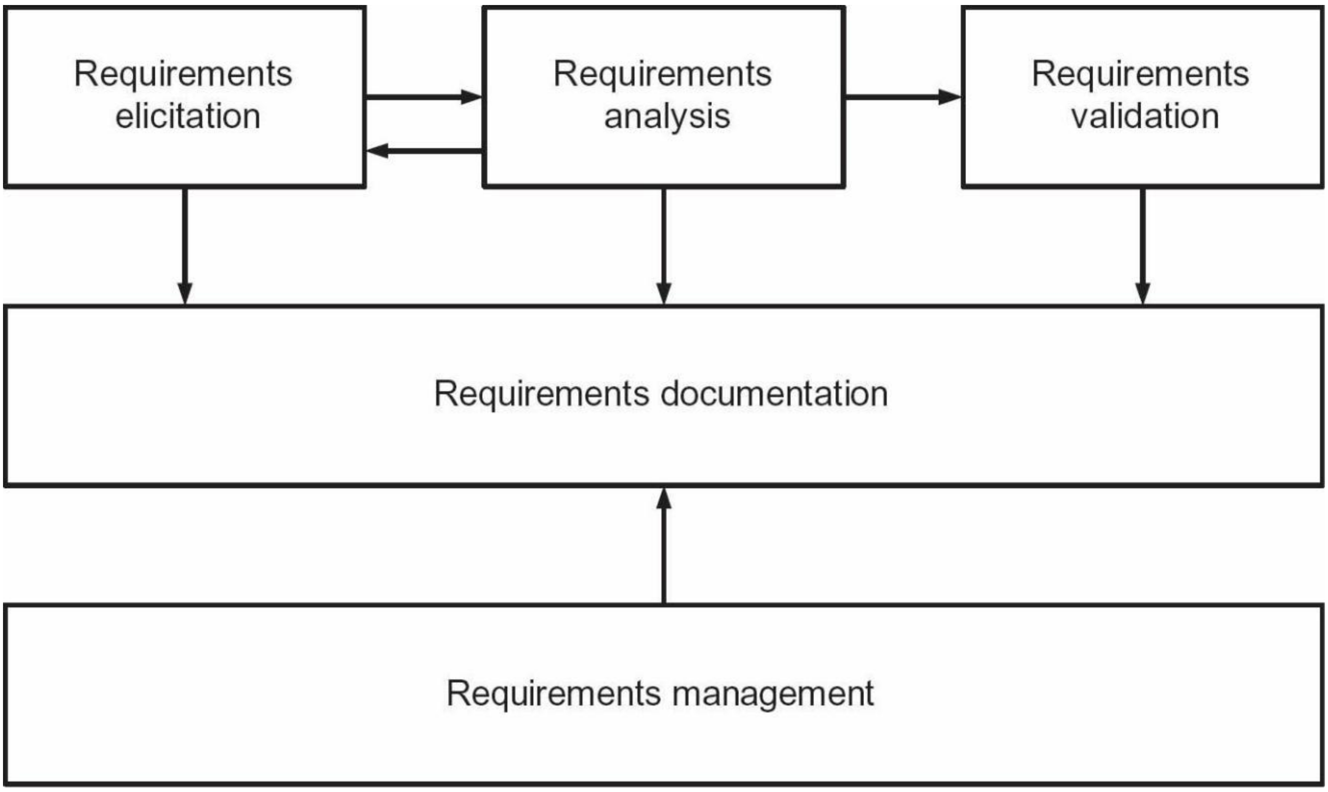
If the creature is perceived as looking to the left, it is clearly seen as a duck; if it is seen as looking towards the right, however, it is clearly a rabbit. What it is not, though, is both a duck and a rabbit. Wittgenstein named this ambiguous animal a duckrabbit. The business analyst will encounter many duckrabbits during his or her career: a sales director who sources products to satisfy customer demands sees the company as a sales organisation, while a finance director who has invested heavily in an in-house manufacturing capability will see a manufacturing organisation. They are describing the same company, but one sees a duck, the other a rabbit. Is the company there to provide satisfaction to its customers (a duck) or to sell its manufactured products (a rabbit)? The analyst or requirements engineer needs to understand all of these valid perspectives, or 'world views' (as described in Chapter 6) to be sure of capturing more than a one-sided view. Recognising the existence of a duckrabbit, or multiple world views, helps to anticipate scoping issues and potential requirements conflicts before they arise.

Another problem that business analysts face is an apparent inability on the part of the business users to articulate clearly what it is they wish the system to do for them. Some users, perhaps due to uncertainty, may even be reluctant to state their requirements. Very often they are deterred from doing so because the nature of the requirement is not susceptible to a straightforward statement. These issues may be due, at least in part, to the problem of tacit knowledge; we shall explore some of these issues in the section on ‘Requirements elicitation’.

A FRAMEWORK FOR REQUIREMENTS ENGINEERING

In the same way that ‘software engineering’ suggests a more structured and scientific approach to the development of software than is implied by the older term ‘programming’, so requirements engineering encapsulates a more disciplined and rigorous approach to requirements definition. The business analyst must understand and document requirements carefully in order to avoid the mistakes and oversights identified above. To achieve this rigour, the business analyst should follow a roadmap that guides them through the key steps required to develop a well-defined requirements document. Figure 10.2 illustrates the requirements engineering framework, which provides such a road map.

Figure 10.2 Requirements engineering framework



Requirements elicitation is concerned with drawing out information and requirements from the business stakeholders. This is done using the techniques described in Chapter 5, which provides a toolkit of techniques to undertake requirements elicitation effectively. When we elicit requirements from the users they are often explained with a lack of clarity and completeness. Before the requirements are formally entered into a requirements document, the business analyst needs to subject the initial requirements list to careful scrutiny in order to ensure that they are well-formed. This is done during the requirements analysis stage which focuses on examining and organising the elicited requirements. This may involve identifying requirements that overlap, are in conflict with other requirements or are duplicates. It may also involve separating out composite descriptions into individual requirements. Once the set of unique requirements have been identified, it is important to check them against the business objectives; if a requirement is not supporting the achievement of a business objective then it is questionable that it is required. In requirements analysis, the business analyst has a gatekeeper role, ensuring only those requirements that pass the scrutiny will be entered in the document. This activity highlights any areas requiring further elicitation and, in turn, the additional information gleaned will be subject to analysis. This iterative process continues until the analyst is content that the requirements have been defined to the desired level of detail and quality.

Requirements validation involves the external stakeholders reviewing the requirements in order to agree and sign off the requirements document. The requirements catalogue is one part of the full requirements document, which also contains models of the business processes and IT system. This document should be analysed and checked by the business analyst for completeness and consistency. Once the document is considered to be complete, it must be reviewed by business representatives and confirmed to be a true statement of the required system; at this point the document is said to be 'signed off' or 'baselined'. During this stage the reviewers examine the requirements and question whether they are well defined, clear and complete. The review will be similar to that undertaken in the analysis stage, but this time it is the business stakeholders who will carry out the checks rather than the analysts.

These three aspects – requirements elicitation, requirements analysis and requirements validation – are described in further detail below.

There are two other aspects that complete the requirements engineering work: requirements documentation is concerned with the development of a well-organised requirements document; requirements management covers the activities needed to manage any changes to the requirements. Changes occur throughout the business change and solution development lifecycles, and procedures need to be in place to deal with them. Whatever the reason, the business analyst must record, analyse and action the changes and ensure that every requirement is fully traceable from the initial recording to sign-off during user acceptance testing. Chapter 11 discusses the development and structure of the requirements document, the issue of traceability and the use of software tools to support requirements management. The approaches to developing the models of the IT system are described in Chapter 12.

ACTORS

An actor is an individual or group who is fulfilling a particular role. There are some roles we would expect to be represented during the requirements work and they represent two broad stakeholder groups:

- the business representatives;
- the project team.

The business representatives

The business is represented by the project sponsor, the subject matter expert (SME) and the business users.

The project sponsor represents the business in ensuring that business objectives are met. The sponsor has the following responsibilities:

- to agree the project initiation document that approves the requirements engineering study;
- to deliver the specific and agreed business benefits predicted in the business case;
- to make funds and other resources available for the
- project; to accept the deliverables at the end of the project;
- to approve and sign off the requirements document as a true statement of the business needs;
- to rule on any conflicting requirements where the business analyst cannot negotiate agreement;
- to confirm that the benefits in the business case have been realised as promised.

The role of the SME is to give business advice regarding the requirements. Particular situations when this may be relevant are:

- the requirements cover more than one business function;
- the requirements relate to a redesigned business process;
- the organisation wishes to introduce a new product or process that the company does not yet fully understand;

- the organisation wishes to adopt the latest industry best practice.

The SME brings a breadth of understanding to RE, and should have experience and knowledge of industry best practice. Their level of knowledge of the business domain should help analysts distinguish between what the business and the project *need* and what a particularly forceful individual user *wants*. The SME may be an internal expert or may be an external consultant, brought in for the duration of the project. While an external SME can bring in fresh views and insights from industry, drawing on best practice as used elsewhere, there are some risks associated with their use:

- They may not understand well how this particular company works, and its specific culture. This may make their preferred approach to the solution inappropriate.
- They may be unaware of political undercurrents in the organisation that can affect the project's success or otherwise.
- They may be regarded as an outsider and so be resented by internal workers who feel they too have suitable expertise.
- There may be no knowledge transfer to internal stakeholders; the skills and knowledge gained on the project leave the organisation when the consultant SME leaves.

The business users are the individuals or groups who will need to apply the new business processes and use the new IT system. They comprise the group for whom the solution is designed. They are required to describe current procedures and documentation, highlight any difficulties they experience with current processes and identify new requirements for the system. They should be able to help the business analyst to define the requirements in detail, by providing specific, clear information. They will be able to assist with the definition of non-functional requirements that apply to their tasks, although some specific aspects may need management involvement. For example, decisions about archiving information and the length of retention of data are likely to require the involvement of middle or senior managers.

The business user community are likely to perform several roles, each of which needs to be considered when analysing the requirements. One role from the business user community may be the 'customer' role. This will occur for any IT systems that are accessible by the end customer. For example, where an online system is to be developed and implemented. In this case care needs to be taken to ensure that the requirements are gathered accurately and appropriate techniques, such as the use of focus groups, are used to acquire the relevant information.

The project team

The project team comprises the project manager, the business analyst and the developers or technical architects. There will also be communication with representatives from the project support office and with the software testers.

The project manager is mindful of the need to meet the business requirements and satisfy the business imperatives that drive the project. The project manager will report to the project sponsor and will be concerned to:

- break the project down into identifiable and measurable pieces of work, each with its deliverable;
- allocate the pieces of work to competent people to perform;
- schedule the tasks with their start and end times, recognising dependencies between tasks;
- monitor the progress of the various tasks and be alerted of any likely slippage;
- take any corrective action should there be slippage, or risk of non-completion of a task for any reason;
- ensure that the project is completed on time and within the agreed budget.

The business analysts will be responsible for carrying out the requirements engineering work. Their key objective is to ensure that the requirements are well-formed, well-documented, complete and aligned with the business objectives. Working closely with the business staff, they gather and analyse the requirements, and are responsible to the sponsor for the quality of the requirements document.

Many organisations assign the project manager role to the business analyst on a project, but this can be problematic as the two roles call for different aptitudes, priorities and skills. There may be conflicting priorities and interests to be reconciled, which will be problematic if one individual is assigned both of these roles. The project manager is most concerned with meeting cost and time targets, while the business analyst's primary consideration is satisfying the quality criteria.

The developer will be able to check the technical feasibility of some of the requirements and help the analyst appreciate the implications of some of the requests. The developer will be able to produce prototypes of the requirements, to help the business user visualise more clearly what they have requested. This will help confirm the analysts' understanding of the requirements, as well as encouraging the users to identify new features they would like to see.

REQUIREMENTS ELICITATION

In the early days of systems analysis, this activity was often known as ‘requirements capture’. The word ‘capture’ implies the existence of discrete entities called ‘requirements’ that were readily available to be spotted and caught. In those days most IT projects were concerned with developing IT systems that would perform the tasks carried out by people, mostly clerical staff. To that extent, each task performed by a person could be regarded as a requirement, or set of requirements, to be delivered by the system, so requirements capture was not an unreasonable term to use.

Nowadays, the rationale for developing or enhancing IT systems includes a need to help the organisation gain a competitive advantage, to support new or re-engineered business processes, or to install an enabling infrastructure. The more straightforward approach of using the current procedures as a basis has declined and there is a strong likelihood that the business users will not be at all clear about what they need the system to provide. The term ‘capture’ is less suited to the reality of today’s business world, and has been superseded by the term ‘elicitation’.

Whereas earlier approaches placed the onus on the business user to identify the requirements, requirements elicitation is a proactive approach to uncovering the requirements. It involves drawing out information from the users, helping them to visualise the possibilities and articulate their requirements. The requirements emerge as a result of the interaction between analyst and user with much proactive elicitation on the part of the analyst.

When devising the strategy for elicitation for any given project, one consideration to take into account is the type of knowledge the stakeholders are using.

Tacit knowledge

When developing a new system, the business users will pass on to us their explicit knowledge; their knowledge of procedures and data that is at the front of their minds, and which they can easily articulate. By tacit knowledge, we mean those other aspects of the work that a stakeholder is unable to articulate or explain. The term derives from the work of Michael Polanyi (2009) whose thesis is succinctly expressed in the maxim ‘We can know more than we can tell.’ In terms of understanding requirements, there are a number of elements to tacit knowledge that we must be aware of and recognise when we encounter them.

Some common elements to this unspoken knowledge that cause problems and misunderstandings are:

Skills

Explaining how to carry out actions, using words alone is extremely difficult. For example, consider how you might convey the correct sequence of actions that would be necessary to turn right at a roundabout on a dual carriageway. This would include every touch or release of the pedals, in the correct sequence, every check of the mirror, every gear change and every turn of the wheel, with the degree of turn. To build an automated vehicle that could travel along roads without a driver would need all of this information to be specified in detail. In practice, an experienced human driver would not be able explain this accurately during an interview, largely because they perform the task without having to rationalise each step; their bodies and limbs 'know' what to do without the intervention of conscious thought. If we needed to document this process, we would have to select a requirements elicitation approach that would help to uncover information about these automatic actions. Protocol analysis is a powerful way to explore these unconscious skills and gather the information to document them. This technique involves the expert performing the task in discrete steps, talking through each step as they make it, and repeating this two or three times. This is an approach often used where skills are taught, for example, when children are taught to tie shoelaces, learner drivers shown how to drive a car, and apprentices taught to use machines.

Taken-for-granted information

Even experienced and expert business users may fail to mention information or clarify terminology and the analyst may not realise that further questioning is required. The gap in our understanding may not emerge until user acceptance testing or even after implementation and this may be costly and complex to correct. This issue has been identified as a cause of many systems failures. This has also been termed 'not-worth-mentioning' information. This highlights that it is not through malice or intention that the user fails to reveal some aspect of the procedure or documentation, simply that to them it is so obvious that they take the analyst's familiarity for granted. The fact that the analyst then fails to ask a question on that aspect simply confirms to them that to talk about it is unnecessary. It is often only at user acceptance testing, and sometimes even later during deployment, that this gap becomes apparent.

Front-story/back-story

This issue concerns a tendency to frame a description of current working practices, or a workplace, in order to give a more positive view than is actually the case. The business user may do this in order to avoid reflecting badly on the staff or the organisation. An analogy could be the swan gliding gracefully across the smooth surface of a lake (front-story) while below the surface its feet are paddling frantically (back-story) to sustain the gentle momentum. This problem may occur if the analysts are perceived to represent management and as a result, may be given the favourable front-story version of how the business or department works. It is clearly important then that we build good working relationships with the business users and encourage them to trust us so that we are able to obtain details of the back-story of the reality of the business operation.

We should be most suspicious of a front story when we are told an operation runs very smoothly without any problems, and if there are, problems they are always easily dealt with. Also, we might be concerned if we are told that the customers of that process are always very happy with the results. While this could be the case it is always sensible to probe a little deeper and ensure that there is quantifiable data to support the assertion. The saying, ‘If it sounds too good to be true – it probably is’ is often found to be the case in organisations. The analyst must avoid seeming sceptical about what they have been told – after all, success lies in building a rapport with key stakeholders and earning their trust. Nonetheless, the true story – the ‘back-story’ – will in all probability give a different picture. Work shadowing, observation of the working environment, rich pictures, spaghetti diagrams and process modelling are all techniques that help to clarify what really happens.

Conceptualising requirements

If the study is required to examine a new business system and there is a lack of expertise and knowledge in our organisation, it is very difficult for the business stakeholders to imagine what they require the solution to offer. We cannot ask them to demonstrate any existing processes or procedures and yet it is important that we draw from them what they need the solution to provide. While the information about the business context, for example, the business strategy or the legal constraints, will provide a degree of understanding, it will be extremely difficult to produce a more detailed definition of the requirements. A good approach is to help the business users visualise for themselves how the business processes could work and what IS support they will require. Providing a visual representation will enable the business users to consider and articulate their requirements more clearly. Approaches that would help with this include exploring possibilities in a workshop, using business scenarios and story-telling workshops, or enlisting the developers to build some initial prototypes to show what the IT system might offer and how it might look.

‘Your finger, you fool’

This is based upon an apocryphal story and tells about a European explorer who landed in the seventeenth century on an island and asked a native inhabitant the name of a prominent mountain. He pointed at the landmark he was asking about, but the islanders did not recognise the gesture of pointing to distant objects; the inhabitant assumed that what he was being asked to identify was the outstretched finger. This illustrates the difficulty of an outside party assuming that there is a common language and that the common norms of communication apply. In such situations, cultural and language differences may create many possibilities for confusion, so we should consider whether an extended investigation might be required. An ethnographic study can be an extremely useful technique in such situations although it will require an extended period of time and a great deal of effort. However, without a detailed investigation approach the analysts will not be sure that they have sufficient understanding and knowledge to be able to define the business requirements. Without this, the scope for misrepresentation of the situation can grow considerably.

Intuitive understanding

This is usually born of considerable experience. Decision-makers such as those working in medical diagnosis or geological surveys, are often thought to follow a logical, linear path of enquiry while making their decisions. In reality though, as individuals acquire decision-making skills and technical knowledge, the linear approach is often abandoned in favour of intuitive pattern recognition. Ask specialists why they made a particular judgement and you may be told about the logical steps, but there will often be a point where the logic ends and intuition takes over; this is where knowledge has been applied at a tacit level rather than explicitly. Protocol analysis aided by drawing a decision tree can help with understanding decisions, as can ethnographic studies.

With the exception of 'front-story/back-story', which is more of a reluctance to tell than an inability to articulate, these issues all occur because of the application of an individual's tacit knowledge. However, there are situations where an organisation possesses tacit knowledge and it is important for this to be recognised and understood. Examples of organisational tacit knowledge include:

- Norms of behaviour and communication – these evolve over time in every organisation. Any new process or system that threatens to conflict with these norms may face resistance.
- Organisational culture – the culture of an organisation can be expressed through the behaviour of the management and staff. The analyst needs to consider what the behaviour says about the culture of the organisation and ensure that this is taken into consideration when considering any business changes.
- Organisation stories – there will always be a shared history of events that

have happened in the past. Some of these histories may relate to projects that failed or succeeded in some more spectacular fashion, and about which stories and in-jokes may have grown over the years. There could be important lessons to learn from these histories, but they are only known by word of mouth, so an analyst from outside may not be aware of this knowledge and make a faux pas as a result.

- Formal and informal networks – these are discrete groups of workers who may be related by task, or by department, by geographical location or some other factor. They have their own sets of experience, norms and practices, and as these are distinct from other groups within the organisation they are not reflected in the organisation as a whole. A network is likely to have its own body of tacit information, which the members understand well and are not accustomed to sharing openly. If a systems development project involves cross-functional requirements, or is company-wide, then the understanding of the networks is an important part of the elicitation process.

Table 10.1 shows levels of both tacit and explicit knowledge.

Table 10.1 Levels of tacit and explicit knowledge

	Tacit	Explicit
Individual	Skills, values, taken-for-granted knowledge, intuitiveness	Task definitions, job descriptions, targets, volumes and frequencies
Corporate	Norms, back-story, culture, networks, organisation history	Procedures, style guides, processes, knowledge sharing repositories, manuals, company reports

Tacit knowledge must be made more explicit. To do this we need to choose techniques to assist business users to articulate their tacit knowledge. Once they have articulated the tacit knowledge, we need to make this knowledge explicit by documenting it and disseminating it to the other members of the project team.

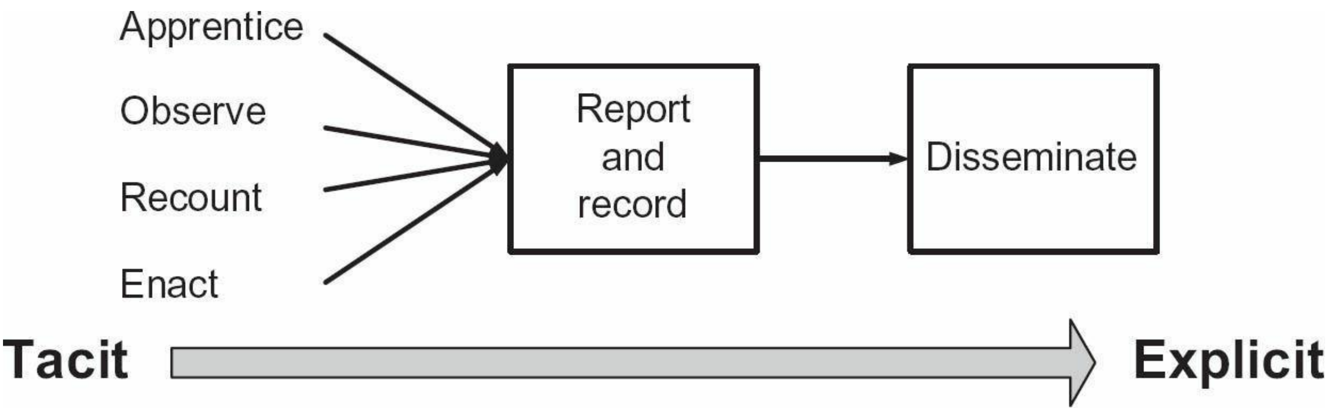
REQUIREMENTS ELICITATION TECHNIQUES

There are a number of best practice techniques available to the analyst to help elicit tacit knowledge and requirements from all levels of the organisation. Those used most often are discussed in Chapter 5.

The process for eliciting tacit knowledge shown in Figure 10.3 identifies approaches for uncovering tacit knowledge. These approaches include:

- apprentice – shadowing, protocol analysis;
- observe – observation, perhaps using the STROBE approach (see glossary), shadowing;
- recount – story-telling, scenario;
- enact – prototype, scenario role-play.

Figure 10.3 Tacit to explicit knowledge



It is important that business analysts have a toolkit of techniques so that they can tailor their approach when eliciting requirements. Table 10.2 matches some of the most popular elicitation techniques with the knowledge types that a business analyst is likely to have to handle. This mapping of techniques to knowledge types provides a good indication of where certain techniques can be particularly useful and where they can still be useful but to a lesser extent.

BUILDING THE REQUIREMENTS LIST

As we elicit the requirements from our various business stakeholders, we need to document them. This is best done in two distinct passes; building the initial requirements list, and later, developing an organised requirements catalogue. The development of the requirements catalogue is described in Chapter 11.

Table 10.2 Techniques and knowledge types (after Maiden and Rugg, 1995, and Eva, 2001)

Technique	Explicit knowledge	Tacit knowledge	Taken for granted	Front/back story	Skills	Future requirements
Interviewing	✓✓	✓	✓	✓	✓	✓
Shadowing	✓✓	✓✓	✓✓	✓✓	✓✓	✓
Workshops	✓✓	✓✓	✓✓	✓	✓	✓✓
Prototyping	✓✓	✓✓	✓✓	✓	✓✓	✓✓
Scenario analysis	✓✓	✓✓	✓✓	✓	✓	✓✓
Protocol analysis	✓✓	✓✓	✓✓	✓	✓✓	✓

The requirements list is quite simply what it says, a list containing every requirement that has been stated or elicited. The list tends to be an informal document and can be presented using three columns, as shown in Table 10.3 below, which represents a preliminary requirements list from an inventory project: the comments are added during the first pass at analysis, when each requirement is scrutinised for acceptability. This may be done at any time during elicitation while the list is being compiled. It can be useful to ask another analyst, who was not present at the elicitation session, to scrutinise the requirements as a fresh perspective can often identify clarifying questions that may have been missed during the conversation with the stakeholder.

Table 10.3 Example requirements list

Requirement	Source	Comments
1. We need an ERP System	I. Morris	
2. We need to print off a list of expected deliveries	I. Morris	
3. We need to cross-check orders against deliveries	F. Drake	
4. We need to supersede an item	J. Keen	
5. The system must record the fulfilment of a purchase order on delivery	J. Keen	
6. The system must automatically re-calculate re-order quantity	J. Keen	
7. The stores controller must have the facility to adjust re-order quantity	B. Armstrong	
8. We need to create and delete contractors	K. Wynn	
9. We need to return damaged items	F. Drake	
10. We need more accurate stock levels	F. Drake	

The requirements list is begun following an initial interview or workshop and is developed further as more requirements are identified. The requirements identified at this stage will not be well-formed and the level and scope will vary considerably; some may be detailed and specific whilst others will be defined at an overview level only or may represent several potential requirements. The requirements list helps to ensure that everything that is raised is documented and the source identified. This is vital to embed traceability in the requirements.

REQUIREMENTS ANALYSIS

Once a set of requirements has been elicited and entered onto the requirements list, the next step in the requirements engineering framework can begin. This involves analysing the individual requirements.

Requirements analysis is concerned with ensuring that all of the requirements identified during requirements elicitation have been developed into clear, organised, well-documented requirements. The separation of requirements elicitation from requirements analysis is one of the strengths of requirements engineering. The analysts are encouraged during elicitation to draw out information, uncover tacit knowledge and identify requirements; during analysis, the business analysts examine the results of this work in detail in order to develop the requirement documentation that will take the project forward. Requirements analysis requires a high degree of logical thought, organisation and rigour if the documentation is to be of the required standard. In this instance, the analyst takes the role of a gatekeeper in order to ensure the quality of the requirements. Only those requirements that are clearly stated, unambiguous, atomic, feasible, aligned with the project objectives, not in conflict with any other requirements and not overlapping with or duplicating other requirements, will be documented fully for implementation.

In order to confirm that requirements are in scope, and also that the set of requirements is complete, it is helpful to draw some models that incorporate all the requirements. A use case diagram may be used to define the scope of the system and the features to be delivered; a business process model may be used to illustrate how the work is to be conducted and the flow of the process; a data model may be used to clarify the data to be held and the business rules to be implemented. If the requirement does not fit naturally into any of these three models it is probably out of scope. By cross-referring the models to each other and to the requirements it should be possible to see where there are omissions. For example, the analyst should check that there is a function for creating, modifying, deleting and accessing the data shown on the data model. If any of these functions are missing there may be a missing requirement, although it is possible that the function is not in the scope of the system. Such omissions should at the least prompt questions. The other reason for including the models is that diagrams can be much easier to makes sense of than a catalogue of several hundred entries.

As this work is carried out, many additional questions will be raised and you may need to investigate the requirements further using requirements elicitation techniques. Thus an iterative cycle of requirements elicitation and analysis develops.

Requirements analysis includes the following tasks:

- Categorisation of the requirements – as a first pass at the analysis, the requirements should be categorised into specific requirement types. There are four major types of requirements: general (business), technical, functional and non-functional requirements. These types are described in more detail in Chapter 11. Further sub-groupings may be by business area or function, or possibly by use case. Grouping requirements this way helps the analyst to examine the related requirements as a coherent group. This helps check for completeness of requirements, and makes it easier for a business stakeholder to validate a particular set of requirements.

- Drawing a set of models that reflect the requirements that have been elicited. These models provide a check that the set is complete, coherent and that no requirements have been omitted. The modelling techniques are described in Chapter 12.
- Applying a series of filters in order to ensure that the requirements are well defined.

Requirements filters

The following filters should be used to examine the requirements and build a well-formed, clearly documented requirements set.

- **Checking for overlapping or duplicate requirements:** once requirements that cover a similar area are grouped together, it is much easier to find the duplicate or overlapping requirements. Where there is duplication, the requirements should be merged; where there are overlapping requirements they should either be merged or separated into distinct requirements.
- **Unravelling multiple requirements:** some requirements may have been listed that cover a number of different aspects rather than stating one requirement. It is important that these grouped requirements are split into individual, atomic requirements. An example of a grouped requirement is: 'the reservations clerk must be able to record, amend or cancel a booking'. In fact, there are three requirements here potentially with their own priority and acceptance criteria. Each needs to be documented.
- **Confirming relevance of the requirement:** all requirements should be aligned to the business and project objectives. They should also address a root cause of a problem rather than just a symptom of a problem. If a requirement statement does not support these areas it is likely that this is not actually a business need.
- **Feasibility evaluation:** all requirements should be evaluated to see if they would be feasible. There are three aspects to feasibility – technical, business and financial.
  - Technical feasibility is concerned with the availability of technology to fulfil a requirement. Does the technology exist to satisfy the requirement, and is it available to the organisation? If we already have the technology in place, can it cope with the expected volumes and frequency of use? Is

it sufficiently robust and secure?

- Business feasibility concerns the likely level of acceptance of the requirement by the business. Does it align with business objectives and strategy? Does it match the organisational culture? Does it contribute to the critical success factors?
- Financial feasibility involves considering how expensive it would be to meet the requirement and consider if this is justified. Is the requirement within the budget? If not, would the extra funding be available? What would be the return on investing in this feature? Imagine a client asking an architect to build a large swimming pool into a new house design without increasing the cost. This would not be possible, but business stakeholders have been known to ask for ambitious additional features, without appreciating the cost implications. Sometimes a manager asks for information to help with a decision, which at first seems reasonable but turns out to involve building a very sophisticated Business Intelligence System (BIS) at a cost far exceeding the original budget.

- **Removing conflicts:** some requirements may contradict or conflict with other requirements such that only one may be implemented. When such a conflict is identified, the business analyst is responsible for helping to negotiate a resolution. Sometimes confirming relevance will resolve a conflict if only one of the requirements is directly aligned with the business objectives. However, if the sources of the requirements are adamant, and there is no room for compromise or discussion, then the decision will need to be passed to the sponsor or even escalated to the project board. Conflicting requirements sometimes come from different business perspectives, sometimes from organisational politics and sometimes from interpersonal tensions. The analyst will often need to tread carefully to avoid alienating either party. The approach used to analyse stakeholder perspectives described in Chapter 6 can be very helpful in understanding any differences of view at an early stage. Failing to do this, is likely to result in conflicting requirements which are difficult to resolve because the opinions are so entrenched.
- **Checking for solutions:** on examination, a requirement may not be something the business needs to happen or have addressed, but may be a pre-determined solution. Business stakeholders often express a requirement in terms of the solution, rather than in terms of what the business needs. For example, a requirement may dictate that a specific software package should be used rather than express the business requirements to be satisfied.

