

**“An Investigation of the Effectiveness of Total Quality Management in
the UK Construction Industry”**

(An Empirical Study)

by

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ABSTRACT

“An Investigation of the Effectiveness of Total Quality Management in the UK Construction Industry (Empirical Study)”

This study examines the application of TQM within the UK construction industry. A review of the literature on TQM and exploratory research within the industry verified the need for research into this area.

Through the study, the attitudes of individuals within companies are examined in order to establish current trends towards implementation of Total Quality Management. The primary sources of data was derived from the literature search. Phase one of the study involved data collection from 92 construction companies experienced in Quality Management or Total Quality Management implementation.

Exploratory field work was undertaken to determine levels of adaptations and the relevance and importance given to TQM in current strategic thinking. Data gathering techniques included a postal questionnaire and an analysis of company financial reporting. Analysis of the data led to the development of further research instruments to analyse and measure TQM and performance.

Six organisations were subsequently selected and assessed involving an in depth case study. The principle findings from the case studies were then validated by further survey, which involved a larger representative sample.

The research indicated that TQM is not yet well established as an overall philosophy within the construction industry in the UK. The leading organisations have 3 to 5 years experience of implementation, and are assessed as low to medium adapters when measured against the European Quality Award Model. Some evidence was found to show that the leading organisations in TQM had achieved improved performance against the industry. The results also show, however, that a high proportion of TQM initiatives fail to deliver expected benefits. The reasons for these differences are examined and best practice identified.

Finally the study shows, implementation is seen as a continuous process of improvement involving 4 essential stages – diagnosis, implementation, measurement and review. Appropriate tools, methods and best practices developed from the research are recommended for addressing each stage.

Information was obtained on the research areas through the use of the following methods:

1. Consultation with quality practitioners and a review of the quality management literature.
2. Questionnaires investigating the quality management practices of over 92 companies (including 11 companies which had implemented TQM).
3. Structured interviews investigating the methods of TQM implementation at 6 leading TQM construction organisations.

The framework was designed as a stand-alone document to be used by quality practitioners, the management board of the organisations implementing TQM and quality management researchers in construction industry.

DEDICATION

This thesis is the most valuable achievement in my life to date. I dedicate it to: -

To my family

My late father and

My beloved mother

In grateful appreciation of their love, support and for their unfailing confidence in my abilities.

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Table Of Contents

		Page
<i>Chapter 1</i>	<i>Thesis Introduction</i>	1
1.1	Success TQM	3
1.2	Objective of the Thesis	3
1.3	The Research Approach	4
1.4	Thesis Outline	5
<i>Chapter 2</i>	<i>Literature Search and Review</i>	
2.0	Quality & Quality Management	8
2.1	The BS 5750/ISO 9000 Series	10
2.2	Definition of Quality	11
2.3	Quality & Construction	12
2.4	Quality Management	12
2.5	Quality Management Procedures	14
2.6	Quality & Quality Gurus	16
2.6.1	W Edward Deming	18
2.6.2	Joseph M Juran	19
2.6.3	Phil B Crosby	20
2.7	Three Guru's Common Ground	21
2.8	Ghobadian & Spell's Opinion	23
2.9	Quality Assurance? The Road to TQM	23
2.9.1	Quality Assurance	24
2.9.2	The Principles of Quality Assurance	25
2.9.3	Objectives of Quality Assurance	26
2.10	Evolution of TQM	28
2.10.1	Total Quality Management	28
2.10.2	Definition and Principles of TQM	31
2.10.3	Core Element of TQM	35
2.10.4	TQM Characteristics	37
2.11	The Need for TQM in Construction	38
2.12	Construction Industry	40
2.13	Quality in the Construction Industry	42
2.14	Client & Contractor	46
2.15	Organisational Change	48
2.16	Organisational Culture	51
2.17	Change	53
2.18	The Management of Change	54
2.19	The Debate on the Effectiveness & Future of TQM	56
2.20	Summary	61
<i>Chapter 3</i>	<i>Methodology</i>	
	Research Methodology	62
3.	Aim	62

Chapter 3 Methodology

3.1	Research Objective	62
3.1.1	The Research Objective, Purpose & Value	63
3.2	Research Approach	63
3.2.1	What is Qualitative Research & How is it Achieved	65
3.2.2	The Principle Criticisms of Qualitative Methods	66
3.2.3	Combined Methods	70
3.2.4	Quantitative Methods	72
3.2.5	Defining the Empirical Variables	73
3.3	Validating and Testing the Case Study Findings	77
3.4	Research Process and Grounded Theory in TQM	78
3.4.1	Grounded Theory	79
3.4.2	Accuracy – Triangulation	82
3.4.3	Level of Participation	82
3.4.4	Grounded Theory Justification	82
3.4.5	Finally	84
3.5	The Research Design	85
3.5.1	The Purpose of the Research Design	85
3.5.2	Literature Search & Review	87
3.5.3	Field Work	87
3.5.4	Exploratory Research	88
3.5.5	Primary Research – The Case Study	88
3.5.6	Validating Research – The Final Questionnaire	89
3.5.7	Developing a Framework for Implementation of TQM in the Construction Industry	90
3.5.8	The View from the Sharp End	90
3.6	How Research was Constructed	91
3.6.1	Creation of the Survey	91
3.6.2	Question Design	92
3.6.3	Introduction Study	93
3.6.4	Data Collection	93
3.6.5	Phase Three – Planning & Designing the Structured Interviews	93
3.6.6	Information Source	94
3.6.7	Contacting Companies	95
3.6.8	Final Company List	95
3.6.9	The Follow Up Study Research Method	96
3.6.10	Phase Four – Case Studies	97
3.6.11	Pilot Study	98
3.6.12	Phase Five – The Status of TQM in Construction Industry (Exploratory Research)	100
3.7	Summary	101

Chapter 4 Tools & Techniques of TQM in Construction Industry

4.1	A Review of the Critical Success Factors for TQM	102
4.2	The Techniques Associated with TQM	105
4.3	The Deming Prize	106

4.4	The Malcolm Baldrige National Quality Award (MBNQA)	107
4.5	The European Quality Award (EQA)	108
4.6	Elements of Success	109
4.7	Leadership	110
4.8	Information & Analysis	113
4.9	Strategic Quality Planning	114
4.10	Human Resource Development & Management	115
4.11	Management of Process Quality	116
4.12	Quality & Operational Results	118
4.13	Customer Focus & Satisfaction	119
4.14	Summary	120
<i>Chapter 5</i>	<i>Discussion of the Main Findings</i>	
5.0	Questionnaire Response Rates (Phase One)	121
5.1	Mailing Questionnaires (Phase Two)	121
5.2	Response Rate	122
5.3	Points to Consider Prior to Analysis	123
5.4	An Analysis of a Research Survey	123
5.5	Conclusion	131
<i>Chapter 6</i>	<i>Case Studies</i>	
6.0	Company Visit Template	133
6.1	High Adapters of TQM in their Organisation	135
6.1.1	“H” Company	135
6.1.2	“I” Company	143
6.1.3	“F” Company	151
6.1.4	“G” Company	156
6.1.5	“P” Company	163
6.1.6	“R” Company	168
<i>Chapter 7</i>	<i>Empirical Evidence</i>	
7.0	Introduction	173
7.1	Evaluation of TQM in Construction Industry	173
7.2	New Empirical Evidence on the Status of TQM with in the UK Construction Industry	174
7.2.1	Financial Quantification of TQM Impact	174
7.2.2	Financial Accounts	175
7.3.	Discussion of the Main Findings	176
7.4	Category 1 - High Adapters	177
7.4.1	Category 2 – Medium Adapters	178
7.4.2	Category 3 – Low Adapters	178
7.5	Analysis of Self Assessment Scores	178
7.5.1	Self Assessment	179
7.5.2	Relative Scores – Within this Study	180
7.5.3	Critical Factor Scores	181
7.6	The Potential for using Self-Assessment	183

7.6.1	An Overall Assessment of Empirical Evidence	185
7.6.2	Performance Outcome Index	187
7.7	Summary	191
<i>Chapter 8</i>	<i>Search for Best Practice</i>	
8.0	Introduction	192
8.1	Background to TQM at “I” Company	192
8.2	Approach to Case Study of “I” Company	194
8.3	Discussion of the Results of Self-Assessment	194
8.4	Validation of Self-Assessment and Performance	196
8.5	Confirmation of Case Studies (Best Practices)	196
8.6	Critical Factors Questionnaire	197
8.6.1	Qualitative Information about Critical Factors	197
8.7	Summary	198
<i>Chapter 9</i>	<i>An Overall Assessment of the TQM Intervention in UK Construction Industry</i>	
9.0	Introduction	200
9.1	Who is leading the Pack?	200
9.2	Concept of TQM	202
9.3	Competitive Strategy	203
9.4	Key Steps for Implementation of TQM in the Construction Companies	203
9.5	Organisational Strategy and Culture of Excellence	205
9.6	Leadership	208
9.7	People Involvement	210
9.8	Employee Management	213
9.9	Benchmarking	215
9.10	Training	215
9.11	View of “I” Company	217
9.12	Teamwork	218
9.13	Communication in the Construction Industry	220
9.14	Management Style & Qualities of Leadership	222
9.14.1	Leadership Behaviour	225
9.14.2	Leadership Understanding	227
<i>Chapter 10</i>	<i>Discussion Conclusion & Final Thoughts</i>	
10.0	Introduction	229
10.1	Discussions and Conclusion	230
10.2	Secondary Findings	233
10.3	In Conclusion	236
10.4	Key Issues/Barriers	238
10.5	Limitations	239
10.6	Final Thoughts	239
<i>References</i>		242

Lists of Tables

			Page
Table	1.5	Thesis Data Collection Techniques	7
	2.1	Summary of Three Gurus Common Ground	22
	2.2	The Usefulness of the Malcolm Baldrige	59
	4.1	The Critical Success Factors Compared	106
	5.1	Mechanisms for Involving Employees	128
	6.1	Company Visit Template	134
	7.1	TQM Factors in Construction Industry Study	176
	7.2	Presence of TQM Factors in 11 Construction Companies in the UK	177
	7.3	Self Assessment Scores	179
	7.4	Company Ranks	181
	7.5	Highest Scores per Critical Factors	182
	7.6	Construction Company Performance Index (1999-2004)	189
	8.1	Self Assessment of 5 Business Unit "I" Company 2003	193

Lists of Figures

		Page
Figure 2.1	The Quality Management System	14
2.2	Developing a Quality Management System	15
2.3	The Quality Guru – 9 Points in Common	23
2.4	The 9 Step Process to Continuous Improvement	45
2.5	Organisation Change	49
3.1	Steps In Analysis Induction	67
3.2	The Chief Components of Grounded Theory	67
3.3	How Qualitative Research can be Evaluated	68
3.4	Case Study Tactics for 4 Design Tests	70
3.5	Definitions of Variables	74
3.6	Analysis of Variables	77
3.7	Generic Grounded Theory Research Methodology (modified from Strauss and Corbin, 1990)	80
3.8	Research Design	86
4.1	List of Criteria for Deming Application Prize	106
6.1	“P” Company TQM Structure	163
6.2	“P” Company Benchmarking Process Model	165
6.3	“R” Company TQM Tea Structure	170
7.1	Level of Success from Implementation of TQM in Construction Organisation	186
9.1	A Framework for Implementation of TQM in UK Construction Company	204
10.1	Summary of Different Approaches (Type 1)	232
10.2	Summary of Different Approaches (Type 2)	233
10.3	Progress of TQM initiative v Time	234

GLOSSARY OF ABBREVIATIONS

BS	British Standard
BSI	British Standard Institute
BPR	Business Process Re-engineering
BQA	British Quality Association
BRE	Building Research Establishment
CEO	Chief Executive Officer
CI	Construction Industry
CIB	Construction Industry Board
COQ	Cost of Quality
CIOB	Chartered Institute of Building
DTI	Department of Trade and Industry
EC	European Community
EFQM	European Foundation for Quality Management
Et al	Et alii – and others. Reference to a work with multiple authors
Ect	Etcetera
GDP	Gross Domestic Product
HMSO	Her Majesty's Stationery Office
HR	Human Resources
ie	Id est – that is (to say)
IBM	International Business Machine Corporation
ISO	International Organisation for Standardisation
IT	Information Technology
JIT	Just In Time
MD	Managing Director
QA	Quality Assurance
QC	Quality Control
QIT	Quality Improvement Team
R & D	Research and Development
SPC	Statistical Process Control
TQM	Total Quality Management

Chapter 1

In the quest for superior quality performance numerous construction companies in recent years have initiated Total Quality Management (TQM). In many cases this has been a follow on from achievement of ISO9000 Quality System registration. While there is little objective data to quantify how many of these companies have successfully implemented TQM, it has widely reported (Crosby 1989 & Atkinson 1990) that a large percentage of TQM initiative fail to achieve their full potential.

This thesis examines the status of TQM within the construction industry (CI) in the UK. The research will show a shift to dynamic environmental conditions, characterised by deregulation, maturing markets, fierce competition, and move towards global services, technological advance, and harsh economic conditions. As a consequence of these changes organisations in the CI are seeking new ways to improve their performance. The research will show that many of the larger organisations are turning to TQM as a key part of their strategy for change.

TQM, which has been successful, applied in other industries, presents a possible platform for effecting desired improvements necessary for regaining lost market share in the UK construction industry.

