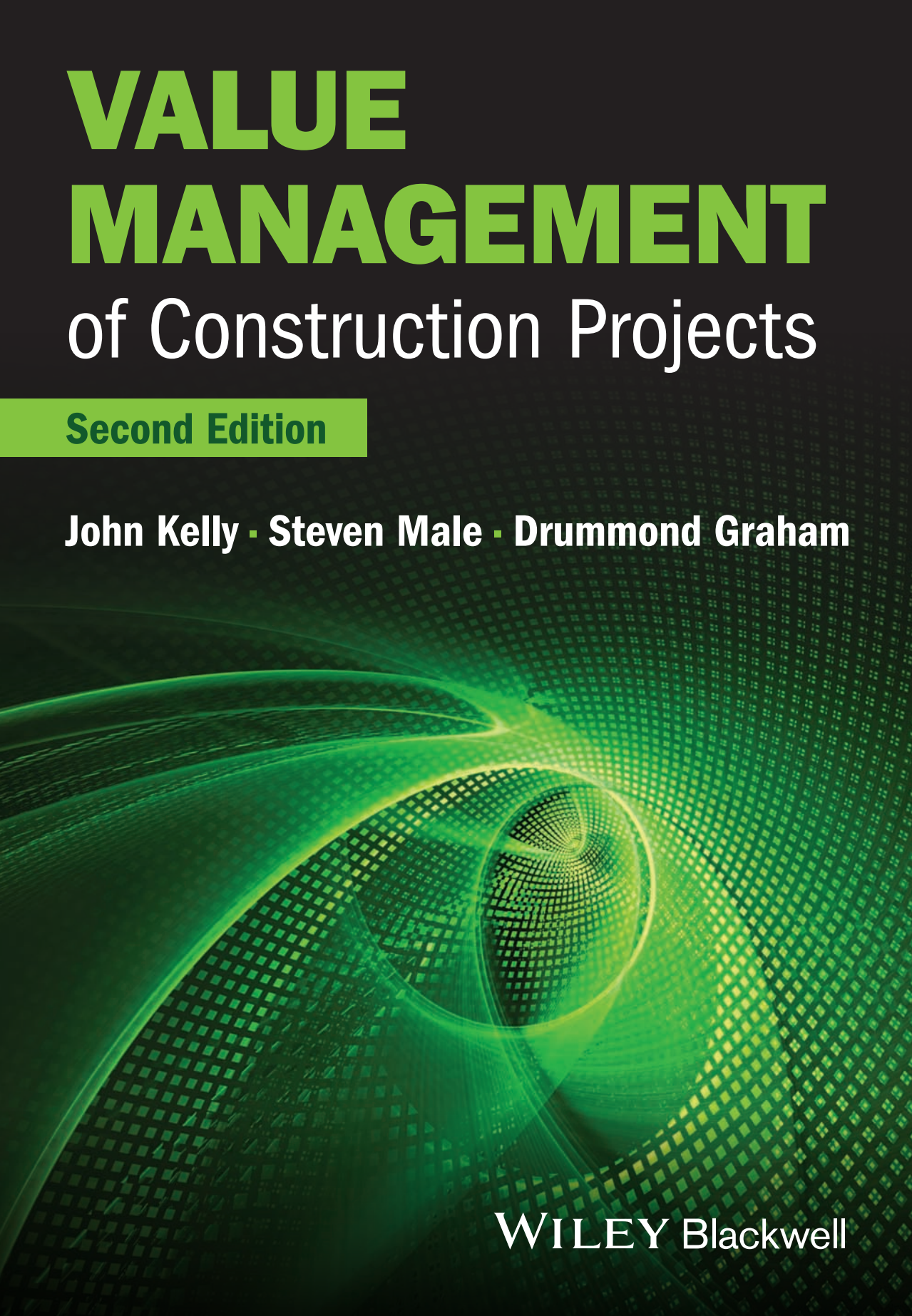
VALUE MANAGEMENT of Construction Projects

Second Edition

John Kelly · Steven Male · Drummond Graham



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Preface

The decade since the first edition of this book has seen significant changes within the construction industry in general and value management in particular. The first quarter of 2004 saw the highest construction output during the previous decade; although construction in the United Kingdom was consistently running at a high level until the first quarter of 2008 when another peak occurred from which construction did not recover as the United Kingdom entered recession in the second quarter of 2008.

Value management, following a period of rapid development during the late 1990s and early 2000s and coinciding with the period covered by the first edition of this book, began a period of twin track development in construction. This comprised a period of consolidation for the value management of construction projects and an exciting period of new development in the strategic value management of assets, Portfolios and Programmes of projects.