- **Confirm standard of quality:** all requirements should meet the quality criteria and should be:
  - **Clear** – the requirement must be expressed in clear language, avoiding vague adjectives and adverbs and using precise verbs and nouns. It is also important to avoid terms such as 'and' 'but', 'except', 'until' as each of these suggest there is more than one requirement in the statement.
  - **Concise** – the requirement must be described concisely. This is not the place to specify data items, triggers or conditions. They will come further down the line. Ideally the requirement should be expressed in one simple sentence.
  - **Consistent** – the requirement must not contradict other requirements. All requirements must be worded using the same format. This reduces ambiguity and confusion, and makes validation much more straightforward.
  - **Relevant** – the requirement must be within the scope of the project. The analyst and SME must distinguish between a business need for this project, and an individual user's 'want', which may add no value overall.
  - **Unambiguous** – the description of the requirement must not contain any ambiguity. This can arise because of the problems of terminology and jargon, or may result from poor grammar. Common sources of confusion involve the use of synonyms (two words used to mean the same thing) and homonyms (the same word used to mean different things). This is especially relevant when a project involves more than one department or division. If two people who read a requirement have a different mental picture of what is being asked for, then it is ambiguous. It is important that developers and business users compare their understanding of the requirements to be sure that there is no misinterpretation. Use of a glossary of terms for the project helps to guard against such misunderstandings.
  - **Correct** – the requirement statement must describe something that is actually required to meet the objectives.
  - **Testable** – the requirement should be described such that the solution may be tested to confirm that the requirement has been met. The statement must be worded so that a simple yes/no answer to the question 'Has it been delivered as intended?' makes sense. Later, non-functional performance measures, e.g. response time, transaction time, and security restrictions must be built into the fuller description in the requirements catalogue.

- **Traceable** – information about the requirement must enable the traceability of the requirement. For example, the 'source' of each requirement should be recorded. Full traceability is only possible once the requirements are documented. This is discussed further in Chapter 11.

Examining the requirements in Table 10.3 in this way yields the following:

1. *We need an ERP system*. This is not a functional requirement for an inventory system, it is a strategic decision about the nature of the solution. The requirements phase is concerned with finding out the individual business requirements that such a system (if it were to be implemented) must satisfy.
2. *We need to print off a list of expected deliveries*. This is both vague (what deliveries? How soon before they are expected? Just the fact of a delivery, or cross-referencing with the orders? Listing the items to be delivered?) and a solution. The actual requirement is to produce an alert of the deliveries due within the specific time period (today, this week, this afternoon). The business requirement is not to print the notice. That might well be a good solution, but to put that into the requirement immediately disqualifies other, possibly better, solutions.
3. *We need to cross-check orders against deliveries*. This is unclear – what orders? Deliveries in or out? Cross-check for what? What is actually the business need?
4. *We need to supersede an item*. There is obviously a business function to supersede one item of inventory with another, but it is not clear what the requirement is from this project. This reads like a high-level requirement, and needs a lot of work to understand what information support is needed, which will be translated into a set of lower-level functional requirements.
5. *The system must record the fulfilment of a purchase order on delivery of the goods*. This sounds a clear statement of a business need.

6. *The system must automatically re-calculate re-order quantity (RoQ)*. While this appears to be a clear requirements statement, it sounds a technically complex operation, with a series of variables to calculate and does not specify at what point the RoQ takes place. We need to investigate why it must be done automatically and when it should be done, and estimate how long it will take to design and implement, in case it proves not to be feasible in our timescales.
7. *The stores controller must have the facility to adjust re-order*

quantity. This sounds as though it might conflict with item 6. Clearly they want to alter RoQ, but who is responsible – is this a political issue? Return 6 and 7 for negotiation.

8. *We need to create and delete contractors*. This is a statement of two separate requirements.
9. *We need to return damaged items*. Not clear what IS support they are asking for with this function. What exactly is the requirement?
10. *We need more accurate stock levels*. This is both imprecise and a complaint about service rather than a requirement. We need to investigate the problem of inaccurate levels. It may be a process or people issue.

While this may seem an onerous process to go through, especially when we have a long list of requirements, it is a necessary step and helps ensure that we deliver a set of requirements that are clear, and that all stakeholders agree are needed, to satisfy the project objectives. As the requirements are likely to be elicited over a period of time, this analysis can be done in parallel as a fresh list of requirements is entered, rather than waiting until the list is complete and then beginning.

We will complete the third column in the requirements list with these comments, or a précis of each.

There are several potential outcomes for each requirement from this exercise:

- to accept the requirement as it stands and document it in more detail in the requirements catalogue;
- to re-word the requirement to remove jargon and ambiguity;
- to merge duplicated/overlapping requirements and re-word them;
- to split composite requirements into their individual entries;
- to take unclear, ambiguous or conflicting requirements back to the business users for clarification.

Requirements that are in conflict, are unrealistic, or are out of alignment with the business objectives, still need to be recorded in the requirements catalogue in order to ensure that an audit trail is kept of all requirements raised and any subsequent action taken. This means that they should be considered for implementation and a business decision should be made. The structure and format of the requirements catalogue is described in Chapter 11.

Once all of the requirements have been grouped and analysed, it is useful to carry out a final, further check. The analyst needs to examine each requirement on the list to check that they are well formed and SMART (specific, measurable, achievable, relevant and time framed).

REQUIREMENTS VALIDATION

Once the analysts have completed the analysis activity and have deemed the requirements document to be complete and correct, the business and project representatives need to confirm that the document provides an accurate statement of the requirements. A review group is formed that will be responsible for checking the requirements document and confirming its suitability. Once the reviewers have been identified, the requirements document should be issued for review.

The review group must include representatives from the key stakeholder groups and different representatives will review different aspects of the requirements. The reviewers should include the following representatives:

- The business sponsor should review the document to ensure that the requirements are all in alignment with the business objectives and do not address areas that are outside the scope of the project.
- The business owners of the individual requirements, or their representatives, should review the requirements to ensure that they express the business needs clearly and correctly, without ambiguity. It is the business representatives' responsibility – and their last opportunity – to be satisfied with the requirements before accepting them.
- The subject matter expert should review the requirements to ensure that they reflect correct business practice.
- The developers should review the requirements to ensure that they are technically feasible.
- The testers should review the requirements to ensure that they are testable.
- Project office representatives should ensure that the requirements are compliant with business standards and policies, and that correct quality review procedures have been followed.

The group may meet to discuss the requirements document in a formal review meeting, may have a virtual meeting whereby comments are submitted electronically via a shared forum, or possibly, individual responses via email may be provided. A formal meeting or shared forum provides an additional aspect to a document review as the reviewers are aware of the comments from the entire group, which provides an opportunity to consider other perspectives. The use of individual emails tends to provide a more limited review approach as there is a lack of shared review and comment. However, it is still a valuable review approach and is preferable to no review. Whichever approach is taken to the review, there are two important roles to be filled: there should be a chairperson, who is responsible for controlling the review, and a business analyst, who is responsible for providing information about the requirements document or possibly presenting it to the review meeting.

A common problem regarding validation is that the stakeholders have been too busy prior to the meeting to study it and carry out the review. The analyst and project manager must make it clear that this is a task that has to be performed, and must stress the impact of not getting the requirements right at this stage. If a key stakeholder does come to the meeting with that apology, their part of the review must be re-scheduled so that they see the importance of doing the prior work. This is easier to say than enforce, but if mistakes do get through to the finished document even after all the close analysis, there will be greater expense and difficulty at a later point.

Another problem of requirements validation concerns the size of the document that is to be reviewed. Where the requirements document is large it is a good idea to review it in sections. Where the requirements have been well-organised, for example, grouped by business area or use case, it is possible to conduct a set of shorter review meetings. Only relevant stakeholders (the business owners of the particular area under discussion) need be invited to review each section of the document, which will help to save time for everyone.

There are three possible outcomes to a review:

1. The requirements document is confirmed as a satisfactory statement of the business requirements. Once the document has been agreed, it is signed off, or baselined.
2. The requirements document requires some amendment and, once these have been completed, can be signed off by the review chairperson. This is typically the business sponsor.
3. The requirements document needs significant rework and should be reviewed again once this rework has been carried out.

Once the document has been signed off, any subsequent changes should be subject to formal change management. This is described in Chapter 11.

The outcome of the review should be an agreement that the entire requirements document is complete, consistent, conformant and a true reflection of what the business requires to be delivered.

AGILE APPROACH TO REQUIREMENTS

The RE approach described above ensures that the project has understood and incorporated all business needs and user requirements before the solution is designed for implementation. It provides an audit trail for the requirements document and is meant to give all stakeholders confidence in the integrity of the development. The traceability features allow all changes to the requirements, for whatever reason, to be incorporated in the document with no loss of quality, and the reasons for those changes recorded in case of query or conflict further down the line.

However, the RE approach can be time-consuming and make demands on resources; many organisations need to produce new systems in a shorter timespan than this allows so have adopted an Agile approach to development.

The key differences between defining requirements when using an incremental or waterfall approach and the Agile philosophy, is in the level and type of documentation that is produced. If RE is employed in an incremental or waterfall-style project, the aim is to produce a baselined set of good, complete, relevant well-formed requirements before a solution is specified and designed; this ensures that the development is driven by business requirements, and not by the technology. Agile, on the other hand, follows a practice of evolving the requirements during development so much of the detail is not specified in advance. However, it is good practice to have a definition of the requirements at a level that enables the Agile development to commence. This requires a set of requirements to be selected for development within a defined timebox. Despite the less detailed nature of the requirements definitions, it is still important to use the RE framework to ensure that the requirements are clear and meet the quality criteria described earlier. The details of the requirements evolve during the development process and, if desired, the detailed definition of the requirements is completed once the development has been completed.

The advantage of this is that it reduces the maintenance overhead of managing a detailed requirements document while the software is being developed. It also removes the redundant work that may be involved in specifying requirements early on, only to see them change, and change again, before implementation. The drawbacks are that it could lead to scope creep as focusing on individual requirements might lead the developers to overlook the big picture of the business objectives. Also, unless there is a strong project structure in place, there is a danger that traceability is compromised, and in future years, maintainability could present a problem where the documentation is insufficiently detailed. Agile software developments are best suited to a dynamic environment where requirements are unclear at the outset, and where there is a short timescale for initial delivery.

Levels of Agile requirements

An Agile project will normally begin with an intensive workshop, possibly a hothouse workshop as described in Chapter 5. The business participants at a hothouse will usually be at a senior level which should help ensure that the development is aligned with the business strategy, and the functionality identified will contribute to that strategy rather than simply being a 'nice idea'. The outcome of the workshop should be the scope, a set of high-level requirements, a priority for implementing the requirements and some way of representing which actors need to interact with the system. While there is no prescribed format for this output, a commonly used notation is the use case diagram. These diagrams are illustrated in Chapter 12. Each use case represents a piece of functionality that is needed to meet an actor's needs, and may contain a number of requirements to satisfy them; these requirements need not be defined absolutely until just before they are due to be built. An alternative approach is to employ the 'user stories' technique, which identify the features required by an actor to be fulfilled by a system. The stories themselves may be at two levels: 'epic' and individual story. 'Epic' describes a story that, because of size, cannot be implemented in a single development period and so must be broken down into smaller, lower-level stories. The lower-level user stories are inputs to the development process, which is carried out in a series of 'timeboxes' or 'sprints' which typically may last between 15 days and 4 weeks, depending upon the scale of the development. The developer, using a prototyping approach and technology, sits with the business user and business analyst, to elaborate on the requirements that will deliver the user story and meet its defined goal.

The user story will generally be framed to answer the questions, Who? What? Why? and be expressed in the format: 'As a {user role} I want {feature} so that I can {reason}.'

'As a warehouse clerk I want to record the quantity of an item that has been picked so that I can know how much stock is left in the bin.'

This format has the following benefits: **who** – helps us be sure we build a usable product, as the actor concerned will be with the developer as they construct the prototype; **what** – defines the functionality that is being provided; **why** – identifies rationale for the function; this may be in terms of enabling a dependant activity or adding value by the performance of the action. The **why** feature enables decisions about the priority of the stories. Once the story has been agreed, it is often documented on an index card (paper or electronic). Business rules, pre-conditions and constraints are then elicited and added to the story, so that they can form part of the prototype.

There is discussion among Agile proponents as to whether user stories, use cases or a mixture best represent the requirements. There is not a single correct answer, just as there is not a single best approach to Agile developments. Each team and each organisation that uses this approach will have its own standards and preferences. What is more important is that the process is tightly controlled, so that the successive sprints are planned and always in accordance with the architecture and the business objectives.

It is important to recognise that Agile offers an alternative philosophy rather than a rigid methodology. It has evolved over several years, beginning with early approaches to development such as RAD, and in the tradition of systems thinking and Lean. It is likely to continue evolving as the world and the technology keep advancing. If a system is likely to have a short life before needing to be replaced, a 'light touch' RE approach followed by Agile software development is an obvious approach to use; if the system is likely to form the backbone of the company's operations for a substantial time or is highly complex, a linear development lifecycle preceded by a more rigorous RE approach, would be beneficial and would make future maintenance and enhancements much less risky.

SUMMARY

Requirements engineering is the approach by which we ensure that the process of understanding and documenting the business requirements is rigorous and ensures the traceability of each requirement. This chapter has considered the RE stages of elicitation, analysis (which feeds back into the elicitation), and validation; the supporting stages of documentation and management are considered in Chapter 11. All of these stages contribute to the production of a rigorous, complete requirements document. The core of this document is a repository of individual requirements that is developed and managed and provides the basis for deciding upon business and software changes. Where organisations place insufficient emphasis on defining requirements it is to the detriment of the implemented solutions and can leave business stakeholders unable to do their jobs effectively. Requirements engineering is an approach by which we can deliver solutions that truly meet business needs.

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11 DOCUMENTING AND MANAGING REQUIREMENTS

Debra Paul

INTRODUCTION

This chapter is concerned with two of the key elements of requirements engineering – documenting the requirements that have been gathered and managing those requirements in such a way that they can be traced through the business change process, from source to delivery. Documenting requirements clearly is vital for the success of a project. Many projects have failed because of they have lacked well-formed definitions of the requirements.

THE IMPORTANCE OF DOCUMENTATION

There are many reasons for needing good documentation. First, it enables communication within the project team and provides a basis for ensuring that all of the related requirements are consistent with each other. Second, the documentation provides the business managers and staff, who are the sources and owners of the requirements, with a firm basis for validating that the documentation accurately records what they need the solution to provide. Third, any further work to develop and test the business solutions will use the documentation as input to these activities. The requirements documentation will define what the solution is to do and the acceptance criteria required to test that the required features have been delivered correctly. The requirements documentation is also used following the implementation of the solution. For example, in the maintenance of IT systems and during benefits realisation.

THE REQUIREMENTS DOCUMENT

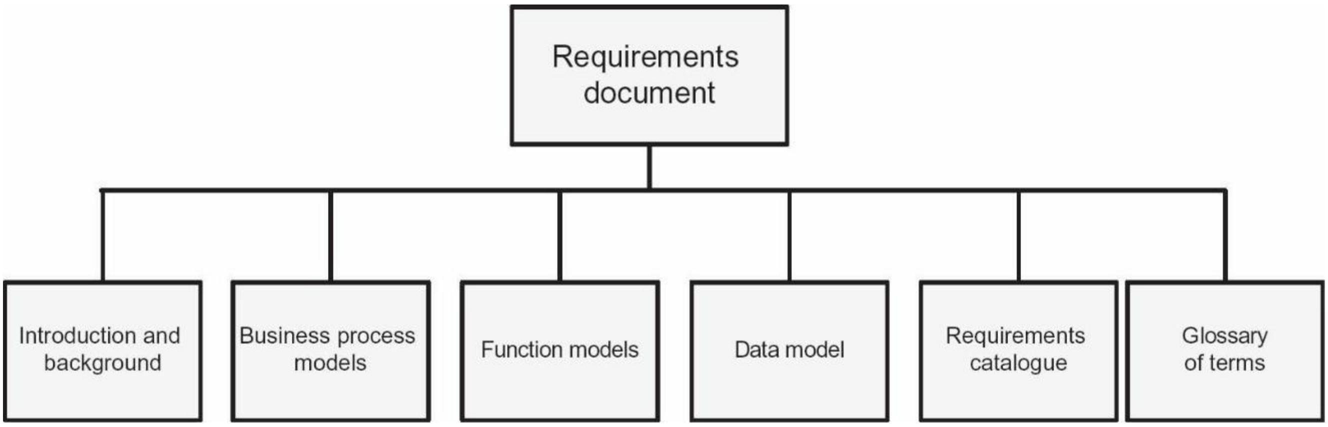
Structure

The requirements document has to provide the basis for the solutions to be delivered to the organisation so it needs to be well formed and clear. The business managers and staff have to review the documentation in order to ensure that the descriptions of the requirements reflect their needs and that the analysts have correctly interpreted and understood the information provided to them. One of the key tactics to support the review of the documentation is to ensure that it is organised and well structured. The requirements document needs to provide all of the information that the reviewers require in an easily understandable and digestible form. A well-structured document will help to improve the accessibility of the document and enable reviewers to identify errors and omissions. The requirements document may be partitioned by requirement type, business area or, at a more detailed level, for specific groups of stakeholders. Whatever the basis used for partitioning, an organised requirements document will make reviewing much easier and help to ensure that the agreed requirements are accurate.

Content of the requirements document

The requirements document will usually contain the sections represented in Figure 11.1.

Figure 11.1 Contents of a requirements document



- **Introduction and background.** This section should set out a description of the business situation and drivers for the project. It serves to clarify the objectives and scope of the work and ensure that all stakeholders are aware of the business context for the requirements.
- **Business process models.** Typically, business requirements involve changes to the business processes and any new or enhanced software solution must support the business process changes. In this section the ‘to be’ process models should set out the vision for the new processes and may be accompanied by more detailed task models. The ‘as is’ processes that are to be revised may also be included here if required for additional clarity or explanation.

- **Function models.** Diagrams showing the functionality of the proposed software solution may be included here. Typical diagrams used here are context diagrams and use case diagrams. These diagrams provide an excellent overview of the solution and provide a means for structuring the requirements catalogue. Context diagrams and use case diagrams are described in Chapter 12.
- **Data model.** A data model is highly relevant where the requirements require a detailed level of data definition, for example, if it is intended to build a software solution or evaluate an off-the-shelf software package. However, it is also useful to develop a data model to understand the nature of the data and the business rules that apply to the relationships between data groups. If the requirements catalogue contains lists of data within individual requirements, these lists are extremely difficult to review and evaluate for correctness. Also, the structure of the data, and how the different groups of data need to relate to each other, cannot be defined easily within a textual description. A data model provides a far superior view of the data than textual descriptions and enables the analyst to consider the exact business rules and requirements to be met by the solution. It is also a parsimonious view that enables the analyst to ask searching questions. Two data modelling techniques, entity relationship modelling and class modelling, are described in Chapter 12.
- **Requirements catalogue.** The information about each individual requirement should be documented in the requirements catalogue. The catalogue is the key component for the audit trail of the requirements as it is the central repository of information relating to the identification, cross referencing and source of the requirements. This document is described in more detail below.
- **Glossary of terms.** One of the key quality characteristics for the requirements document is to ensure that it provides a clear definition of the requirements so that it can be read, understood and agreed as easily as possible. However, within any organisation there will be terminology that is understood by the people working in a particular area and often this terminology is very precise in conveying information. As a result, while it is important that the requirements use this terminology, this can present a problem for the analysts and reviewers who lack familiarity with the terms. A glossary of terms overcomes this problem and provides a central source of terminology definitions. The glossary may be created just for a particular project or there may be an organisation-wide glossary that can be used as a basis. Either way, it is an important component of the requirements document and will be used throughout the business change

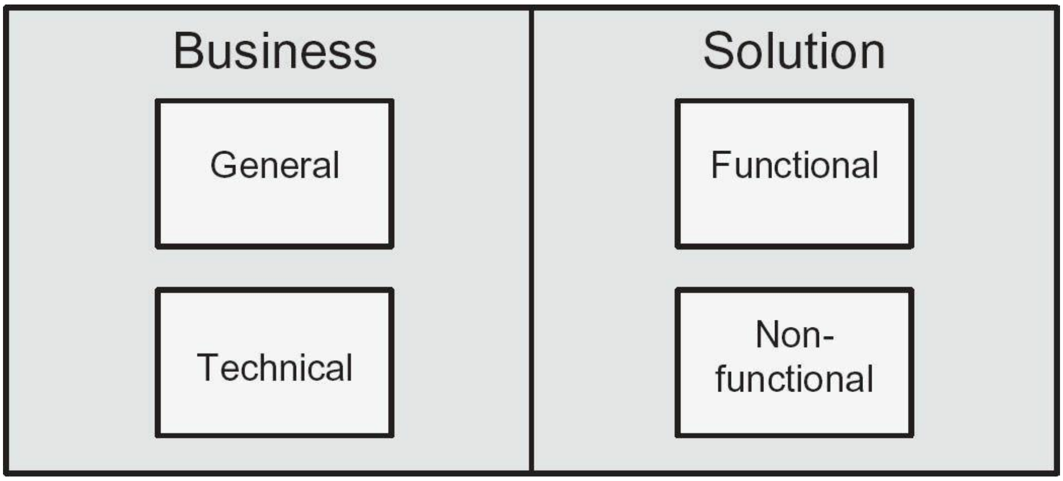
and software development lifecycles.

This is not an exhaustive list and many organisations include other areas in their templates. For example, a list of assumptions or decisions made can often be found in a requirements document.

THE REQUIREMENTS CATALOGUE

When requirements are initially elicited, they are not organised and it is only once the requirements analysis activity takes place that they are structured and formed into an organised set. There are a number of ways of organising requirements but fundamentally, a hierarchical approach will provide the easiest structure for navigating and reviewing the requirements. Figure 11.2 shows the four types of requirements: general, technical, functional and non-functional. These categories provide a useful overview structure for a requirements catalogue.

Figure 11.2 Types of requirements

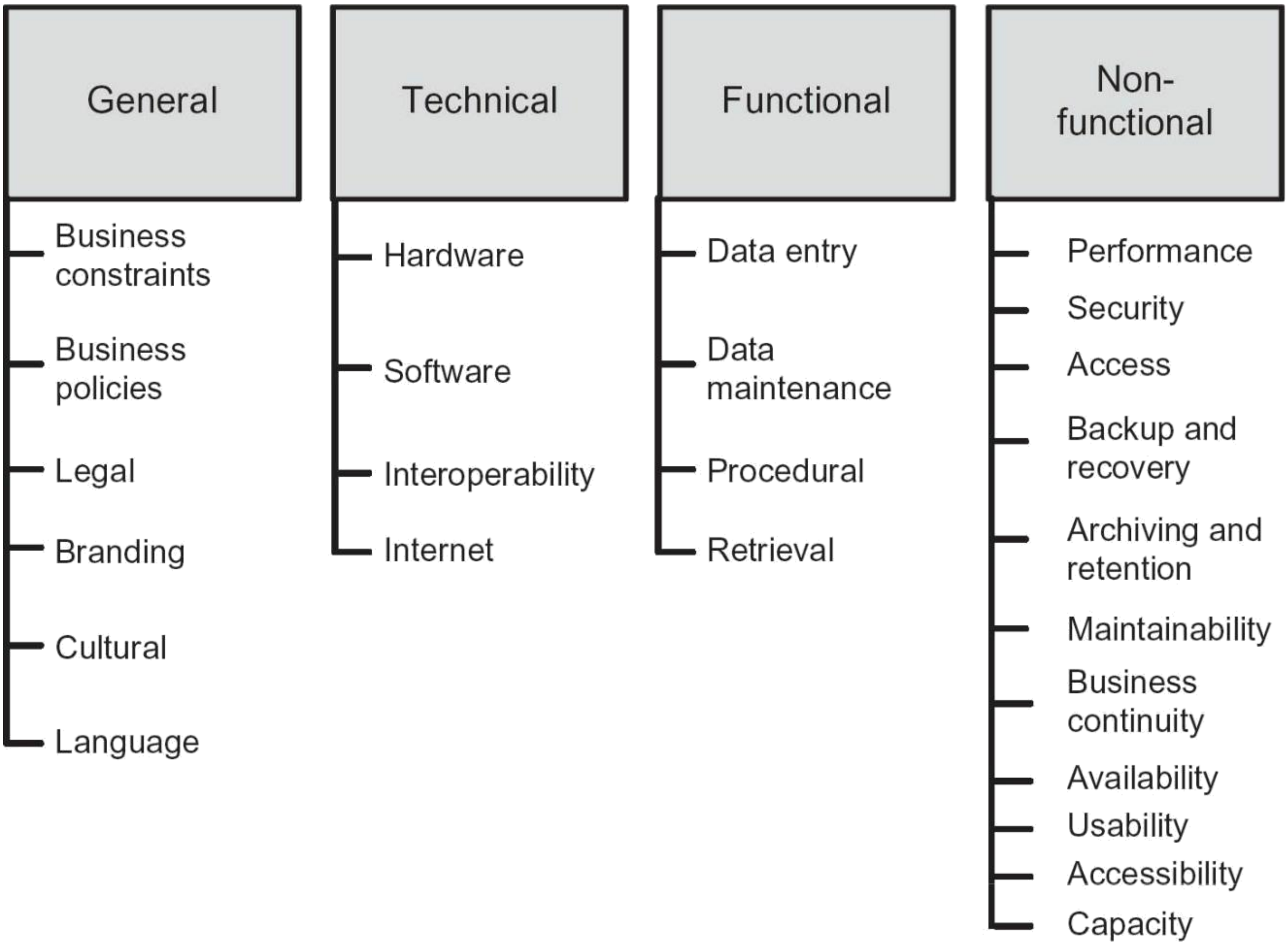


This hierarchy structures the requirements into four discrete areas, based upon the type of requirements. These are described below. At the next level, the hierarchy uses other subdivisions to categorise the requirements. For example, within the functional requirements, all of the requirements relating to reporting may be grouped together or each use case may be used as a mechanism to group requirements.

Types of requirements

Within each of these areas there are several specific categories of requirement that should be considered in further detail. We can use these categories as aide memoires to ensure that areas of requirement are not missed. As discussed in Chapter 10, tacit knowledge is a major issue when eliciting requirements and the categories of requirement provide a useful basis for asking specific questions about areas that the business staff may not consider relevant or are taken for granted. Figure 11.3 shows the key categories of requirement for each type identified above.

Figure 11.3 Categories of requirements



General requirements

These are the requirements that define business policies, standards and needs. These requirements are often very broad in scope and can have an impact upon a number of different areas. Many general requirements apply to entire business change programmes; sometimes all of the change initiatives underway across the organisation. There are specific sub-categories of general requirement:

- **Business constraints** – these cover aspects such as budget, timescale and resources.
- **Business policies** – these cover aspects such as standards and business policy decisions (often known as business rules). These policies and standards ensure consistency of operation across the organisation and are often linked to the vision and values of the organisation. Business policies may define specific areas such as the environmental policy or the strategy to be adopted to ensure business continuity.
- **Legal** – these are the requirements that state relevant legal and regulatory constraints. These requirements may relate to organisations in many business sectors, for example the Data Protection Act applies to any

organisation that holds personal data, or may be specific to a business sector or industry, for example, the Sarbanes–Oxley Act of 2002 and Basel III Accord which apply in the financial sector.

- **Branding** – these requirements are concerned with the image and style to be promoted for the organisation. Typically, there will be branding documentation, for example a style guide, which will set out factors such as logos, key words, language and colour requirements. This documentation will ensure a consistent brand and image are established across all forms of communication deployed by the organisation. The style guide will set out the 'look and feel' of any systems and documents used within the course of the organisation's work.
- **Cultural** – these requirements relate to the type of culture required within the organisation. This may mean that the requirements set out the vision for the organisation, the approach taken to dealing with customers and the management style.
- **Language** – many organisations have specific language requirements as they are operating across international boundaries and languages. These requirements set out the languages to be used in the organisation and the ways of communicating with customers and other organisations.

Technical requirements

These are the requirements that state the technical policies and constraints to be adopted across the organisation and apply to a range of change projects. These requirements may refer to the artefacts that describe the technical infrastructure for the organisation. The specific sub-categories of technical requirements are:

- **Hardware** requirements covering aspects such as the make and model of hardware equipment to be used in the organisation. The requirements may cover the IT hardware but can also include equipment relating to the work of the organisation such as production or general office equipment.
- **Software** requirements covering areas such as operating systems, software applications, networking and communications software. There may also be standards for use of online software such as cloud computing services.
- **Interoperability** requirements that cover the standards for communicating between systems where they are required to exchange data. These requirements may also need to be specified where systems need to communicate with other technical equipment such as printers. The interfaces may be with systems and equipment operated within the

organisation or by other, external organisations.

- **Internet** requirements. These requirements relate to the technical policies governing the organisation's use of the internet and web-enabled services.

Functional requirements

The functional requirements set out the features that any solution should provide. The features set out in these requirements may be provided by an IT system solution but this is not necessarily the case. Some of the requirements may prove to be too costly or time-consuming if provided by IT, in which case alternative means of delivering them will need to be considered – or they could be dropped altogether. Some requirements may be better delivered by non-IT means, for example, a personal communication may be more effective.

The functional requirements form a key element of the requirements catalogue because they define the specific features to be delivered by a solution. Also, whereas the general and technical requirements tend to have a certain longevity, the functional requirements can be subject to frequent change particularly as they are elaborated to a more detailed level. The level of detail used to define the functional requirements, and when this detail is completed, will depend partly upon the delivery mechanism adopted. For example, if a linear software development approach is required, the requirements will need to be defined in sufficient detail for the design and development of the IT system to be undertaken. Alternatively, if an iterative development approach is to be adopted, the detailed requirements may evolve during the development activity and the documentation updated at a later stage. However, sometimes, the level of the requirements documentation to be produced is not this clear cut. For example, in situations where the development is outsourced, an iterative approach may be taken but the requirements will need to be defined to a sufficient level to help manage any communication difficulties. Also, it may be the case that while some of the requirements may evolve during the iterative development, there may be a part of the system that requires the application of complex business rules; in this case, it would be very sensible to define these clearly up front.

If the requirements are to be managed closely, certain characteristics – such as the identifier and source – need to be documented so that each requirement can be tracked through the development and delivery of the business solution. When eliciting and investigating functional requirements, it can be useful to consider several categories:

- **Data entry** requirements are concerned with gathering and recording the data that is required in the solution.

- **Data maintenance** requirements handle changes to the data used within the solution.
- **Procedure** requirements. One of the key sources of error in a business solution is where the detailed business rules to be applied during the working procedures are not understood well. These requirements need to be defined clearly so that they can be adopted accurately within the solution. Techniques such as decision trees or decision tables can be very useful in documenting these requirements.
- **Retrieval** requirements. These requirements are concerned with requests about the data and include the provision of specified reports and responses to enquiries. Management and operational information requirements can be numerous and wide-ranging. In this case, it can be useful to consider these requirements as a separate area of functionality when structuring the requirements catalogue.