The logic underlying TQM is based on the premise that organisations prosper by consistently meeting a set of customer needs. To survive they must do this at least as well as competitors; to gain advantage they must have some core competencies which competitors find hard to duplicate. Based on the author's interest in TQM and the ongoing research in the area of Quality Management at Heriott Watt University. This project was undertaken with the intention of gaining a better understanding of how construction companies approach the implementation of TQM.

The main objective of the thesis was to examine in detail the various aspects of successful implementation of TQM in the UK construction industry. In order to address this hypothesis 6 objectives were set for this study.

- To establish when is TQM considered a success?
- To establish what is a suitable time frame in which to examine a company's success in implementing TQM?
- To examine what results these company groups have reported from their TQM efforts.
- To identify which measures companies use to assess progress of TQM implementation.
- To establish what techniques are used to gather, analyse and present TQM measurement data.
- Who is responsible in companies for measurement in the various areas of TQM?

Some authors would argue that a company never reaches TQM since this is a never-ending journey. This raises the question, is it possible to measure TQM progress comprehensively until all the elements of TQM have been built into a company's method of operation?

Williams and Bertsch (1989) contend that strong world class products and services can only be achieved when a company has reached the stage of being able to compete for Deming Application Prize or the Baldrige Award of the European Quality Award.

The decision to implement TQM as the prime vehicle for improved performance and competitive advantage poses difficult questions, how does a company know when TQM is being implemented effectively? Given the considerable resources allocated by companies to TQM it is extremely important that there is a clear framework to measure (a) How successful is implementation of TQM in a company? And (b) how much a TQM initiative contributes to the strategic business objectives of a company? It follows that if a company cannot define and measure progress of TQM implementation, how therefore can it determine if its TQM efforts are successful or not?

TQM is a management system based on a customer focused, strategic and systematic approach to continuous improvement (Construction Industry Institute 1990).

1.1 Success TQM

This aspect of the hypothesis statement is the most difficult to define ie what is meant by successful TQM? What might be termed success in one company would be considered failure in another company.

For the purpose of this project the author decided that a company could judge its TQM efforts to be successful if the company satisfied all the criteria:

- (i) Had in place the 5 critical factors (leadership, policy and strategy, people management, resources and processing) of TQM;
- (ii) Could submit its TQM process to independent assessment by a third party eg a Baldrige or EFQM examiner.

These 2 requirements take into account the varying levels of success that may be achieved during TQM implementation.

1.2 Objective of the Thesis

The over all objective of this thesis is to examine the relationship between construction and the implementation of TQM. Through the process and content of this study it is hoped that the findings and discussion will contribute in the following areas:

- 1) Organisation attempts to improve levels of quality;
- 2) The development of the theory of quality management;
- 3) Investigate the effects of TQM on performance in the construction companies;
- 4) Identify critical factors for success of TQM.

The research objectives for this study have been compiled from an extensive review of the literature as the critical factor, principles and techniques of TQM. These criteria may be fitted within an established framework, The European Quality Award (EQA) self-assessment model. This provides a structure, and a mode, which can be

use for designing data collection and analysis tools. An interview pro-forma and interview transcription pro-formas have been designed to ensure that the process of data collection is systematic, and the method capable of repetition. Multiple interviews (chapter 6), Multiple sources of data (chapters 6 and 8) and pre-case study trails have been incorporated into the research design (chapter 3).

1.3 The Research Approach

The 3 main tools used to obtain information, to develop TQM implementation framework, were a literature review, questionnaires and structured interviews.

Literature on all aspects of 'Quality Management' helped to provide a detailed understanding of the state of quality management today in terms of its research and its application within the construction industry. The review of literature identified the need for a TQM implementation framework and identified the areas, which needed to be addressed in its construction. Chapter 2 describes in detail how a literature review shaped the development of the research. The references list the numerous books and papers reviewed during the period of the research.

Questionnaires were used to obtain information on the areas identified for research by the literature review. One sample was a randomly selected sample of construction companies and a second was a sample of constructive companies, which had probably implemented TQM. The questionnaire obtained information on a company's organisational characteristics, the Quality Management Activities used, the effects of quality/management activities on business performance, the training and education of employees, and specific details on organisations, which had implemented TQM. Chapters 3 and 5 describe the planning, design and analysis of the questionnaire.

Structured interviews were used to obtain information on the areas identified for research by the literature review. Structured interviews obtained information on TQM policy formation, current methods of implementing TQM, the effects of TQM on business performance, factors affecting the success of TQM and obtaining information on problem solving, team activities, statistical process control, quality

systems, quality cost, customer focus and education and training. Chapters 3, 4 and 7 describe the planning, design and analysis of the structured interviews.

1.4 Thesis Outline

The aim of this dissertation is to investigate the different stages that an organisation must pass for implementing TQM.

Through the research, the attitudes of individuals within companies are examined in order to establish current trends towards implementation of TQM as a means of doing business and addressing the quality management problems in construction.

This thesis consists of 11 chapters. The first chapter is the introduction to the thesis, and chapter 2 reviews the literature to provide the foundations for this study. In chapter 2 quality, quality management and TQM are examined and the critical factors for success, the founding principles and the associated techniques are identified. Also the construction industry is examined in depth. Chapter 3 and 4 describe the research methodology, research objectives and purpose and value. The chapter presents development of combined qualitative and quantitative methods. Exploratory research included an analysis of corporate reporting and a postal survey of industry executives. This particularly provides a preliminary indication of interest levels, opinions and identifies high adopters of TQM methods. Case studies are used to carry out in depth investigations into the use of TQM, using an established framework for TQM, the European Quality Award (EQA). Finally a further postal survey of industry executives and managers is undertaken to assist the process of validation of the principle findings.

In chapter 5 TQM is examined and the critical factors for success, the founding principles, and the associated techniques are identified.

Chapter 6 presents the results of exploratory research exercises. A postal survey is undertaken to establish the views of industry executives on TQM and strategy.

Chapter 6 and 7 presents an analysis of in-depth case studies. Six constructive organisations were examined using the EQA framework to guide the process of data collection, and evaluate the findings. Different approaches are presented and the strengths and weaknesses of each are identified. Best practices are identified from the case studies. Also the published accounts and annual returns of each construction organisation are scrutinised for the presence of TQM factors.

Chapter 8 repeats the case study methodology with an in-depth investigation of 5 business units of a major construction company. This process provides new qualitative data on a major construction industry organisation pursuing a corporate strategy of TQM implementation and assists the process of validation of the research finding arising from case studies.

In chapter 9 further analysis and evaluation of the case studies are presented. The impact of TQM on performance is investigated. Evidence of the reason for the success or failure with TQM implementations is explored, and some conclusions drawn from the research is evidence. The strategic implications of these findings on different approaches are examined.

Finally, chapter 10 gives a summary of the dissertation, and draws conclusions from the research findings. A new framework for the implementation of TQM in the UK construction industry is recommended, best practices identified and barriers to success are examined.

The strength of the research findings is in the discovery of the status of TQM within the construction organisation. The identification of different approaches to implementation, the strengths and weakness of each, and in the identification of the industries best practices. In a wider context the findings also show further evidence of the link between TQM and performance improvement, adding to other empirical studies. Finally the study draws together the principle findings to present a new framework for TQM implementation in the UK construction industry, which includes the methodologies developed in this study, the best practices identified in the research and the barriers to success.

1.5 Thesis Data Collection Techniques

Research Stage	Nature of Data	Techniques	Sources
Literature Search	Qualitative & Quantitative	Document & Analysis	<ul style="list-style-type: none"> • Online Search • Thesis Search • TQM books and journals • Business and Engineering journals • Media Articles
Phase 1	Quantitative	Post Questionnaires (survey)	UK Construction Companies
Phase 2 a) Pilot Survey b) Case Study	Qualitative	Discussion Structured Interview	TQM Consultants and Academic Staff TQM Construction Companies
Phase 3 Mail and Interview Survey	Quantitative and Qualitative	Survey	TQM Companies Leader

Chapter 2

A literature search was conducted to gather information from the profusion of writings published in the area of quality, TQM and measurement.

The search provided insight into the principles of TQM; techniques associated with TQM, organisation of the construction industry and finally debate on the effectiveness and future of TQM in the construction industry.

2 Quality and Quality Management

In the 20th century two major events revealed much about the importance of quality considerations to the national competitiveness. Two major events took place after the Great War, which had a profound effect of the World's economy. The first event was the start of the Second World War, and the second was the oil embargo in 1974.

Those events were milestones in the history of the development of quality management in industrial countries worldwide. It brought prosperity to some and decline to others.

It is remarkable that both Japan and West Germany who's military conceded defeat the war have now stronger economies than the Allies. Although for many years after the war, Japan and West Germany did not have to spend on massive defence budgets, as did the Allies that did not give them a clear advantage in the economical sense.

The economic prosperity of any industrial country is through its ability to export the goods manufactured. Yet during the period that followed World War II, the Allies industries had free access to captured markets.

However, what has to be taken into consideration is at time British products were perceived as having excellent quality by comparisons with the goods manufactured in other countries. Products after all were built to last forever, particularly heavy machinery, which was also renowned for its reliability.

Thus the opposition found it difficult at the start to break into these markets. However, gradually through promoting quality products at competitive prices the battle for market dominance was beginning to slope towards industries that supplied superior quality products irrespective of their country of origin.

The second major event, which affected the progress and direction of our perception to quality in the 20th century, was the oil embargo in 1974, which affected almost all industrial countries. The increase of oil prices from \$5 to \$35 a barrel led to an increase in the cost of production of manufactured goods thus resulting in export prices also increasing dramatically. Hence the developing countries, being the market place for the world's industrialised countries, naturally demanding fewer imports and only purchasing what they were able to afford.

In Japan the oil crises invoked further campaigns for cutting waste and rejects by using methodologies of Just-in-time and Zero Defects to reduce the unit cost of their production methods. Not only was this achieved to make their prices more affordable to importing customers but also to make their products more competitive over other producers in the market. Thus they upstaged their quality campaign in order to give their customers further future assurance in products purchased as being value for money combined with fitness for purpose.

Oil producing countries that benefited from the additional revenue were able to spend more on their development programmes. Inevitably British manufacturers then held a large initial slice of the market, however, that slice decreased by the year due to uncompetitive prices and relative sub-standard quality of products and services. The problem was recognised in Britain, and committees were set up to report on possible strategies to try and overcome. At that time the Japanese, the West German and many Pacific Basin countries were elevating their own quality programmes.

A study in 1978 estimated the cost to British industry of not adopting a quality approach, in terms of unnecessary extra work and product replacement due to faults was some £10 billion or 10% of the GDP (DTI-0, 1986 pg 6).

In 1979, the first British standard on quality management systems was published (BS5750 Parts 0,1,2 and 3, 1979). A white paper was later published in 1982 (Standards and International competitiveness, Cmnd, 8621, 1982), which outlined the government's determination to enhance the status of standards and quality assurance in the UK. Many years have elapsed and only now are these initiatives bearing fruit with such success stories of British industries, such as British Airways, Ford, British Telecom and others.

2.1 The BS5750/ISO9000 Series

BS5750 is the UK national standard for quality assurance. Suppliers and purchasers throughout the UK industries can use it. It was based on the philosophy that, *'Quality cannot be inspected into a product or service. Therefore, it must be built into the organisation structure.'* Quality has different meanings, and also different interpretations to different people, but BS5750 looks at it in the *'fitness for purpose and safety'* sense (DTI-1, 1987).

BS5750 was used as the basis for the International Standard ISO9000. BS5750/ISO9000 series are designed to provide customers with some degree of confidence that the product will conform to specification through the maintenance and management of a quality assurance system (QA). However, BS5750/ISO9000 series gives no guarantee either that the product will conform, or the specification, fully conform to its intended use (Mortiboys-1, 1987).

Therefore, it is not the intention of this thesis to discuss in depth the procedural applications of BS5750, other than reflect on its excellent role as a unifying quality standard aimed at giving customers confidence before purchasing a specific product or service. Much work has been done to explain and simplify the applications of BS5750 for a specific organisation. Thus, there will be little reward in duplicating the work carried out already by many organisations and many quality assurance managers and consultants. Nevertheless, while BS5750 will rightly remain as a comprehensive quality assurance standard with which quality systems need to comply, quality management will have a vital complementary role in attaining the ultimate quality goal.

2.2 Definitions of Quality

“Quality is one of today’s most misunderstood and abused words. The meaning of quality is very much dependant upon the context in which it is used and the perception of the persons transmitting and receiving that message. Indeed, the word quality may often, quite deliberately, be used ambiguously.” (Bendell Etal; pg 13, 1994)

David Garvin, a Professor at the Harvard Business School and the author of ‘Quality Management,’ (1988), gives a contrasting view in his description of the difficulties associated with defining quality:

“Quality is an unusually slippery concept, easy to visualise and yet exasperatingly difficult to define. It remains a source of great confusion to manager, leading to a frequent but empty claim, ‘I know it when I see it.’ Quality improvement is unlikely in such settings.” (David Garvin 1988, pg xi)

Crosby (1979) defines quality as, ‘*Conformance to requirements or specification.*’ He suggests that, in order to manage quality adequately, the attributes of quality should be measurable. His definition emphasises the engineering and manufacturing aspect of quality control eg consistence and conformance of products. A quality product is one with all the attributes and characteristics conforming to the predetermined specification.