On the first track, the value management of construction projects entered a period of stabilisation. It was increasingly commissioned by the new and developing Integrated Service Provider companies offering a cradle to grave integrated supply chain configuration primarily within Private Finance Initiative, Prime Contracting and other Design, Build Finance and Operate procurement systems. The definition of value management provided in the first edition is

> *Value management is the name given to a process in which the functional benefits of a project are made explicit and appraised consistent with a value system determined by the client.*

It has proved consistently accurate through a large number of project value studies. Edition 1, Chapter 5, described study styles and value processes founded on the international benchmarking study of value management and the observations from over 200 value studies conducted by the authors. The fundamental principles described in the first edition have proved sound and are carried forward and developed in terms of theory and practice in Part 2 of this text – The Anatomy of a Value Study.

On the second track the authors were commissioned to undertake a growing number of strategic value management studies founded on construction but increasingly involving a complete reappraisal of a client's property assets, within an environment of change, to maximise value for money from a portfolio of property and consequent potential Programmes of projects. Several studies reflected a shift from a facilities management as an operations and maintenance service to a more comprehensive asset management service maximising the benefit of a portfolio of assets to achieve client core business objectives. These value studies were undertaken in health, education, transport (road and rail) and maritime environments. It was interesting to note that colleagues in Australia were also engaged on similar value studies typified by the Pacific Highway planning studies. These strategic value management studies required a new application of the methodology. The research, development and practice involved in this journey is described in this

second edition. A new definition of value management was evolved to encapsulate those second track developments in making clear that value management is a more wide ranging value study as an intervention involving the three stages of Organisation and Diagnostics, Value Workshop and Implementation. The new definition is

> *Value management is a value study (or series of value studies) with the aim of optimising organisational decision making and performance by increasing effectiveness and efficiency through a formal, structured, value-based management methodology involving key stakeholders. At project level VM is the name given to a value study in which the functional benefits of a project are made explicit and appraised in alignment with a value system determined by the client.*

On a personal note, in 2007, John Kelly resigned the Chair of Construction Innovation at Glasgow Caledonian University, although retaining some academic duties and visiting professor appointments, to establish a small consultancy company specialising in training, research and consultancy in value management and whole life costing.

In 2008, due to changing research interests, Steven Male gave up his Chair of Construction Management to become Professor of Property and Infrastructure Asset Management at the University of Leeds. He resigned this post in late 2011 to pursue other interests and to run his own business in Edinburgh specialising in value management training, research and consultancy.

Drummond Graham is Director of Thomson Bethune, Chartered Surveyors, Edinburgh.

John, Steve and Drummond undertake commissions individually and jointly, meeting regularly, as they have done for over 20 years, to discuss studies undertaken and to plan future development.

During the past 20 years we have interacted with hundreds of construction clients, consultants, contractors, value management practitioners and academic colleagues from many countries. We have taught undergraduate and postgraduate modules, run institutionally accredited value management courses and supervised research students at Ph.D. level. We have widened the scope of value management activity and directed value studies at the highest levels in commerce, public sector institutions and government.

In the development of this text we are particularly grateful to Dr Derek Thomson of Loughborough University whose (sometimes highly) critical but helpful insights over three years into our research, theory and development of a Whole-Life Value method have given us the confidence to include the proposals in Chapter 12. In particular, we would also like to express our thanks to Bob Charette CVS, Montreal, and Howard Elegant CVS, Evanston, Illinois, whose enthusiasm for value management and early insights into its practice instigated this journey in 1986. Furthermore, to all the people and organisations too numerous to mention who have given us freely of their time, views and insights and who indeed may see something in this text that has resulted from a comment or other interaction we give you our grateful thanks.

John Kelly
Steven Male
Drummond Graham
September 2014

Glossary

In this book the terms and abbreviations listed here have the meaning ascribed notwithstanding contrary definitions in other publications.

Terms and Abbreviations	Meaning in this Book
AM – Asset management	A defined management process that links an organisation's strategic plan to the whole life management of physical assets. AM includes investment decisions associated with managing assets through time to create value for an organisation.
Benchmarking	Identification and measurement of own performance and comparison with best in class.
Benefits realisation	An audit process conducted at each stage in the development of the project to ensure that the benefits identified in the business case are embodied both in the developing project and at completion, into the organisation's core business.
Business as usual	The things done to keep the business operating on a day-to-day basis.
Business case	The strategic, commercial and/or organisational case for an investment to effect a change to the core business of an organisation.
Client	The person(s) or organisation that engages professional assistance in the undertaking of the inception, planning, financing, execution and commissioning of a project.
Client's Project Value System	The client's value system modified to apply to a specific project and expressed in terms of time, cost and quality.
Client's Value System	The corporate and business values that arise from deep within the client business as the perspectives and paradigms existing within the organisation's governing board, departments and individuals. It is these values that are transmitted through the client core supply chain as a value thread.
Client stakeholder team	Those stakeholders from the client organisation and those (primarily customers and users) inextricably linked to the benefits or disadvantages of the Programme or project.
Component	A single manufactured product installed in a single operation which can be described by its manufactured part number or by its physical characteristics and function.