Non-functional requirements

The non-functional requirements are concerned with how well the solution will operate and answers questions such as: 'how quickly will it respond?' and 'how easy will it be to use?' There are several areas of non-functional requirement to consider:

- **Speed of performance.** These requirements concern the speed with which a transaction should be processed. For example, if a customer wishes to order some goods or place a booking, this requirement would define the speed of the processing to handle this.
- **Level of security.** The majority of organisations handle information and data of varying levels of confidentiality. These requirements identify the security levels required for the organisation's data. The security levels are likely to differ depending upon the nature of the data. Some will be highly confidential and require extremely rigorous security while other data may still be confidential but subject to less security. The storage requirements for the data may also be defined here.
- **Access permissions and constraints.** These requirements are usually related to the security requirements as they define the stakeholder groups and their levels of access to the data. The access permissions will state which stakeholders are able to carry out which transactions. For example, which stakeholders are allowed to delete the details held for a customer or pay an invoice from a supplier. The requirements relating to the provision of functions to implement the access permissions will be documented within the functional requirements.

- **Backup and recovery.** The requirements for secure storage and access of information are also linked to these requirements. While it is important to guard against confidentiality breaches, retaining data is also vital, particularly with the rise of remote storage and cloud computing. The backup and recovery requirements define the policy for protecting against the loss of data and information.
- **Archiving and retention.** The retention of data and information retained within an organisation may be subject to internal policies or external legal regulations. These requirements define aspects such as the length of time of the retention, the nature of the archiving approach and the approaches to be taken to the disposal of information and data.
- **Maintainability.** These requirements are concerned with the approaches to be taken to maintaining the solution. These will include aspects such as servicing, problem investigation and correction.
- **Business continuity.** The ability of the organisation to continue to function in the face of various threats, natural and man-made, is very important and gives rise to various disaster recovery and business continuity requirements. For example, there may be requirements which state how quickly an organisation should be operational, possibly in a limited form, following a business continuity incident. Business continuity requirements may include those to prevent a disaster affecting the organisation to any great extent – for example, the need for duplicate installations – and also contingency requirements should a disaster occur. There are likely to be several non-functional requirements related to the business continuity requirements, for example, in the area of backup and recovery.
- **Availability.** The timeframe during which a solution must be available to stakeholders. For many web-enabled systems, this is likely to be 24/7 (24 hours a day, 7 days a week) availability. However, other solutions may not require this level of availability or there may be some aspects that can accept a lesser level of availability. For example, a telephone enquiry service may need to be available from 8.30 am to 6.00 pm each day but should be supplemented by a recorded message service outside these hours.
- **Usability.** This area concerns the ease with which a stakeholder can learn, apply and use new processes and systems. It is a critical aspect of many IT solutions in particular because of web-enabled information and purchasing services offered by many organisations. Whereas internal business stakeholders can be trained to use new processes and systems, this will not be possible for external stakeholders such as customers so

ease of learning and use is very important. There are many aspects that can be defined for usability requirements including speed of learning to use the system and ease of navigation (for example, the number of clicks to obtain information).

- **Accessibility.** The accessibility requirements are related to the usability requirements but they focus specifically on enabling access for all, regardless of infirmity or disability. We need to consider four aspects:
  - cognitive disability;
  - motor disability;
  - hearing disability;
  - visual disability.

  These requirements state the need for features that enable accessibility for anyone with a disability. The means of meeting accessibility requirements can be numerous and varied. For example, providing software facilities such as such as screen reading tools and using images rather than text, or physical facilities such as access ramps and lifts, or considering the height and positioning of buttons (such as those in lifts) and counters.
- **Capacity.** These requirements cover areas such as the volumes of data or images to be stored, the volumes of transactions to be processed and the number of stakeholders to be supported.

The non-functional requirements are areas that are often left until later or even dismissed at an overview level without clear thought and analysis. This can be a critical error. There are numerous apocryphal tales of organisational disasters – or near disasters – resulting from such relaxed thinking. Public sector organisations have been criticised heavily for losing confidential data, or making it accessible when this should not be the case. However, private sector organisations are not necessarily any better at this. Some commercial organisations have promoted new services and then not had the capacity of staff and systems to handle the level of interest generated. Some websites providing online information and services are shockingly unusable. How often have you entered data only to be told after submitting the data that you have made a simple error and now have to re-enter the entire set? How often have you left an organisation's website in frustration at the lack of assistance and the time required to complete a simple enquiry? And accessibility for all is growing in importance with the increasing recognition of the need to ensure anyone with a disability has the access they need.

Business analysts have a range of techniques at their disposal (see Chapter 5) to enable them to explore non-functional requirements and ensure that they are identified at an early stage rather than being considered as a later (and often more expensive) addition. In a competitive business world, organisations cannot afford such legal transgressions and business mistakes. It is often the work of the business analyst that analyses the needs and ensure the solution includes the processes and systems to overcome them.

Hierarchy of requirements

Requirements are related to each other. Some of the general and technical requirements are elaborated and expanded in the non-functional and functional requirements; some functional requirements are related to non-functional requirements. All of the requirements are driven by the organisation's values, strategy and objectives. If a requirement is not aligned with these then it needs to be explored further as it is questionable that it is really a requirement. Understanding the hierarchy of requirements helps ensure that the requirements are consistent and coherent. When we define a functional requirement the business context provides the basis that underpins and supports the requirement. When eliciting non-functional requirements, the business and technical policies help give insights into why these requirements are necessary at the level of performance stated.

For example, data protection legislation defines the principles to be adopted by any organisation that stores personal data. This requirement will be elaborated further in the non-functional requirements to define the security levels required for specific sets of data, and the requirements concerning access restrictions, backup and recovery. Further, the functional requirements that define the data requirements will be linked to the security and legal requirements for this area.

The hierarchy of requirements, linking functional and non-functional requirements back to the general and technical business requirements, provides a means of tracing the original business need for the requirements. This helps when considering the priority of the requirements, the timescale for delivery and the possibility of removing a requirement.

Documenting a requirement

Each requirement is documented to define clearly what is required. A requirements catalogue template is provided below showing the range of characteristics that may be documented about an individual requirement. An example requirements catalogue entry is shown in Appendix 11A. The exact set of characteristics used to define requirements will depend upon the organisational standards and development approach to be adopted.

Requirement identifier

The unique identifier allocated to the requirement. This is often a code that is linked to the type of requirement. For example, the technical requirements may be allocated the identifier T-n such as T-001, T-002, etc. The identifier may also include a version number, including a draft version number for when the requirement is still to be reviewed and agreed. An identifier may be:

G-006v0-1 to indicate a general requirement in its first draft version;

F-028v2-0 to indicate a functional requirement in its second reviewed and agreed version. Alternatively, the version history for the requirement may include the version number (see below).

Requirement name
The name allocated to a requirement. This is a short descriptive phrase that indicates what the requirement concerns.

Requirement description
The description should provide a clear definition of the requirement. Initially, the description may be at an outline level and elaborated in more detailed versions of the requirement documentation. When describing requirements it is good practice to adopt the following structure:

- actor (or user role)
- verb phrase
- object (noun or noun phrase).

An example functional requirement is: *'the receptionist shall be able to view the customer name, address and telephone number'*.

An example general requirement is: *'the solution shall comply with the provisions of the Data Protection Act'*.

Source
The originating person or information source for the requirement. This may be a stakeholder or could be a document containing information relevant to the project. For example, a stakeholder may have identified the requirement during an interview or other discussion, or there may be an earlier document – such as a project brief or feasibility study – that includes some of the business requirements.

Owner
The business stakeholder who can make decisions regarding the requirement. Typically, this will be the business manager responsible for the business function or

department, who has the authority to approve the definition of the requirement.

Author

The analyst who has elicited and documented the requirement.

Type of requirement

The categorisation of the requirement. It may be sufficient to indicate whether the requirement is general, technical, functional or non-functional – although it may not be necessary to state this if the identifier includes a reference to the type. The type of requirement may be defined at sub-category level, for example, a requirement may be general, legal.

Priority

The level of priority of the requirement. The approach used here varies between organisations but can also vary between different projects within an organisation. Sometimes a straightforward approach of high, medium or low priority is used with the organisation deciding the implications of each level. Similarly, sometimes the categories ‘mandatory’, ‘desirable’ and ‘nice to have’ are used. The Dynamic Systems Development Method (DSDM) defined a richer approach to prioritisation using the mnemonic MoSCoW. This approach is particularly suitable where several increments of a business change solution are to be implemented or iterative development is to be used to develop a software solution. The MoSCoW mnemonic stands for:

M – Must have. Mandatory in the first increment. Absolutely essential.

S – Should have. Mandatory but may be deferred (for a short period) to the second increment.

C – Could have. Desirable but may not be implemented due to time and budget.

W – Want to have but won’t have this time. Identified as a requirement to be deferred until a later stage. There may be several reasons why a requirement is deferred. Some requirements are recognised as needing further consideration and would cause delays to some of the mandatory requirements if they were to be implemented in the first increment. Other requirements may require a later implementation for business reasons. This may be because it concerns an element of the business strategy that is due to be put into operation at a later point or could be an anticipated legal change.

Business area

The name of the business area to which the requirement belongs. This may be the name of the business function or department. Alternatively, a more detailed approach may be useful and the name of the business process or use case may be used.

Stakeholders

The job roles or names of any stakeholders with a particular interest in the successful resolution of this requirement, and the details of their interest. Identifying stakeholders and their interests for each requirement provides a useful prompt to the business analyst to ensure that all relevant stakeholders' interests have been considered.

Associated non-functional requirements

Some functional requirements are associated with specific non-functional requirement. For example, there may be a business customer service policy that guarantees a speed of response to information requests. As a result, the functional requirement about accessing customer account information may have a performance response time non-functional requirement associated with it. An alternative approach is to document related requirements (described below).

Acceptance criteria

The criteria that will enable the business staff to formally agree that the requirement has been delivered. For each requirement, we should consider how we can check or measure if a requirement has been met.

Related requirements

The identifiers of any requirements that are related to this requirement. They may be related for several reasons: there is a higher-level business requirement that provides further business information or justification for a functional or non-functional requirement; there are non-functional requirements concerning areas such as usability or security that affect functional requirements or vice versa; there are other requirements that concern a similar general, technical, functional or non-functional area. The identifier for each of the related requirements should be listed here.

Related documents

The identifiers for any documents that provide further information about this requirement. These documents may be project documentation such as the project initiation document or may be business justification documents such as the business case. Another form of documentation that may be linked to the requirements is the modelling documents that have been created for the business change project. Some of these models may be contained within the requirements document however, it is still useful to show where there are requirements that are related to them.

Comments

Additional comments that the analyst feels are useful to document for a particular requirement.

Rationale

The business justification for the requirement. The rationale for a requirement may be cross-referenced to specific benefits in the business case.

Resolution

The outcome of a requirement. There are several possibilities as a requirement may be implemented, deferred for consideration in a later increment, merged with another requirement or dropped. The resolution will be used to record the decision and the timing of this decision.

Version history

The history of the requirement through the different versions that have been created. This information should include the version number (although as discussed earlier this may be combined with the identifier) and the date. Each version should also record the reason for the change to the requirement and the reference to the change control documentation.

However, producing a full definition for each requirement will be extremely time-consuming and could be wasted effort in some situations. The level of detail of the definition will depend upon several factors:

- The stage of the analysis, is it an initial view of the requirements or a more detailed requirements specification?
- The nature of the solution, for example, a business process change or IT system replacement.
- The level of priority of each requirement. This is an essential piece of information and will help to prioritise the requirements work. For example, if a requirement is allocated a W priority, the detailed work should be deferred until the point where it is to be included in the solution.
- The approach to be adopted to deliver the solution, for example, evolutionary system development or off-the-shelf software purchase.

Some aspects of a requirements catalogue definition will emerge earlier than others; initially, we may only document the identifier, name, description, source and author. However, once more detailed requirements analysis has been performed additional aspects such as owner and priority will be defined. After the requirements catalogue has been structured and duplicate or overlapping requirements removed, features such as the related requirements will be stated. Cross-referencing to other documents or models may be done late in requirements analysis. The resolution of a requirement may only be entered once the requirements have been validated and this may be subject to change if a MoSCoW prioritisation approach is used. The version history will only be required if the requirement changes.

The requirements catalogue is a central document throughout a business change project. It records what is required, the business justifications, sources of information and a rich network of connections. The level of the descriptions need to be sufficient for the purpose rather than over-engineered for any eventuality. Sometimes the business stakeholders are unable to provide the precise requirements in extensive detail and the approach that will deliver the requirements needs to take account of this. In this situation, the description still needs to be clear about what is required but may not contain the complete set of details; a useful distinction is to separate what is required from how it will be delivered. Sometimes, the business staff have decided what is needed but some of the finer detail concerning how the requirement will ultimately be delivered, may still be open for discussion. In this situation, the requirements catalogue should be clear about what is required and leave the further detail to be explored using approaches such as scenarios and prototyping.

MANAGING REQUIREMENTS

A failure to understand, document and manage requirements often lies at the heart of problems with business and IT system changes projects. While a structured, well defined set of requirements will provide an excellent basis for a change project, problems can still occur if the requirements are not traceable. The traceability of the requirements is a critical quality characteristic. There are two forms of traceability: horizontal and vertical.

Horizontal traceability concerns tracing the requirement from inception to delivery. We can think about ‘backwards from’ and ‘forwards to’ horizontal traceability:

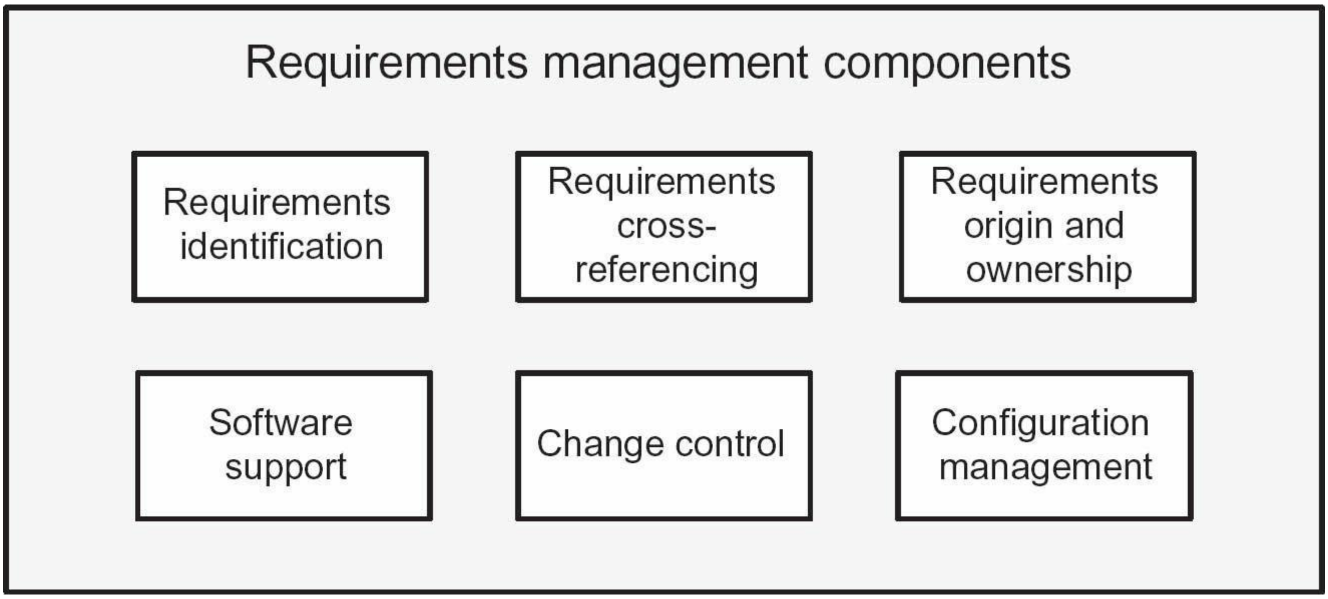
- ‘Backwards from’ traceability involves the ability to trace the source of a requirement from any later point in the business change or software development lifecycle. It answers the question ‘what was the source requirement for this feature of the solution and who raised it?’ We need to be able to identify where a requirement originated so that we can seek clarification from the source where necessary. This is particularly important when requirements are in conflict or there are conflicting views as to the priority of a requirement.

- 'Forwards to' traceability involves the ability to identify any requirement and track where it has been further developed and ultimately implemented. It answers the question 'what happened to this requirement?' and should show that each requirement has been resolved satisfactorily.

Vertical traceability concerns tracing a requirement up or down the hierarchy so answers the questions about alignment with business values, strategy and objectives.

Requirements management is essential if there is to be traceability of requirements. There are several elements involved in managing requirements as shown in Figure 11.4 and described below.

Figure 11.4 Elements of requirements management



Requirements identification

Each requirement needs to be identified uniquely in order that any reference to that requirement corresponds to only one requirement.

Cross-referencing

All related requirements and documents should be cross-referenced so that further elaboration or information concerning the requirement can be accessed easily. During requirements management, the cross-references provide the basis for the impact analysis of proposed changes. They allow the analyst to identify which requirements are related to the requirement that is the subject of the change, and consider whether the change will affect the other requirements.

Origin and ownership

The source identifies the origin of the requirement. This is the person or document the requirement should be traced back to during 'backwards from' traceability. This is the origin of the requirement and, whether this was a person or a document, will be able to provide additional information and justification about the requirement. When considering changes to the requirement, the source can help to clarify the impact of the change and as a result help with the decision about the change.

The owner typically has responsibility for the business area affected by the requirement and will need to make decisions about the requirement. It is important therefore that this person is involved as the change project unfolds. The owner will be a key stakeholder should any proposed changes arise that will affect the requirement, either directly or indirectly via related requirements. In addition, fundamental business changes such as budget reductions or timescale changes may require requirements to be discontinued, reprioritised or delayed; the owner will be the senior person in the decision-making process for the requirement and will have the ultimate authority concerning the requirement.

Configuration management

Configuration management is concerned with controlling any changes made to project deliverables, such as documents, in order to ensure that the changes are made in a disciplined manner and traceability sustained. Without effective configuration management the requirements document can become inaccurate as the following problems can occur:

- inability or difficulty in identifying the latest version of a
- requirement; the reintroduction of out-of-date requirements;
- using the wrong set of requirements for further development or testing work.

As a result, it is important that appropriate mechanisms are developed that will manage the implementation of any changes to the requirements. There are two key areas to consider:

- configuration identification;
- configuration control.

Configuration identification

Configuration identification is concerned with defining the following:

- The deliverables to be brought under configuration control. These are known as the configuration items (CIs). During requirements management, the deliverables will include the individual requirements catalogue entries, the composite set of entries that form the requirements catalogue, the models that elaborate and define the requirements, the requirements document. There should also be a structure showing how these configuration items relate to each other.
- The identifier and version numbering scheme to be applied to the CIs. As discussed previously, each requirement has a unique identifier but if we are to control the other configuration items then this will also be required for each of them. For example, the requirements catalogue will require an identifier. Where a CI has been identified, and has an identifier, it will also require a version number. The approach to be adopted for allocating version numbers will need to be defined. Version numbers will apply to each individual CI. For example, while a requirement will have a version number, so will the whole requirements catalogue within which the requirement sits.

Configuration control

There will also need to be a process for controlling the CIs and ensuring that they are not changed without formal approval and version numbering. This is typically called a version control process. There are several elements to this:

First, a CI is created in draft form. While the item will have an identifier, the version number will need to indicate that the CI is in draft form. One approach is to number initial drafts using the format 0.n. For example, a draft requirement catalogue entry with an identifier T-007 could be numbered T-007v0.3 indicating that this is the third draft version of the technical requirement numbered 007.

Second, as described in Chapter 10, requirements validation is carried out to review and agree the requirements documentation. At this point, the CIs that describe the requirements are said to be 'baselined'. This means that they are brought under configuration control and cannot be changed by anyone without the following the formal configuration management procedure. When a CI is brought under configuration control it is allocated a version number reflecting its baselined status. Using our example above, the technical requirement would have the identifier/version number T-007v1.0. Sometimes it can be useful to baseline a requirements document prior to requirements validation, when rigorous requirements analysis has been carried out and a formal approach to change control is felt to be beneficial.

Third, once a CI is baselined, no changes can be made to the content without the approval of the configuration manager. All of the CIs should be stored in a secure area so that they cannot be accessed and revised at will. If a change to an item is approved, the configuration manager releases it for revision. Once the item has been amended and the revised version brought under configuration control, the new version is renumbered. In our example, the requirement would now be allocated T-007v2.0.

Configuration management in an Agile environment

Configuration management needs particular consideration when an Agile development approach such as DSDM or Scrum is used. Because these approaches tend to embrace change and explore requirements using prototyping approaches, initially much of the information about the requirements will be defined within the prototypes rather than the requirements documentation.

While the high-level requirements documentation should be relatively stable, the prototypes that are used to elaborate and implement the requirements are likely to change regularly. Having baselined the requirements document reasonably early in the development project, this document will provide an audit trail for the high-level requirements. Further detail regarding the requirements may be added at a later stage. Baselining and controlling the versions of the prototypes will also be important if the requirements are to be managed.

There are several possibilities for baselining the prototypes during Agile software development including:

- **Baselining every prototype before demonstration:** this has the virtue of clarifying the version that has been demonstrated to the business users.
- **Baselining daily:** this is highly disciplined but can prove onerous and unnecessary.
- **Baselining at the end of a timebox:** this is fine if the timeboxes are reasonably short – a few days perhaps – but less sensible with longer timeboxes or, for example, the 21-day ‘sprints’ used within Scrum.

Each baselined prototype is placed under configuration control as this is the only way to ensure that the up-to-date version of the prototype is used. The CI will consist of the actual prototype, the tests run on it and the record of the users’ comments. Thus, as the prototypes are developed and refined, a complete audit trail is created of the changes made and – very importantly – why they were made.

Change control

Changes occur frequently on projects. This may be because of external factors such as legal or regulatory changes or competitive forces, or may result from internal changes, such as strategies, policies or people. As a result, any requirement may be subject to change during a project. Having accepted that changes will happen, then requirements management should include a process to handle these changes. The stages of this process are as follows:

- **Documenting the proposed change.** The change should be documented as a ‘change request’, stating who raised the change, a description of the change and a justification for requesting it.
- **Consulting the stakeholders.** Each change request should be sent to representative stakeholders to assess the impact of the proposed change, including the effort to make the change and the corresponding cost.
- **Deciding on the change.** The change request and the impact assessment should be reviewed by the designated approval authority. If the change is approved for implementation, the CI is released by the configuration librarian so that the change can be applied and the new version created. The combination of the configuration management and change control approaches, provide a means of creating a version history for the requirements documentation. Each change that has been applied to the requirements is documented and explains why one version was changed to create the new version. Over time, a complete audit trail will be created explaining what actions were taken, why this was done and when.

Software support

Most requirements documents contain too many requirements to manage the set of documentation, cross-references and versions manually so an automated tool is usually required. These tools should provide the following features:

- **Documentation creation and storage.** This will require editing tools that provide facilities such as word processing and modelling. Further, some tools provide document management capability that incorporates functions such as publishing documentation for access by authorised stakeholders, allowing on-line reviewing and tracking revisions.
- **Secure storage and access.** If the documentation is to be placed under

configuration control, it will be essential for there to be restricted access to the individual documents.

- **Documentation linkage.** The cross-references between documents will need to be recorded and related documents accessed easily. This will help in requirements management activities such as impact analysis and tracing version histories.
- **Version numbering.** The allocation of identifiers and version numbers to configuration items.

Some specialist toolsets provide a range of features, including those above, designed to support rigorous and efficient requirements management. Some may be integrated tools providing functionality that support later activities such as code generation and testing. However, many organisations use automated tools that are not designed for requirements management specifically and may offer just generic features such as diagram creation and word processing. Such software can offer the key functionality required for requirements management but will also require a great deal of manual activity to supplement the automated support.

SUMMARY

Well defined and traceable requirements are undeniably key to a successful business change project. They set out what a solution needs to deliver and the relative priorities of the features to be included. The requirements document needs to be structured clearly so that a thorough requirements validation can be conducted by the reviewers. Traceability of the requirements is also critical if the business is to be able to confirm that their needs have been met and all decisions regarding the requirements are to be transparent and auditable.

APPENDIX 11A

REQUIREMENTS CATALOGUE ENTRY						
Project ID and name: Trent Cars Sales Improvement Project						
Author:	Date:	Version:	Status:	Page:	of	1
J Williams	02/09/14	0.1	In development			1

Requirement ID	G-001v0.1
Requirement name	Compliance with Data Protection Act
Business area/domain	Sales, Servicing, Customer Services
Source	L. Stevens, Customer Services Manager
Owner	W. Brown, Managing Director
Priority	M
Type of requirement	General
Requirement description	The solution shall comply with the eight principles of the UK Data Protection Act, 1998
Associated non-functional requirements	See related requirements
Acceptance criteria	A user without authorised access to personal data shall be advised that they do not have the authority to access the data and shall not be allowed access to the data
Justification	Legal requirement. Non-compliance could result in the receipt of an enforcement notice from the Information Commissioner's Office or the Information Commissioner's Office could impose a financial penalty on TrentCars
Comments	
Related documents	Memo from W. Brown 'Data Protection Act compliance' dated 12/06/08. Information Commissioner's Office website www.ico.gov.uk
Related requirements	N-005 Data Access Restrictions; N-110 Data Security
Resolution	To be implemented in phase 1

FURTHER READING

Cadle, J., Paul, D. and Turner, P. (2014) *Business Analysis Techniques: 99 essential tools for success*, 2nd edn. BCS, Swindon.

Robertson, S. and Robertson, J. (2012) *Mastering the Requirements Process*, 3rd edn. Addison Wesley, Harlow.

12 MODELLING REQUIREMENTS

Debra Paul and James Cadle

INTRODUCTION

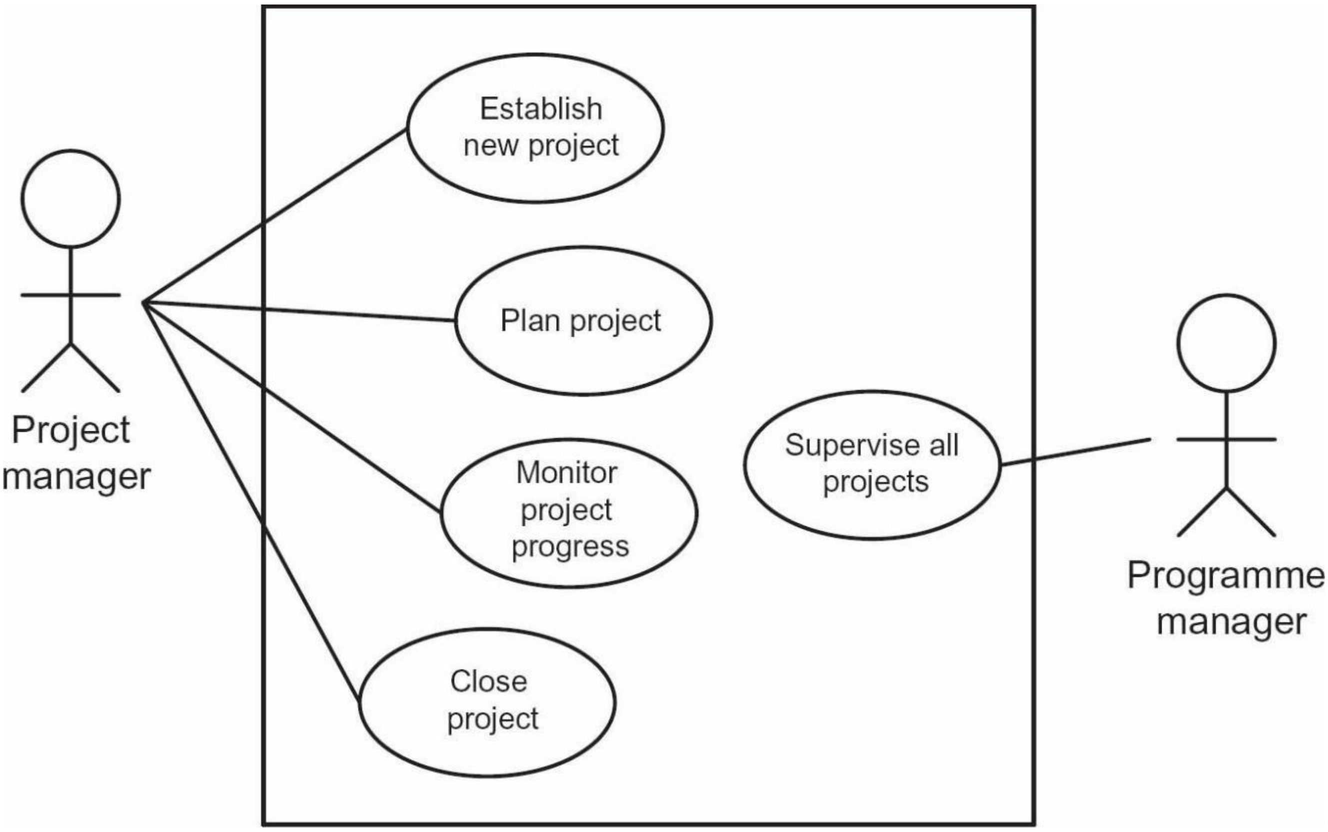
This chapter introduces some of the most commonly-used techniques for modelling requirements for IT systems. These techniques are used to analyse and specify requirements during systems development. Models are extremely useful in helping to clarify understanding and, if cross-checked with other models, ensuring the completeness of the analysis. A model shows only one view, or perspective, of a system but shows this view very clearly. This induces the analyst to ask further questions, often those that have not been identified previously. The techniques we describe here have been selected from two distinct approaches to systems modelling: use case diagrams and class modelling from the Unified Modeling Language (UML), and entity relationship modelling from the family of structured, data-driven approaches. The selected techniques model two distinct views of the IT system: the functions that the system will provide and the data to be stored within the system.

MODELLING BUSINESS USE CASES

A top-level view of an organisation or business system can be provided through developing a business use case diagram. Use cases are described in more detail in the next section but, for now, it is sufficient to say that they represent things that an organisation, business system or IT system need to provide. A business use case diagram shows the usage that stakeholders require of a system. An example is shown in Figure 12.1; there are just two actors, a project manager and a programme manager, and the use cases represent what they require of the business system.

Business use case diagrams can be extremely useful when scoping a project or gaining an overview of the areas to be investigated and analysed. Some of the use cases on a business use case diagram may be fulfilled by an IT system but for others this may be only partially the case, and for some the solution may be completely manual. Some of the business use cases shown in Figure 12.1 are taken down to the system level in Figures 12.2 to 12.4.

Figure 12.1 Use case diagram for a project management organisation



MODELLING SYSTEM USE CASES

The saying 'one picture is worth ten thousand words' applies directly to the definition of IT system requirements. It is extremely difficult, if not impossible, to write textual statements that are completely unambiguous. However, this is not the case with a model that has been drawn using defined notational standards; each box and line makes a clear statement about the system under investigation. Some models are more easily understood by business users than others. The view of a system that is often most accessible to business users depicts the 'functions' that will be provided and the 'actors' who are involved in using those functions. A function may be defined as a set of actions that the business users want the IT system to support in order to achieve a specific goal. For example, a function might be 'Record customer' and the actions here would include the following:

- accept the customer details;
- validate the customer details;
- store the customer details that have been entered.