Another commonly use of quality is “*Quality fitness for purpose of use*” (Juran, 1979). This definition places emphasis on the functions of products, including ‘*quality of conformance*’ as well as quality of design. The requirement of consumers has been concerned in product design and specification. Although many different definitions for quality were cited, not surprising, not a single one was found all embracing. Garvin (1988) presented a method of categorising his cited definitions according to the five principal approaches. They are: Transcended, product based, user-based, manufacturing-based and value-based. However, defining quality does not make its understanding much easier. For quality has many characteristics or dimensions, spread over many phases of the production or servicing process. In order to be able to evaluate quality, BS4778: (1979, Clause 4.1 – 4.11) calls for the

identification of these characteristics and features bearing upon the *'fitness for purpose'* of product and service. The code also states that the ability to *'satisfy a given need'* includes economics as well as availability, maintainability, reliability, design and other characteristics that the need of product or service involves.

2.3 Quality & Construction

"Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied term."

(BSI pg 3)

The Building Research Establishment (BRE), in attempting to answer this question related to buildings, what is quality? Defined it as *"the totality of the attributes of a building which enable it to satisfy needs, including the way which individual attributes are related, balanced and integrated in the whole building and its surroundings."*

By the early 1990 it had become an act of managerial heresy to argue against *'Quality'* (Micklethwait and Woodridge: 1996, 30) over the year the expectations of project owners increase. Project owners want their projects to be constructed on time to a price that is value for money and to a quality that matches or betters the specification. *"Faster, cheaper, better quality is about exceeding the client's expectations"* (Geoff Reiss: 1996,237).

2.4 Quality Management

The industrial revolution, which took place in the 18th and 19th centuries, has forced the evolution and development of the various methods used in controlling the quality of products and later services.

In the 1950's the Quality movement was strongly influenced by the techniques of both Japanese and US Quality Gurus including Dr Deming, Juran, Crosby, Feigenbaum, Ishikawa, Taguchi etc. By 1965 Japanese organisations had their entire workforces

involved in continuously improving the manufacturing process and were strongly proactive in the pursuit of Quality Improvement.

In the UK BS5750: "Quality System" was issued in 1979. Also in 1979, BSI started its registered firms of assessed capability scheme and issued a consultative document titled "The Quality Assurance Council of BSI – its present and future role."

By the mid 1980's, in part due to competition from Japanese imported products and services, it became apparent throughout European companies that traditional quality control theory and methodologies were no longer sufficient to compete with these imported products. One by one companies began to realise that Quality could be considered as a strategic business variable and that because of the ever increasing expectations of customers what yesterday passed for quality may today no longer match customer's expectations

"The quality management system adopted must be an evolving one with improved organisation design and human resource practises, new practises, new methods and new regulations" (Pheng and Omar: 1997, 38).

BS5750 (1979) defined Quality Management as, *"that aspect of the overall management function determines and implements the quality policy."*

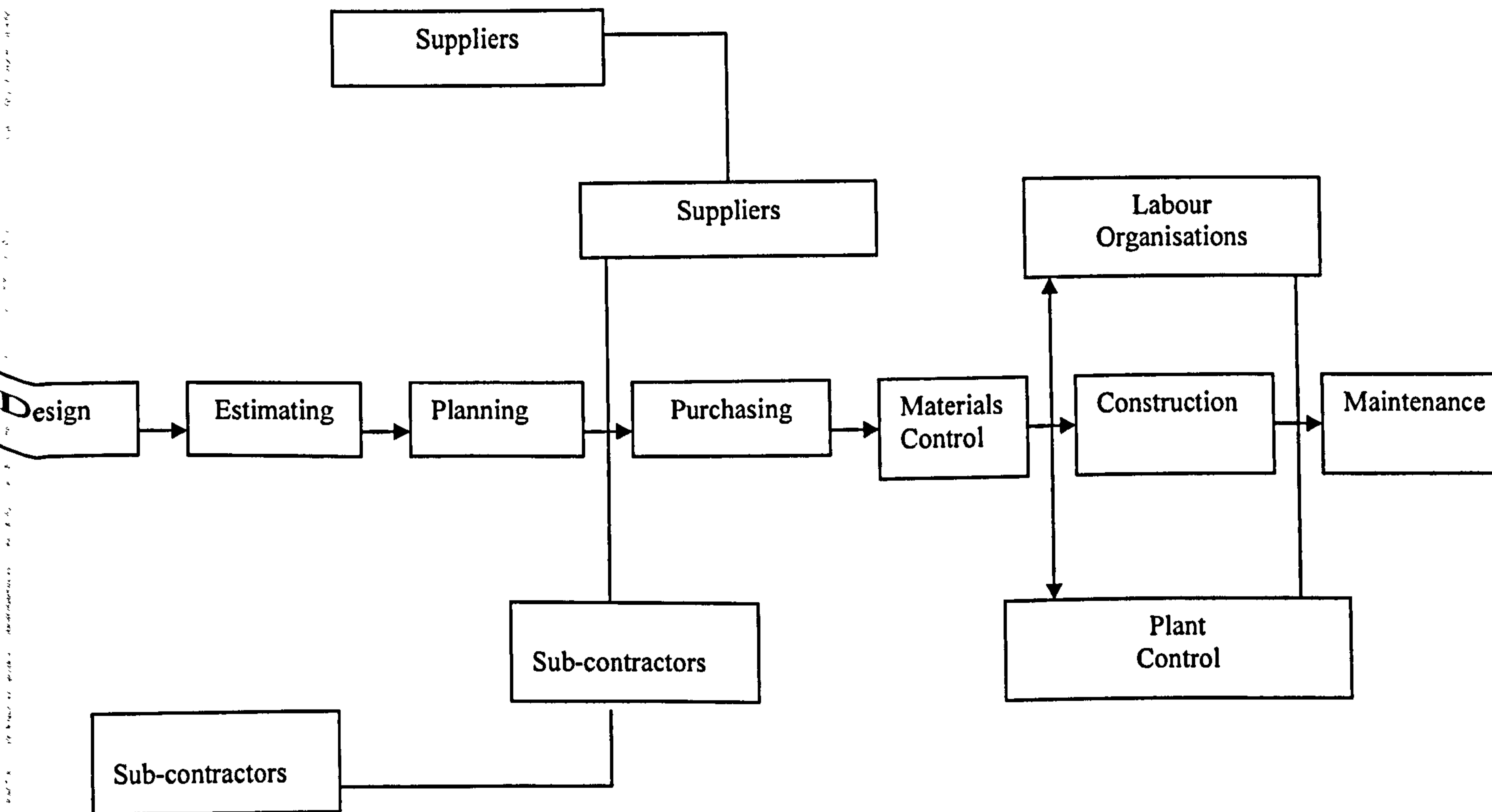
Quality Management is concerned with the organisation taking a good hard look at itself, and considering how it might improve what it does. There may well be benefits efficiency and productivity, and cost savings (Lavender, S. 1996, 235).

Within the requirements the customer's needs may include performance, availability, delivery, reliability, maintainability and cost effectiveness, amongst many other features. The ability to meet the customer's requirements is vital. The management methods, which were appropriate for the 70's, 80's and 90's, are not appropriate for the 21st century. Companies and organisations which keep doing what they have always done will find that they are becoming less and less competitive or effective.

2.5 Quality Management Procedures

It is necessary to provide written standards when dealing with measurements. In a large organisation the function of quality manager is to oversee and co-ordinate the writing and implementation of these procedures. His/her aim is to ensure that they are consistent, readily understood and carried out correctly. Procedures should be written only by the person or team who is/are responsible for them being carried out as he/she/they are the most able to adopt and adapt present practice. However, it is expected and assumed that the procedures will need to be revised and updated.

Figure 2.1 The Quality Management System



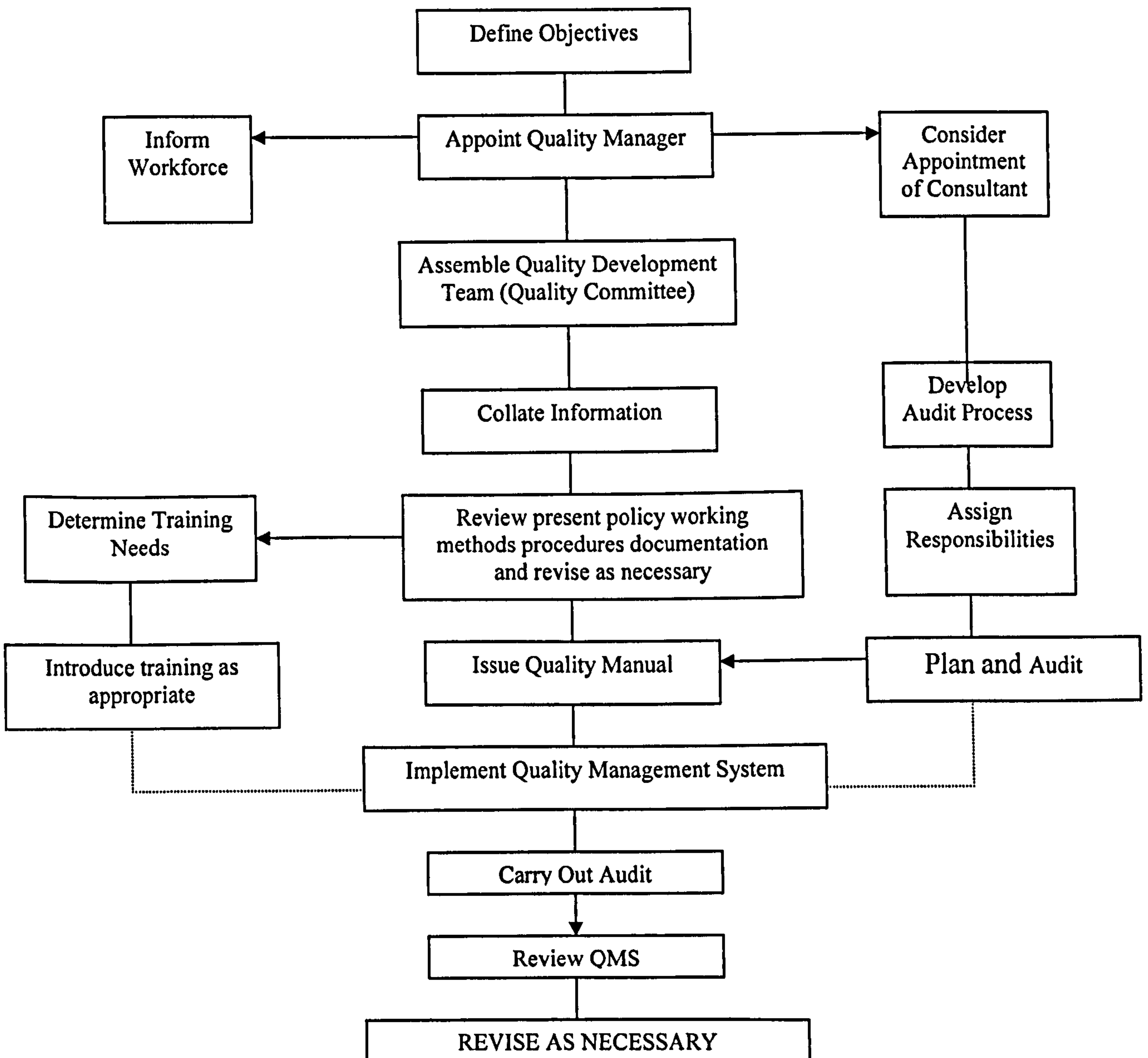
(Source; Construction Industry Training Board, "A Guide to Managing Quality in Construction," 1991)

Quality Management within the construction would include all activities, such as decision work, work on site, commissioning, repair and maintenance services as well

as products and their manufacture and is clearly shown in the above diagram figure 2.1.

A systematic approach is required when implementing a quality improvement programme. Each author provides guidelines based on experience, radical thinking and much research. An examination of the various approaches would suggest that there are 6 distinct stages to implementing a quality system as it is represented in figure 2.2.

Figure 2.2 Developing a Quality Management System



(Source: *"A guide to Managing Quality In Construction," Construction Industry Board, 1991*).

The importance of planning is stressed by many authors, but none more strongly than Oakland (1993) who regards "systematic planning" to be a basic requirement for effective quality management in all organisations. Two important components underpin any effective implementation plan. There must first of all be some idea of the considerable amount of time required to perform each phase effectively. Secondly, individuals must be prepared actively to do something. It is believed by Crosby (1979 *Quality is Free*) that the most difficult lesson to learn is that, *"real improvement just plain takes a while to accomplish."* *"Quality must be designed into a product before manufactured by the translation of purchaser requirements into practical designs and specifications that permit production, maintenance and servicing to be technically and economically feasible,"* (Broomfield, *'Quality Construction*).

2.6 Quality & Quality Gurus

"Four decades ago, inspired by two Americans, Juran and Deming, the Japanese began to think differently. In the long-term Deming argued, you stay competitive and in business by being the best there is, not necessarily the cheapest, by taking the customer seriously and giving him or her what they want and need. The product comes before the money. Quality be maintained, however, is only achieved if everyone is always concerned first of all to improve their own quality at work, eliminate mass inspection, said Deming, in what came to be his famous 'fourteen point' drive out fear, break down barriers, get rid of slogans and targets, encourage people to educate and develop themselves to work in teams, to think for themselves, and to believe that everything can be improved forever." (Charles Handy 1992).

Today it is clear that companies cannot sustain prosperity without providing increasing value to the customer over a period of time. Those that take short-term advantage of the customer may not be around in the long term. The world simply filled up: too much product chasing too few customers. Customers began to exercise

their choice. They sought value: more features, better reliability, more support for their money. Companies who had maintained high standards found customer's flocking to them. Most companies today are making improvements – everyone knows that standing still is not a viable option. The dilemma for some is that they are not improving fast enough. They are caught in the quality gap between their rate of improvement and the customers' accelerating expectation (S Smith 2000, PP17).