CREM – Corporate real estate management	The management of property owned, leased or held incidentally by an organisation to support its corporate mission and thereby contribute to its business operations. CREM is less concerned with the investment value of property.
Element	That part of construction which performs the same function irrespective of the components and materials from which it is made.
Facilitator	The person who manages the value study workshop process, commonly but not necessarily the VSL.
Function analysis	The processing of Programme and/or project information to succinctly define functional requirements in an inert form, that is, in an expression, devoid of cost or performance measures, commonly comprising an active verb and a descriptive noun.
Gatekeeper	An individual or occasionally an organisation, that coordinates information passing between the constituents of an organisationally complex endeavour for example, the client project manager for a construction projecr passing information to a Value Study Leader in a value study.
GSL	Government Soft Landings.
HMG	Her Majesty's Government (UK).
HMGCO	HMG Cabinet Office (UK).
HMT	Her Majesty's Treasury (UK).
Innovation	The search for a new idea and the presentation of the idea in a form conducive to use; comprises two steps, the generation of ideas to satisfy identified required functions and a judgement of which of the many ideas generated are of potential use.
ISP – Integrated Service Provider	A consultancy or construction company offering to a client an integrated service in, *inter alia*, Programme and project management, design and cost management services, construction delivery and facilities management.
Job Plan (USA)	In the United States the agenda for the workshop phase only of a value study.
MoV	Management of Value (UK).
NAO	National Audit Office (UK).
Option appraisal	The functional description of a potentially worthwhile change to the operation of an organisation and the identification of options which maximise the value of the change. Option appraisal includes the evaluation of potential options and the recommendation of a single option.
P3	Portfolios, Programmes and Projects.

Paradigms	The explicit or implicit rules governing the way in which individuals and departments operate, responding to and contributing to, the corporate culture of the organisation. These rules influence the client's value system.
Performance indicator	A factor that can be accurately measured to enable the comparison of performance.
Perspectives	The deeply held consensual views of individuals and groups within a client organisation that influence its corporate culture and thereby the client's value system. The more senior the individual or group the more influence.
Portfolio	Groupings of Programmes and/or projects which may or may not be interdependent managed by the organisation at strategic level.
Programme	An organisational structure or framework to group, co-ordinate and manage substantive change through related projects.
Project	A process, operating in parallel to the core business, to deliver an investment within a programmed time to effect change to the core business of the client organisation.
Project Board	A temporary formal group of client representatives and other key stakeholders set up to oversee the governance of the project.
Project Manager	The person responsible for the day-to-day management of the project. The gatekeeper between the client and the project team.
Project Sponsor	The client representative responsible for the project. The project sponsor is commonly chairman of the Project Board and responsible for the delivery of the business case.
Project Value System	The client's project value system as incorporated into design and construction. The client's project value system may be influenced by the design and construction team.
Quality	The totality of features and characteristics of a product or service that bear on its ability to satisfy stated needs or implied needs. The assessment of quality is a construct of comparability in which the degree of excellence is determined as the provision of all basic needs at the required level and all performance needs at the highest level. In this book quality is focused on the facets of Community, Environment/ Sustainability, Exchange, Flexibility, Esteem and Comfort.
Quality Assurance	The management of defined, consistent, standards of products and/or services to assure freedom from defects.
Risk	A disadvantageous future event in which the probability and consequence of the outcome can be estimated.