In the Unified Modeling Language (UML), a use case is something that an actor wants the IT system to do; it is a 'case of use' of the system by a specific actor and describes the interaction between an actor and the system. Each use case will have a stated goal and will contain a description of the actions that the system must perform to achieve this goal. The use case model will consist of a diagram showing the actors, the use cases and the associations between them, plus a set of use case descriptions. The following elements are found in the use case diagram:

Actors are whoever or whatever expects a service from the system. They are usually user roles but also may be external systems or time. On the use case diagram, actors are shown interacting with the use cases. As they are external to the system and outside its control, defining the system actors and the use cases they are associated with, helps define the system boundary. Actors are usually shown as matchstick figures, but if the actor is another system it can be shown by a rectangle with an <<actor>> stereotype before the name of the system. Some analysts prefer to show all actors, including the job roles, as rectangles because business users can feel that matchstick figures trivialise the diagrams. Time can also be an actor and may be shown as a rectangle or matchstick figure.

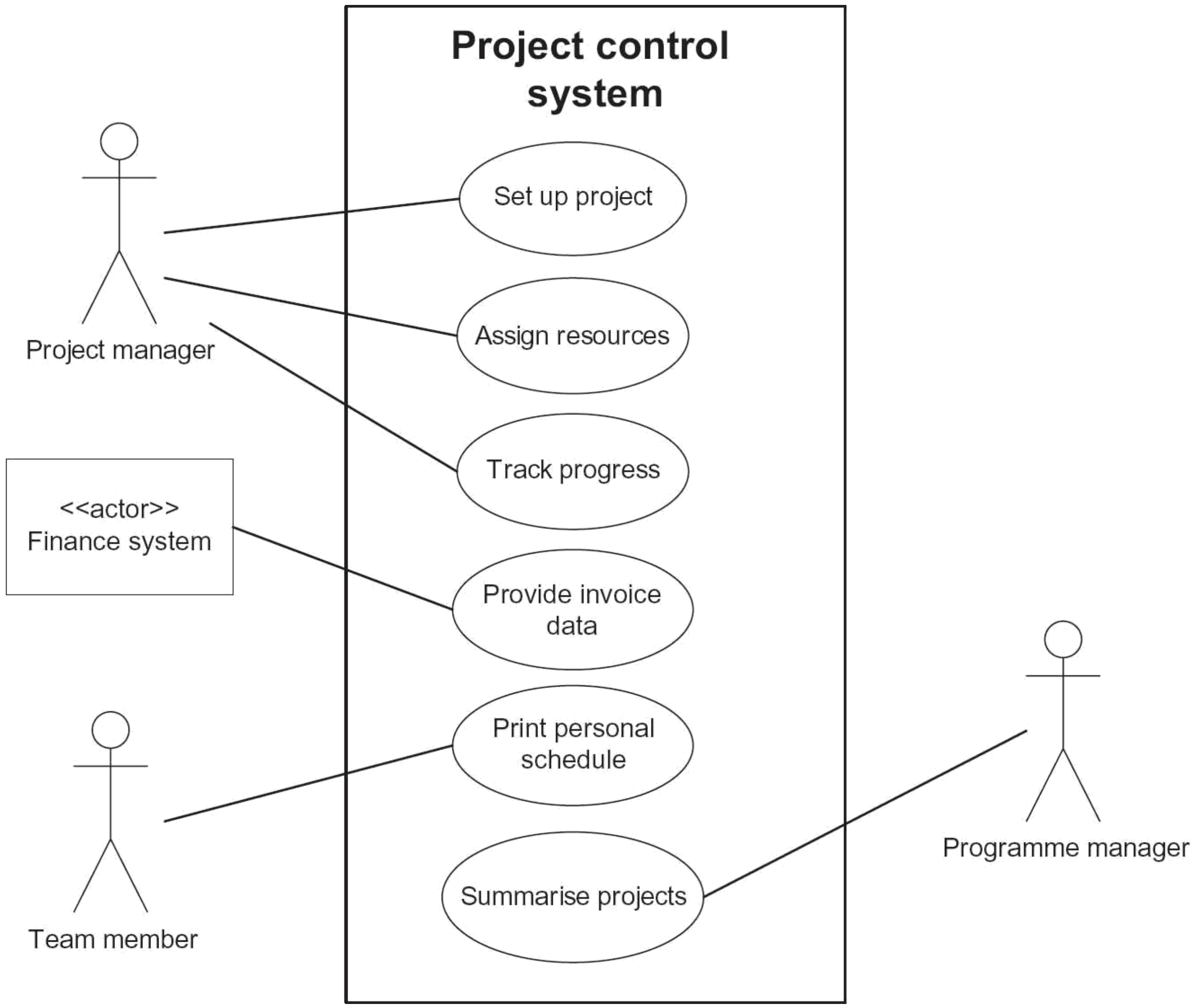
Each **use case** is shown as an oval and represents a function that the system will perform in response to a trigger from the actor. We use the 'verb noun' convention to name use cases. For example, 'Set up project' or 'Book room'.

The **system boundary** is indicated by drawing a large box around all of the use cases but with the actors outside the box. This clearly illustrates the boundary of the system and is very useful when agreeing the scope of the system.

Associations indicate which actors will need to interact with which use cases. Lines are drawn linking actors with the appropriate use cases.

The use case diagram in Figure 12.2 shows part of the project control system. You might create a diagram such as this during a workshop or following some interviews with the business users.

Figure 12.2 System use case diagram for a project control system



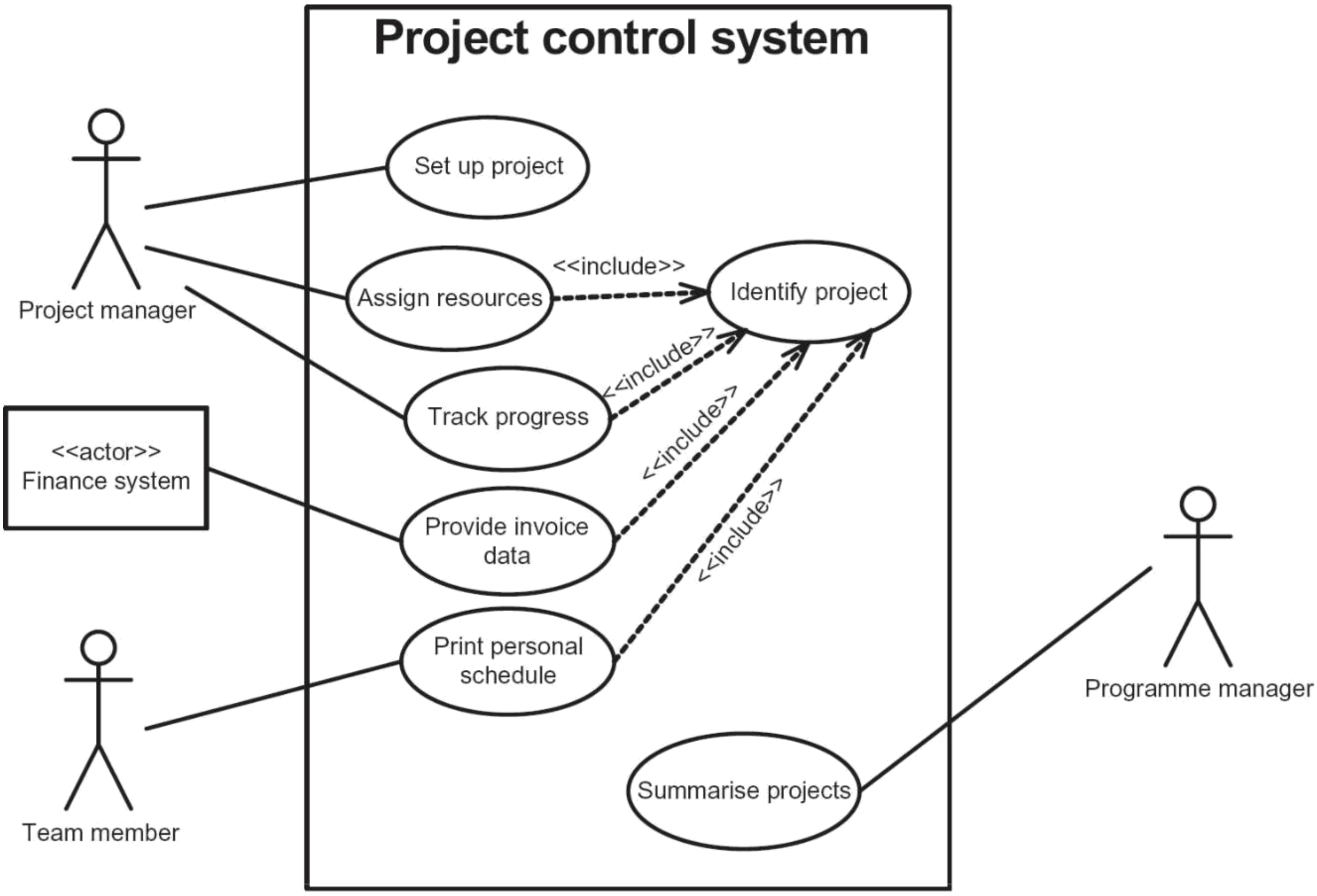
Use case diagrams are particularly useful during a workshop because they are so easily understood by business users and provide an excellent framework for the discussion. The detail of the interaction between an actor and a use case is documented in a use case description. This lists the steps that take place during the interaction and is usually a textual description. The detail of any processing carried out within the use case may be documented using a variety of techniques. For example, we could use activity diagrams from the UML or other more established techniques such as decision tables.

The <<include>> and <<extend>> constructs

When exploring the use cases, it often emerges that some processing elements are repeated. For example, in the project control system, many of the use cases start by identifying the project concerned. As it stands, the steps involved in identifying the project would have to be included in each use case and a great deal of duplication would result. Instead of this, the project identification elements can be written as a separate use case and then ‘included’ in a number of others. This is represented in

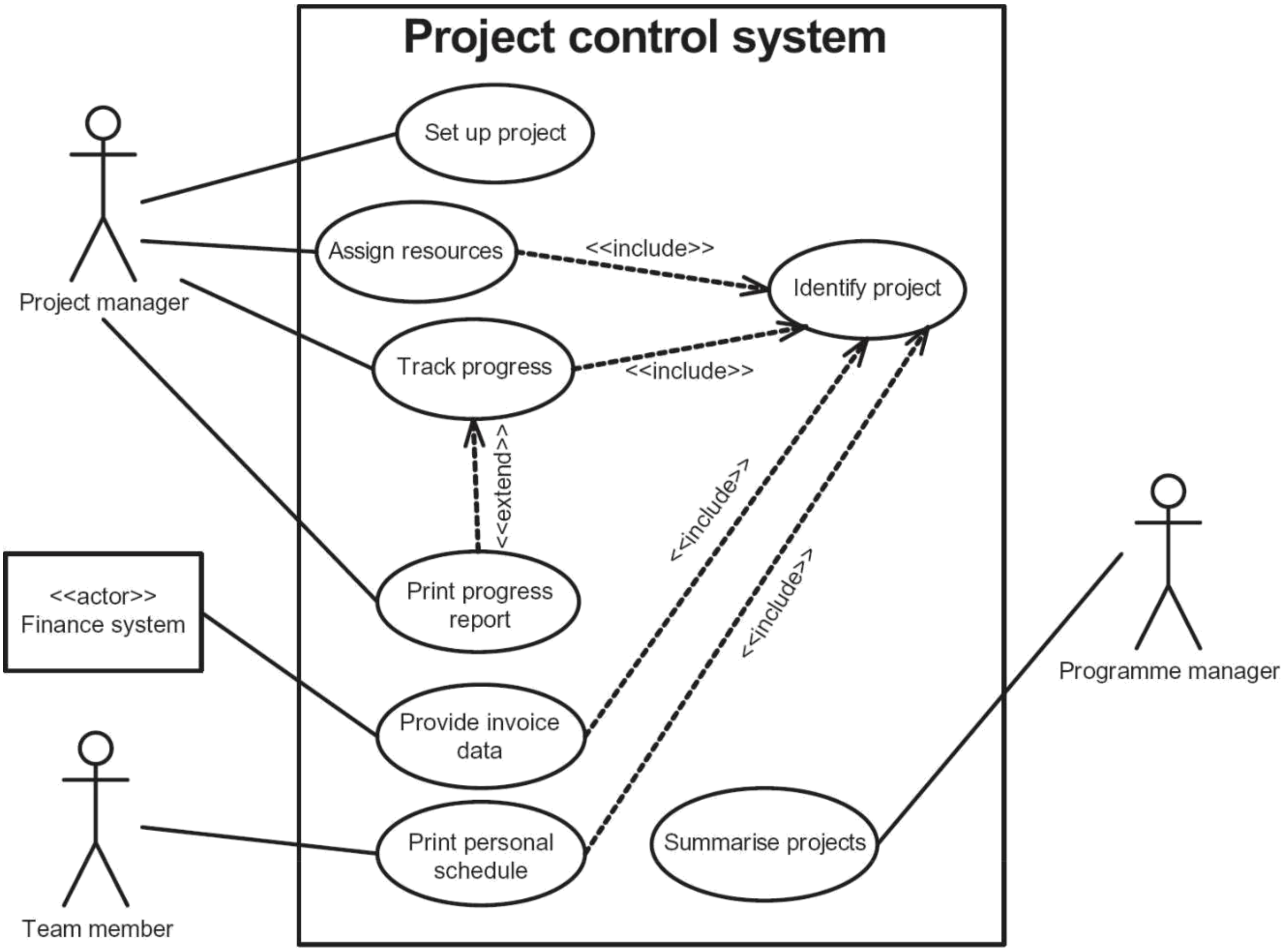
Figure 12.3 where the <<include>> stereotype is shown on a dotted line with an arrowhead pointing to the included use case.

Figure 12.3 Use case diagram showing <<include>>



It may also emerge during more detailed investigation and specification that there are some elements of the use cases that are not mandatory for the current development iteration or release of software (in other words, the relevant requirement has not been classified as a 'must' in MoSCoW terms as described in Chapter 11). In this situation, a separate use case can be created to 'extend' the original use case. For example, after the project manager tracks progress, she may also print a progress report and, in Figure 12.4, this has been split off into a separate use case because it is not required in the first iteration. The new use case is said to 'extend' the original use case. This type of association is shown by a dotted line with an arrowhead that points back to the original use case.

Figure 12.4 Use case diagram showing <<include>> and <<extend>>



The <<include>> and <<extend>> concepts allow use cases to be connected to each other. This is the only way that use cases are linked as these diagrams are not intended to show the flow – or sequence – of the processing.

MODELLING SYSTEM DATA

It is essential to model the data to be stored within the IT system. A data model allows the stakeholders who use the system, or obtain information from it, to agree the data that will be recorded and retrieved. It also provides the basis for the database design in a bespoke development or helps in the evaluation of a packaged application. But data modelling should not just be the province of system developers or IT professionals; it is a key tool for the business analyst. It helps the analyst understand the business rules that govern the creation, manipulation and deletion of data within an organisation and the data required to support process improvements. It also provides a mechanism for communicating the data requirements forward into the design and build of an IT system. The long-established technique of entity relationship modelling is used extensively to model data and the UML class modelling technique is also widely used. In this chapter we look at both of these approaches.

ENTITY RELATIONSHIP DIAGRAMS

Whether they are computerised or not, organisations require clear and accurate knowledge of the data structures that underlie their information requirements. Data is the raw building block of all information systems and the objective of data modelling is to express this structure in a concise and usable way. Data modelling is concerned with identifying and understanding:

- the data items (attributes) which the organisation (or system) needs to keep;
- the grouping of the attributes (into entities);
- the relationships between entities.

The notation used here for entity relationship diagrams (ERDs) is that developed by Harry Ellis and Richard Barker and is also known as the CACI notation (after the consulting firm where they worked at the time). This notation was also adopted for the Oracle CASE tool and within SSADM (the Structured Systems Analysis and Design Method) from its version 4 onwards.

An entity is something that the enterprise recognises in the area under investigation and wishes to collect and store data about. An entity might be:

- **Physical** – for example, an Order, Customer or Supplier.
- **Conceptual** – for example, a Booking or an Appointment.
- **Active** – for example, a Meeting or a Course.

Entities are represented on the model by a box. Each entity has a meaningful name, normally a noun, which is always singular. It is important to distinguish between what are called the ‘entity type’ and the ‘entity occurrence’. For example, if the entity type is Book then the entity occurrence is a specific instance of a Book, such as *Business Analysis* or *Data Analysis for Data Base Design*. The physical equivalent of an entity type is a table, and of entity occurrence a record. We usually talk about ‘entities’ as an abbreviation of ‘entity types’ but specifically refer to entity occurrences. Individual occurrences of an entity must be uniquely identifiable. For example, each customer or order must have a unique identifier such as account-number or order-number.

Attributes

Entities contain and are described by attributes (or more accurately attribute types). For example, the entity Book might be described by the attributes title, author-name, publisher and price. Attributes may also be called data items. An attribute's physical equivalent is a field. A specific entity occurrence should be uniquely identifiable by the value of an attribute or combination of attributes. For example a Member may be identified by the attribute member-number or a specific Book recognised from the combination of the two attributes author and title. This identifying attribute or combination of attributes is termed the key to the entity. The initial entities and some attributes will be identified from the interview notes, documents and observations made in the fact finding and investigation of the current system. Existing file or database content and information needs also give pointers to system entities and their attributes. Attributes are not generally shown on the entity relationship diagram itself but are typically defined in supporting documentation (entity descriptions) or recorded in a data dictionary.

Relationships

A relationship is a relevant business connection between two entities. A relationship is represented on a data model by a line linking the associated entities. Relationships may be:

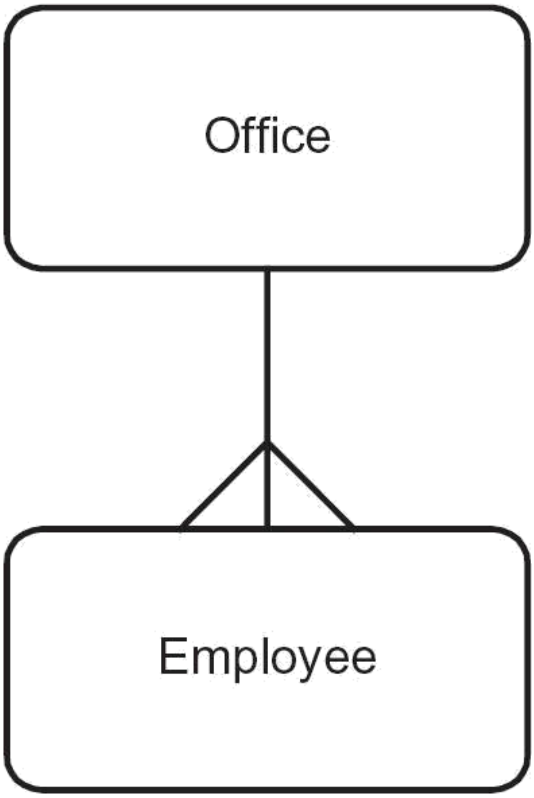
- one-to-many (1:m);
- one-to-one (1:1);
- many-to-many (m:m).

It is good practice to name the relationships on the model so as to provide anyone viewing it with more information about the nature of the relationship. This is discussed later in this chapter.

One-to-many relationships

Relationships are often of the degree one-to-many (1:m). For example, an Employee is allocated to one Office, but each Office must have one or more Employees allocated to it. We represent this as shown in Figure 12.5. Here, the notation of a 'crow's foot' is used to indicate that an Office is related to between one and many Employees. At the other end of the line, a solid line indicates that an Employee is related to exactly one Office.

Figure 12.5 One-to-many relationship between two entities

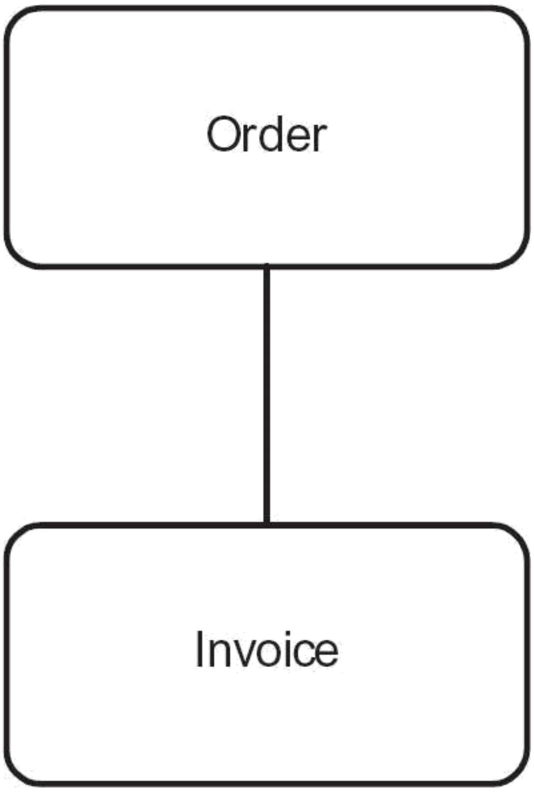


Similarly, in an order processing entity model there appears to be an obvious 1:m relationship between Customer and Order. A customer will place one or many orders but a particular order will only be placed by only one Customer.

One-to-one relationships

If we were looking at a system to hold data about a company, its offices and the employees working in the offices and each office was allocated to only one employee and each employee allocated to only one office, then the relationship between Office and Employee would be one-to-one. Similarly, as shown in Figure 12.6, where an order is related to one invoice and an invoice is concerned with only one order. The relationship between the two entities is exactly one-to-one. A solid line is used to indicate that the relationship is exactly one.

Figure 12.6 One-to-one relationship between two entities

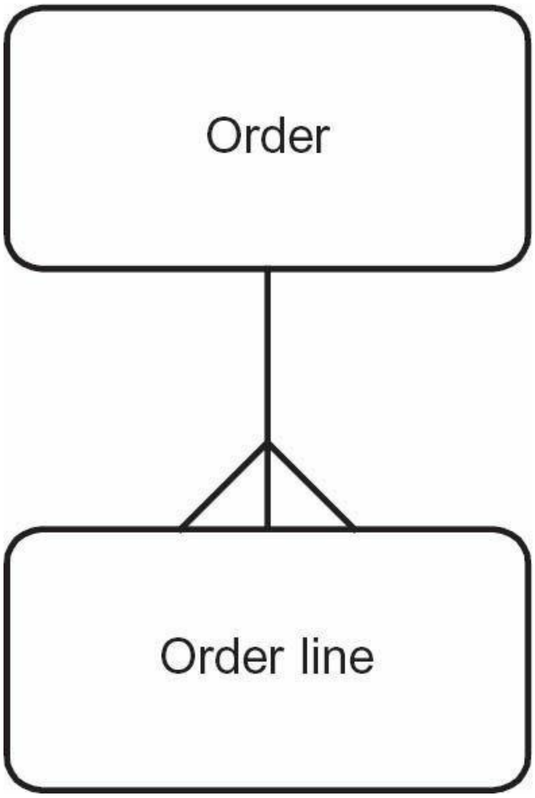


These relationships are not permitted in some data modelling approaches and, where this is the case, it is usually suggested that the two entities are merged. If this happens, one of the identifiers is selected to identify the merged set and the entity is named accordingly. An identifier is the attribute or set of attributes used to identify the entity. The identifier that is created first is usually used to identify the entity created from the merged entities. If the Order and Invoice entities from the example above were merged, the identifier for the Order entity is likely to be the chosen identifier as the order is created before the Invoice.

Optionality

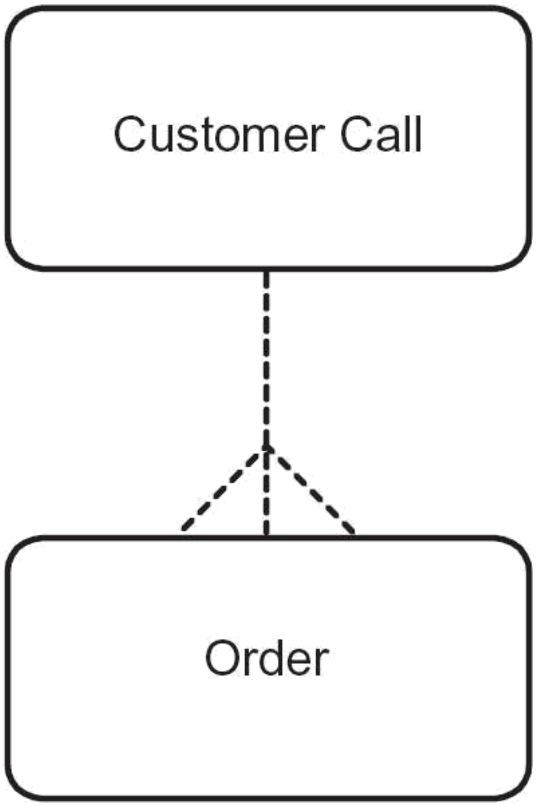
More detailed information about the business rules that underpin the data model is represented by including optionality in the relationship between two entities. The optionality of the relationship describes whether or not the entities at both ends of the relationship must always co-exist or whether one entity can exist without the other entity. Where there is not optionality and both entities must always co-exist, the relationship is drawn using a solid line. In the examples in Figures 12.5 and 12.6, the entities are joined by a solid line. This indicates that both entities must exist and that neither can be stored on a system without the other being present; this is sometimes called a fully mandatory relationship. Another example of this type of relationship is shown in Figure 12.7. In this case, each Order input to the system must always have at least one Order line and each Order line must be related to exactly one Order.

Figure 12.7 Fully mandatory one-to-many relationship



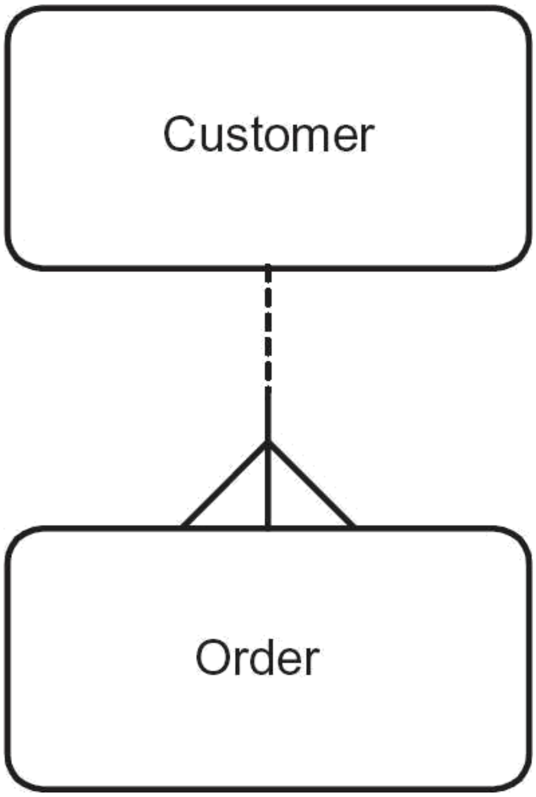
The complete opposite of a fully mandatory relationship occurs where a relationship is fully optional. This means that both entities can exist completely independently of each other. In the example in Figure 12.8 the relationship is using a dotted line. This indicates that an Order can be placed without a Customer call being made and a Customer call need not result in an Order.

Figure 12.8 Fully optional one-to-many relationship



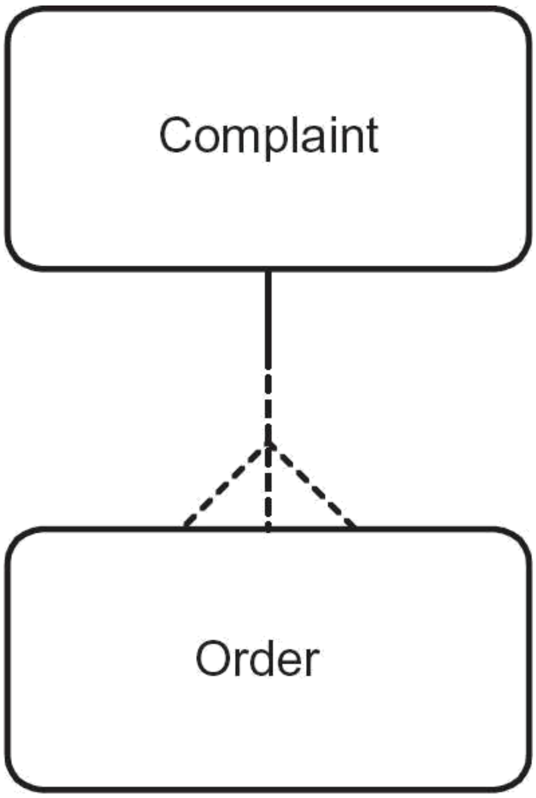
The remaining two alternatives show how relationships need to be analysed in two directions: from the ‘one’ end of the relationship, known as the parent or master entity, to the ‘many’ end of the relationship, known as the child or detail entity. The first situation is where a parent entity can exist without any child entities but a child entity must have a parent. In the example in Figure 12.9 we can see that a Customer may not have placed any Orders as yet, but an Order must always be placed by a Customer.

Figure 12.9 Mandatory parent entity with optional child entity



The second situation is the opposite of this is where the parent entity must be linked to at least one child, but the child entities can exist without a parent. The example in Figure 12.10 shows that an Order need not be related to any Complaints but a Complaint must concern at least one Order.

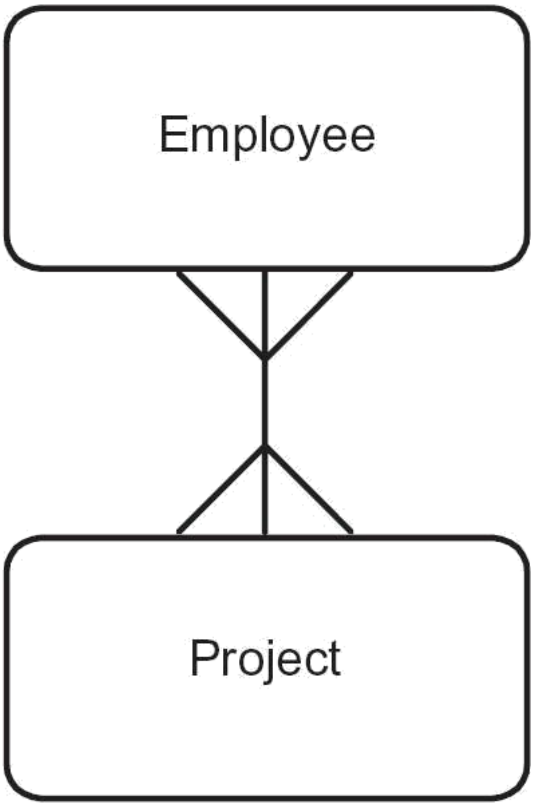
Figure 12.10 Optional parent entity with mandatory child entity



Many-to-many relationships

Many-to-many (m:m) relationships occur frequently. For example, as shown in Figure 12.11, an employee may be contracted to work on one or more projects and a project may have one or more employees contracted to it.