2.6.1 W Edward Deming

Dr Deming was the first of the American quality consultants to work in Japan after the Second World War; infact, he is seen by many as being responsible for the development of the current attitudes towards quality in the Japanese industry.

In 1950, Deming introduced a comprehensive management system, which is the model for Japanese-style management, or total quality management (TQM). TQM uses statistics to analyse variability in production processes in order to improve the product quality continuously. Quality is whatever the customer needs and wants and, because the customer's needs are always changing, the solution to defining quality in terms of customer is to focus continually on customer research; Deming's basic philosophy on quality is that productivity improves as variability decreases. A statistical method of quality control is needed because of variations. He is an advocate of worker participation in decision-making. Deming also claims that management is responsible for 94% of quality problems. He also points out that it is management's job to help employees work smarter, not harder." (Pindur et al 1995).

Deming encouraged the Japanese to adopt a systematic approach to problem solving, which later became known as the Deming or Plan-Do-Check-Act (PDCA). He saw the importance of the role of senior management and urged them to become involved in their company's quality improvement programs. After all, in his view, they were responsible for over 90% of the problem.

In his book "*Out of Crisis*" (1986) Dr Deming describes what he says is a "*comprehensive philosophy for management.*" He describes his work over 30 years and particularly his experiences working in post-war Japan. He claims that some of

this early pioneering work in the USA, based largely on statistical process control methods showed promising signs and was taken up by several large American corporations with some success. However, to his disappointment most of the principles were dropped after the war as US industrialists enjoyed for a time favourable market conditions.

The most widely quoted of his contributions is his list of 14 points in which he sets out his approach to total quality. In these points he stresses the elimination of numerical targets, performance appraisals and inspections.

Deming's 14 Points.

- 1) Create consistency of purpose toward improvement of product and service, with the aim to become competitive and stay in business, and to provide jobs.
- 2) Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
- 3) Cease dependence on inspection to achieve quality. Eliminate the need for inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
- 4) End the practice of awarding business on the basis of price tag. Instead, minimise total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
- 5) Improve constantly and forever the system of production and service, to improve quality and productivity and thus constantly to decrease costs.
- 6) Institute training on the job.
- 7) Institute leadership (see point 12). The aim of leadership should be to help people and machines and gadgets to do a better job. Leadership of management is in need of overhaul, as well as leadership of production workers.
- 8) Drive out fear, so that everyone may work effectively for the company.
- 9) Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
- 10) Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity.

- 11) Eliminate work standards (quotas) on the factory floor. Substitute leadership.
 - b Eliminate management by objective. Eliminate management by numbers, numerical goal. Substitute leadership.
- 12)a Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervision must be changed from sheer numbers to quality.
- 12) b Remove barriers that rob the hourly worker of this right of pride of workmanship. This means, inter alias, abolishment of the annual or merit rating and of management by objective, management by the numbers.
- 13) Institute a vigorous program of education and self-improvement.
- 14) Put everybody in the company to work to accomplish the transformation. The transformation is everyone's job.

2.6.2 Joseph M Juran

He too, was invited to Japan in the early fifties and, along with Deming, is credited with part of the success of Japanese companies. His reputation as perhaps the top quality guru was obtained through the publication in 1951 of the huge manual, "The Quality Control Handbook." While Deming taught the Japanese how to obtain continuous quality improvements through the application of statistical process control, Juran advocated quality improvement through management. Central to his philosophy is that the impetus must come from the top and his essential message to managers is expressed through 3 basic quality related processes: quality planning, quality control and quality improvement. These have become known as the 'Juran Trilogy.'

Juran (1988) contends that less than 20% of quality problems are because of workers. Management and faulty processes cause the rest. Accordingly, all managers should have training in quality in order to oversee and participate in quality improvement projects (Pindur et al 1995).

Juran's 10 Steps to Quality Improvement

1. Build awareness of the need and opportunity for improvement.
2. Set goals for improvement.

3. Organise to reach the goals (establish a quality council, identify problems, select projects, appoint teams, designate facilitators).
4. Provide training
5. Carry out projects to solve problems.
6. Report progress.
7. Give recognition.
8. Communicate results.
9. Keep score.
10. Maintain momentum by making annual improvement part of the regular systems and processes of the company.

2.6.3 Phil B Crosby

“Crosby (1979) is best known for his concept of zero defects. Accordingly to his definition, quality is conformance to requirements and it can only be measured by the cost of non-conformance. Crosby lists 3 components that can be used by organisations to prevent non-conformances – determination, education and implementation.” According to Crosby (1984) the performance standard for quality is zero defects and what zero defects means is not that people never make mistakes, but that the company does not start out expecting them to make mistakes. Do it right first time and zero defects. According to Crosby this can be 35% of operating expenses for service companies.

Crosby's 14 Steps to Quality Improvement

1. Make it clear that management is committed to quality.
2. Form quality improvement teams with representative from each department.
3. Determine where current and potential quality problems lie.
4. Evaluate the cost of quality and explain its use as a management tool.
5. Raise the quality awareness and personal concern of all employees.
6. Take actions to correct problems identified through previous steps.
7. Establish a committee for the zero defects programme.
8. Train supervisors to actively carry out their part of the quality improvement programme.

9. Hold a 'zero defects day' to let all employees realise that there has been a change.
10. Encourage individuals to establish improvement goals for themselves and their group.
11. Encourage employee to communicate to management the obstacles they face in attaining their improvement goals.
12. Recognise and appreciate those who participate.
13. Establish quality councils to communicate on a regular basis.
14. Do it all over again to emphasis that the quality improvement programme never ends.

2.7 Three Guru's Common Ground

Table 2.1 summarises and illustrates the views of Crosby, Deming and Juran. The table is adapted from an analysis by Oakland (1989). A final column is added to highlight areas of common ground. The table agrees with Hill and Wilkinson's (1995) conclusions, confirming an emphasis on customer orientation, process orientation, and continuous improvement. However, it also shows that a strong emphasis has also been given to leadership commitment, organisation and resources for quality, measurement, and supplier relations. Underlying attitudes to people and processes are also emphasised, for example, participation, teamwork, empowerment and prevention.

	Crosby	Deming	Juran	Common Ground
Definition of quality	Conformance to requirements	A predictable degree of uniformity and dependability at low cost and suit to the market	Fitness for use	Focus on customer satisfaction.
Degree of senior management responsibility	Responsible for quality	Responsible for 94% of quality problems	Less than 20% of quality problems are due to workers	Top management must be committed
Performance standard motivation	Zero defects inspection	Quality has many 'scales;' use statistics to measure performance in all areas; critical of zero defects	Avoid campaigns to 'do perfect work'	Long-term journey. Avoid campaigns. Everyone involved, Measure performance.
General Approach	Prevention, not inspection	Reduce variability by continuous improvement; cease mass inspection	General management approach to quality, especially 'human' elements	Prevention/right first time continuous improvement of processes, people empowerment
Structure	14 steps to quality improvement	14 points of management	10 steps to quality improvement	Organise for quality
Statistical process control (SPC)	Rejects statistically acceptable levels of quality	Statistical methods of quality control must be used	Recommends SPC but warns that it can lead to 'tool – driven' approach	Use of SPC or zero defects.
Improvement basis	A 'process,' not a programme; improvement goals	Continuous to reduce variation; eliminate goals without methods	Project-by-project team approach; set goals	Continuous improvement of process
Teamwork	Quality improvement teams; quality councils	Employee participation in decision making; break down barriers between departments.	Team and quality circle approach	Participation Teamwork approach Leadership/human relations skills Cross functional teams
Cost of quality	Cost of non-conformance; quality is free	No optimum, continuous improvement	Quality is not free, there is an optimum	Measure: <ul style="list-style-type: none"> • costs of non conformance • process improvement • waste
Purchasing and goods received	State requirements; supplier is extension of business; most faults due to purchasers themselves	Inspection too late; allows defects to enter system through AQLs; statistical evidence and control charts required	Problems are complex; carry our formal survey	Supplier seen as an extension of business
Vendor rating	Yes and buyers; quality audits useless	No, critical of most systems	Yes, but help supplier improve	Supplier seen as an extension of business
Single sourcing of supply		Yes	No, can neglect to sharpen competitive edge.	Build lasting relationships price not sole determination

2.8 Ghobadian & Speller's Opinion

A study by Ghobadian and Speller (1994) has similarly compared the principles of quality. In this study the authors have compared – Deming, Juran, Crosby, Feigenbaum, Taguchi and Ishikawa. The results of their analysis are presented in Figure 2.3. The study identifies 9 points in common, and the authors have concluded that there is a strong measure of agreement on the underlying principles of quality.

The study by Ghobadian and Speller (1994) confirms the common ground identified from the analysis of table 2.1 but also shows an emphasis on education (distinct from training) and stresses quality as a company wide activity (not a separate function).

Figure 2.3 The Quality Gurus – 9 points in common

1. The importance of controlling the process not the product.
2. The importance of not forgetting the human process.
3. That top management is responsible for Quality, not the workforce. Provide leadership and commitment.
4. The management determines the climate and organisation for quality.
5. That education and training are highly important.
6. The emphasis is on prevention of defects, not inspection.
7. Quality is a long-term process of continuous improvement.
8. All parts of the organisation must be included; quality is not a separate function.
9. Quality is a company-wide activity.

Source (adapted from Ghobadian and Spellar 1994).

2.9 Quality Assurance? The Road to Total Quality Management

In recent years increasing concern has been expressed over the standard of work achieved in building construction. With the modern sophistication of build environment and rapid change in materials and building technology, the need for specialist expertise and the use of subcontract labour has fragmented the design and

construction of buildings so that the job of defining and communication the quality required has to be more explicit and well planned.

Modern theories and methods of quality management arose from the industrialisation in the late nineteenth and early twentieth centuries, and developed rapidly during and after the Second World War. Among those effective theories and methods of Quality Management was Quality Assurance (QA).

Quality Assurance was developed originally from manufacturing activities to meet the need for controlling quality of supplied products. The establishment of third party quality certification, especially the quality accreditation and quality certification systems in many countries, enable the wider application of the philosophy and methods of quality assurance in various industrial areas. In the early 1980's quality assurance was introduced into construction practises in the UK.

2.9.1 Quality Assurance

To quote Juran 1979, "Quality Assurance is the activity of providing, to all concerned, the evidence needed to establish confidence that the quality function is being performed adequately."

The overall aim of Quality Assurance within the construction process is to provide the client with a product that will be:

- Suitable for the intended purpose;
- Properly constructed;
- Satisfactory in performance;
- Value for money

The Royal Institution of Chartered Surveyors (RICS 1989) state that a management process designed to give confidence to the client by consistency meeting stated objectives.

Quality Assurance involves not only setting up standards, but also documenting those standards and the procedures for achieving them and then implementing a program to assure that quality is achieved.

‘A systematic way of ensuring that the organised activities happen in the way that they are planned. It is a management discipline concerned with anticipating problems and creating the attributes and controls, which prevents problems arising (CIRIA Report 1985).

2.9.2 The Principal of Quality Assurance

Quality Assurance, to quote Juran 1979, *“Is the activity of providing, to all concerned, the evidence needed to establish confidence that the quality function is being performed adequately.”*

The mechanism of quality assurance is based on the following principle: if evidence shows that a quality management system is established and implemented effectively in accordance with relevant requirements, confidence can be gained that quality of the products delivered under such a system will be constantly maintained at a satisfactory level. Such evidence is obtained from quality audits to the quality management system eg inspection into documents of the system and relevant records, which are produced by implementing the system.

The purpose of quality assurance falls into at least one of the following 3 bands:

- 1) To gain customer’s confidence on quality of the products so as to obtain market share;
- 2) To satisfy the requirements from larger purchase organisation(s);
- 3) As a part of the business development strategy designed by the top management.

Quality Assurance is a management process designed to increase confidence in a product or services by consistently meeting stated interim objectives (Kemp 1987). Kemp maintains that cost effective quality assurances will result in improvement in efficiency, productivity and profitability.

- a) Assurance of fitness for purpose;
- b) Completion on time;
- c) Provision of an as-built record of the project;
- d) Cost savings resulting from fewer errors.

The responsibility for assuring quality involves all employees, contractors, suppliers, architects and owners (Hilker 1988). However, the quality assurance programme should commence at the brief and design phases (in the form of precise definition of the required quality level) and continues throughout the project. The principle is relied on in fast tracking where quality assurance takes the form of control of drawings, other documents, projects information and records.

2.9.3 Objectives of Quality Assurance

Since early 1980, quality assurance has been introduced into the construction industry as a means of quality improvement. Quality Assurance systems are more comprehensive than quality control systems and require validation by a third party (Dale et al 1990).

This often involves adherence to a framework produced by the third party itself (eg the British Standards Authorities BS5750 series). Once established, such systems receive regular internal and external audits. The registration of an organisation's quality assurance system by a third party has an important marketing value (Collard and Sivyer 1990; Dale and Oakland 1991).

Quality Assurance needs to be integrated into all process and functions from the conception of and an idea throughout the life style of the product or service recognising customer needs and requirements, planning and designing, production, delivering and after sales service. There has been considerable disparity of opinion over what quality assurance seeks to achieve. However, there has been a demand-pull by both the private and public sector clients. Many large private clients now compile tender lists of contractors operating a quality system. The property services agency (PSA) is moving towards the use of contractors with quality management systems for

all its projects. From this demand-pull, it is clear that if for no other reason, contractors need quality assurance systems for survival and for commercial interests. The objective should be for every employee in the organisation to take personal responsibility for the quality assurance of the processes for which he or she is accountable. Quality Assurance is a 6 part exercise: T Brown, 1993

- Clearly define the objective;
- Plan the way objectives are to be achieved;
- Carry out the plan;
- Record that the plan has been carried out ;
- Monitor the plan in progress;
- Review the plan and change it as necessary.