SFC	Strategic Forum for Construction (UK).
Stakeholders	Those individuals and groups that are in a position to directly influence the development of a Programme or project or are directly affected by the actions of an organisation pursuing a Programme or project.
Supply chain	The people and organisations involved in the production and distribution of a product or service from raw material to customer/consumer.
Systems	A number of identified discrete components combined to form a mechanism to perform a single function or a number of functions of a similar nature, e.g. a central heating system.
Systems approach to analysis	A number of individual processes working synergistically to deliver a defined objective.
TQM – Total Quality Management	A system of technical and organisational management expressed in the cultural attitude of staff to the provision of the highest level of excellence in products and/or services.
Uncertainty	A future event in which the probability and consequence of the outcome cannot be estimated.
VA – Value analysis	A value study of a current service or the production of an existing product with the aim of identifying and eliminating unnecessary cost through the analysis of the necessary functions required of the product or service.
Value	A relationship between function, time, cost and quality.
Value gap	Value gap analysis defines the difference between the status quo and what could potentially be achieved by undertaking a value study to enhance a project and the value of an asset.
Value study	A discrete intervention in the core business of the client to undertake a structured appraisal at Portfolio, Programme or project level with the aim of enhancing value by effecting change. A value study comprises the three generic phases of Orientation and Diagnostic phase, Value Workshop phase and Implementation phase.
Value thread	The mechanism that conducts the client value system through the supply chain.
Value workshop	A team based activity comprising key stakeholders to review and synthesise information to make explicit function and value in order to derive innovative solutions for a Programme or project.
VE – Value engineering	A value study of a designed space, element, system and/or component with the aim of improving the design by providing the necessary functions at the lowest cost without compromising quality.

VfM – Value for money	The optimum combination of whole of life costs and quality (or fitness for purpose) of the product or service to meet the users requirement. VfM is achieved when the highest level of benefit is received in exchange for the least consumption of resources.
VM – Value management	A philosophy and management style to enhance stakeholder decision making. It is operationalised through a value study (or series of value studies) with the aim of optimising organisational decision making and performance by increasing effectiveness and efficiency through a formal, structured, value-based management methodology involving key stakeholders. At project level VM is the name given to a value study in which the functional benefits of a project are made explicit and appraised in alignment with a value system determined by the client.
VSC – Value Study Commissioner	The person, usually an employee of a client organisation, responsible for commissioning value studies.
VSL – value study leader	The person responsible for the planning and execution of a value study.
WLC – Whole-life cost	An economic evaluation method that takes account of all relevant costs over the defined time horizon (period of study), including adjusting for the time value of money. A WLC exercise is used in option appraisal or to predict a cash flow.
WLV – Whole-life value	A systems approach to the discovery, representation, measurement and audit of the lifetime value of an asset (product or service) to an organisation. WLV is used in option appraisal and benefits realisation.
Work plan	As BS EN 12973:2000 and AS 4183:2007 note the strategy and plan for a value study detailing each of the three phases of Orientation and Diagnostics, Value Workshop and Implementation.

Part I

Introduction and Evolution of Value Management

The value methodology as a structured management service has been recognised for almost 70 years. It began in the manufacturing industry of the United States in 1947 as an in-house service to reduce the cost in the production of existing products without compromising product quality. This activity, called value analysis, was carried out by a structured examination of the function of the product using an in-house team of designers, production engineers and purchasing agents. By the 1960s the term value engineering was being used to describe a service where the focus shifted to the function analysis of the design and estimated cost of proposed products rather than products already in production. It was during the early to mid-1960s that value engineering transferred from the analysis of manufacturing design to the analysis of construction design initially through the activity of US Navy Bureau of Yards and Docks.

The 1980s saw an increasing international interest in the use of value engineering in design and construction and included an embryonic discussion of value management. In the United Kingdom, value management in construction evolved in the late 1980s. The first UK textbook (Kelly and Male, 1993), *Value Management in Design and Construction*, by the authors was published in 1993. Since that time value management in construction has evolved to become an established service with commonly understood tools, techniques and value study styles. The authors' research activity which began in 1986, funded by the Education Trust of the Royal institution of Chartered Surveyors (RICS), was boosted in the 1990s by further funding from the RICS and the Engineering and Physical Sciences Research Council. The latter funded a major examination of the international benchmarking of value management practice which investigated best practice from the perspective of tools, techniques and study styles using the authors' 1993 text as the research benchmark. One significant outcome of this work was the completion of a new benchmark entitled 'The Value Management Benchmark' published by Thomas Telford (Male *et al.*, 1998).

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The benchmarking research was the foundation for further research into value management which confirmed that it is a service with three primary core elements:

1. A system of function analysis promoting an understanding in and a clear definition of requirements of construction projects.
2. An appreciation of the client's value system and the transference of this value system to the project effectively defining the criteria for project success.
3. The value study process involving a structured stakeholder team.

Furthermore, that research also identified that value management is operationalised as a value study process with key intervention points during the project inception and development process with three equally important generic phases:

- The Orientation and Diagnostics phase
- The Value Workshop phase
- Implementation phase

Part One comprises two chapters. Chapter 1 outlines the changes that have occurred in value engineering and value management research and practice since the first edition; with a brief overview of influential reports, the changes in construction procurement and the developments in value management, notably their application to a wider organisational context reflecting contemporary thinking in asset management.