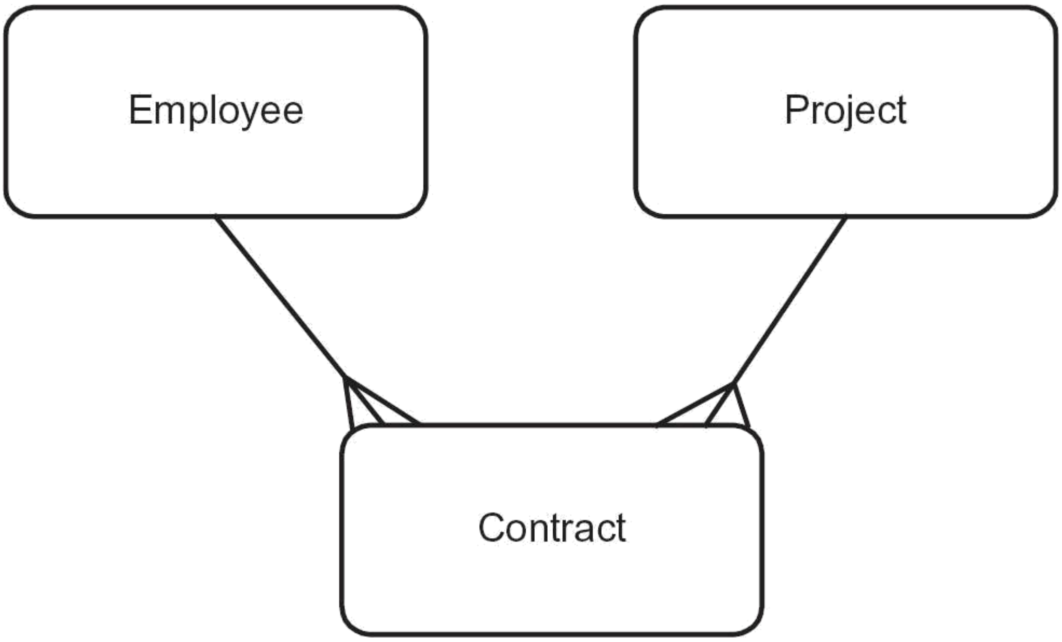
Figure 12.11 Many-to-many relationship



Many-to-many relationships are normally decomposed into two 1:m relationships with the definition of an additional link entity. Figure 12.12 shows how the link entity Contract has been added so that the many-to-many relationship can be removed. The extended structure shows the following:

- an Employee is linked to one or more Contracts and a Contract is for exactly one Employee;
- a Project is linked to one or more Contracts and a Contract is for exactly one Project.

Figure 12.12 Resolved many-to-many relationship



This allows all the contract details which an individual employee is associated with to be accessed as detail entity occurrences. It also allows access from the project entity to all the contracts associated with a specific project occurrence. Attributes of the original relationship, for example, 'date employee contracted to the project' and 'duration of each contract', can now be recorded as attributes of the link entity. Note that the name of the link entity is normally the noun form of the verb which described the relationship, thus the contracted relationship is replaced by a Contract entity.

If we look at an order processing example there appears to be a many-to-many relationship between the entities Product and Order. An order may be for more than one product and we would expect most products to be ordered more than once so they would appear on more than one order. This is solved by introducing a link entity (Order line) which has one-to-many relationships with both of the original entities. (This structure is shown on the diagram in Figure 12.15.)

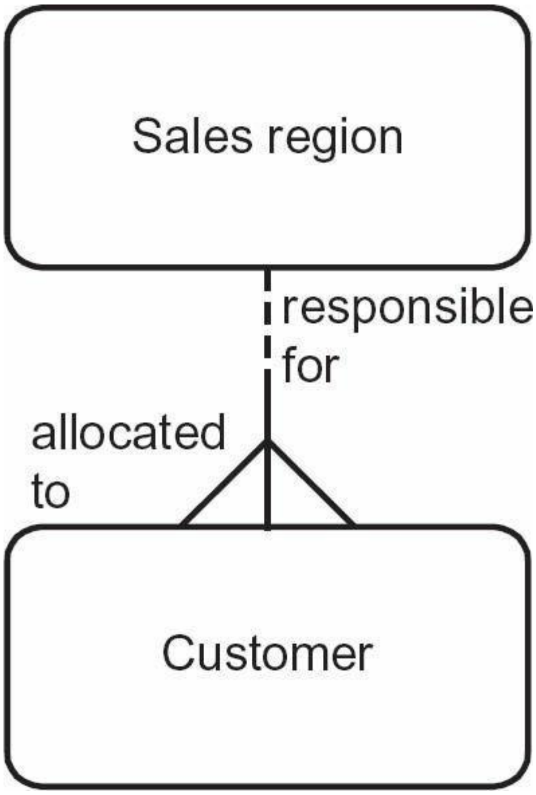
Many-to-many relationships can be problematic for at least two important reasons:

- First, they may mask omitted entities. Two examples have already been given above.
- Second, most Data Base Management Systems (DBMS) do not support many-to-many relationships.

Relationship names

The nature of the relationship between two entities is clarified by relationship naming and identification. A relationship link phrase is constructed from the perspective of each entity. In the example in Figure 12.13, a Sales region is responsible for zero, one or more Customers.

Figure 12.13 Named relationship between entities



This reads from the Sales region end as:

> *each Sales region may be responsible one or more Customers*

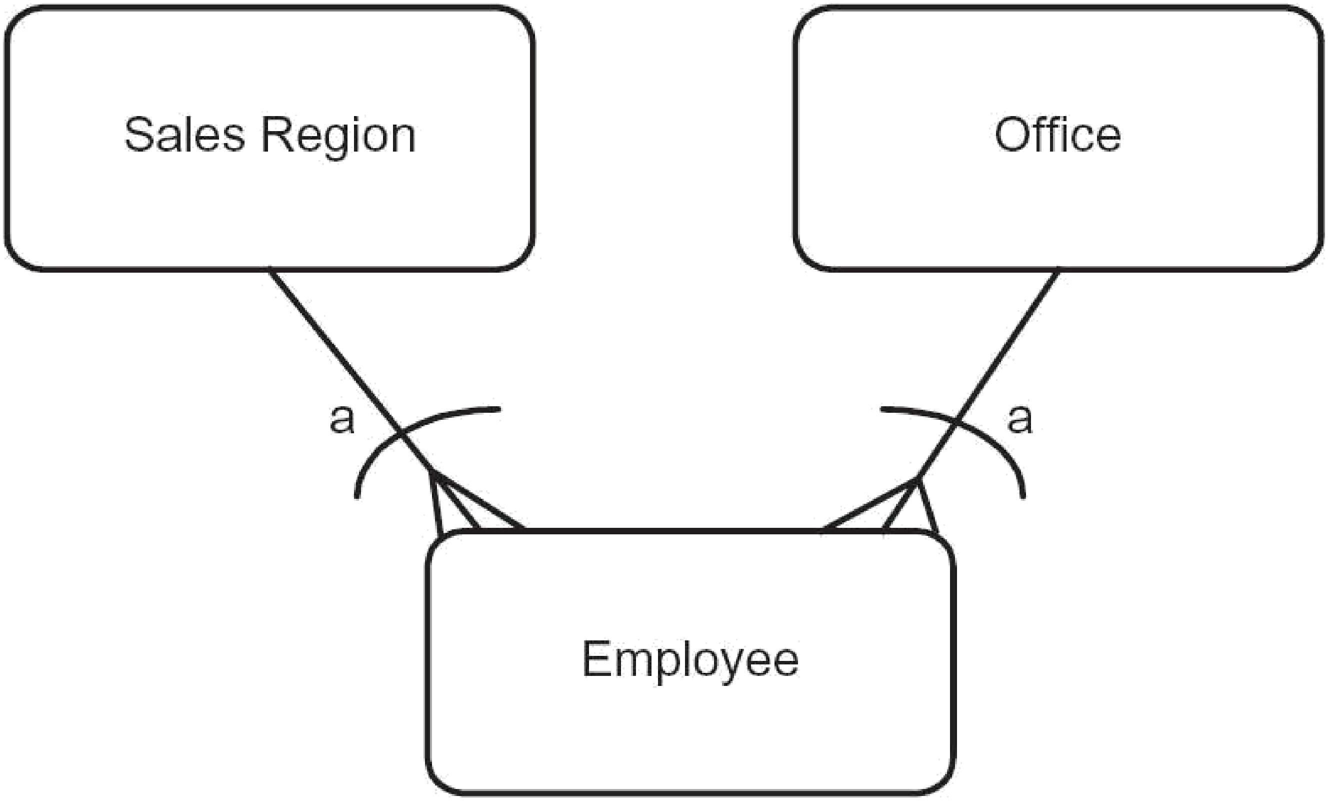
and from the Customer end:

> *each Customer must be allocated to exactly one and only one Sales region*

Exclusive relationships

In an exclusive relationship, the participation of an entity occurrence in one relationship precludes it from participating in another. This is indicated by an exclusivity arc (Figure 12.14).

Figure 12.14 Exclusive relationships



In Figure 12.14, the diagram uses the exclusive arc notation to show that:

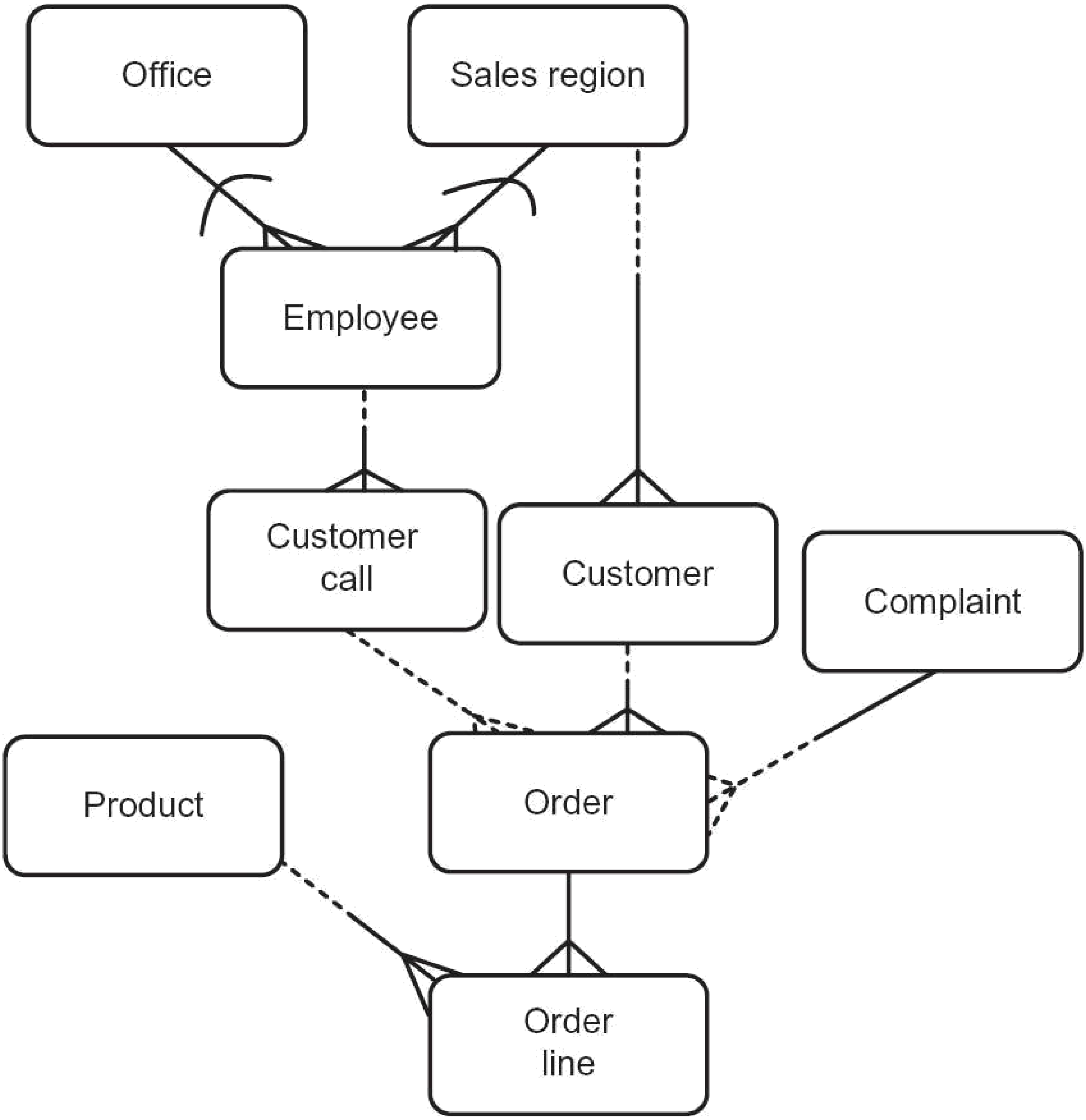
- each Employee must be allocated to one and only one Sales region *or* to one and only one Office;
- each Office is occupied by one or more Employees;
- each Sales region has one or more Employees.

The exclusive relationship may extend to more than two alternatives. For example, if the Employee could be allocated to a Sales region, Office or Data centre, there would be three entities related to Employee and the exclusive arc would extend across all three relationships.

Entity relationship diagram for the sales system

If we put these examples together we can build an entity relationship diagram (Figure 12.15) that reflects the data requirements for our system.

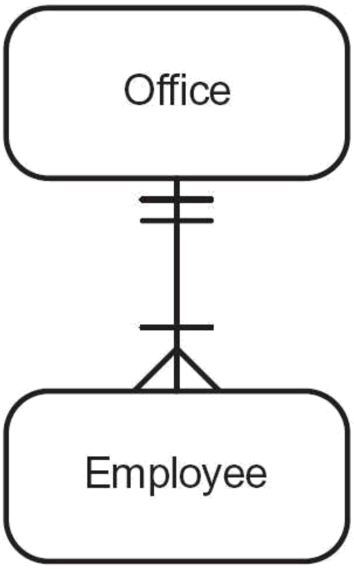
Figure 12.15 Entity relationship diagram for a sales system



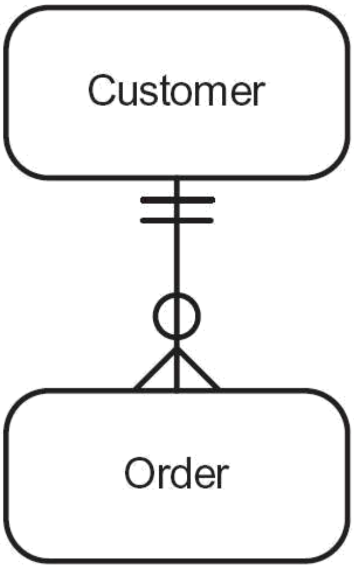
Alternative notation

There are many notations used when modelling data. Class modelling from the UML is such an alternative and is described below. A further alternative uses horizontal lines to indicate 'one' and circles to indicate optionality. Examples using this notation are shown in Figure 12.16.

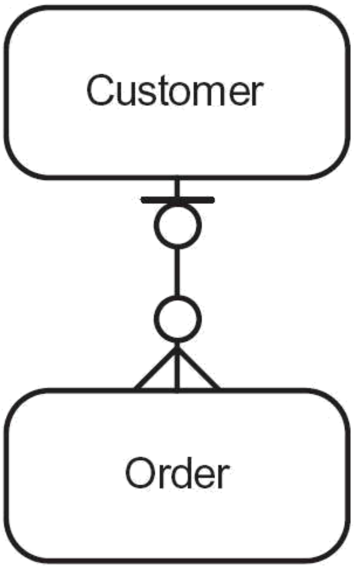
Figure 12.16 Alternative data modelling notation



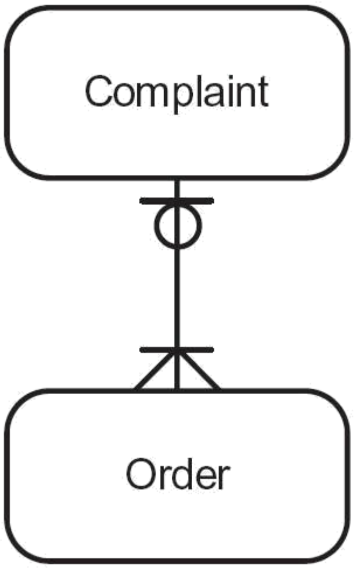
One-to-many relationship – fully mandatory



One-to-many relationship – optional child entities



One-to-many relationship – fully optional



One-to-many relationship – optional parent entities

CLASS MODELS

A class model shows graphically the *classes* in a system and their associations with each other. These models have similarities to entity relationship diagrams and apply many of the same principles. In a business system, a class model captures information about the particular things involved in the organisation's operations, for example projects, customers and team members for a project control system.

Objects

An object is something that we wish to hold data about because that data is needed within the system we are analysing. For example, an object might be Order number UK74563 and we may wish to hold the following information about this object:

Order number:	UK74563
Customer:	C66430
Date placed:	25 August
Date fulfilled:	1 September
Total value:	£147.50

Objects are sent messages that invoke them to respond in some way, typically by changing data. For example, a message might be sent to the object UK74563 to change the date the order was fulfilled.

Classes

To build a model of the system data we consider classes of objects rather than individual objects. We explained earlier the difference between entity types and entity occurrences. Similarly, in object class modelling, we have classes that provide the generic definition of the data items or *attributes*, and objects that are the instances of a particular class. Thus order UK74563 is an object of the class Order. The class Order Account has attributes such as orderNumber and totalValue and, as we saw above, the object UK74563 has values associated with these attributes. When we define a class we also include *operations* that the Order is subject to. These might include updateDateFulfilled and recordDatePlaced. All of the orders in the system will contain these attributes and be subject to the same operations. A class, therefore, is a template for its object instances in the same way that an entity type is the template for its entity occurrences. Every object is an instance of some class that defines the common set of features (attributes and operations) that are shared by all objects in that class.

In the UML, classes are represented by rectangular boxes with three sections. The name of the class is shown in the top part and is a noun. The first letter is capitalised, for example, Order, Customer and Complaint. If the name has more than one word then each word is joined and capitalised in the class name, for example, OrderLine.

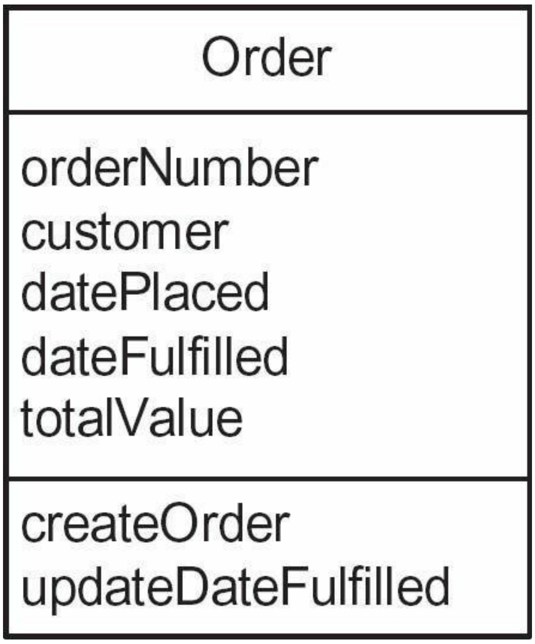
The attributes – the individual items of data about the class – are stored in the middle section. The attribute names are usually shown in lower case with constituent parts shown with a capital letter. The first letter of the attribute name is not capitalised, for example, orderNumber, customer and datePlaced.

Operations are stored in the bottom part of the class and are invoked by messages being sent to the class by other classes. It is usual to name the operation in the class with the same name as the message. The detailed content of the operation – what the class will do when that operation is invoked – will be defined in the *method* associated with the operation; this is usually left to the later stages of the development process.

Attributes held within a class are only accessible to the operations of that class as they are hidden from all other classes in the system. This is known as encapsulation and is an important principle of the object-oriented approach. Any other part of the system that needs to access or modify the data of that class has no need to understand how it is structured. It just sends a message and the receiving class responds appropriately.

For example, in Figure 12.17 the object class Order has the operation updateDateFulfilled which may take place when all of the goods have been despatched to the customer. To enable this to take place a message is sent to the object Order to updateDateFulfilled and the parameters of orderNumber, newDateFulfilled are also sent to indicate the order in question and the new date fulfilled. In the class Order, we have defined an operation also called updateDateFulfilled to respond to the message of the same name. This operation has been specified as ‘replace dateFulfilled with new dateFulfilled’ which uses the value passed in the message to update the date on the appropriate order.

Figure 12.17 Definition of the class ‘Order’



Associations

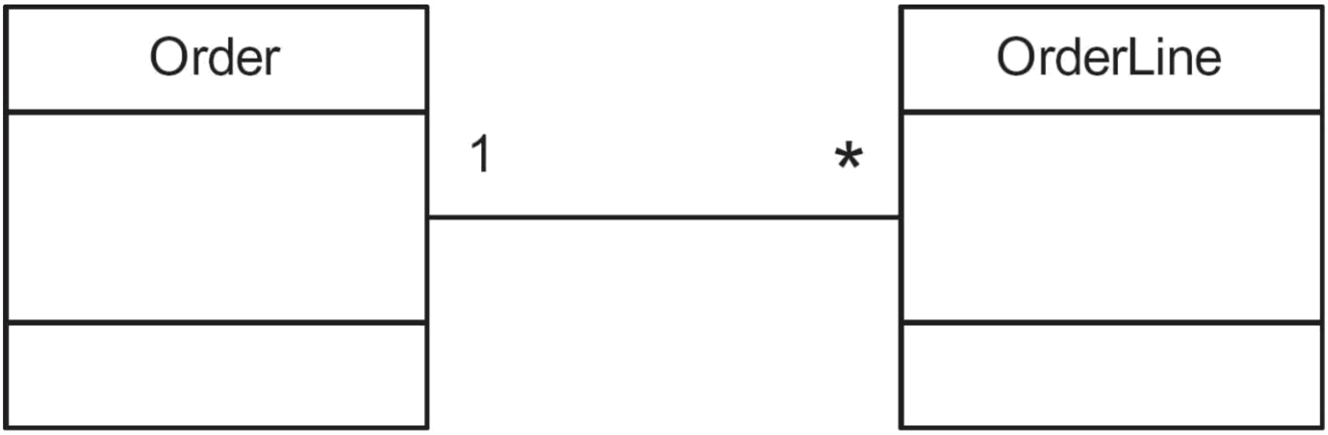
As in entity relationship modelling, we now need to establish how different classes are linked to each other and the nature of these connections. We call the connections between classes *'associations'*. For instance, an Order class must have an association with an OrderLine class so that the system will be able to identify the items on the order. Figure 12.18 shows this association.

Figure 12.18 Association between two classes

We have already said that classes interact and this is done by the messages moving along the association lines defined in the class model. If there is no association between classes, then they cannot communicate directly.

The class model reflects the business rules that will govern the classes and the operations performed upon them. Multiplicity is used to show the business rules for an association between classes. For example, the multiplicity of the association shown in Figure 12.19 indicates that an Order may include many Order lines but an individual Order line project may only be part of one Order.

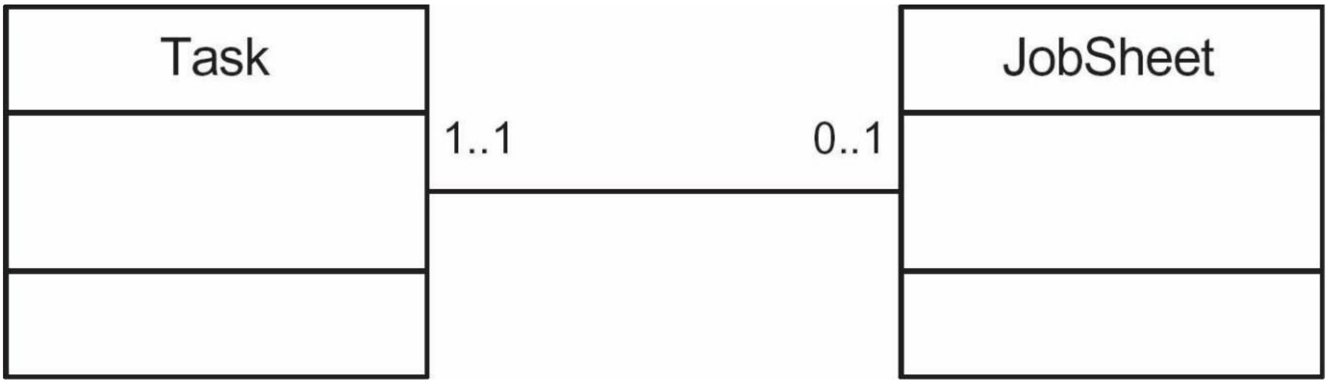
Figure 12.19 Association showing one-to-many multiplicity



The multiplicity entries can be extended to show the minimum and maximum values in the association. This is shown using two dots between the minimum and maximum values. For example the asterisk in the example in Figure 12.19 is a simplification of the range 0..* and the ‘1’ is a simplification of 1..1.

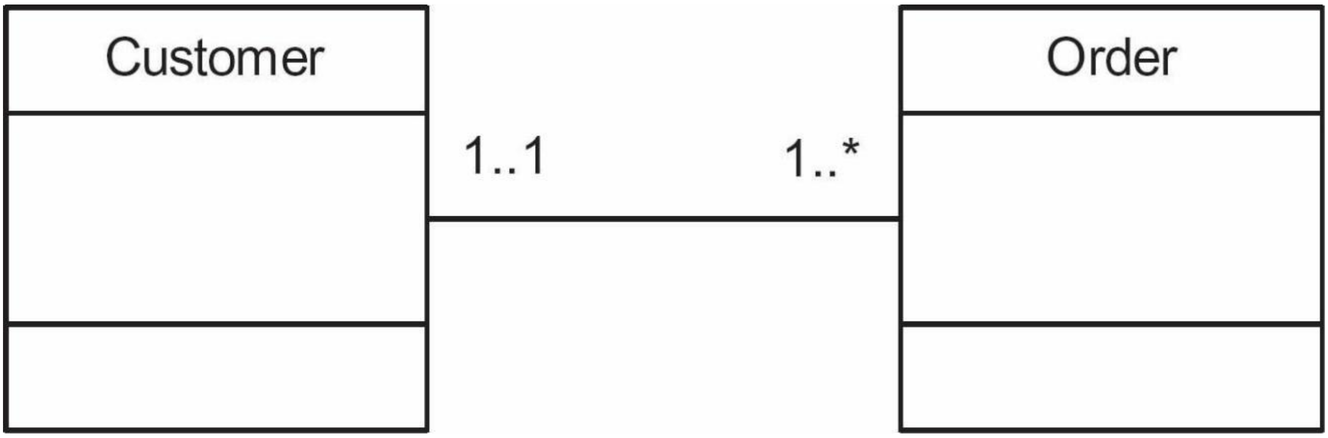
The JobSheet to Task association shown in Figure 12.20 shows that an instance of Task has an optional association with JobSheet. In addition, this shows that, although there may be no JobSheets associated with a Task, there is also a maximum of one JobSheet for a given Task.

Figure 12.20 Association showing optional multiplicity



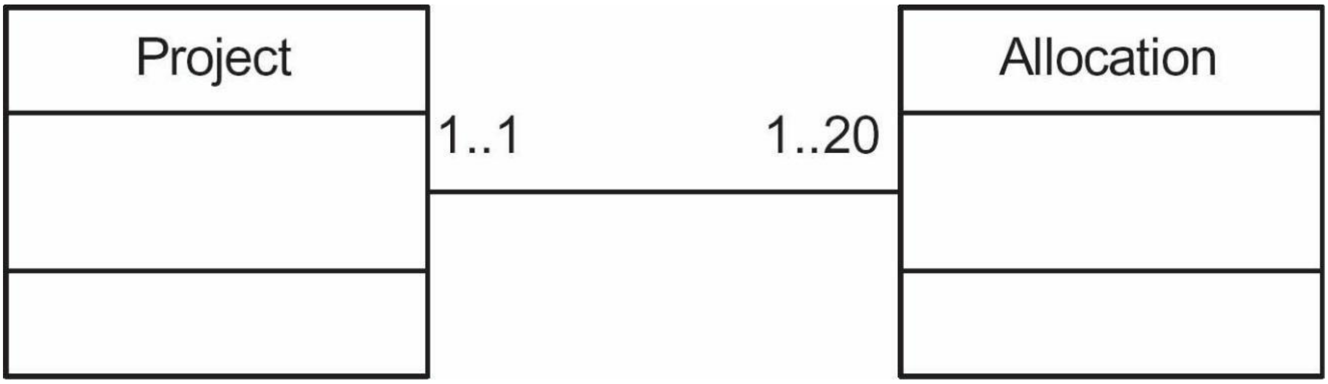
In the example in Figure 12.21, the class Customer has a mandatory association with Order. There must be at least one instance of Order for each instance of Customer (though the asterisk indicates there is no upper limit). An Order is for only one Customer. (This shows, by the way, how associations are manifestations of business rules, in this case that in this organisation a customer is defined as someone who has placed at least one order with us.)

Figure 12.21 Association showing mandatory one-to-many multiplicity



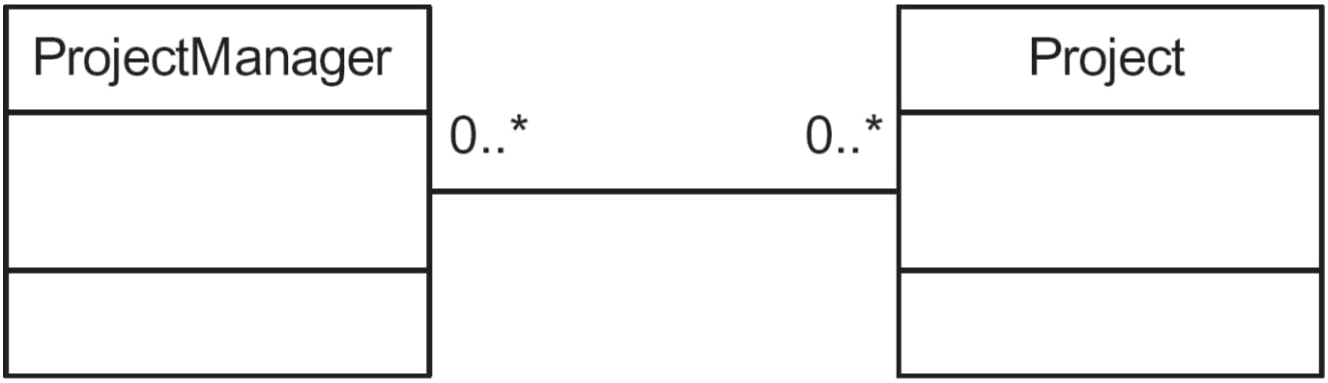
In some circumstances the actual minimum and maximum values may be defined. For example, if we assume there is a business rule that no more than 20 people can be allocated to a project this would be modelled as shown in Figure 12.22.