All individuals must understand how they fit into the overall management of the parent organisation and relate to their following team members.

Training at most levels within the industry has been sadly neglected for many years. Classic disasters have occurred because of inadequate training or those responsible for key activities. Formal Quality Assurance requires that training policies for all staff are developed and implemented (J M Duncan 1990).

Formal quality assurance demands that all levels of staff associated with the construction process have a clear definition and understanding of their own limits of responsibility.

The British Standards BS5750 (ISO 9000) provides a framework or guides for management techniques required when developing and implementing a quality assurance system for any organisation within many different industries and sectors while seeking the adoption of, recognition and formal certification for a quality assurance system.

As Gary and Flanagan (1989), amongst other, noted, the experience of quality assurance in construction is one of divisiveness, where a quality assurance scheme becomes a stick with which to beat collaborators, particularly those who do the work

at the sharp end – the subcontractors. Thus, a major argument regarding quality management in construction has been: who should be in control (client, consultant, or contractor?) rather than how the parties can be more effectively collaborated.

“No matter how carefully devised and comprehensive a quality system may be, it can only be put into effect by people. If the people do not know how to operate it, or if they do not want to operate it, then failure will result. To give people the knowledge and skill to operate the system, they need to be trained. To give them the will they need to be motivated.” (J Ashford 1991).

2.10 Evolution of Total Quality Management

TQM, introduced in Japan by W Edwards Deming just after the Second World War, has had a 50 year history (some experts consider that the Japanese economic success is largely due to its dedicated work-force, shaped to its present form by the Japanese culture)(Ishikawa,1985 PP18). This is partly true. In less than 4 decades they have comprehensively overtaken the world’s traditional powers, transforming Japan from economic also ran to a global front-runner. Just how has this been achieved? How, more specifically, has it been achieved by a country with virtually no natural resources? No iron, no oil, no copper or zinc, no coal and gold...no nothing or at least almost nothing of virtually everything.

It has been achieved because Japan in fact has one natural resource. A resource it has used to vastly greater effect than the West has ever conceived possible: its people. People uniformly adhering to one single guided principle – Quality.

2.10.1 Total Quality Management (TQM)

“TQM is defined as a philosophy based on the quest for progress and improvement. In this sense TQM looks for continual improvement in the areas of cost, reliability, quality, innovation, efficiency and business effectiveness. The main driving force is belief and commitment with strategic and operational objectives as the outputs.”

(Zairi. M 1991)

TQM is based on a number of ideas. It means thinking about quality in terms of all functions of the organisation and is a start to finish process that integrates interrelated functions at all levels. It is a system approach that considers every interaction between the various elements of the organisation. TQM is a philosophy of doing business. Though it has its procedures and guidelines, a TQM program focuses on an attitudinal change of a company's culture (Chapin: 1995).

TQM focuses on the quality of management system, not the management of quality. Moreover, TQM is process focused rather than outcome focused. The participation of all the employees is essential for the success of TQM.

Feigenbaum (1983) argues that, "this is because the people best able to identify improvements to a particular process are those who are directly involved in that process.

In TQM all members of an organisation need to understand their value and role, both as customers and as suppliers to every customer and supplier with whom they interact, inside and outside the organisation.

An important element of TQM theory is the need for continuous improvement of the process of production. This involves the regular review of each process within the organisation to identify better ways of operating. It is based on the recognition that most quality defects are attributable to the systems and processes of production and not to an operator error. Deming (1986) TQM is an all-embracing philosophy incorporating not only the techniques such as Just-In-Time (JIT) and Quality Circles (Qc's), but also includes other such as Statistical Process Control. TQM is a complete control of all management functions, which impinge on the quality of the product; functions which include defining the suitability of the product for the target market, design of the product, building of the product and the after sales services. TQM is extremely far reaching in that it will ultimately affect the whole of the organisation rather than simply focus upon a conventional inspection approach to product manufacture. It extends beyond the processes –

from design and marketing to purchasing and the business support function, such as industrial relations and training.

Companies take on TQM for many different reasons.

For some the focus is upon reducing the cost of operation, others focus on improving customer and/or employee satisfaction, some see it as a way of changing the corporate culture and style. Many look to TQM as a step further than their achievement of ISO9000 certification.

Most, though are looking for a way to improve their businesses, make them more profitable and competitive and more enjoyable to work in.

TQM aims at helping the organisation develop such competencies by making it more effective and more efficient (Binney, 1992). Effective in that the products and services, which it produces, meet the actual requirements of its customers, efficient in that it does this in the best possible way, at lower cost. Effectiveness can be achieved by delivering defect free products or services, by meeting currently unmet needs, or, by removing non-valued features. Efficiency can be achieved by cutting out internal waste, such as scrap, defects, or time spent on worthless activities; by redesigning operation, to make them quicker and more reliable; hence, increasing productivity, reducing defects, and minimising the need for inspection. This dual role of TQM is well accepted in the literature.

Conti (1993) has referred to effectiveness as '*quality of goals,*' and efficiency as '*quality of execution.*'

An organisation is said to have to change its culture to facilitate and support TQM (Brocka & Brocka, 1992, Sashkin & Kiser, 1993).

Hill (1991) argues that '*cultural change is the ultimate objective of quality management.*' What would the notion of a total quality culture consist of? In other words, what are the cultural values that are important to TQM?

Sashkin & Kiser (1993) outline 8 elements of TQM culture to include, for example, job security, a climate of fairness, and ownership stake for employees, and co-operation as a basis for working together. In addition, a move from individualism to team orientation, from an autocratic management style to supportive leadership are other cultural values that have been identified as part of a quality culture (Blackburn & Rosen, 1993).

2.10.2 Definitions and Principles of TQM

Researching the critical factors for success Porter and Parker (1993) identify the main quality gurus and their major works as, Crosby (1979), (1984), Deming (1986), Feigenbaum (1983), Garvin (1987), (1988), Grocock (1986), Ishikawa (1976), (1985), Juran (1979), (1988) Oakland (1989), (1993). Others in the literature have been afforded this status, for example, Tom Peters, Bill Conway, Taguchi and Kano.

An intensive review of these and other works was undertaken. The publications cover the development of theory in TQM from the end of the second war.

Oakland (1989) defines TQM as-

“TQM is an approach to improving the competitiveness, effectiveness and flexibility of a whole organisation. It is essentially a way of planning, organising and understanding each activity, and depends of each individual at each level.”

Other recent examples are as follows:

M Hutton, President, Phillip Crosby Associates, (1993).

“TQM is how to efficiently and effectively run your business to satisfy your customers on a continuously improving basis. It looks at the whole organisation.”

David Coal, Director of TQM International, PA Consulting (1993).

“TQM is a total management philosophy which affects corporate decisions taking which aims to constantly improve your performance and which lowers the cost of work processes. It works by attacking lots of small problems so that the standing of the whole organisation is transformed.”

Colin Williams, Ashridge Management School, (1993).

“TQM is based on 3 principles – customer focus, process improvement, and people empowerment. It is a process of listening to the customers and breaking down the barriers between supplier and customer. It is also about understanding how your business operates as a series of horizontal processes rather than seeing the organisation as a series of departments and functions. It is also about a belief in learning, training, and the importance of self-esteem, and it recognises the importance of teams and individuals. If you get these 3 facets of TQM in harmony then you do get improvement.”

No one concise definition emerges from the literature. Black (1993) concludes from a review of literature on TQM that the lack of an agreed definition and approach has contributed to the difficulties in understanding and implementing TQM.

Grocock (1986) examines the definitions of quality offered by Deming, Juran and Crosby. Deming (1986) defines quality as, *“a predictable degrees of uniformity and dependability at low cost and suitable to the market.”* Juran (1979) defines quality as, *“fitness for purpose,”* and Crosby (1979) as *“conformance to requirements.”* Grocock concludes that the differences are essentially evolutionary, Deming stressing the roots of quality with an emphasis on the control of variations in production, Juran introducing greater emphasis on the external market and customer, Crosby developing this further with a determination of specific customer requirements or product specifications.

Continuing the evolutionary development of quality Chase (1992) has concluded that organisations must not merely satisfy customer requirements but must aim to exceed them.

Hill and Wilkinson (1995) conclude that there is now reasonable agreement on the basic principles underlying TQM. They present that TQM is a generic approach to management based on 3 fundamental principles – customer orientation, process orientation, continuous improvement, and a range of techniques. Zairi (1994) agrees with this and concludes that while the principles are now well established TQM consists of a mix of activities and techniques. Oakland (1993) concludes that much of the work of the quality gurus was heading in the same direction.

Juran (1993) concludes that the principles of quality are now well established.

The roots of TQM are embedded in the control of processes and the control of variation, Shewart (1931), Deming (1986), Juran (1979), Feigenbaum (1983). The adaptation of statistical process control is fundamental, as are techniques which define, measure and solve problems in processes, for example, flowcharting of processes, measuring the cost of production and waste, problem solving using Ishikawa/Herringbone methods, or Pareto analysis.

Business Process Re-engineering (BRP) has emerged in the 1990's as a technique for fundamentally re-defining key business processes. Hammer and Champy (1993) present that TQM traditionally works with existing processes; BRP however, discards what exists and creates new processes that are simpler and more effective. In this way the authors claim that breakthroughs in performance improvement are more likely.

Hill and Wilkinson (1995) have concluded that there is evidence of disillusionment with BRP amongst a high proportion of those organisations that have tried it. They argue that the BPR movement has failed to understand the nature of TQM, and process improvements may be both incremental and transformational, and that both are more likely to occur in organisations, which understand and operate TQM. Zairi (1994), and Greene (1995), support this view, concluding that breakthroughs are more likely within organisations, which encompass TQM concepts.

Benchmarking has been associated with TQM, Camp (1989), Zairi (1992). Camp (1989) describes benchmarking as a vital new tool for measuring and comparing processes, best practices, and performance. Zairi (1992), states that the origins of benchmarking relate to the practice in Japan of Shukko, the loaning of employees between firms. In the West, Xerox pioneered the technique in the early 1980's.

Camp (1989), presents that effective benchmarking requires organisations to better understand and measure their key processes in order that they may seek to improve upon them by comparing them, internally, or externally either within or outside their main industry. He argues that the search for best practices inherent in benchmarking is totally consistent with the concept of continuous improvement, but also adds the dimension of external perspective.

Zairi (1992) has concluded that benchmarking and TQM tend to run hand in hand, and that organisations that are embracing the principles of TQM are naturally more likely to progress with benchmarking.

The review of the literature on TQM finds that there are many techniques, which have become associated with TQM programmes. Some examples are, Quality Function Deployment, Zairi (1993), Quality Circles, Oaklands (1993), Activity Based Costing, Drury (1988).

Some studies have concluded that TQM in essence consists of a mixture of concepts and techniques, and that these may be classified as "hard" and "soft" elements, Garvin (1991), Hill and Wilkinson (1995), Black (1993). "Hard" elements involve the use of techniques which are concerned with processes, measurement, resources, organisation, structure, activities, whilst "soft" elements involve the use of techniques which are concerned with people, behaviour, teams, empowerment, participation, leadership – Garvin (1991). The importance of this classification is that TQM requires organisations to address both the "hard" and "soft elements – Garvin (1991).

TQM calls for consideration of processes in all the major area of an organisation marketing, design, procurement, operations, distribution etc. Commitment to quality

requires the 3 hard management necessities: a good quality management system, tools such as statistical process control (SPC), and teamwork.

2.10.3 Core Elements of TQM

Can TQM be accurately portrayed by a number of key elements? The inherent danger in reducing TQM to a number of key principles is that the complexity and far reaching scope of TQM is not accurately reflected. However, by concentrating on a number of key elements, the essence of TQM can be more easily explicated. Dean & Bowen (1994) assert that TQM is based explicitly or implicitly on 3 fundamental principals: customer focus, continuous improvement and teamwork. To a large degree, Hill & Wilkinson (1995) present a similar interpretation of underlying key elements of TQM; these include customer orientation, continuous improvement and process orientation.

The former writers subsumed the principle of process orientation in continuous improvement. Although teamwork is excluded as a key element by the later writers, there is sufficient support for the importance of teamwork elsewhere (Bowen & Lawler, 1992; Deming 1986, Hill, 1991, Wilkinson, 1994). Brocka & Brocka (1992) argue that, *'without teamwork, quality management is finished before it can start.'* Thus, it may be more accurate to describe TQM as consisting of 3 primary but also a number of secondary elements ¹ that support and facilitate the primary elements. Why are these principles so important to TQM?

First and foremost, these principles are not independent but mutually interdependent. For example, the pursuit of customer satisfaction (internal or external) may stimulate or provide ideas for improvement, which in turn may require teamwork or co-operative activity between individuals, groups or departments in order to implement these improvements. Therefore, while customer satisfaction is the ultimate goal and continuous improvement is the vehicle by which this is achieved, continuous improvement in itself relies on teamwork.

¹ These secondary elements may include for example, more open communications, job security, participative management style, collectivist orientation and increased quality awareness.