Chapter 2 describes the three stage development of the value methodology from its inception in the 1940s to 2014. The chapter describes the evolution of value engineering and value management and concludes with the salient features of a value study in order to provide a foundation for the subsequent chapters in this book.

References

Kelly, J. and Male, S. (1993) *Value Management in Design and Construction: The Economic Management of Projects*. London: E and F N Spon.

Male, S., Kelly, J., Fernie, S., Grönqvist, M. and Bowles, G. (1998a) *The Value Management Benchmark: A Good Practice Framework for Clients and Practitioners*. London: Thomas Telford.

1 Introduction

1.1 The aims and objectives of the book

The 1980s saw an increasing international interest in the use of value engineering in design and construction and an embryonic discussion of value management (VM). The climate in UK construction of the 1990s was right for the further development of innovative systems including VM.

The authors' research activity into the topic, which began in 1986 and was funded by the Education Trust of the Royal Institution of Chartered Surveyors (RICS), was boosted in the 1990s by further funding from the RICS and the Engineering and Physical Sciences Research Council (EPSRC). The latter funded a major study into the international benchmarking of value management practice that resulted in the completion in 1998 of 'The Value Management Benchmark' published by Thomas Telford (Male *et al.*, 1998). The benchmark was the springboard for detailed work into three areas. First, to make clear different study styles and their application at particular stages of projects, and, relate each study style with their most commonly associated method, tools and techniques. Second, to investigate the concept of quality and value to understand their interrelationship and their application within supply chain thinking. Third, to extend the use of VM into other organisational settings and investigate other more generic study styles.

This research work was carried out by the authors, or under their supervision, using a variety of research methods. Significant findings were made through grounded theory and action research approaches. This work continued unabated, reshaping, refocusing and extending the authors' ideas about the theory and practice of value engineering and more, especially value management.

What has changed from edition 1

In reviewing the context and content of the first edition, published in 2004, the authors concluded a second edition needed to take account of the following:

Value Management of Construction Projects, Second Edition. John Kelly, Steven Male and Drummond Graham.

- A range of recent UK industry and government publications, most notably BS EN 16271:2012 – Value management: Functional expression of the need and functional performance specification, the imminent update of BS EN 12973:2000 Value Management; BS EN 1325:2014 Value Management – Vocabulary; the changes to 'Value for Europe' governing the training and certification of Value Management in European Union countries; the UK Government's Management of Value (MoV) initiative, together with other leading reports, international guidance and standards on Value Management.
- Research in value management undertaken since 2002.
- Changes in value management practice, particularly in relation to the management of Portfolios, Programmes and Projects (P3).
- Developments in the theory of value, principally value for money measures, whole life value, option appraisal, and benefits realisation.
- New asset management initiatives covering the management of physical infrastructure, for example, BSi PAS55 2008 'Asset management: Specification for the Optimized Management of Physical Assets', which has transitioned into a suite of three documents comprising the new standard BS ISO 55000: 2014 Asset Management (BS ISO 55000: 2014 Asset Management – Overview, Principles and Terminology; BS ISO 55001: 2014 Asset Management – Management Systems – Requirements; BS ISO 55002: 2014 Asset Management – Management Systems – Guidelines on the application of ISO 55001).
- A wealth of material contained within over 200 case studies undertaken by the authors as consultancy and research, and distilled into lessons learned and good practice.

The chapters in the second edition demonstrate the further contextualisation of value management within construction. This text is influenced principally by a UK-style construction culture. This book, draws together developments in value management thinking and practice, and argues that value management needs to develop further and potentially within different practice settings.

The objectives of the second edition

The second edition deals distinctively with the practical opportunities and difficulties of VM set in the context of theory and good practice in a range of organisational contexts.

In writing the second edition, the authors have brought together and synthesised the background, international developments, benchmarking and action research in value management to provide a comprehensive package of theory and practice. The book is overtly concerned with value management in terms of the philosophy, process, use of function analysis and the nature of team dynamics. It proposes methods for determining the client's value system, quality criteria and whole life value. An exploration of different value management study styles is conducted, and the text proposes solutions for various activities at different stages of projects and organisational contexts. The book describes, but does not probe into, the areas of creativity, such as those described by De Bono or TRIZ, or the fields of operational research and more specifically operational hierarchies, nor does it address the whole subject area of

group decision support. These are covered excellently in texts by other authors and academic colleagues.

The second edition follows on from a chronology and reflections on research, teaching and practice since the first edition. It describes further developments in value thinking and presents a validated approach to the method and practice of value management. It also attempts to position and reposition value management in the construction industry for the next decade.