Figure 12.22 Association showing defined range of multiplicity



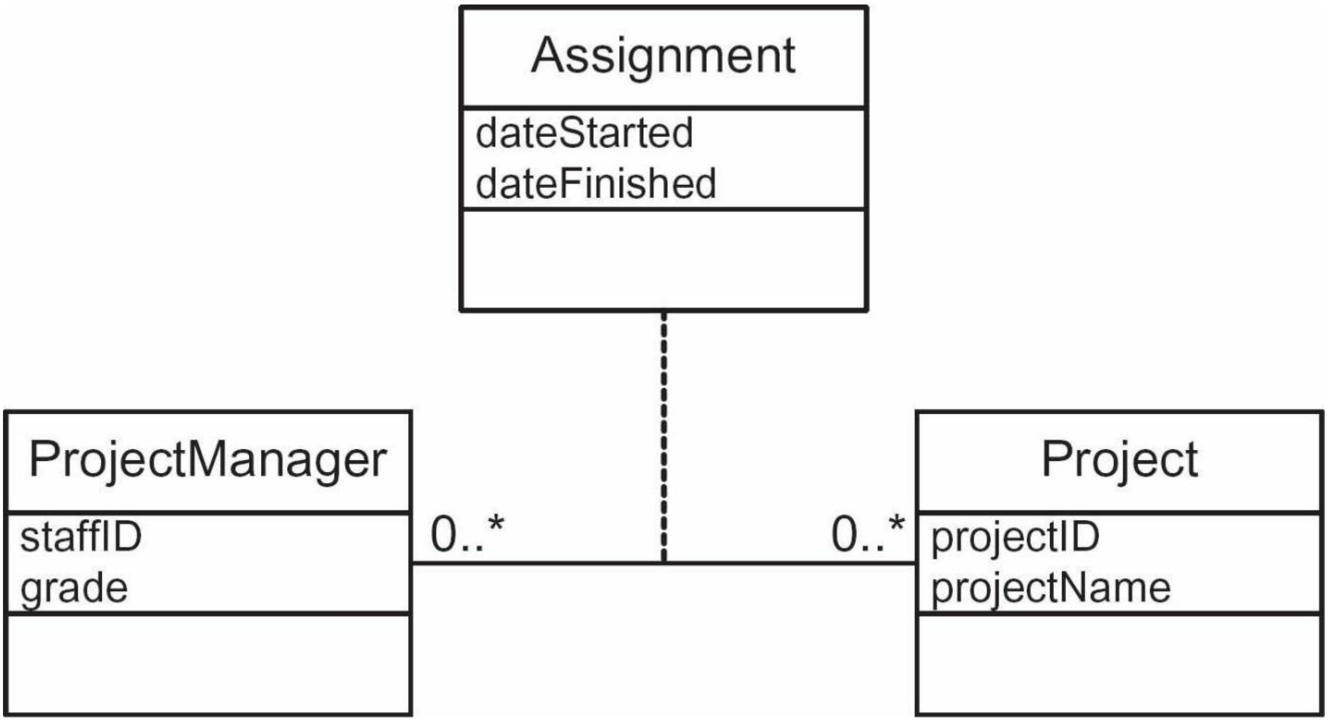
The class model supports associations where the multiplicity is many to many. For example, Figure 12.23 shows that a Project may have many ProjectManagers and each ProjectManager may control many Projects. Should this happen, it is likely that this would occur over a period of time. The zeroes on this diagram indicate that a ProjectManager may be newly appointed and thus not yet have been allocated a Project; and that a Project may be set up without knowing the name of the ProjectManager.

Figure 12.23 Association with many:many multiplicity



In some circumstances, the association between the classes also holds information. If we consider the example in Figure 12.23, we would probably want to know which ProjectManager was in charge of a project during a particular period. To do this we create an *association class* called Assignment to hold the start and end date for each ProjectManager. Figure 12.24 shows this additional class.

Figure 12.24 An association class



In this example, there is only one instance of the class Assignment for each combination of Project and ProjectManager. If there were more than one – for example, if a ProjectManager could be reassigned to a Project they had previously left – then it would be necessary to convert this association class into a class in its own right.

Generalisation and inheritance

Sometimes, as we get further into the analysis, we discover that there are different sub-categories for a class. For instance, a general and a private are both soldiers but while some of the information that we would like to hold about them is the same, other information may differ greatly. UML handles this situaton through a concept known as generalisation and this is illustrated in Figure 12.25.

Figure 12.25 Generalisation structure

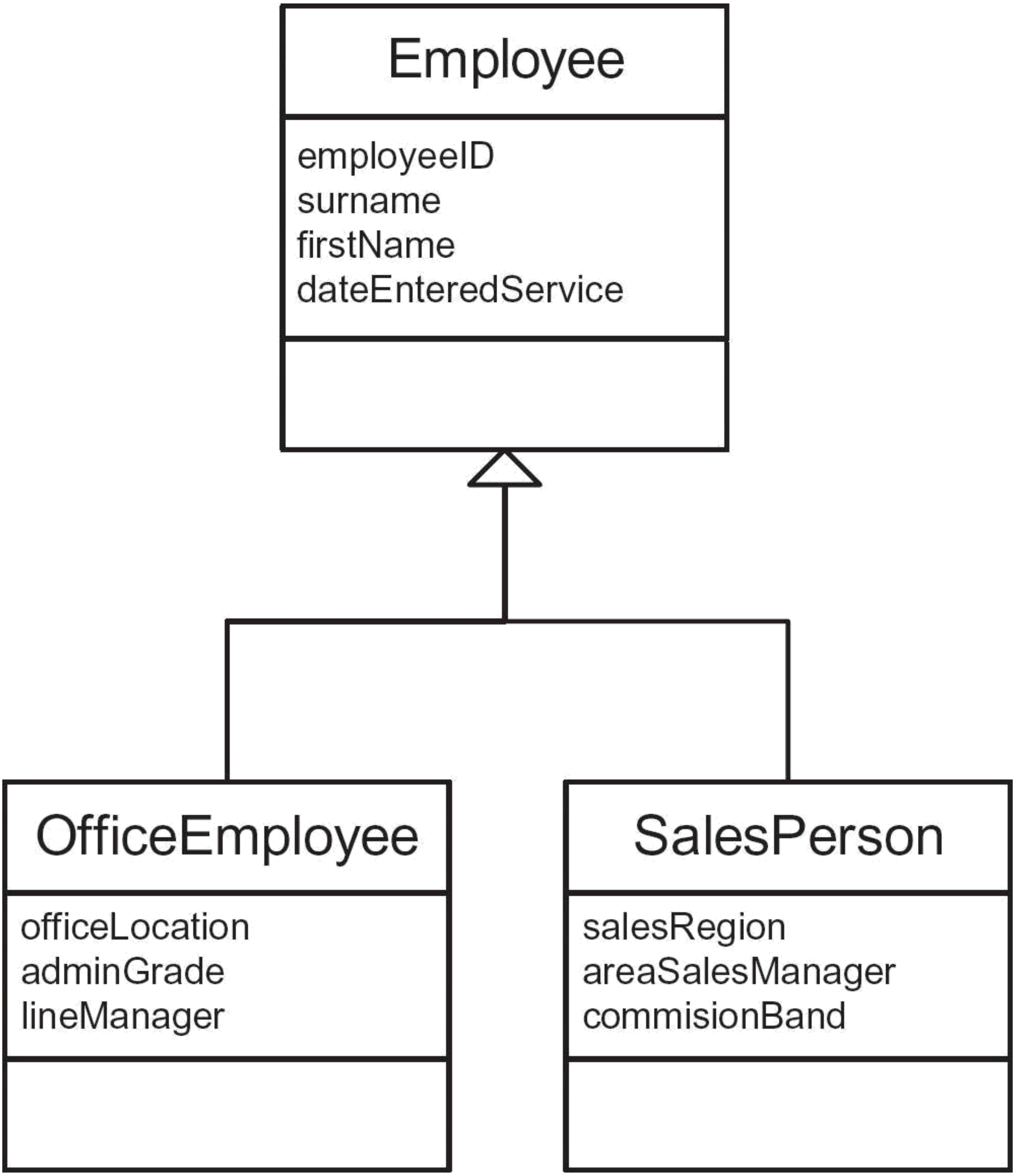


Figure 12.25 shows that some attributes are shared by all employees, whether they are office-based or work in sales. So, these are shown in the general class called Employee. However, other details are very different for office employees and sales employees so different atributes are held for them. The upward-facing arrow indicates that these two sub-classes inherit the attributes of the generalised class.

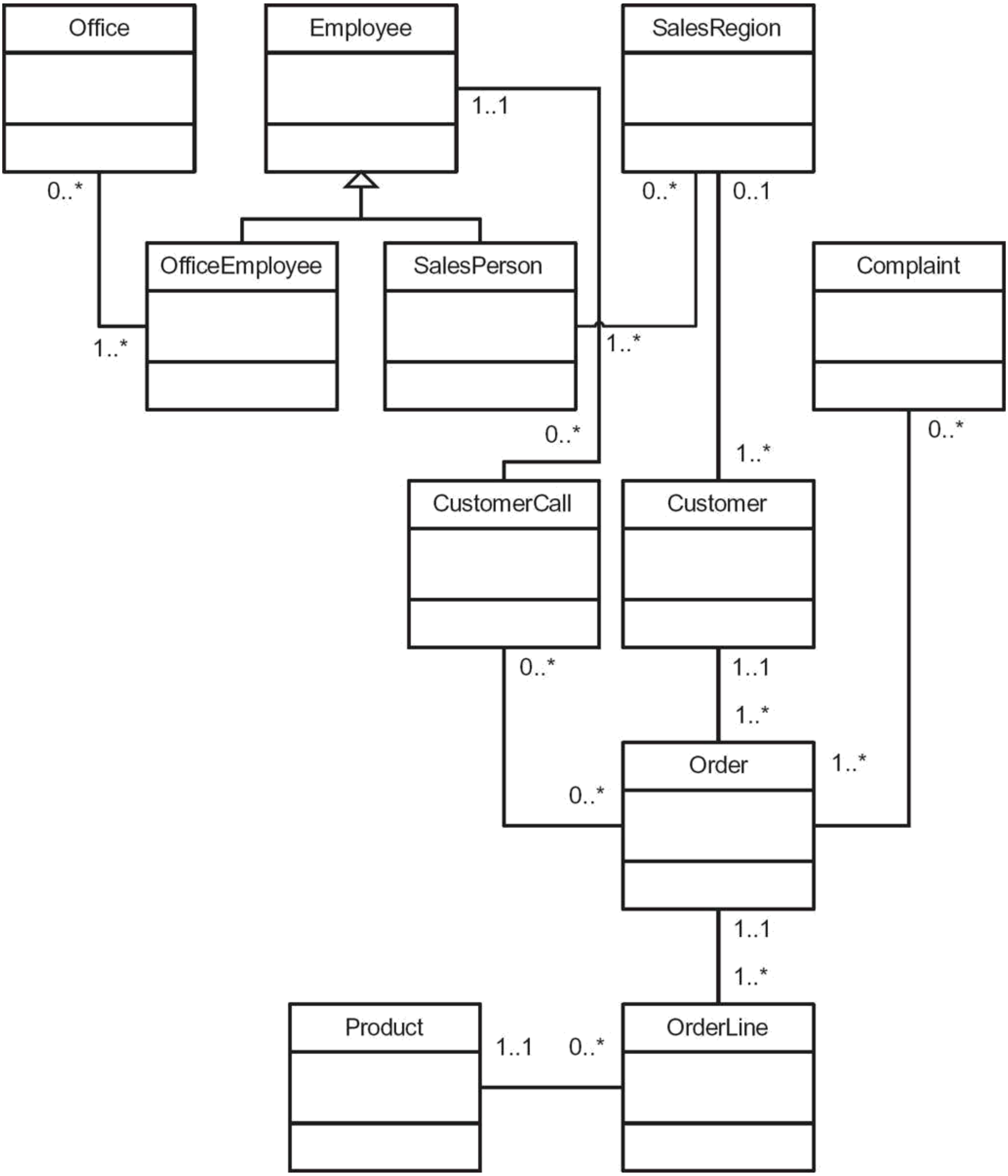
When we come to identify associations with other classes, we may find that some are with the generalisation class and some are only with one or either of the sub-classes. This is illustrated in Figure 12.26.

Class model for the sales system

By way of comparing the two different approaches, Figure 12.26 is the sales system shown as a UML class model that was previously modelled as an entity relationship diagram in Figure 12.15.

The UML notation does not cover the ‘exclusive relationship’ between employee and office or region shown in Figure 12.15 and so, in Figure 12.26, this is addressed in a different way. CustomerCall is associated with the generalised class Employee and then a specific type of employee, OfficeEmployee, is associated with Office. Similarly, SalesPerson is associated with SalesRegion. This shows how a particular issue can be tackled in different ways depending on the method or notation that is being used.

Figure 12.26 Class model for a sales system



MODELLING IN AGILE APPROACHES

It is sometimes thought that models are not used in projects that follow the Agile approach because, in these projects, there is not the need to fully define the system 'up front'. Indeed, the Agile Manifesto stated that working software is valued over comprehensive documentation.

However, the Manifesto does not say that there is *no* value in documentation, only that working software is *more* valuable. It is our view that, even in an Agile project, models can be useful to help the user community understand the scope and scale of the proposed system before detailed development commences. In addition, once the system is delivered, there is the question of ongoing maintenance to consider and models can be invaluable to the maintenance team, as described in the next section.

THE USE OF MODELS IN SYSTEM MAINTENANCE

It is a fact that, if the lifetime cost of an IT system is considered, by far the bulk of the expenditure – 70 per cent according to some authorities – is incurred after the system has been implemented. This is because errors are discovered in the software that have to be fixed and, of course, the users require changes to the system to meet their changing business needs.

A common problem that faces support and maintenance teams – which often consist of different people and sometimes even different firms than originally built the system – is understanding the overall scope of a system and how it all fits together. In addition, although inspection of the code can usually reveal *how* a system works, the business reasons for it being built that way are often lost in the mists of time.

It is here that models can prove invaluable, whether the system was created using Agile or more conventional development methods. Use case diagrams can help the support staff to understand the overall shape of the system and data models, either ERDs or class models, capture the business rules that control the creation, manipulation and deletion of data.

SUMMARY

This chapter has provided an introduction to some of the key techniques used to model system requirements. The benefit of using models is that they provide an unambiguous view of the system, albeit from one specific perspective. Another benefit is that these views may be compared and cross-checked. So we might develop a use case diagram and cross-check it against a model of the data in order to identify any gaps such as missing data items or use cases. The models also help to generate further questions and improve our understanding of the business requirements and the business rules to be implemented in the system.

FURTHER READING

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Wesley, Upper Saddle River, NJ.

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13 DELIVERING THE REQUIREMENTS

Debra Paul and James Cadle

INTRODUCTION

Once the requirements have been defined, attention shifts to considering how they will be delivered. The business analysis work could provide the basis for a large scale, broad scope business change programme or could be much more focused on a particular area. As a result, delivering the requirements could include some or all of:

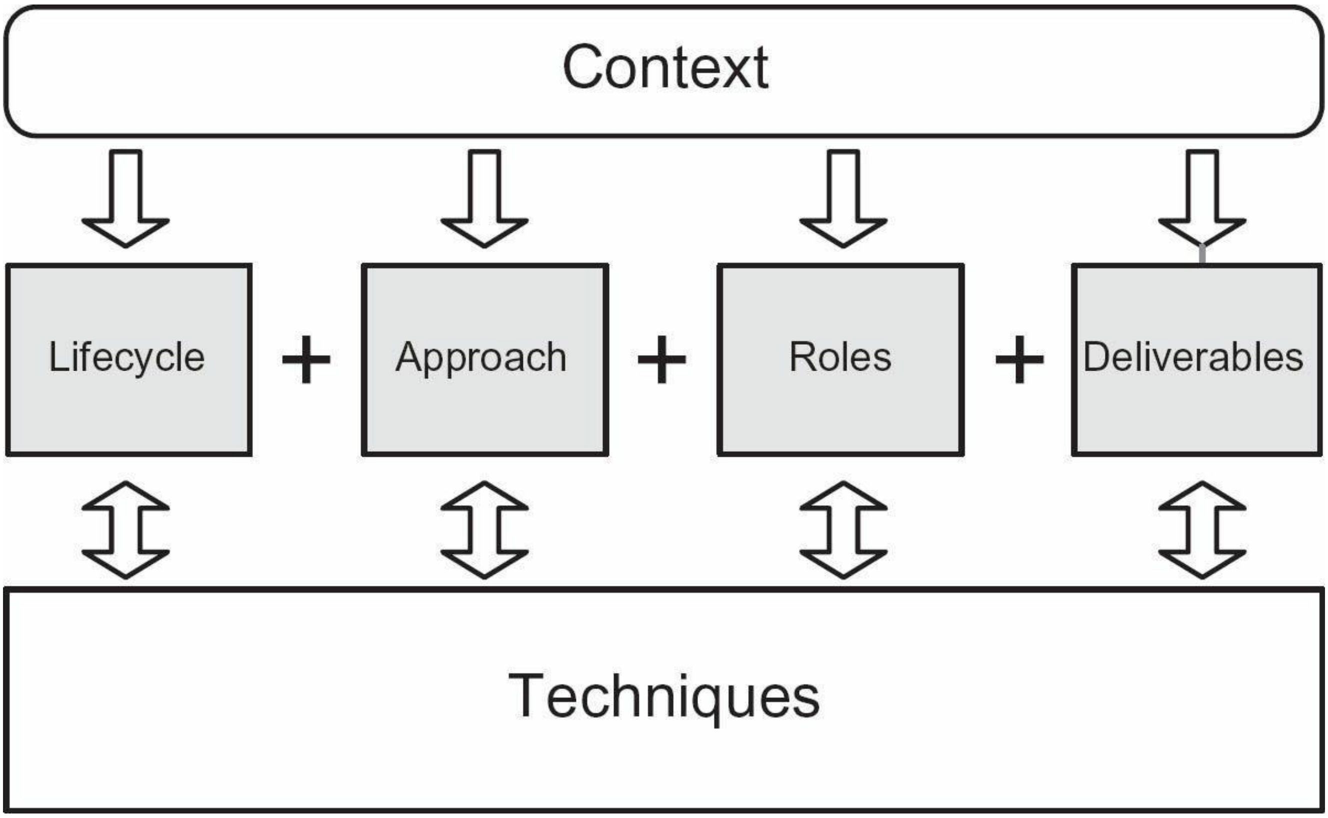
- **Business process changes:** the business processes may be altered to be simpler, faster, more accurate or more effective.
- **People changes:** the jobs of the people involved may be redefined and new tasks and skills added. In turn, this gives rise to further requirements for training, coaching or mentoring, and to changes in the way people are recruited and appraised.
- **Changes to organisational structure:** often, posts disappear, new ones are created and sections or departments are merged or split. Sometimes, introducing a new structure (projects, for example) is seen as key to the business improvements sought.
- **Changes to the IT systems:** the software that supports the business processes may need to be enhanced or replaced in order to provide the features and information used by the organisation.

These elements must not be considered in isolation and it is important that the business analyst keeps their interdependence in mind. A holistic approach to the delivery of the requirements is essential for the successful delivery of the changes to the business.

DELIVERING THE SOLUTION

There are several lifecycles, methods and standards that may be used when developing solutions to meet the requirements. In deciding how to deliver the requirements it is important to consider a number of factors and these are summarised in Figure 13.1.

Figure 13.1 Factors in deciding the delivery approach



The elements are concerned with the following areas:

- **Context:** the nature of the organisation and project that will provide the basis for deciding how the solution will be delivered.
- **Lifecycle:** the process adopted for developing and implementing the solution.
- **Approach:** the methods and standards that are used during the lifecycle.
- **Roles:** the key roles to be filled during the project.
- **Deliverables:** the products to be delivered by the project team.
- **Techniques:** the management and development techniques used to plan, analyse and document the project work.

These areas are described in further detail in the following sections.

CONTEXT

The context for the organisation and the project will provide the basis for deciding how any business changes are to be delivered. Organisations are subject to external pressures from customers, competitors and other business demands and these usually determine the need for change and the constraints within which those changes need to be met. For example, if an organisation works in a safety-critical or highly regulated environment it may be essential for the entire set of change requirements to be defined in great detail and implemented in one group. Alternatively, if an organisation operates in a highly competitive business environment then it is likely that a rapid response to change will be required.

The key factors to take into account are as follows:

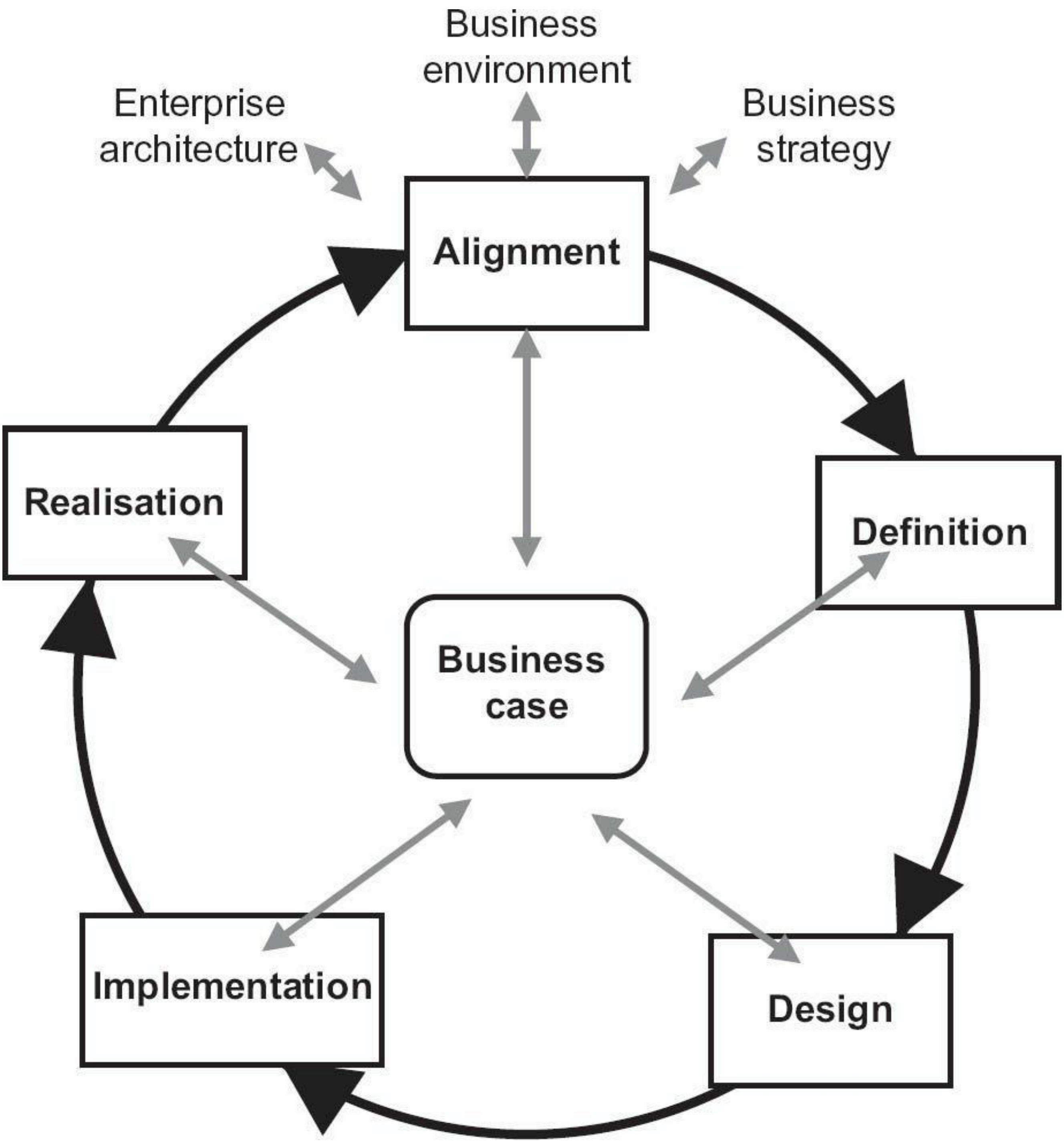
- **The culture and underlying philosophy of the organisation:** here, we can consider questions such as what type of organisation is this, what is the nature of the business domain within which it operates, what are the values and beliefs of the senior managers?
- **The business context for the proposed changes:** for example, what is the organisation hoping to achieve in terms of business benefit as a result of this project?
- **Any constraints that impinge upon the project:** for example, what is the timescale for delivering the solution, what is the budget, what resources are to be made available, what standards does the organisation use?
- **The prioritised needs of the business:** for example, improved public image may be more important than cost savings or alternatively, reducing costs may be the top priority.
- **The drivers for the project:** for example, is this project based upon a need to comply with new legislation or is it concerned to offer additional or enhanced services to customers?

The context will vary from project to project or across change programmes. Whichever is the case, it is important that this is understood in order to determine that we adopt the most appropriate approach to deliver the requirements.

LIFECYCLE

The business change lifecycle defined in Chapter 1 and reproduced in Figure 13.2, shows in overview the sequence of stages to be carried out when analysing, developing and delivering business changes.

Figure 13.2 The business change lifecycle



However, while this lifecycle shows in overview the areas of business change activity needed, it does not indicate *how* the solution is developed and delivered. There has been a great deal of effort devoted to defining lifecycles for IT systems development and it is important to understand the nature of these lifecycles as they provide a clear basis for the project work. Although they focus on software development, it is important to align this work with the broader business changes, such as the definition of new processes and revised job roles. The systems development lifecycles are described below.

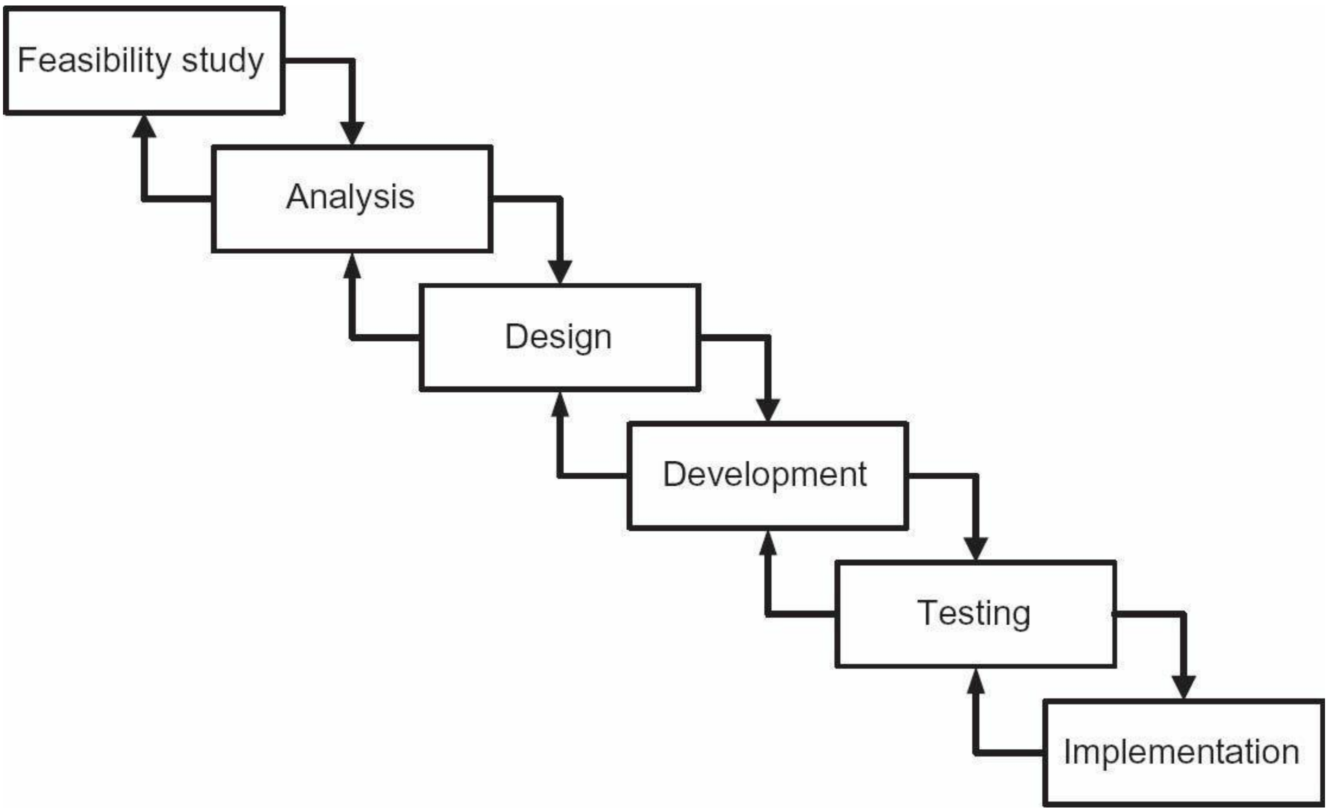
The concept of a systems development lifecycle

The development approaches to IT systems are known as systems development lifecycles (SDLCs). These approaches have evolved over many years and are based upon underpinning philosophies that determine the route taken from analysis through to deployment of the system solutions.

A systems development lifecycle sets out the stages, and their sequence, that are undertaken in the process to develop and implement an IT system. The lifecycle covers the entire life of a system from feasibility study to operation. There are two main philosophies that underpin systems development lifecycles: the linear approach, whereby steps are carried out in sequence and are completed before moving on; and the evolutionary approach, whereby the solution to be delivered emerges during iterative periods of software development based upon the use of prototyping and multi-disciplinary teams.

The earliest established model of a linear SDLC is the waterfall lifecycle but, over the years, variants and alternatives have been devised and each has advantages and disadvantages.

Figure 13.3 The waterfall lifecycle



The waterfall lifecycle

The waterfall lifecycle, illustrated in Figure 13.3, shows the development proceeding through a series of sequential stages. In theory, each is reviewed and signed off before the next starts. Thus, we should only begin analysis once a feasibility study has been approved, and design should be based on an agreed set of requirements from the analysis. The backwards-facing arrows in the lifecycle indicate the need to check back at each stage to ensure that the project has not expanded its defined scope, that the present stage builds logically on its predecessor and that modifications to the deliverables from the previous stage may be made where required.

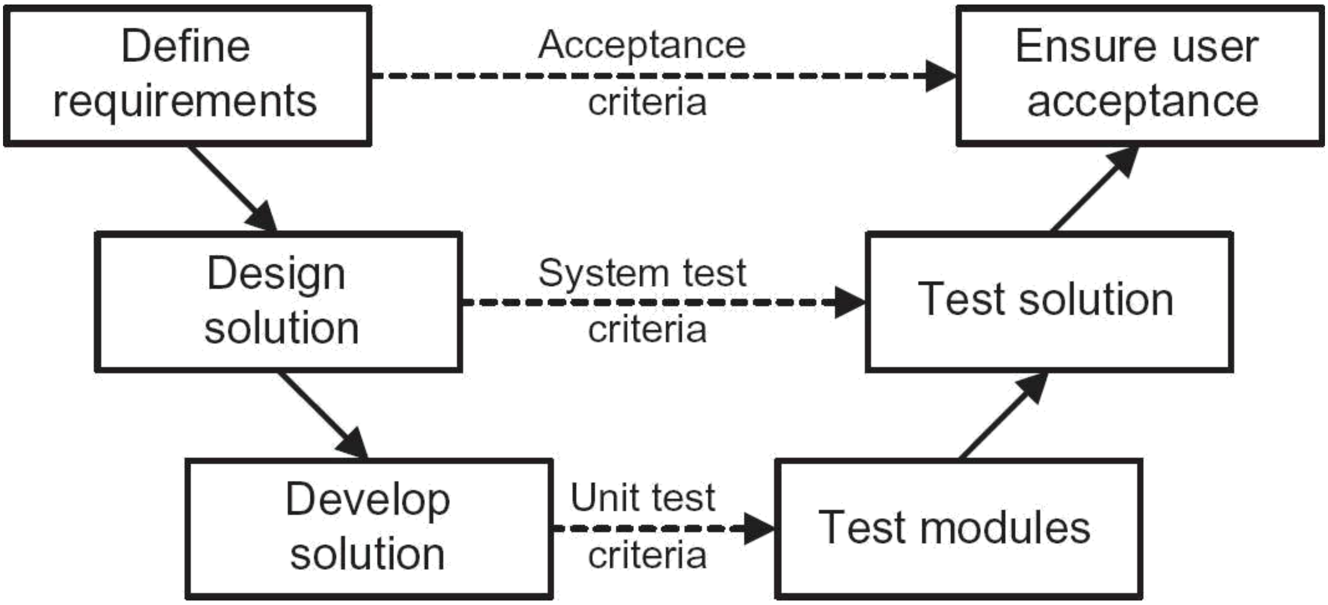
BAs would typically be involved in the feasibility study and analysis stages of the project. They would also probably assist in the user acceptance that forms part of the testing stage and help the business users during implementation. During design and development, BAs would be available to answer queries about the business and solution requirements raised by the development team.