Continuous improvement requires all organisational members to be motivated to improve the status quo. In essence this requires a constant questioning and examination of existing processes in the search for more effective and efficient means of doing things. As such, commitment to improvement becomes an integral part of an individual's job; that is, an individual is not only required to carry out his/her specific tasks but also to think in terms of how he/she can improve his/her work and that of his/her work group. In addition to this value or attitude, there needs to be a supporting system or infrastructure. This could take the form of continuous improvement team or at the specific job level, statistical process control methods. Both the value system and infrastructure are mutually dependent.

An individual committed to continuous improvement needs a vehicle to translate ideas and suggestions into practise and this may be accomplished through his/her participation in an improvement structure.

The notion of interdependence is reinforced with the internal customer – supplier principle. Employees are expected to view themselves and act accordingly as suppliers of the next person in the supply chain. As Wilkinson (1992) notes, this customer focus is designed to highlight and individuals contribution to the final customer. Therefore, teamwork and co-operation are essential at all links in the chain from the initial contact with the external customer through to the satisfaction of the external customer requirements. *“Terms such as internal customer may reshape members’ ideas not only about the relevant organisation of teamwork, but also about the purpose and importance of their task”* (Spencer, 1994 Pg 467).

These 3 principles of customer focus; continuous improvement and teamwork may be thought of as comprising a ‘soft’ and ‘hard’ component relating to a cultural and system dimension. In this sense, soft may be interpreted as values or attitudes while hard relates to the visible mechanisms or structures. For example, commitment to improvement as an attitude and quality improvement team as the parallel structure. In the case of teamwork, a team orientation is parallel with work re-structuring around the team or cell ².

² This is characterised as a series of self contained mini offices within the office.

A customer orientation is reinforced by internal customer – supplier audits and by direct contact with customers.

2.10.4 TQM Characteristics

TQM is considered by many to be the management paradigm capable of facilitating the attainment of continuous improvement and external focus. This accounts for the attention paid to TQM by all sides of commerce and industry, politicians and academics.

The European Quality Awards (EFQM, 1992) 9 criteria are broadly similar to the Baldrige (MBNQA 1987) criteria, although the EQA place stronger emphasis on results from quality improvement efforts. Moreover, customer and people satisfaction; impact on society; and business results, incorporating financial and process improvements; are given distinct criteria, in their own right, in the award.

The Baldrige Award Criteria, in their 1995 format, proposed a systematic approach, not just to the planning, implementation and review of TQM itself but also to each of its 7 components categories. For example, in the case of strategic planning, the Baldrige criteria calls for procedures which plan how quality planning itself should proceed and procedures to review the quality planning process.

All of these quality award criteria were developed from expert consensus on important aspects to be considered in assessment of TQM strengths.

Deming (1986 & Wolton 1986), Juran (1986) and Crosby (1979, 1984) are 3 leading gurus in the quality management field. Although Juran enthusiastically supported the Baldrige criteria, Crosby & Deming dismissed them (HBR, 1992) and indeed the notion of TQM itself, as a waste of time, none-the-less their separate philosophies can be viewed in terms of the major TQM criteria advanced in the literature. Deming's thinking was based largely on the need for statistical control (SPC), to ensure non-defective production for delighting customers. He also placed great emphasis on better use of employee abilities.

Juran concentrated on his quality trilogy of quality planning, quality control and quality improvement. He viewed quality improvement as a systematic, top down activity.

Crosby is perhaps the most controversial of the three. The others saw his emphasis on zero defects as ill advised. Crosby emphasised motivation of employees and focus on quality as the key improvement opportunity as the centre piece of his work.

2.11 The Need for TQM in Construction

The construction industry (CI), for the past 3 decades has been following a path that has led to lack of trust and confidence thus resulting in adverse relationships among the contracting parties and increase litigation. The industry has become increasingly reliant on cumbersome specifications which seldom say exactly what the owner/customer intends for them to say. Therefore, the net result is that the CI has been bogged down endless paperwork, defensive posture and litigation.

The CI is one of the largest industries in the UK. The output of the industry is currently valued at approximately £50 billion therefore making it one of the most significant economic indicators. The sector employs 7% of Europeans workforce and represents capital investment worth approximately 12 % of GDP (Snape, 1996). CI is one of the most diverse businesses in the world. "Projects are generally unique. Furthermore, it covers a very wide range of products and the people working in it come from a broad range of professional backgrounds and crafts (Snape, 1996)".

Although, contrary to popular belief, "the construction industry is not a separate planet (although sometimes it seems so) it does not exist in technological realm separate from the wider society (Clara Greed: 1998, 11)."

"Construction is the most visible of industries and conducts its affairs almost totally in the public arena. Prototypes of design, experiments in material and component usage, and innovations in managerial approaches are available

for all to see and monitor. The manner of execution and rate of progress of the building process frequently from a public spectacle (Baldry:1997,3).”

The CI has its lead from other industries, such as manufacturing, in implementing quality, quality improvement and TQM. “The origins of many commonly used management techniques (eg process analysis, cause and effect analysis and statistical process control) can be traced back to the early work of Deming and Juran (Whittle 1989).”

Hackman and Wagemen 1995 critically analysed the current state of knowledge and practise regarding TQM, and conclude that TQM is a distinctive philosophy; with a core set of shared assumptions, but is implemented in a wide variety of ways. Practise is often in conflict with the principles laid down by the founding fathers of the movement, Deming, Juran and Ishikawa.

“TQM is rich enough to serve as the framework of foundation of any organisation’s culture. Consequently, when implementing TQM, an organisation may be dealing with replacing, not merely modifying, its culture and the forces resisting this effort may be formidable.” (Demski; 1993).

TQM is the management approach of an organisation, centred on quality, based on the participation of all its members and aiming at long term success through customer satisfaction and benefits, to all members of the organisation and society (BSI, pg 27).

According to I U Ahmed (1996) TQM has become a crucial aspect in the CI. Many articles have been written and published on the adoption of TQM principles in construction. To some construction managers it is nothing more than a buzzword, while to others it is difficult to implement. TQM is by far the most glimmering ray of hope for the CI to reverse this trend. If properly executed, TQM will help all parties involved in construction organisation come closer to meeting their expectations. The objective is to present a standard model based on accepted and validated theoretical constructs from the literature on organisation theory.

TQM is widely recognised as a strategic approach aimed at producing the best product or service currently available through innovation and continual improvement.

“To support this managers need to create an organisational environment in which individuals feel committed to getting things done right first time and have sufficient delegated power to be able to do this. Time will be spent on doing things right and achieving outputs with the minimum of resources, rather than on errors to put things right retrospectively.”

(Burton & Franckeiss)

TQM is about changing attitudes and behaviour towards doing business. It requires a bold new attitude that pervades every aspect of the organisation.

2.12 Construction Industry

Unlike the manufacturing context, construction is not a repetitive continuing process; ‘rework’ or ‘repeated work’ is costly. It is difficult to apply statistical quality measurement programmes in the process of construction. The outcome of the construction process is characterised by a high degree of uncertainty. Construction is more vulnerable than manufacturing processes to the effects and impacts of external factor, such as weather. Construction is one of the most regulated industries – facilities must be built according to code. Proper safety measures must be followed before, during and after construction according to government acts and regulations.

The construction firm is the organisation that is contracted by the project client to construct the required building or civil engineering project. The construction firm generally achieves the assembly process of this objective with the:

- 1) Permanent staff;
- 2) Sub-contracted labour.

Given the nature and diversity of activities carried out in the construction industry, there is a natural tendency for the industry to be viewed as manufacturing in nature rather than a service industry. R. Newcombe, suggested that, *“it is a misnomer to*

classify the construction industry as a service industry along with banking, insurance and retailing."

This view is not however supported by PJ Hillebrant (1984) who considers construction to be a service industry. This conclusion is drawn from the evidence of what builders actually do. She notes that, 'construction may be regarded as one industry whose total product is durable buildings and works.' It is 'the contracting part of the industry which undertakes to organise, move and assemble various materials and component parts so that they form a composite whole of a building or other work. The product which the contracting industry is providing is basically the service of moving earth and material, of assembling and managing the whole business.'

The ownership of fixed assets by the construction industry, including the plant-hire industry is low compared with other industries although within the plant-hire part of the industry assets is very high.

Large fluctuations in demand and hence output over a long period of time has lead to this type of investment in plant and machinery by construction firms to achieve flexibility rather than efficiency at a particular output even at cost. This has also lead to construction firms sub-contracting much of their work. Numbers of directly employed operatives thus tend to be very small or even zero.

It is therefore, believed that Hillebrant's classification of the construction process is much closer to the truth than that of Newcombe's outdated version. The construction process of this study will therefore be regarded as a management service specialising in overcoming the problems associated with the 'complex, fragmented and volatile work patterns' typically found within the construction industry.

"Construction is project based rather than product-based, unlike manufacturing. This means that actions and processes occur only a limited number of times in any one project, which reduces the scope for measuring improvements which the repetitive nature of manufacturing process gives." (Construction News: 19 September 1991).

The problem of industry fragmentation is exacerbated by the continually changing composition of the workforce and procurement practises in the industry such as subcontracting. *“Construction operatives are the most visible representatives of the industry but are characterised as an ill-regulated and difficult to manage group of employees who carry out unsavoury tasks in an unsophisticated manner and demonstrate a strong resistance to changes in working practises or mode of conduct.”* (Baldry:1997).

2.13 Quality in the Construction Industry

The boom in the construction industry of 1950's and 1960's, together with the introduction of new building materials with qualities and properties not sufficiently understood by the skilled craftsmen, generated a plethora of built in problems and defects causing a rapid fall in the quality of construction works. The above drawbacks together with the poor quality of information and detail provided by the over-stretched consultancy practices raised the concern for the level of quality achieved in the construction industry. This led to the British Standards for quality systems BS 5750, which were published by BSI in 1979.

In 1982, the Government's White Paper “Standard Quality and International Competitiveness” led to the National Quality Campaign launched by the Department of Trade and Industry (DTI) in 1983, and the setting up of the National Accreditation Council for Certifying Bodies (NACCB) in 1985. This proved to be the turning point in the development of quality assurance in the construction industry.

The success of BS 5750 as a practical standard for quality systems was recognised at international level when the International Standards Organisation (ISO) used them as the basis, along with the 8 years of UK experience, to formulate the International Series for Quality System, ISO 9000, published in 1987. The ISO 9000 series was accepted also without deviation by the European Standard body (CEN) and named as EN 2900.

The Construction industry differs very much from the other Engineering Industries. It operates in concentrated-production with workers moving around a motionless product instead of in a chain-production with products moving and motionless workers. Mainly because of this fact, many of the quality processes used in other industries do not apply in the construction industry.

Another important aspect is that each project is a prototype, more or less sophisticated. Different methods of conception, design and execution are used on each case depending on the environment (adaptation to the site and local conditions of work and on the implementation process, making it difficult to develop and use proper and specific techniques.

Griffith suggests that the main reasons for failing to produce the required standards of quality on-site are:

- A lack of understanding of the levels of quality required by the client;
- Poor definition in the roles, duties and responsibilities towards quality allocated to site managers, foreman and workforce;
- Inadequately prescribed standards of quality;
- Ineffective quality control procedures used on site for inspection and, where necessary testing;
- Inadequate standards of workmanship by the operatives;
- Ineffective first line supervision by foremen at the workplace;
- Imbalance in the definition of project priorities with time and cost parameters out weighting the requirements for good performance and quality.

The above would seem to suggest that it is the contractor's responsibility to achieve the required level of quantity. However, Griffith goes further on by suggesting this is infact far from the truth. This achievement of good quality depends equally upon the actions of the client and other parties.

The goal of continuous improvement is common to many managerial theories, however, what differentiates TQM is that it specifies a specific step-by-step process to

achieve this (Adrian, 1995). This process consists of nine steps as shown in figure 2.4. It is far better for 600 people to make one small step forward than one man to make 600 steps forward on his own. Continuous improvement should follow the holistic viewpoint already put forward insofar as each department or division form part of the whole and should strive to run at the same pace as each other to continuously improve rather than adopt a relay approach.

However, moderation in all things. *“Constant improvement in pursuit of perfection is admirable... to a point. But at some stage ... and often earlier than imagined ... pursuing perfection for perfection's sake can be a catastrophic mistake. It boils down to obsession with polishing yesterday's paradigm.”* (Tom Peters: 1997, 25).

TQM is not merely implementing a few procedures, however, radical they may be, but embracing a new philosophy. Hence the characteristics of the organisation play a prime role in how well this philosophy is diffused in an organisation. Concepts from organisational theory are therefore believed to be germane to a model of TQM adoption.

Creech (1994) In his book, 'The five pillars of TQM,' Creech defined TQM as *'a total approach to put quality in every aspect of management.'* He identified product, process, organisation, leadership and commitment as the five essential pillars of TQM.

W Edward Deming (1986), who is considered by many to be the godfather of Japanese Industrial success, as cited by Cole (1997), "Saw quality as aiming at 'the needs of the consumer, present and future.' A further key point in Deming's approach was his emphasis on the need to gain both managerial and employee commitment to engage in a process in which quality was paramount. Thus the Total Quality approach was born - an approach based not just on statistical process control and similar quantitative techniques but also on a positive attitude towards quality at every level in the organisation."

A prime reason for beginning the journey to Total Quality is that it creates an organisation, which is better for people. People are what make or break a company.