The objectives of the book are as follows:

- Describe in sufficient detail for practical use a series of VM study styles, tools and techniques, including presenting the core technique of function analysis.
- Interpret and reinterpret the results of recent research and specifically the authors' own research into the international benchmarking of value management.
- Record developments in value thinking during the past decades, addressing the nature of value, transforming it into definitions, and also discussing its alignment with total quality management and performance indicators.
- Examine the complexity of value systems that must be addressed in any Value study, specifically the project value chain and value thread, and also organisational value.
- Present a reasoned argument for the development of the client's value system, integrating the components of value, cost, time, risk, functionality and quality.
- Examine teams, team behaviours and facilitation, and to point out practical issues when facilitating value teams in workshop settings.
- Describe an enhanced VM process, argued to be the potential foundation for future 'professional' development.

The authors intend that this book is used to enhance value management knowledge in the following ways:

- By dipping in and looking for a particular topic using the Contents list at the front of the book or the Index.
- Understanding the process of value management and the tools and techniques, in particular information contained in Parts 2, 3, 4 and the Appendix, which provide information for the background and development of value management to be appreciated together with the study styles, tools and techniques, which combine to form a value management service.
- For checking on a particular value management study style, tool or technique. The Toolbox (Appendix) is provided in alphabetical order.
- For an accomplished value management practitioner to benchmark their service. Parts 2, 3 and 4 together with the Appendix provide the study styles, tools and techniques, to permit the practitioner to adopt or amend them for their own personal use. Additionally, Part 3 explores the value concepts and describes a method for the construction of the client's value system.
- For a theoretical overview of value the reader is referred to Part 4, Chapter 11, in which the authors expose value and break it down into a number of discrete points and themes. A definition of Whole Life Value and a proposed method for its management is given in Chapter 12.

- A consolidated methodology for value management and the authors' thoughts on the subjects of managing stakeholders, professionalism and ethics in this context are set out in Part 4, Chapter 13 .

Audiences for the second edition

The second edition is written for a number of audiences. For the competent practitioner who may be looking to benchmark their existing service; for construction clients, consultants and contractors who may be looking to probe value management further; and for undergraduate and postgraduate students. This book, whilst it is focused on construction, is also applicable to projects in other sectors and much of the thinking, philosophy, systems, tools and techniques can be adopted or adapted.

For practitioners, construction clients, consultants and contractors there is one chapter devoted to an extensive collection of case study material representing the authors' diversity of practice. The case studies deal with the design and implementation of value studies in their different contexts, and the lessons learned. Further detailed case studies are also presented in other chapters to reflect the operationalisation of value management research and practice within different organisational contexts that have been undertaken by the authors.

For the undergraduate or postgraduate student taking a course or module that includes value management, the second edition is designed to be an extended exposition of the process and to present some fertile ground for individual thought.

For the researcher, this is the authors' personal view of the value management story thus far. We have utilised numerous research methods since the mid-1980s including hypothetico-deductive, action research and grounded theory based analysis. Techniques have included literature analysis, case study analysis, case vignettes, benchmarking, questionnaire survey, structured and unstructured interviews, and the real-time analysis of live projects. The second edition extends that work further by looking forward in the final chapter on the possible future direction and challenges facing value management.

1.2 Developments in UK construction

A fertile ground was prepared for further developments in value management in the UK construction industry during the 1990s, and that has continued up to the point of writing the second edition. A diverse and copious range of reports and initiatives have sought to increase the efficiency and effectiveness of the industry from the 1990s onwards, and this has influenced value management in a number of ways.

- The Latham Report (Latham, 1994) spawned the Construction Industry Board, which published influential works on the modernisation of the industry. Value management was seen to be conducive to good practice and received significant coverage.
- The Egan Report (Egan, 1998), which spawned the Movement for Innovation (M4I), took advantage of Web technology to showcase examples of good practice and provided an

opportunity for benchmarking through its key performance indicator database. It was influential in shifting a substantial proportion of the construction industry towards more collaborative working, an environment in which value management thrives.