The principal benefit of the waterfall lifecycle is that it provides good control from a project management perspective. In addition, the requirement to sign off each stage before the next one starts should lead to a high-quality system. However, the highly structured nature of this lifecycle is also its weakness as it can lead to a long-drawn-out development that can leave the business in limbo. In addition, it does not handle change particularly well since a whole sequence of deliverables may require adjustments to adapt to the change; for example, a change that occurs during development would require adjustments to the analysis and design documentation and possibly to the feasibility study as well.

The ‘V’ model

The ‘V’ model, shown in Figure 13.4, is a variant of the waterfall model and consists of similar stages and sequence of the work.

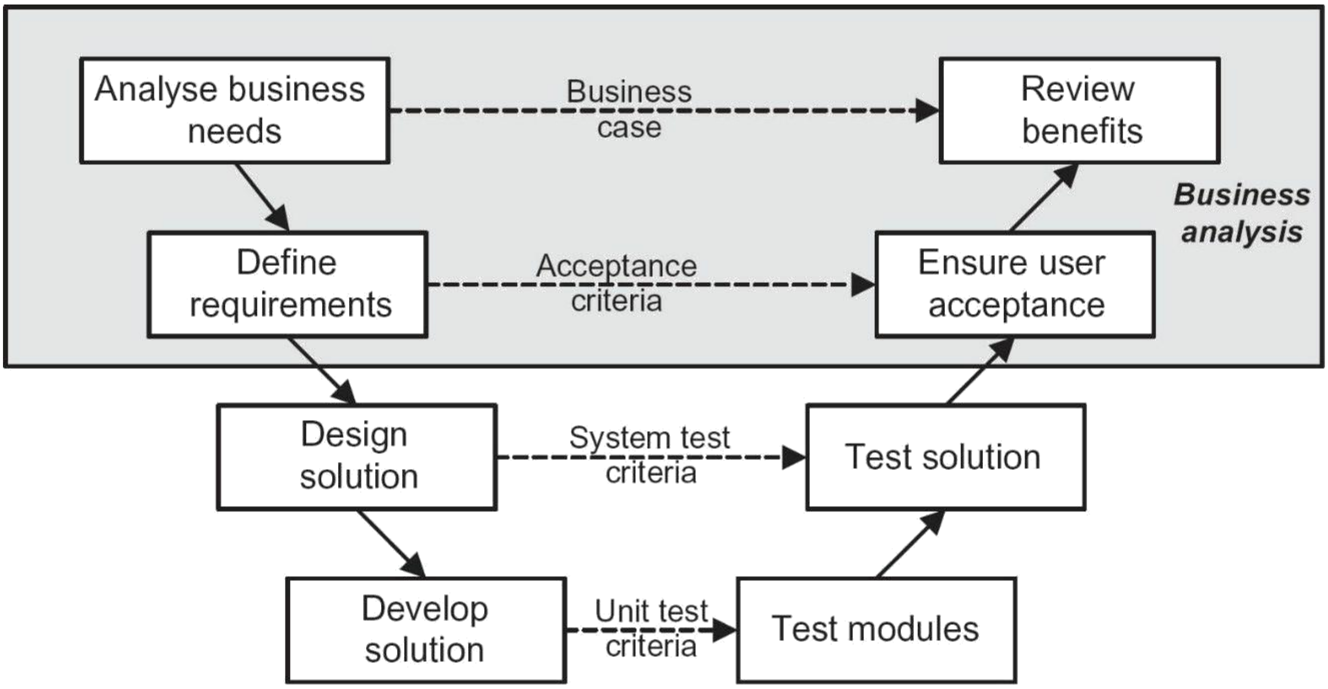
Figure 13.4 The ‘V’ model



While the ‘V’ model is based upon the same principles as the waterfall lifecycle, in effect the waterfall has been bent back on itself following the development activity. This adds another dimension, showing explicitly the connection between the earlier – developmental –stages of the project and the later – testing – stages. In particular, the derivation and usage of the test criteria is made explicit at each stages, for example, showing how the acceptance criteria should be defined as part of the requirements documentation and used during user acceptance testing.

An extended ‘V’ model has been developed to show the context and nature of business analysis work. This model is shown in Figure 13.5.

Figure 13.5 Extended ‘V’ model



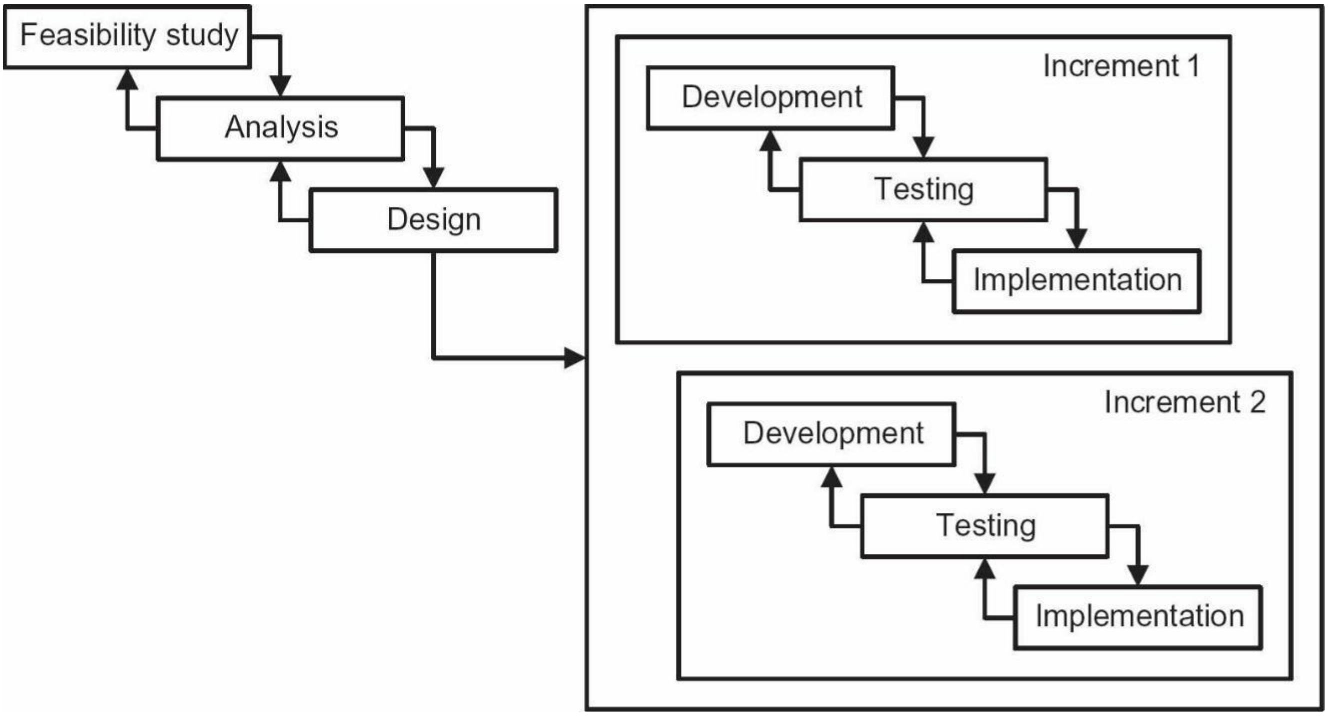
In this model, the initial work concerns an analysis of the business needs and the development of the business case that justifies the recommended solution. This solution sets out the scope of the business change work to be explored further in the requirements definition stage. Again the corresponding leg of the 'V' model shows how the deliverables from the initial stages are used in testing the solution. The business case is used during the benefits review to test the success of the recommended solution by reviewing the predicted business benefits against those delivered by the new business system. The aim is to confirm that the benefits have been achieved, or 'realised', and to identify further actions if this has not yet happened. This model is also used to show the range of business analysis work in the light of an IT solution lifecycle. As can be seen in Figure 13.5, the business analyst is involved at the outset in assessing the business needs and defining the requirements. The later activities of ensuring user acceptance and reviewing the benefits also form part of the business analyst role. Business analysis is not shown within the other stages of the lifecycle as they focus on the design, development and testing of the IT element of the solution. The design, development and testing stages are primarily the remit of technical architects, developers and software testers. However, the business analyst should still be involved during these stages for the following reasons:

- to ensure that the business needs continue to be met;
- to develop the process and job role definitions that will be implemented alongside the IT solution;
- to assess the impact of proposed changes.

Incremental delivery

When analysing the requirements for the business change solution, some requirements will be more important, or more urgent, than others. For example, a regulatory deadline or an expected move by a competitor may make it imperative to implement some requirements quickly whereas others may be less urgent and can be delivered at a later point. One way of achieving this is to develop and deliver the solution in a series of increments. The incremental delivery lifecycle is illustrated in Figure 13.6 and shows the analysis and design for the solution being completed initially. This is then followed by two incremental delivery phases, each consisting of development, testing and implementation. The most pressing requirements are in increment 1 and the rest follow in increment 2.

Figure 13.6 Incremental lifecycle



Something to be remembered if using the incremental lifecycle is that the total cost of delivering the solution is likely to be higher than delivering the solution in one release. This is because of the need to ensure that each increment will not compromise the system when it is implemented. Also, in the second and subsequent increments, it will be necessary to carry out a specific form of testing known as regression testing, to make sure that the additional features do not cause something already implemented to stop working. What is more, the high-level analysis and design for the solution needs to be defined in order to future-proof the design for the later increments. If this is not done, aspects of the solution may be discovered during later increments that will necessitate changes to parts of the system already implemented. This lifecycle shows both incremental development and delivery while utilising the structure of sequential stages defined in the waterfall lifecycle. The need for a complete set of requirements and an overall design is one of the fundamental differences between the incremental lifecycle, described here, and the iterative approach which is described next.

Iterative systems development

A feature common to the waterfall, 'V' and incremental models is that a complete set of requirements is gathered at the start of the project and these form the basis for all subsequent work. An alternative approach is sometimes represented by a spiral model which was originally devised by Barry Boehm in his article: 'A spiral model of software development and enhancement' (Boehm 1986). Boehm's original perception of the spiral model incorporated the concept of iterations (or 'rounds' as Boehm called them) and used prototyping to reduce risk when developing software for complex situations. This developed into the basis for early Agile approaches such as Rapid Application Development. With the advent of Agile methods such as DSDM and Scrum, iterative development has increasingly used prototyping and related techniques in order to evolve the detailed requirements and the corresponding software features.

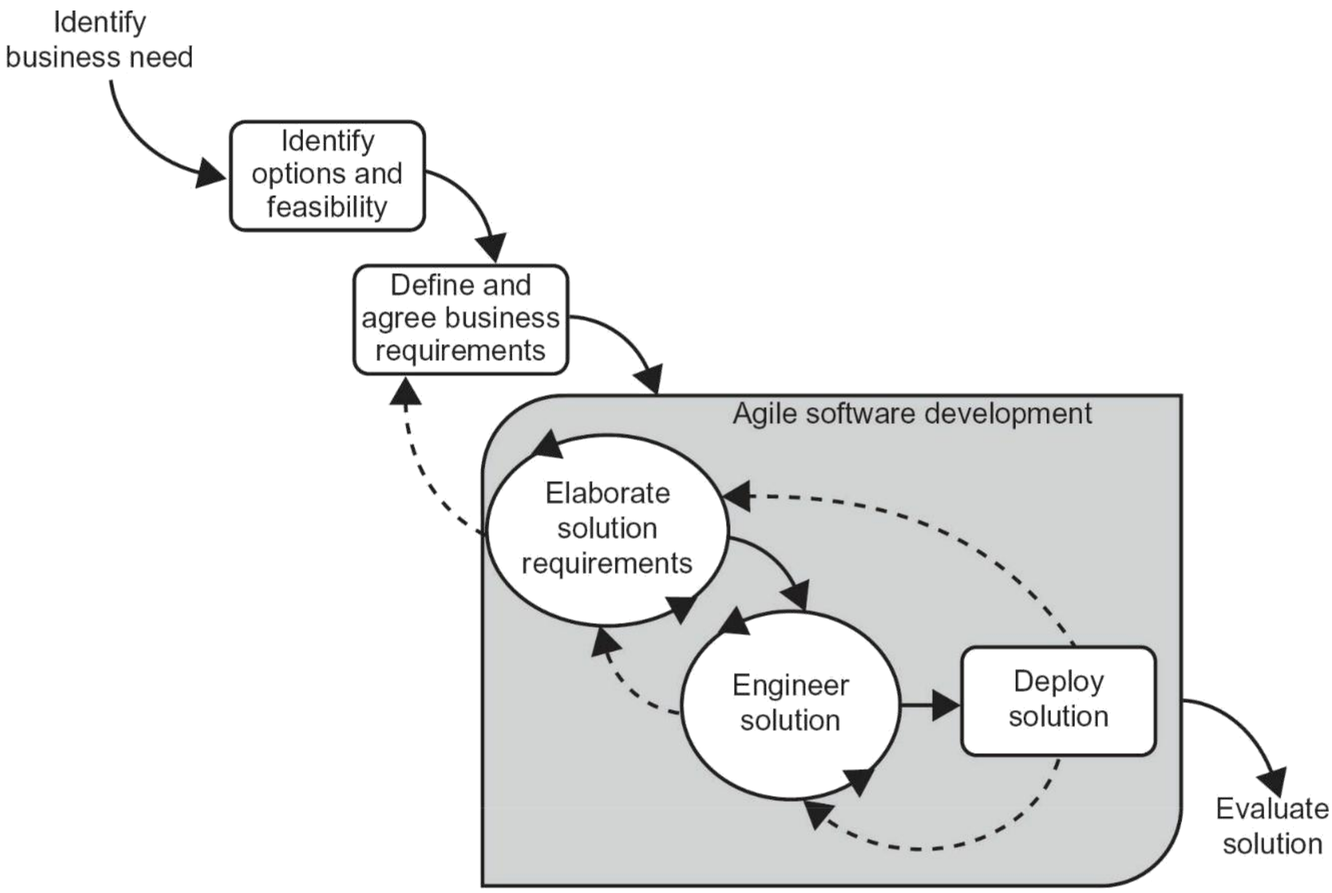
The iterative development approach is founded upon some fundamental generic principles:

- **Evolutionary** – Detailed requirements are evolved through a series of iterative prototyping development stages.
- **Empowerment and collaboration** – It is a fundamental requirement that the team, including business staff and IT developers, are empowered to make decisions during the software development and work as a collaborative team.
- **Fitness for purpose** – The deliverables are required to be fit for purpose rather than aligned slavishly with a set of defined requirements.
- **Testing all the time** – Testing is an integral part of the iterative development approach so the software should be tested continuously. Automated testing tools are very useful in doing this.
- **Re-factoring** – Iterative development adopts an exploratory approach so any work may be reversed if it does not add value. This is not perceived as being a mistake or waste of time but instead as an integral part of the iterative process.

- **Incremental delivery** – The system is likely to be deployed in increments, with each subsequent increment providing additional functionality or improved performance.
- **Prioritisation** – An approach such as MoSCoW (see Chapter 11) is used to identify the different levels of priority amongst the features to be delivered.
- **Timeboxing** – The concept of a 'timebox' whereby time limit is set, at the outset, for the development of part of the system. Prioritisation is used to provide some contingency in the timebox, for example by including features of a lower priority that may be deferred or dropped if time does not allow.

A generic Agile model which encompasses the key principles of the iterative software development is shown in Figure 13.7.

Figure 13.7 Generic Agile model



The model begins with the identification of a business need; typically it will be the work of the business analyst to uncover the needs to be met. This initiates the generic Agile process depicted in Figure 13.7. The stages of this model are described next.

Identify options and feasibility

A feasibility study is conducted to determine the options that the business might pursue in order to address the business need. This will set out the options available in particular the costs, benefits, impacts and risks of each alternative option, and possibly a preferred option.

Define and agree business requirements

Once a preferred option has been selected, the high-level business requirements need to be defined, from which more detailed solution requirements can be derived. This stage identifies the scope for the systems development project by defining a set of high-level features to be delivered by the solution. These high-level requirements are also prioritised during this stage.

Elaborate solution requirements

The high-level business requirements are explored and elaborated into more detailed requirements for the solution, using techniques such as storyboards, wire frames and prototyping. An iterative approach is adopted in order to develop a final, operational prototype. This confirms the functional requirements to be built and deployed in the current release.

As Agile development projects typically deliver functionality incrementally, this stage and the following two stages (engineer solution and deploy solution) will be repeated for each incremental solution delivery.

Engineer solution

Once the functionality for the current delivery has been agreed, a production-ready solution is built that can be deployed into the live environment. This stage will addresses the non-functional requirements and technical infrastructure required to turn the operational prototype into a fully-fledged, working solution.

Deploy solution

The tasks necessary to deploy the working solution into the live operational environment are conducted, including data take-on, data conversion, preparation of documentation, end-user training, installation of the live environment and transition to the service delivery team.

Evaluate solution

Once the solution is 'live', typically some period of time after it has been deployed, an evaluation of the solution is undertaken to determine whether it has met the business objectives and is working satisfactorily. This review may lead to perfective maintenance to improve aspects such as performance and usability. Once the final version is deployed, a benefits review will be conducted to examine whether or not the benefits have been realised and, if not, identify any further actions required to enable their realisation.

The arrows in Figure 13.7 show the overall sequence. The dotted arrows show optional revisiting of previous stages.

Advantages and disadvantages of the lifecycles

The waterfall, 'V' model and incremental lifecycles incorporate a high level of control which offers many advantages. However, in practice there are some real difficulties in the way:

- There may not be time to define all the requirements at the outset and only the most important or urgent ones can be defined in the time available.
- It is unlikely that the business actors will know exactly what they want, particularly if they are moving into new and uncharted areas of business.

Even if they are reasonably knowledgeable about the requirements, it is likely that there will be areas where they are less certain. These areas could concern the exact details for some requirements or non-functional aspects.

- It is important to establish some of the business changes quickly in order to demonstrate capability and achievement, and keep the support of the key stakeholders.
- The pace of business change is so rapid these days that a completely defined set of requirements can become out-of-date very quickly.

The most flexible delivery approach is achieved by utilising iterative development with incremental delivery together, in a co-ordinated and controlled way. This is the approach adopted during Agile software development, for example, using methods such as Scrum or DSDM which are described later in the chapter.

Developing the business solution

While the lifecycles described above are concerned with software development, the basic principles also apply to other business changes. For example, where the project is concerned with business process improvement, the requirements for the new processes may be defined prior to the development of the processes or an explorative, evolutionary approach may be adopted. Given that most requirements are delivered through a mix of IT and process changes, the lifecycle chosen for the software elements may impose a lifecycle and constraints on the other aspects of the business solution. For example, where an incremental software release is to be delivered, we will need to define the process, task and job changes that will make that increment workable in practice, and these may need to change again with the release of the next increment. Where a complete solution is to be implemented, the entire set of process, task and job definitions will be required at the same point.

DEVELOPMENT AND DELIVERY APPROACH

Whichever lifecycle is adopted it will also be necessary to select an approach to carrying out the project work. The approach will determine the methods and standards to be adopted on the project. There are several published approaches to business process improvement and software development that offer techniques and standards. The Unified Modeling Language (UML) is a popular approach, providing a range of modelling techniques that may be used to represent different views of a system. Organisations will need to take account of the context and the lifecycles described above when deciding which approach to adopt. In deciding this, there are two key areas that should be considered: the approaches to the development and the delivery of the solution.

- **Development:** there are two key questions to answer:
  - are we able to work collaboratively with the business users during the development of the solution or is this not possible?
  - are the requirements unclear or well understood?

When deciding on the development approach, we need to consider if the detailed requirements will need to be defined by working collaboratively with the business users during the solution development. Where this is the case, it is vital that the business users are available to work closely with the project team so that the detail of the requirements may be uncovered as the solution evolves. Techniques such as scenario analysis and prototyping will be invaluable in this situation. However, if the requirements are sufficiently well understood to be defined prior to the solution development and testing, and there is likely to be limited contact with the business users, formal documentation techniques, such as detailed process and data models and a well-formed requirements catalogue, will be needed.

- **Delivery:** do we require one delivery of the entire solution or a phased delivery using incremental releases? The context described above will provide the basis for deciding whether the organisation requires the delivery of all of the requirements in one release, or if a phased approach that delivers incremental change, is necessary.

Software development approaches

There are several published, defined approaches to developing software solutions, each of which provides a framework and standards. Two key approaches are described below.

The **Unified Process** (UP) from the Object Management Group (OMG) is a generic software development process which can be configured to meet the requirements of an organisation. Its structure acknowledges that no single development process fits all organisations, development environments and cultures. It is designed to fit small releases such as enhancements to existing systems as well as large systems development projects. The UP provides a guide on how to use the Unified Modeling Language (UML) effectively; techniques from the UML are discussed in Chapter 12. The UP is both an iterative and incremental approach. It is based upon the principle of using UML modelling techniques to explore and elaborate requirements through a series of iterations. Increments are developed that may be combined for one release of the entire solution or may be implemented as phased releases.

Agile software development approaches include DSDM and Scrum. In recent years, these have become increasingly popular in organisations for a number of reasons:

- The need for organisations to respond quickly to fast-changing business situations.
- The difficulty – indeed, sometimes the impossibility – of knowing what is wanted at an early stage of the project.
- The importance of flexibility when deciding how a requirement will be delivered. For example, a requirement may be defined to protect certain areas of the data but there may be several possibilities in how this is achieved. The solution to deliver this requirement may be decided through an exploration of various mechanisms.

The Agile methods provide a means of developing IT systems using an iterative approach while still ensuring the quality of the software solution. This approach assumes that it is impractical to expect that systems can be built during one development phase for the entire system. It is based upon the principle that 80 per cent of a solution can be delivered using 20 per cent of the development effort needed to produce the total solution. When using an Agile approach, there is the danger that the emerging prototype systems are not documented sufficiently or are not coherent, which leads to considerable difficulties later when they are in live operation. The methods described here address this danger quite explicitly and stress the need for documentation and testing throughout the development activity.

Scrum is a widely-adopted manifestation of the Agile approach. The name refers to the method of re-starting a game of rugby after an infringement of the rules and, in the method, is the name given to the daily progress meeting between members of the development team. The ScrumMaster is a facilitator for these meetings but is not a project manager in the conventional planning and directive sense. The development team is self-governing and is guided in its work by the product owner who acts as the 'voice of the customer'.

In a Scrum project, the development work proceeds in a series of 'sprints' which are timeboxed periods of effort, typically from one week to one month in duration. At the start of each sprint, there is a sprint planning meeting where the product owner nominates the work to be done by selecting tasks from the 'product backlog'. The daily Scrum meetings focus on what has been accomplished yesterday, what is planned for today and what obstacles have been encountered.

As with other Agile approaches, Scrum depends on close co-operation between the user community (represented by the product owner) and the developers, and on the ability to prioritise the work to be done. Prioritisation is explored in more detail in the next section.

The importance of prioritisation

Prioritisation is extremely important during solution development as there are always many requirements and limitations on time and budget. Clearly, all requirements are not deemed of equal importance, and this helps determine what should go into each work package or iteration. Whichever approach is adopted, it will be important to identify where the priorities lie in order to ensure that the available effort and funding is targeted at the requirements designated the highest priority. Careful and accurate prioritisation is vital if we are using an incremental delivery lifecycle, possibly combined with iterative development. It is here that a prioritisation scheme such as DSDM's MoSCoW structure, which was introduced in Chapter 11, is particularly relevant. The MoSCoW prioritisation categories are related to the development and delivery of the solution as follows:

- 'Must have' requirements will be delivered in the first deployed increment; these form the 'minimum usable subset' of requirements. If an iterative development approach is to be adopted, these requirements will form the first elements of the prototypes.
- 'Should have' requirements provide one of the mechanisms for introducing contingency and flexibility. They could be implemented as manual 'workarounds' in the short term, which is extremely helpful when deadlines are tight. Any of these requirements that have not been delivered in the first release will be allocated a 'must have' priority in the second increment.
- 'Could have' requirements may be included in the set of requirements under development, particularly if they are relatively easy and inexpensive to incorporate with the higher priority requirements. Where timeboxes are used, these requirements provide some contingency, as they can be left out should the development team run out of time.
- Finally, the 'Want to have but not this time around' requirements are recognised as those that will be set aside and considered during one of the later increments. This is an essential element for incremental delivery approaches as it provides a means of identifying requirements for later phases of the solution and specifically annotating them as such. These requirements will be allocated a different priority once the point arrives for their delivery to be considered. For example, there may be a specific

date when some of these requirements become mandatory and, when planning for that release, the ‘W’ prioritisation may be changed to an ‘M’.

The MoSCoW approach is also extremely useful for prioritising other types of business changes. For example, when developing process documentation we can identify the elements that must be included at the outset, those that can wait for the next version and those that could be dropped if we run out of time; or when developing team capability, we can prioritise the different skills into the MoSCoW categories in order to highlight those that are most important and those that can be deferred, even if only for a short time.

Use case diagrams, described in Chapter 12, are also useful in prioritisation as they can provide a highly visual way for business actors and developers to understand the level of priority assigned to each of the use cases. While modelling the potential scope of the entire solution, a use case diagram can be used to partition the solution into practical implementation packages for the short or longer term and provide a means of considering the different options available to deliver the business requirements.

Software package approach

So far in this chapter, we have considered the lifecycles and approaches that may be used when developing a software solution, using either an in-house development team or an outsourced software development supplier. However, in many situations, organisations prefer to adopt commercial off-the-shelf (COTS) solutions where possible, using these to implement best practice and engender related business process changes. The reasons are not hard to find:

- A COTS solution is almost certainly going to be cheaper than the organisation having to fund the entire development process since, by definition, the development costs are shared by all the users of the package.
- Implementation should be faster, as the solution exists and only has to be set up in the way the customer wants.
- Support and maintenance packages are available from the software vendors.
- COTS vendors keep their software up to date, for example in line with changes in legislation.

As against these advantages, however, there are some drawbacks, including:

- No COTS package is likely to be a perfect fit with the requirements, so either the customer must adapt their processes to what the package can do or they must pay for expensive tailoring and customisation, thereby partly negating one of the benefits of the COTS approach.
- If competitive advantage is required, it is unlikely to come from a software package, since all organisations working in a particular business domain can buy the same software and adopt the same work practices. However, the deployment and use of the software also needs to be done effectively, which may offer an opportunity for differentiation from competitors.

If a COTS solutions is desired, care must be taken that the requirements focus on what the system is required to do, rather than how it is expected to work (unless the 'how' really is vital to the business, for example to improve competitiveness). And the most effective use of a software package requires a willingness to change the business processes and procedures where necessary to align with how the package works.

Whichever approach is taken – bespoke development or COTS solution – and whichever lifecycle and approach are chosen if the former is selected, the business actors must make a decision on how far they want to go with automating the processes and jobs. For example, there may be situations, such as those requiring complex decision-making, where it is preferable for the work to be undertaken manually by staff who can make judgements on a case-by-case basis.

ROLES

The roles that are required to deliver the solution will depend upon these three factors:

- the context of the organisation and
- project; the nature of the lifecycle
- selected; the approach adopted.

Typically, there will be a project team that will include the following roles:

- project manager;
- business analyst;
- developer;
- tester.

However, the point at which these roles are required will differ depending upon the nature of the solution, the lifecycle to be used and the approach chosen. If the solution is not concerned with changes to the IT systems but to the business processes that use them, the role of the business analyst will be to analyse and define the business process improvements but there will not be a need for the IT developer or software testers. Where there is a software solution, and the ‘V’ model or the incremental lifecycle are selected, the business analyst may complete much of the early work without the need for the involvement of the developer or tester. However, if a software solution is required and an Agile approach is adopted, a collaborative project team that includes development and testing skills, will need to be set up at an early point. Whichever approach is adopted, there may also be a need for other roles. For example, a technical architect may be needed where the solution to be developed is complex and needs to be integrated with other software applications. Or, a data analyst may be needed where the software is underpinned by a complex data structure that will need to be designed carefully to ensure that all of the requirements and business rules are understood.

Within the business community there are also key roles such as that of the project sponsor and the business user. These roles play an essential part in the development of the solutions. The project sponsor is the business representative who is the point of contact for the project manager and is responsible for providing the resources to the project team. The business users provide the details of the requirements. However, the nature of the work carried out by these roles, in particular that of the business user, will vary depending upon the approach adopted. Where a waterfall, ‘V’ or incremental lifecycle is adopted, the business user will be involved in the definition of the requirements and the acceptance of the solution. Where an Agile approach is adopted, the business users have to work collaboratively with the development team during the software development.

DELIVERABLES

The products that are to be delivered will also vary depending upon the nature of the solution, the standards of the organisation and the lifecycle and approach adopted. Sometimes we can deliver the requirements through a training exercise to improve the skills of the business users. In this case, the deliverables may be course descriptions and training manuals. Sometimes, the business rules applied by the business users need to be defined and documented and a follow-on training exercise conducted. In this case, the deliverables will also include the procedure descriptions. Where business process changes are aligned with or supported by IT systems changes, the deliverables will be more extensive and will be linked to the software development lifecycle and approach. Early methods for systems analysis and design, such as the structured systems analysis and design method (SSADM), placed a strong emphasis on formal documentation throughout all stages of the systems development lifecycle. While this method is rarely used these days, some of the principles concerning documentation are still applied. For example, many organisations develop extensive requirements documentation prior to deciding upon the delivery approach, and maintain that documentation throughout the development lifecycle. Where an iterative development approach is to be adopted most organisations document the requirements in overview before exploring the selected requirements set in greater detail through the use of prototyping techniques. In this situation, the deliverables include the prototypes developed during each iteration. However, many organisations also enhance the requirements documentation as part of the iterative development work and ultimately may produce similar deliverables to those resulting from a waterfall-type lifecycle.

One of the important aspects about the deliverables is that they should always be suitable for the purpose. Where documentation standards exist – whether organisational standards or part of a particular approach – it is useful to adhere to the standards as long as the deliverables are valuable in the particular project context. There is little benefit to be gained (and potentially a lot of time to be wasted) in developing deliverables that do not contribute to the aims of the project.