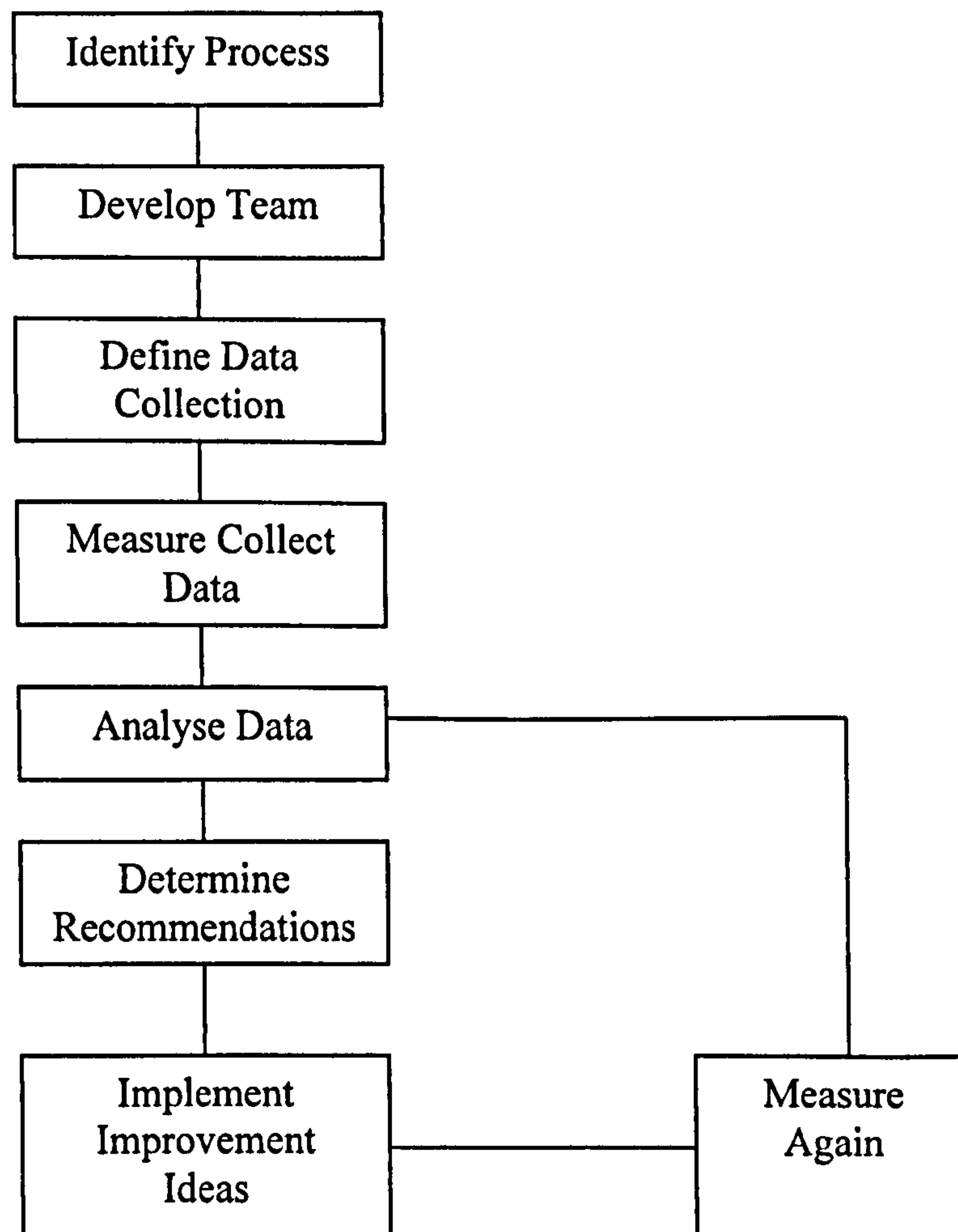
They are a company's most important asset. They should be treated as such. Also, a sound reason for beginning the voyage toward Total Quality is survival. Competitive pressures demand higher quality products and services. Unfortunately it is easy to focus on tools and techniques but very hard to understand and achieve the necessary changes in human attitudes and behaviour.

"In an increasingly competitive global environment, companies operating at an international level in many industries have come to realise that a good awareness and understanding of culture issues is essential to their business success."

(Hall & Jaggar:1998).

There are "customers" who have requirements and "suppliers" who must conform to such requirements. However, in the Construction industry, the ultimate customer is the client and the ultimate supplier is the project team.

Figure 2.4 The 9 Step Process to Continuous Improvement



2.14 Client & Contractor

In the United Kingdom "Construction provides work for 7% of all male employees, and for one in four of self-employed people. In addition it generate employment in a range of activities in associated area of manufacturing for example, in the building materials and plant. It is a key industry in term of its size and employment and moreover, it is one that will not go away. Unlike some other industries which seem set to decline and ever to be revived, construction will continue to be an important domestic employer in the year 2000 and beyond."

Drucker & White:1996

The first fundamental of quality as defined by Crosby (1984) and Mortiboys (1983) definition of the customer's needs and expectations, which must be translated into clearly defined and measurable requirements for construction projects. Often, there were conflicting views between a client and their designers and contractors. Pateman (1986) states clearly, the building user (client) perceives quality in terms of "degrees of excellence." In the eyes of the designer, quality related to the needs of the users. Clients are now becoming more aware of their needs and expectations. They now increasingly employ advisors to help in the preparation of their brief. Some of the clients have commissioned construction projects abroad and now demand the same quality standards that they often obtain outside of the UK. Apart from the British Property Federations (BPF) "Form of Contract," some clients now have their own "form of contractor" tailored to their particular needs. Ashley (1985) states "clients will increasingly demand greater value for money." Clients are now coming together (more than before) under different bodies to make their views known and to influence both the construction industry and the government on issues concerning construction facilities. Some of the larger clients are working towards BS5750 (ISO9000) quality system.

No matter who the client may be, the common link is that there is a need for an end product that complies with the client's brief and financial budget. The client not surprisingly has a major role in any development and the client's decisions can at times negatively reflect upon a contractor operating under the spotlight of the public at large. "The progress of the works, both before and during a contractor's presence

on site, is the subject of the most intensive and continuous scrutiny by a curious public. Seemingly derelict sites cause a level of dissatisfaction, which is often directed at the construction industry. Although client policy decisions are often the real cause it can fairly be recognised that the pre-contract design and procurement procedures of the industry often inhibit the early allocation of resources.” (Baldry:1997)

Generally, the higher level of client involvement, the higher level of satisfaction. Gunning (2003) investigated the private sector client contribution to the construction process in Northern Ireland. He drew the conclusion that if private sector clients take fuller control of their projects either directly or indirectly, they will be assured of improved satisfaction at the completion stage with their priorities constantly concentrating the minds of all other associates.

Further research indicated that clients should be involved and should: provide a clear project objective (Bennett, 1985), convey it into precise and concise client brief.

“Clients seem to have wakened up to the fact that perhaps the contracting industry is to a large extent a creature of their own invention and that naked pursuit of the lowest price is not the best way to procure capital assets.”

(Nick Barrett:1998)

The history of failure within the construction industry to produce quality products has become a reason for concern. The need for structured and formal systems of construction management to address the aspects of performance workmanship and quality has arisen as a direct result of deficiencies and problems in design, construction, materials and components.

When dealing with a complex and varied industry, within which numerous professionals and craftsmen operate, whose background training and professional development are entirely different from each other, the most effective way to achieve good communication is to formalise it. Formalised systems adopted by all parties for the checking and recording of communication would irradiate many of the problems. It is crucial that clients of the construction industry receive value for money. This

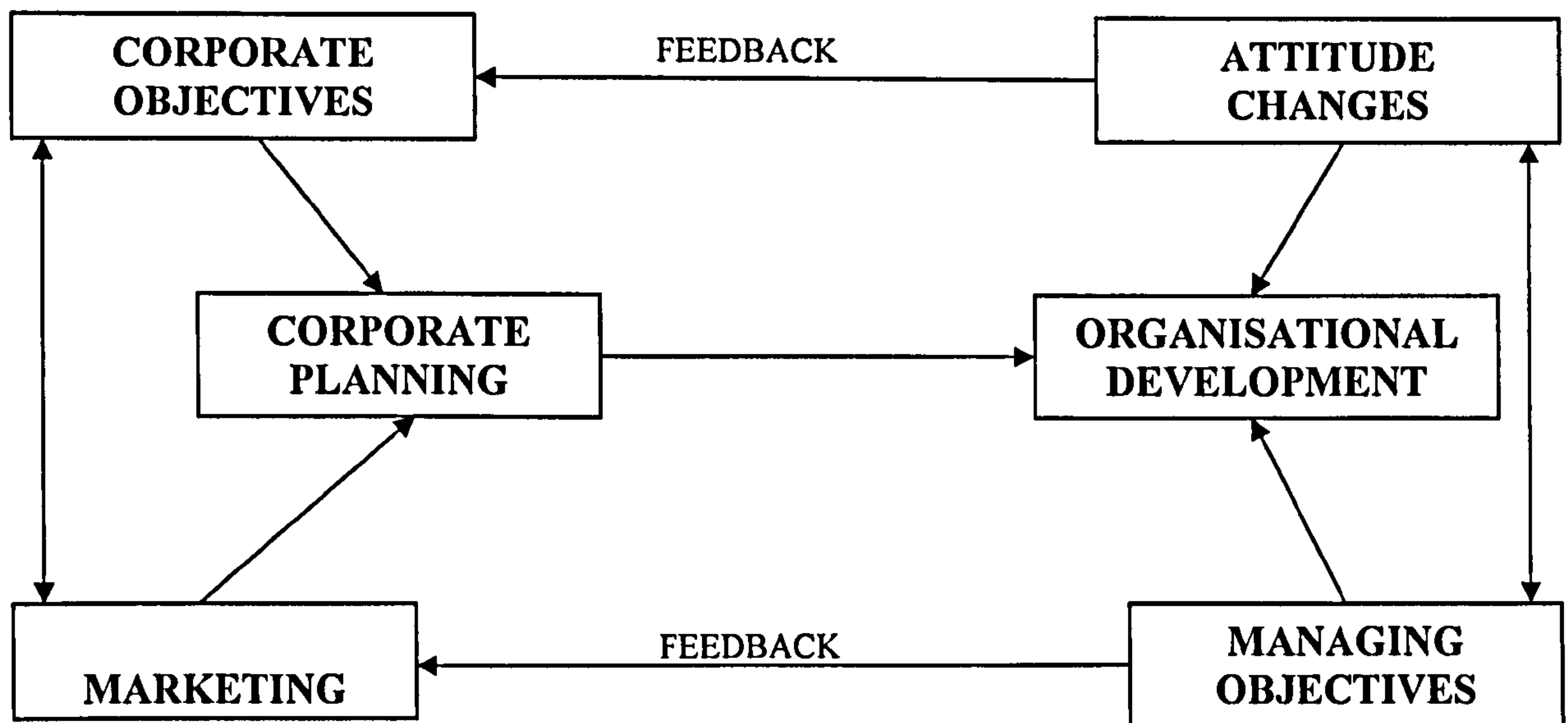
includes obtaining competitive bids from contractors. The nature and form of the competitive arena for the contractor in construction contractive are largely determined by the client and for advisors. The choice of bidding system coupled with bidder selection practises has a direct bearing on the degree of competition, because it affects both the number and the identities of bidders competing for a particular contract. Selective tendering systems appear to be more restrictive than open tendering system, because the contractor can bid only upon receiving an invitation, whereas for open tendering the responsibility is on the contractor to bid by responding to an advertisement,

Sir Michael Latham (1994) implies that the client is the source of many problems. It is important therefore for the client to “set clear objectives” (Ward et al :1991). “Every client in the construction industry has the right to assume a standard of quality that has been specified for the project.” (Ashworth:1996). “The quality achieved by the man on the job, assembling the building in the factory or on site, depends ultimately upon the quality of the brief produced by the client or building owner.” (Ferguson and Mitchell:1986).

2.15 Organisational Cultural Change

According to Fryer (See Figure 2.5), change can be implemented at various levels. At the management level, it involves activities such as corporate planning, marketing and organisational development. At the individual level it involves changing employee’s attitudes and helping and encouraging them to develop creative and adaptive skills.

Figure 2.5 Organisational Changes



(Source: B Fryer, "The Practice of Project Management," 1985 p34, Collins)

The term 'culture' refers to the general patterns of behaviour, values and assumptions which are shared by members of a particular group. It originates from anthropological studies aimed at understanding societies as a whole. Organisational culture is defined colloquially as the way we do things around here. A broader description is provided by Kilmann et al:1985.

"The organisation itself has an invisible quality – a certain style, a character, a way of doing things – that may be more powerful than the dictates of any one person or any formal system..... Culture is to the organisation what personality is to the individual – a hidden, yet unifying theme that provides meaning, direction, and mobilisation."

(Ibid:Pix)

Construction managers and employees are the people within organisations, who must change, if their construction are to remain in tune with society's needs. Construction managers and employees have to respond to changes, which are beyond their control, but they must also shape the environment in which their companies operate. They must engineer change. No programme of change will succeed unless accepted by the people who will be affected by it.

“It takes many years to put in place a construction facility of any significance, but it may take a few hours or days to changes the views of those who are instrumental in deciding upon and investing into these constructed facilities. Future research in construction economics needs to put greater emphasis on the human mind and its ‘products’ rather than almost exclusively to dwell on bricks and mortar.”

(Bon:1995)

There are 4 common culture exist as a result of varying combinations of these factors. These 4 cultures are namely Power, Role, Task and Person Culture (Handy 1993).