- The National Audit Office (NAO) report *Modernising Construction* (NAO, 2001) argued forcefully for the application of whole life thinking to meet the needs of end-users, the use of integrated working, risk management, and value management and value engineering to improve buildability and drive out waste from the process.
- The Strategic Forum for Construction report *Accelerating Change* (SFC, 2002) built on the work of M4I and established Rethinking Construction as the primary vehicle for public and private sector construction product and process advancement. There is significant stress on value and value-for-money, integrated working across the supply chain, and also whole life value.
- The Office of Government Commerce launched the Gateway process (OGC, 2003) which, with the accompanying construction procurement guidance, describes the benefits of good practice in construction procurement in the public sector. Documents describe the place for value management within this process.
- The NAO report *Improving Public Services through Better Construction* (NAO, 2005) defines value management and value engineering, and notes their use throughout that text and in a range of case studies.
- A report produced in 2005 called *Be Valuable: A Guide to Creating Value in the Built Environment* (Saxon, 2005) grappled with the concept of value, and set out with the goal of shaping knowledge on and about value in the built environment. It focuses on exploring, articulating, defining and trying to resolve competing views on a vital concept in construction and the wider built environment. It outlines preliminary thoughts on the 'soft landings' approach to design and management. It noted that in the buildings-sector of construction the traditional focus has been on cost minimisation and not on value optimisation. The report, in setting out a series of definitions and arguments around value-related information, explains the relationships between value and stakeholder viewpoints in the built environment. It adds, 'Most value is created in the opening stages of defining need and designing the response. Once the delivery phase begins the task shifts to defending the value proposition against erosion'. The report further adds 'Value engineering to minimise cost, can erode the proposition if unskilfully done. Changes or substitutions to meet practical needs or increase supplier profit may also risk the customer quality sought' (p 44). The report argues against value engineering as a cost reduction and substitution approach.
- The Strategic Forum for Construction report *Profiting from Integration* (SFC, 2007) continues to articulate better value for money through integrating the supply chain, a focus on whole life value, risk management and value engineering. In the same year, the NAO report *Building for the Future: Sustainable Construction and Refurbishment on the Government Estate* (NAO, 2007) examined the extent to which Government Departments and Executive Agencies are meeting sustainability targets for their new buildings and major refurbishments. Much like earlier reports, there is a continued emphasis on integrated working across the supply chain and a focus on whole life value. The report adds further that sustainability is consistent with the HM Treasury's definition of value for money, noted as 'the optimum combination of whole life cost and quality (or fitness for purpose) to meet the user's requirement' (NAO report p.7).

The report adds further that it is the responsibility of integrated teams to 'ensure that all of the aspects of sustainability included in the original design are delivered, i.e. that "value engineering" does not result in less sustainable product substitutions or the removal of sustainable design criteria on grounds of cost' (NAO report p.27). The implication is clear from this last statement that value engineering is, but should not be seen as, a cost-cutting exercise to the detriment of sustainability, and within that concern is the potential for it to focus on product and material substitution, which again may act against sustainability.

- The joint HM Government and Strategic Forum for Construction report *Strategy for Sustainable Construction* (BERR, 2008) again emphasises the importance of a focus on whole life value. Furthermore, in 2008 the Business and Enterprise Select Committee reported on a major inquiry into the UK construction industry in its publication *Construction Matters* (BEC, 2008). This was a substantive and in-depth review across the numerous facets of construction. The report addresses in a significant way the concept of whole life value.
- The Government's *Construction Strategy* (HMGCO, 2011) set out the arguments for a significant change in the long-term relationship between Government at different levels and the construction industry. The strategy sets out how the public sector will become a better, more informed and co-ordinated client such that it will achieve a set of requirements that are specified, designed, procured and delivered more effectively and efficiently to the benefit of the country. By challenging industry business models and practices the continuing intent is to replace adversarial cultures with collaborative ones. The strategy also articulates the necessity for cost reduction and innovation within the supply chain to maintain market position, and not innovation focussed around the tendering process in order to establish bargaining positions for potential future claims. It further argues that procurement should be seen not just as a stand-alone process but as part of a broader aspect within the built asset life cycle. There are a number of issues and consequences of the Construction Strategy such as proposed new procurement models, Building Information Management (BIM) and the concept of 'Soft Landings'.
- In the same year as the Construction Strategy was published, the British Standards Institute published BS8534:2011, entitled *Construction Procurement Policies, Strategies and Procedures – Code of Practice* (BSi, 2011). The standard provides recommendations and guidance on the development of policies, strategies and procedures for the procurement of construction in the built environment. It covers public and private sector organisations. The standard notes BS EN 12973, Value Management, as a normative reference, amongst others. It goes on to define VM as 'a structured approach to the assessment and development of a project to increase the likelihood of achieving the objectives at optimum whole life value for money' (p.4). It also defines a series of other terms, including value-for-money, noting this includes optimising whole life cost and quality to meet the user's requirements. The Standard views VM as an integral part of the project delivery process, noting that in the establishment of the Business Need a VM study should be undertaken. The focus of the study should be on establishing business and stakeholder needs in the short and long term, and to set objectives. The Standard is clearly recommending the use of VM in a proactive manner and at an early stage on a project. It also recommends that

VM should be undertaken at various stages throughout a project – multiple interventions – and that risk and value management should be undertaken together as part of this activity. Equally, the Standard argues that good project planning should include identifying when VM is undertaken, and also notes criteria weighting mechanisms for the selection of consultants in their use of VM.