TECHNIQUES

The techniques to be adopted during the development of the solution can vary considerably from project to project. They will depend upon the scope of the solution, the standards of the organisation and the lifecycle and approach adopted. Some typical situations are described below:

- The use of a waterfall-based lifecycle will require the use of formal documentation that has been reviewed and ‘signed off’. This necessitates the use of formal and rigorous techniques for documenting and modelling requirements. For example, a technique such as entity-relationship modelling or class modelling is likely to be required.
- Where an Agile approach has been adopted for a project, this will determine the techniques to be used. As stated earlier, prototyping is a vital element of the Agile approaches but equally techniques such as wireframes, scenarios and user stories are extremely useful.
- Organisations may have defined templates for requirements documentation that include standards for modelling business processes and IT requirements. They may also have templates for organisational documents

such as job role definitions and job descriptions.

- Many organisations have adopted support tools that impose both a development process and the modelling standards to be used.

SUMMARY

All of the aspects described above need to work together to ensure that a coherent approach to delivering the requirements is adopted. It is important to recognise that the context for the organisation and the project should determine this. An inappropriate lifecycle and approach will not reap the business benefits and is likely to result in wasted time and budget, possibly leading to the failure of the change initiative. The standard lifecycles and approaches are used in the main to develop software (or some stages are used when procuring an off-the-shelf package) but we also need to consider them when delivering the other required aspects – the business processes and procedures, and the new jobs and people skills. In many situations we cannot deliver all of the requirements as we would ideally, or even ultimately, desire. The nature of the business constraints may mean that we have to explore alternative means of delivering some requirements in the short, or even longer, term. The role for the business analyst is to identify where this is required and seek out the options for delivery that will ensure the business needs are met.

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14 DELIVERING THE BUSINESS SOLUTION

Debra Paul and James Cadle

INTRODUCTION

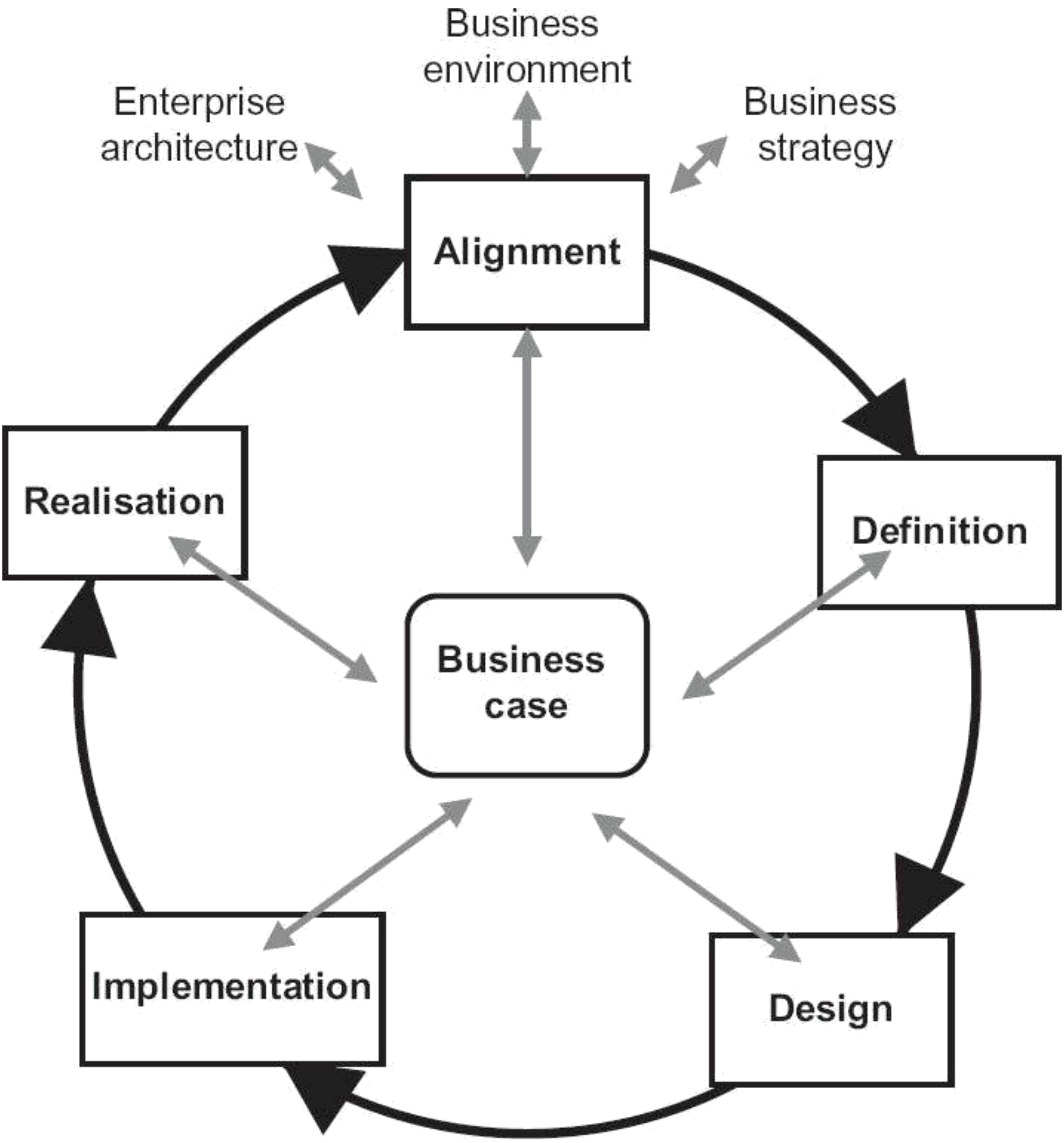
This chapter considers the work of the business analyst following the initial problem investigation and the definition of requirements. Although utilised mainly during the early stages of the business change lifecycle, business analysis skills are also required through to the delivery of the solution, and beyond, in order to support and enable the successful implementation of the changes and the realisation of the benefits.

STAGES OF THE BUSINESS CHANGE LIFECYCLE

While business analysis is critical at the outset of a change project, there remains a lot of work to be done as the project progresses through the business change lifecycle. This may involve the engagement of stakeholders in order to ensure their continued buy-in, and the detailed design, development and deployment of the new processes and systems. To do this successfully requires a great deal of thought, preparation and planning – and all of these activities are facilitated by the involvement of business analysts.

There are five stages in the lifecycle introduced in Chapter 1 and reproduced in Figure 14.1. These stages represent the key areas of activity required to enable successful business change for an organisation.

Figure 14.1 The business change lifecycle



- **Alignment** is concerned with ensuring the organisation's objectives and strategy are aligned with the external business world, and that any proposed changes are aligned with the internal policies and architectures. This work is discussed in Chapter 3, including the involvement of the business analyst.
- **Definition** is concerned with taking a closer look at a proposed business situation in order to uncover root causes of problems, conduct a thorough analysis, recommend relevant, feasible changes and define the requirements. This stage is the topic of much of this book and is not

explored further in this chapter. However, the business analysts will have defined the business and solution requirements by the conclusion of this stage.

- **Design** is concerned with the detailed specification, development and testing of the solution, including the business processes and related tasks, and the software that is needed to support them.
- **Implementation** is concerned with the planning and preparation for the deployment of the business changes.
- **Realisation** is concerned with the review of the predicted business benefits with a view to identifying those that have been achieved and taking further action to support the achievement of those still to be realised.

These stages are shown in the lifecycle as a sequence but this is not necessarily the case as there may be an iterative approach taken requiring some stages to be revisited. Therefore, it is preferable to consider the lifecycle as providing an overall direction for a change project rather than enforcing a straight sequence of activities.

BA ROLE IN THE BUSINESS CHANGE LIFECYCLE

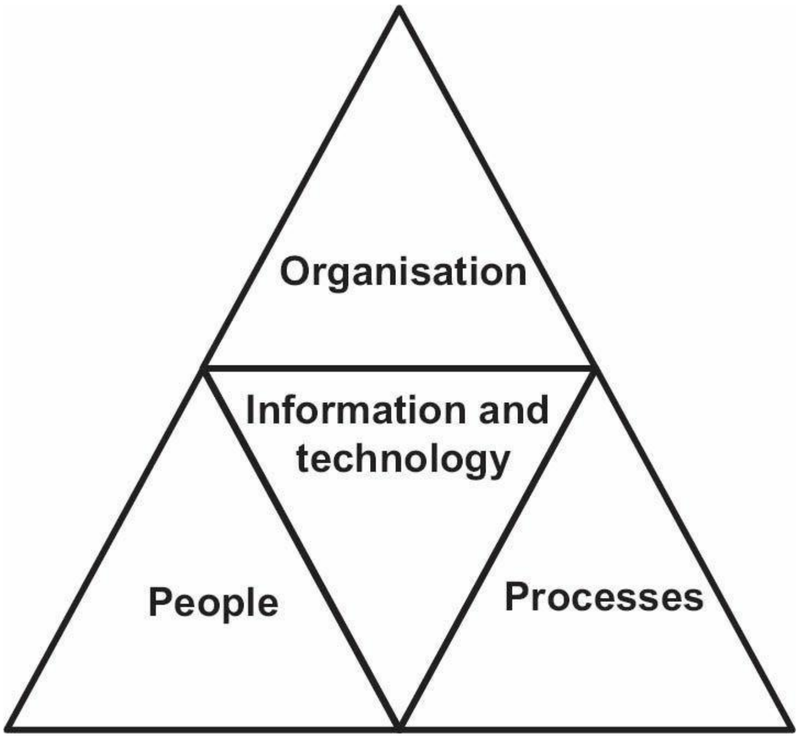
Business analysis helps organisations implement change successfully so it follows that the role of the business analyst is relevant across the entire change lifecycle. The tools and techniques described throughout this book are invaluable when working within a change project. This is explored further below.

Design stage

The design stage encompasses several major tasks: the design of the solution, and the development and testing of the software to support the solution. If the changes are complex, there may be a need for extensive testing or piloting of the revised business processes in order to ensure that they are robust and will deliver the required value. The POPIT model, shown in Figure 14.2, was introduced in Chapter 8 as a useful aid for gap analysis. However, it is also helpful to summarise the different elements to be addressed when designing a solution.

As can be seen in the POPIT™ model, there are four areas to be considered during the design stage: the organisation, the processes, the people and the information and technology. So, we cannot change the processes and systems without considering their impact upon the organisation's management structure and job roles or upon the skill requirements of the staff. There may be a need to introduce a different structure because of the merger of teams. There may be a need to redefine jobs where the tasks conducted have changed. Different performance measures may be required. The capability of the teams may need to change in line with the new work practices. And all of this needs to be thought through, not only in terms of what the change might be but also how the change will be brought about.

Figure 14.2 The POPIT™ model



People – skill development

If there needs to be new capability offered by the team, the skills of the team members will need to be identified and subject to a gap analysis. Having identified the required skills, the means of achieving them will need to be designed; this may involve the design and development of training events. Business analysts are often involved in capability uplift, delivering the training and support to business users to enable them to conduct their new work practices.

Organisation – structures, measures and jobs

Where the revised processes have involved the merger or change of the team structure this will need to be defined and the impact upon the management structure considered. The changes to business processes typically involve the introduction of amended, if not new, job roles, so these will also need to be defined. Again, the business analyst will be able to produce these definitions. There may also be a need to reconsider performance measures, such as CSFs and KPIs (see Chapter 3).

Business process design

The design of the ‘to be’ business processes was described in Chapter 7; this is a key area of business analysis work and is a fundamental part of the business change solution. However, there is a great deal of work to be done when a ‘to be’ process is to be implemented and it is often the case that this detail is overlooked or postponed. For example, there may be a need for detailed definition of the procedures and documentation to be used in the new process; or, the communication channels may need to be revised. All of this will need to be considered at an early stage in order to ensure that the solution is well understood and ready for deployment.

Information and technology

Chapter 13 set out the lifecycles used to develop the software required to support the business processes. While other chapters have discussed in detail the major aspects of business analysis work such as requirements definition and management, it is also worthwhile considering the BA role during the design, development and testing of the software solution.

Design

As the bridge between the business and the IT team, the business analyst is required to ensure that the requirements are understood and delivered. This may require them to clarify what the software needs to do. The requirements documentation provides the basis for the design of the software solution. Therefore, the business analyst may be required to support the design activity by clarifying any points, possibly following consultation with the business users.

Development

It may also be the case that the development team has detailed queries about the requirements, or that decisions about the detailed software functionality need to be made; the business analysts can help in communicating with the business staff and supporting them in making decisions about the detailed requirements. Given that the business analysts have an overall understanding of the solution, they can also be of great assistance during this discussion as they are able to assess the impact of proposals across the solution, identifying where there may be problems in adopting a particular approach and suggesting alternatives.

Testing

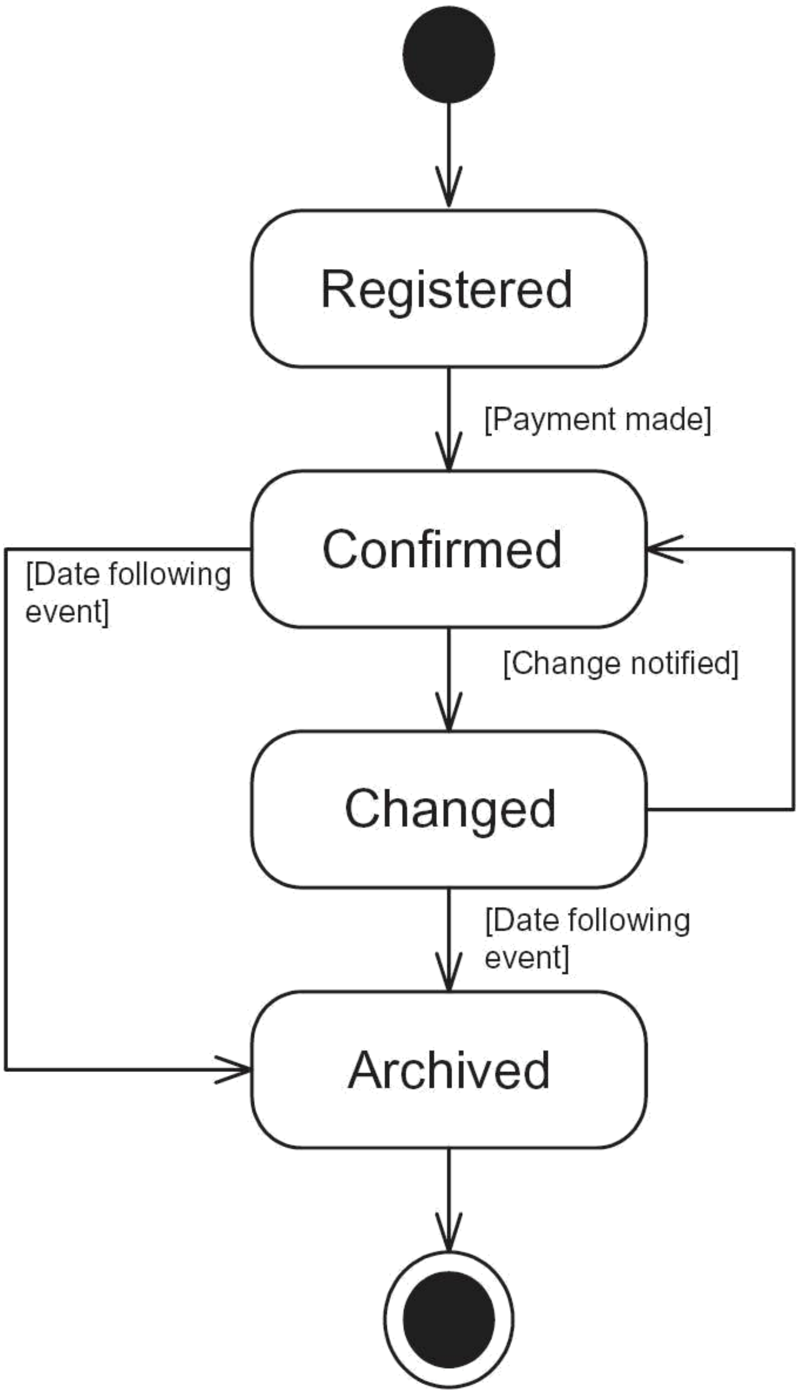
Business analysts regularly support user acceptance testing. Initially, the business analyst will have defined the acceptance criteria that will be used to confirm a requirement has been met. These will be defined in the requirements catalogue (see Chapter 11). Once the software has been developed and tested by the IT team, the business analysts may support the business staff during user acceptance testing. There are various techniques that may be used to define test cases and scenarios including:

- Use case descriptions – these support a use case diagram and show the system response to the occurrence of an event. A main success scenario or ‘happy day’ is documented as a series of steps plus any alternative scenarios that may occur.
- Decision tables – these set out clearly the range of conditions for a particular situation and the actions to be taken given a specific set of conditions. An example is shown in Figure 14.3.
- State charts (also known as state transition diagrams and state machines) – these show the different states a particular entity or class may take on during its lifetime in the system. An example is shown in Figure 14.4.

Figure 14.3 Example decision table

Conditions:								
C1: No outstanding balance?	Y	Y	Y	Y	N	N	N	N
C2: Order value > £250?	Y	Y	N	N	Y	Y	N	N
C3: Cardholder > 3 years?	Y	N	Y	N	Y	N	Y	N
Actions:								
A1: Priority treatment	X	X	X		X			
A2: Normal treatment				X		X	X	X

Figure 14.4 Example state chart



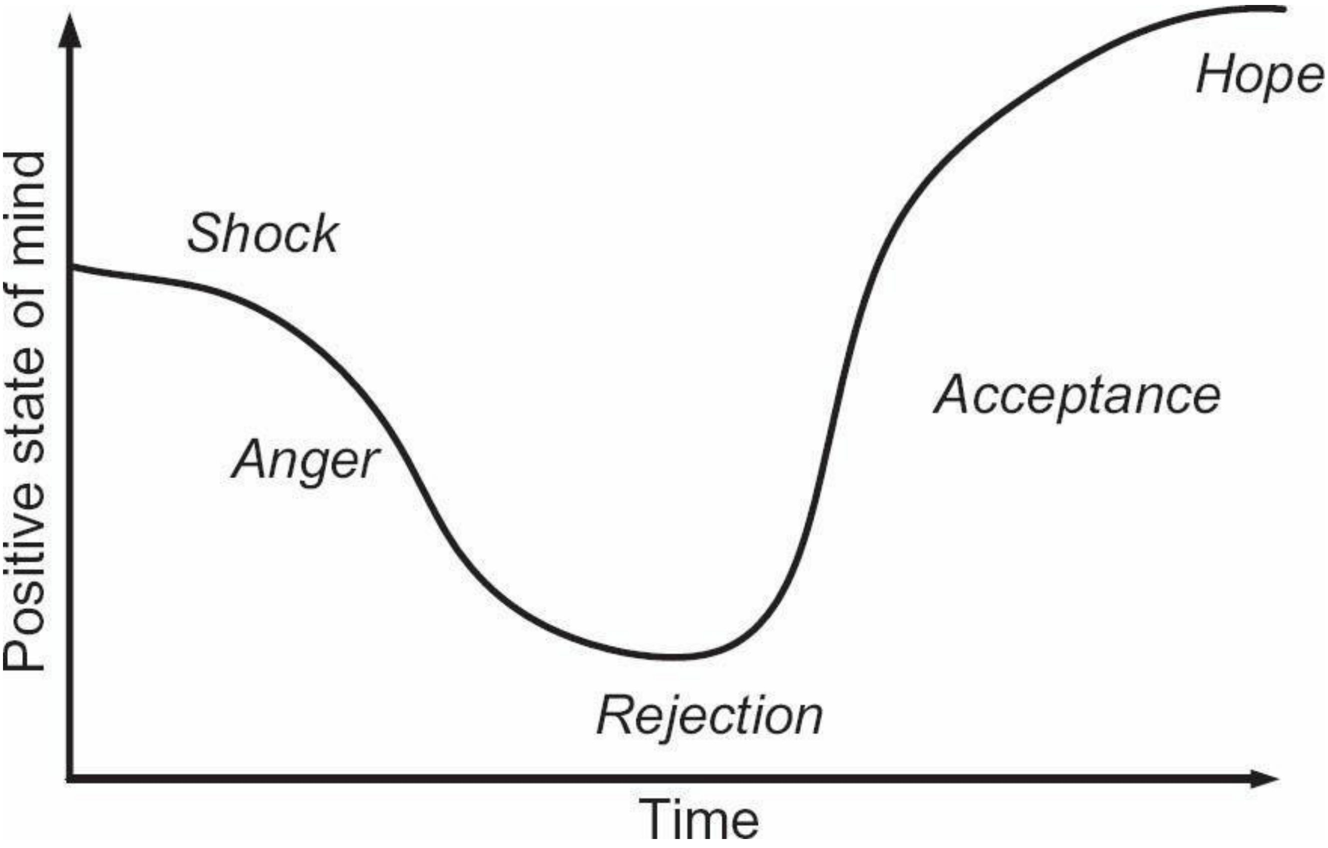
The business analyst may also be involved in documenting the outcome of the user acceptance testing and, in some cases, considering how the issues that arise are to be addressed.

Implementation stage

The implementation of a business change programme requires a great deal of planning and any changes need to be executed with care. The major concern here is the emotional impact experienced by the business staff during this stage. A failure to consider this may inflame resistance and undermine the changes. In extreme cases, this may cause the entire change programme to fail. The SARAH model in

Figure 14.5 sets out the emotional curve that may affect anyone experiencing the introduction of business change.

Figure 14.5 The SARAH model



The SARAH model sets out five stages of the emotions experienced when someone is faced with a change.

Shock

The initial reaction to a change initiative is often shock. This may be due to a lack of awareness of the need for change. This may be particularly the case if most of the staff feel the organisation is doing well.

Anger

Shock then moves to anger as people begin to understand what the change may mean for them. This anger may be directed at the senior managers who have initiated the change and also at others – for example, the business analysts or developers – who are involved in bringing it about.

Rejection

When someone feels angry about the change, the next stage is to reject the ideas and direction. A sense of avoiding the change can develop along with the desire to be left to continue as normal.

Acceptance

Eventually an acceptance of the change develops. This may not mean that there is wholehearted support for the change but, as a minimum, a sense that the change is definitely happening so it is best to accept it.

Hope

Ultimately, people begin to see the positive benefits brought about by the change.

Business analysts must recognise that these reactions to change are to be expected in those affected by a business change programme. It is important that we are sensitive to these reactions and try to help people move through the different emotional stages. BAs can help support the business staff to cope with the business changes by providing coaching, training and ongoing support. They may also be able to offer reassurance to help the business staff gain confidence in using the new processes and systems. To do this requires a high degree of interpersonal and stakeholder engagement skill during the deployment of the changes.

Realisation stage

Benefits are only likely to be realised if they are defined well, planned for their delivery and managed properly. However, it is often the case with change projects that a lot of thought goes into planning the project to define, develop and deliver the solution but less into how the expected business benefits are to be achieved. It is vital that a comprehensive benefits plan is developed in addition to the business case so that the benefits can be tracked and managed.

The benefits plan

The benefits plan should include the following elements:

Context/vision
This sets out the background for the change project and provides a wider business context for the benefits.

Benefits profiles
This is a full description of each of the benefits, including the type of benefit and the identified benefit owner (see below). Each benefit profile includes information such as the identifier and name, the owner, any stakeholders involved or interested in the benefits, relevant measures and dependencies.

Benefits dependency network

The benefits dependency network shows the enabling and actual changes required to deliver the predicted business benefits. The dependencies between the benefits and the ultimate business objectives is also shown.

Responsibilities

A list of the benefit owners and their responsibilities.

Tracking procedures

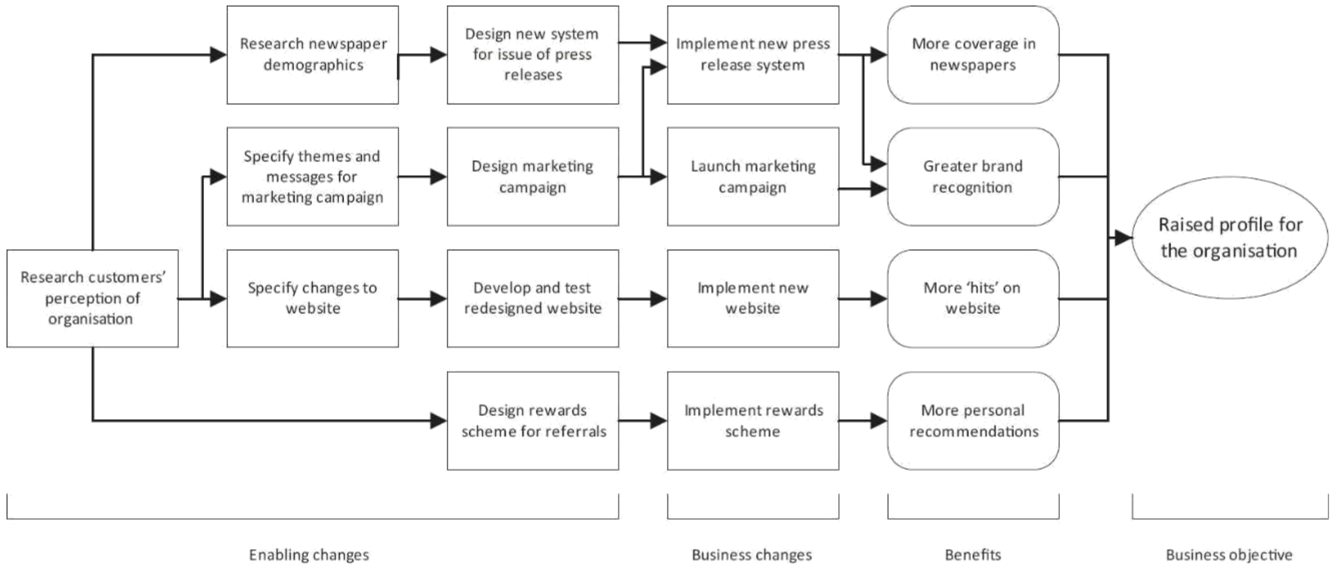
How the benefits will be tracked and reported upon.

The **benefit owner** is a named individual who is tasked with ensuring that the benefit is achieved. To discharge this role effectively, the person nominated must be in a position to take the actions needed to secure the benefit, which implies that they are a senior manager with responsibility for the area in which the benefit will be gained. For instance, if the main benefit of a project is staff savings, then the benefit owner has to be someone in a position to make these savings. Sometimes – and particularly in large organisations – benefit ownership has to be shared among a number of people but this brings with it the problem of divided responsibility; some managers make the required changes to secure the benefits, others do not and so the project is less successful overall than it could have been.

Benefits dependency network

A benefits dependency network (or benefits map) is a diagrammatic representation of what needs to be done on a project in order to achieve its expected benefits. It also sets out how the benefits contribute towards the project's ultimate (business) objectives. An example of such a framework – for an organisation that wishes to raise its public profile – is shown in Figure 14.6.

Figure 14.6 Benefits dependency network (adapted from Ward and Daniels (2012))



Although the arrows run from left to right, a benefits dependency network is best created right to left, starting with the overall business objectives that the change project is designed to achieve. We then work backwards to the set of benefits that will contribute to those objectives. Next, we consider what business changes will be required to secure those benefits. And finally we identify the enabling changes that will lead to the business changes.

The advantage of constructing a benefits dependency network such as that in Figure 14.6 is that it forces us to consider all of the work that is required to achieve the project's business benefits, not just that related to IT systems development. As the example in Figure 14.6 shows, only one 'stream' of enabling/business changes represents the technical aspects of the project; the other 'streams' highlight the non-IT changes that will be required if the overall benefits and objectives are to be achieved.

The network also helps us to identify who should take responsibility for each stream. The technical stream, relating to the website redevelopment, for instance, is obviously the responsibility of the designated (IT) project manager whereas the stream relating to improved press coverage should probably be managed by the PR function or, if there isn't one, by the marketing team.

Managing the business case

The business case needs to be managed throughout the business change lifecycle. The central and ongoing nature of the business case is shown clearly in Figure 14.1. Each time a request for change arises, it is important to review the business case to ensure that it is still valid and to reflect the impact of the change. There may be an effect upon several aspects of the business case, for example, the solution description, costs, benefits and risks. It is also usual to review the business case at key points during the business change lifecycle. This takes into account further detailed work that has taken place up to a particular stage and may also require changes to the costs, benefits and risks. If these changes are required the case for the investment must be checked to ensure continuing viability.

Benefits reviews

Management processes are needed to ensure that the benefits are reviewed in two circumstances:

Scheduled reviews
At each of the 'decision gates' in the project (see Figure 9.1 in Chapter 9), the expected benefits should be examined as part of the review. At each stage, careful consideration should be given to whether the expected benefits are still available and whether they are still sufficient to compensate for an increase in the expected costs of the project. In the light of such a review, it may be necessary to rework the financial case in order to defined the expected investment return or even re-scope the project to improve the prospects of securing the maximum business benefit.

Unscheduled reviews
These should be triggered whenever a significant event occurs that could potentially affect the expected benefits. Major requests for change are an obvious example of such a situation as they could cause the project to cost more, take longer or deliver something different, and all of these might affect the benefits. Other significant events could include a change in the key stakeholders (especially the project sponsor), developments in the external business environment or a change to the organisation's business strategy.

So, the business case should be reviewed frequently during the project in order to check if the predicted benefits are still able to be achieved and to identify any changes required to the project in order to enable those benefits to be delivered. The main evaluation, however, takes place after the project has finished and has been in operation for a designated period of time. Consideration should be given to the timescale required for the expected benefits to have materialised. Depending on the type and scale of the project, this could happen months, or even years, after the project ends. The evaluation will also examine the progress being made towards achieving the benefits and consider whether any further action needs to be taken to enable the benefits to be achieved.

Benefits Realisation Report

Ultimately a Benefits Realisation Report should be produced which assesses clearly whether the hoped-for benefits have been gained or not. This report has four important uses:

1. Where the hoped-for benefits have not yet been achieved, to identify any additional actions that could be taken to retrieve them. For instance, if users are not making full use of a new system, additional training may be required.
2. To reassure the decision-makers, and the wider organisation, that the time, effort and cost of the project has been justified.
3. To provide input to future business cases and future projects, to help make them more successful.
4. To enable the organisation, over time, to increase the capability for choosing which projects to undertake.

A benefits review is conducted at a designated point following the deployment of the business changes. The review focuses on the predicted benefits and assesses whether or not they have been realised. During the review, benefits that have not been fully realised should be analysed in order to identify where business changes have not taken place or where additional changes are needed. Where further changes are required to deliver the benefits, the benefits plan should be updated and a further benefits review should be scheduled. It is also possible that additional benefits are identified during the benefits review; these are benefits that were not predicted in the business case but may now be available as a result of the change project. The benefits review includes a consideration and analysis of what needs to be done to deliver these additional benefits. This will also result in changes to the benefits plan and scheduling of a further benefits review.

SUMMARY

This chapter has provided an insight into the contribution of the business analyst throughout the change lifecycle. It is often said that the implementation of change is the most difficult part to deliver successfully. In this book, we have looked at some of the key aspects of business analysis which should enable the identification, development and delivery of the right solutions for organisations. Business analysis is a discipline that can offer insights, proposals and recommendations grounded in real business needs and can help ensure wise investment of limited financial resources. It is important that organisations competing in today’s fast-moving business world recognise the role business analysts can play in helping ensure their success.