- Finally, Construction Commitments 2012 represents the principles intended to underpin all construction projects to achieve a better industry and exceed current best practice. The six principles cover client leadership, procurement and integration, design quality, a commitment to people, sustainability, and health and safety. A focus on whole life value is noted within the design quality principle.

In the context of the foregoing, stakeholders is a term often used in construction. At an organisational level, a stakeholder is defined as a person or group of people who have a vested interest in the success of an organisation, or the environment within which it operates, and at project level a project stakeholder is a person or group of people who have a vested interest in the success of a project and the environment within which the project operates (McElroy and Mills 2000: p.759). The issue of stakeholders in the context of value management will be addressed further in Chapter 13.

To conclude, the 1980s, 1990s and 2000s saw a further significant impetus to reform the way construction operates. Procurement systems were developed based on framework agreements, negotiations, integrated team-working, guaranteed maximum price and cost plus projects that initiated forward-thinking contracts such as PPC 2000, the Defence Estates Prime Contract and the NHS ProCure 21/21+ procedures. PFI/PPP also gained significant ground as a procurement strategy that embraced whole life thinking and value-for-money through the Public Sector Comparator mechanism. VM was advocated as good practice within many of these approaches and some encapsulated it as a formal way of working. The review of reports cited earlier also articulates the increasing momentum towards thinking about value, value for money, stakeholders, whole life value, and not just cost. Some reports reviewed also caution about the inappropriate use of value management/value engineering as purely a cost-reduction methodology.

Section 1.3 reviews briefly developments in value management.

1.3 Developments in value management

The essence of value-based thinking is a focus on delivering value and value-for-money to a client, customer or end-user. Value and value-for-money are multifaceted, are often context-driven, and involve elements of subjectivity, judgement and the need for appropriate measures. In project-based organisations or industries, such as construction, they typically involve consideration of clients, customers, end-users and other important stakeholders that impact or influence projects. In this context, value-based thinking keeps the client, customer, end-user and other key stakeholder requirements to the fore. Its focus is on their requirements, which the Value Management methodology typically expresses as functions. As a management approach, value-based thinking seeks innovative alternatives to meet those functions and requirements. Within the framework provided by these principles, the VM methodology uses tools and techniques to select the

most effective option that best meets those functionally expressed requirements at optimal or least cost and then delivers them efficiently. Typically it will also involve issues around trade-offs, clarity over value-criteria, engagement with the market place and supply chains, and considerations of risks to creating and delivering value throughout the whole process of delivery.

Maximum value as defined by Burt (1975) is obtained from a required level of quality at least cost, the highest level of quality for a given cost or from an optimum compromise between the two. This is a useful definition because it highlights the relationship between value, quality and cost. In this book, the definition of value is extended to include a relationship between time, cost, risk, functionality, and the variables that determine the quality a client seeks from the finished project.

Value management

Value Management is a philosophy, a set of principles, and a formal, structured, value-based management methodology for improving organisational decision-making. Its aim is to optimise organisation performance by increasing effectiveness and efficiency through a Value Study. The basis of a formal value study is as follows:

- It is a function-oriented management methodology that can fit into a wider organisational context at
  - Corporate level
  - Portfolio, Programme and/or Project level
  - Service and/or product level.
- It is a structured, challenging and mediating process involving key stakeholders drawn from across important value interfaces. For example, key user representatives, client senior managers and the different members of the design team. Hence, it involves using the right team at the right time.
- It focuses on exposing, making explicit and exploring a construction client's 'value criteria' and using this subsequently for resolving trade-offs surrounding solutions, options and alternatives.
- It permits different 'value systems' to coalesce to the benefit of the client across a project, Programme, Portfolio and organisation.
- It is a change–oriented methodology.

At project level, Value Management is the name given to a process in which the functional benefits of a project are made explicit and appraised in alignment with a value system determined by the client. It is concerned therefore with optimising the strategic, concept, feasibility, technical and operational aspects of a project and its outcomes against that explicit value system.

This definition applies to all types of projects irrespective of which sector they come from. For example, the project could be the design and manufacture of a product, the design and construction of a building or infrastructure as physical assets or products, the re-evaluation of an organisational process or the provision of a new or improved service in banking, insurance or public services such as education or health.