Power Culture – attempt to dominate their environment and those who are powerful within the organisation strive to maintain absolute control over subordinates. Sadler states that such success will only continue, ‘as long as the source of power exercises sound judgement, makes the right decision, behaves with integrity and wins loyalty from others.’

Role Culture – such organisations would more typically be described as a bureaucracy. There exists a strong emphasis on stability, legitimacy, responsibility and mechanistic structure. Conflict is regulated by rules and procedures. Members of such an organisation follow orders and are not encouraged to be innovative. Rights and privileges are defined and adhered to.

Task Culture – in such organisation structures, functions and activities are all evaluated in terms of their contributions to organisational goals. It encourages a team approach that utilises the unifying power to the group to improve efficiency through creativity and fast response to customer needs. The task culture is appropriate where flexibility and sensitivity to the market or environment are important. Nothing is allowed to get in the way of task accomplishment. Authority is based upon appropriate knowledge and competence. Collaboration is sought if this promotes goal achievement. Task and project groups are common.

Person Culture – this type of organisation exists primarily to serve the needs of its member. Authority may be assigned on the basis of task competence, but this practise

is kept to a minimum. Instead, individuals are expected to influence each other through example and helpfulness. Consensus methods of decision-making are preferred. Also, roles are assigned on the basis of personal preference and the need for learning and growth.

2.16 Organisational Culture

Although the term 'culture' is widely used in an organisational context, there is considerable debate regarding the nature of 'organisational culture' and how it might be defined.

Organisational culture is the pattern of all those arrangement, materials or behavioural, which have been adopted by a society (corporation, group, team) as the traditional ways of solving the problems or its member; culture includes all the institutionalised ways and the implicit cultural beliefs, norms, values and premises which underlie and govern behaviour." (Payne1991).

A large number of definitions of organisational cultures have been produced covering a variety of approaches. Richard L Williams (1994) stated that, "*Culture is the cumulative perception of how an organisation operates and how employees treat each other, vendors and customers. Organisational culture is constantly evolving and is largely a product of the values and perceptions of it leaders.*"

Also culture identifies what is important in the external environment, what the group attends to and monitors. For senior executives this may be corporate performance competitor activity, market share etc.

Crosby (1998) stated, "Quality is a result of a carefully constructed culture", it has to be the fabric of the organisation. Culture can also determines the important issues within the organisation. It identifies the principal goals, work methods and behaviour, how individuals interact, address each other, how friendship and personal relationships are conducted. Culture guides organisational membership, how the boundaries are maintained, who is an insider and who is an outsider. For the groups within the organisation, culture may provide a common purpose and a co-ordination

of activities. For members, common beliefs are important because they provide predictability in the social world and a common frame of reference.

“Most scholars would now agree that organisational culture is a phenomenon that involves beliefs and behaviour; exists at a variety of different levels in organisations; and manifests itself in a wide range of features or organisational life such as structures, control, and reward system, symbols, myths and human resource practices,” Pettigrew (1990).

Culture is both an input and an output. The managerial culture of an organisation is therefore likely to be the product of past strategy, a moderator of current strategy and a determinant of future strategy. Furthermore, while policy makers may attempt consciously to influence the culture of an organisation, they too are often a cultural product. Policy makers who have spent their career in, say, a role – orientated culture are likely to develop future policy accordingly.

Smith 1990, stated that a way of describing the behaviours and the day-to-day actions, which are, predominate in the business. This culture would include the following: customer driven, clear purpose and overall goals, direct activity, intolerance of wastage, few levels, few departments, few grades, many teams, “leaders not managers,” no recognition of status, team responsibility and accountability, clear measures, staff expected and empowered to act, disciplined innovation not adhocery and excitement.

Ott (1989) – identifies four functions about which there is general agreement:

- 1) It gives organisational members knowledge of how they are expected to act and think;
- 2) It gives organisational members a sense of what they are expected to value and how they are expected to feel;
- 3) It defines and maintains boundaries, allowing identification of members and non-members;
- 4) It acts as an organisational control system, prescribing and prohibiting certain behaviours.

From an individual perspective, culture gives organisational members a conceptual structure concerning what is essential, what is valuable, what is possible and what will work effectively (Bate 1984). From an organisational perspective, culture facilitates the co-ordination and control of the activities of the members of that cultural group (Wilking & Dyer 1988).

2.17 Change

“Change is a necessary condition of survival, as we individuals or organisations, find that differences are a necessary ingredient in that change, is that never-ending search for improvement. The challenge for the manager is to harness the energy and thrust of the differences so that the organisation does not disintegrate but develops. Without politics we would never change and without change we would wither and die.” (Charles Handy 1993).

The management of change in an organisation is an area of potential conflict because of these inherent issues of understanding and communication. Management actions to facilitate change can easily be misunderstood because the procedures and processes already in existence appear to be perfectly good.

Quality Managers have had to develop ways of dealing with inherent instability in the market, resistance to change by employees and intrinsic conservatism. They have “coping strategies” to make the introduction of change more palatable. Ultimately, they have to demonstrate that quality initiatives will bring long-term benefit to their organisation. (McCabe, 1996).

John Harvey-Jones (1993) has stated that change is easier to manage when there is an element of danger present in an organisation and there is an obvious need for change: It is impossible to change organisations which do not accept the dangers of their present way of doing things.

Faced with pressure for change, managers are likely to deal with the situation in ways, which coincide with the culture of the organisation. This raises a particular challenge

to management when the action required is outside the assumptions and beliefs of members of the organisation.

As a result of technological and scientific development ‘the way we do things around here’ may be altered over night, but even in the most extreme cases the managers’ role is to anticipate the change and prepare for it.

“Changing a culture is not a matter of teaching people a bunch of new techniques, or replacing their behaviour patterns with new ones. It is a matter of exchanging values and providing role models.” (P Crosby 1988).

Change should be forward looking, otherwise the organisation will gradually, perhaps imperceptibly, become more and more at odds with the environment in which it operates. At the strategic level at least, managers need to look forward towards the changes that are necessary for the success of the organisation and then start to prepare people in the organisation to meet these changes. It is people who carry out construction projects, not just conditions of contracts. Employees must be motivated to alter their work practices, learn new skills and change their attitudes.

Tichy suggests that an integrated change strategy must be based on simultaneous attention to the three systems-political, technical and cultural. The future desired state must be thought in terms of these three systems. What must be considered is how good the alignment is within a system as well as how good it is between the systems. Tichy argues further that the cultural change strategy is developed through two types of alignment. First, that there is an alignment with the technical and political systems of the organisation. Second, there is an alignment within the cultural system.

2.18 The Management of Change

“The Construction industry faces a continuous circle of change in workload, work mix and the method of managing the changes and, by definition changing its product all the time. One of the consequences of these many changes is that the construction firms are moving closer to their clients who are themselves becoming more

sophisticated and are often now the driving force for improvements in the construction process.” (Yisa Et Al 1996).

It is beyond argument that the world is changing. Client expectations are increasingly seen to be the only criteria by which success is measured. Bounds et al. (1994) stresses the need for organisations to move to the new paradigm of providing a superior customer value strategy.

According to McCabe (1995), in the construction industry, the transition from writing procedures to changing the culture is bound to be difficult. It requires skills, which are different to those, employed in the pursuit of registration. This is because: TQM is a process of change and no single change is more important than that of employees' attitudes. A shift in management style is necessary to allow “*change*” to happen.

It is possible to recognise certain characteristics in the process of change. These include uncertainty about the causes and effects of change, unwillingness to give up existing practices, and awareness of problems in the change process. Managers have to determine the actual causes of resistance to change and remain flexible enough in their approach to overcome them in an appropriate manner.

“Everyone doing his best is not the answer. It is first necessary that people know what to do. Drastic changes are required. The first step in the transformation is to learn how to change.” (Deming 1986).

The task of the manager is to direct energy away from feelings of powerlessness and looking backwards and towards seeing the opportunities for the future.

This is particularly important because in the process of change, people feel that they are threatened by the future while they need to recognise the dangers in the present position and the opportunity in the new one.

Management when executing change needs to utilise the approach or combination of approaches, which best avoids potential problems of resistance. Culture can be seen as a barrier for change. Changing culture of an organisation is a slow process.

Companies and their cultures grow up over a long period of time, and to change it takes either an equally long period of time or a gigantic accelerated effort to 'move the mountain.'

Culture has to be changed when conditions such as the following are occurring:

- a. When the environment is changing;
- b. When the industry is competitive;
- c. When the company is mediocre;
- d. When companies are about to become very large;
- e. When companies are growing very rapidly.

Deal and Kennedy take the view that in most other situations companies should not undertake large-scale cultural change.

2.19 The Debate on the Effectiveness and Future of TQM

In 1993 a research study by UK Consultants A T Kearney (1993) for the TQM magazine received widespread press coverage. Their report entitled "Total Quality: Time to take off the Rose Tinted Spectacles" was featured in a series of articles in the Financial Times in October and November 1993. Amongst the findings the report concluded that 80% of TQ programmes had not yet shown to be successful. Principle reasons for failure were attributed to a lack of commitment from top management, and too great an emphasis on short-term pay back. However, of this group, 50% still remained committed to TQM.

Twenty percent of the organisations surveyed were reported to have claimed significant improvements. The report concluded that successful companies observed 4 characteristics:

1. An emphasis on tangible results;
2. An insistence on performance measurements;
3. An integrated program;
4. A clear commitment from top management.

In the US a survey of 500 manufacturing and service companies by consultants Arthur D Little (1992) reported that only 33% of companies using TQ said that it had a significant impact on their competitiveness. Lack of top management commitment was given as the highest reason for failure.

A report by the Ashridge Management School for the Economist Intelligence Unit in 1993, surveyed 50 companies in the UK and in Europe. The report concludes that it is early days for TQM in Europe and the UK but that many schemes have failed to deliver benefits.

A survey by Durham University Business School (1992) surveyed 235 companies. Their report entitled "The Adoption of TQM in Northern England" was published in 1992. Amongst the conclusions the report shows that 50% of the companies surveyed had adopted TQM of which 66% expected to achieve some benefits, 90% expected efficiency gains, and 84% expected improved productivity. The report concluded that there was no evidence that TQM had failed but that it was too early to judge progress in the North of England.

In a survey by the University of Bradford Management Centre published in 1992, 29 companies using TQM methods were subjected to detailed financial performance analysis over a 5-year period. The report concluded that there was a strong association between using TQM techniques and significantly better than industry average financial performance. The 29 companies were all found to be well above the industry norm over 5 years for profitability, return on capital, and earnings.

Zairi (1992) examines the evidence to support the link between TQM and improved performances. In his paper entitled "TQM and Bottom Line Results: where is the evidence," he summarises several studies which he argues demonstrate the link. References include a Japanese study, which examines the performance of 26 winners of the Deming prize in the period 1961-1980 using 5 indicators, earnings rate. Productivity, growth rate, liquidity and safety (net worth). All companies were reported to have achieved higher than average performance in all 5 indicators (consistently over a number of years). Details are also presented of a 1992 study by

consultants Ernst and Young for the American Quality Foundation, which reported increased profitability, higher productivity, and greater perceived quality, from a sample of companies pursuing the Malcolm Baldrige Award.

Ramirez et al (1993) concluded their research on TQM in US organisations that companies studied (who had introduced TQM) had done so to improve competitiveness, increase market share, and ensure long-term survival.

In 1992 and 1993 the Harvard Business Review ran a series of papers reviewing the status of the Malcolm Baldrige Award. Garvin 1992 says that since its launch in 1989 the Baldrige has become the single most important driver of quality in the US with most major corporations adopting the framework for their quality programmes. The papers led to several letters from industrialists and academics, which were subsequently published. An exercise was undertaken to capture and summarise this debate Table 2.2 illustrates the findings. These show that a high proportion of respondents support the MBNQA, though notably both Deming and Crosby warn of shortcomings in the approach. The responses are summarised in the notes, which accompany the table.

Table 2.2 The Usefulness of the Malcolm Baldrige

NAME	OFFICE	Strongly Support	Generally Support	Neutral	Generally Against	Strongly Against
Arden C Sims	President & CEO, Globe Metal Inc.	*				
Jerry Bowles	Publisher – The Quality Executive		*			
Philip Crosby	Consultant/Author/Quality Guru					*
Bradley Gate	Founder – Market Driven Quality Inc.		*			
Joshua Hammond	President, American Quality Foundation		*			
Curt Reinmann	Director MBNQA	*				
W Edwards Deming	Author/Statistician/Quality Guru					*
Claire Crawford-Mason	Senior Producer, CCM Production Inc		*			
Don Clausing	Professor of Engineering, Massachusetts		*			
Robert Galvin	Chairman Motorola	*				
K K Hockman	Consultant Statistician, E I Du Pont Inc	*				
Phil Pfafer	Principal, McKinsey & Co			*		
Gail E Cooper	Chairman, Cooper Consulting		*			
Kenneth E Leach	Founder, Leach Quality Inc	*				
Kate McKeown	President & CEO, McKeown & Co					*
Drew Peak	Vice President, Donaldson Inc		*			
Shoji Shiba	Visiting Professor, Sloan		*			
Donald Peterson	Former Chairman, Ford		*			
Bruce Irwin	CEO, Enterprise Australia	*				
Norman Rickard	Vice President, Xerox	*				
Alex D'Arbeloff	Chairman, Teraclyne Inc	*				

Sample = 21

8
38%9
43%1
5%0
03
14%

(Source Adapted from a review of letters printed in the Harvard Business Review Jan/Feb 1992)

Notes to Table 2.2

1. HBR give no indication of the methods used to select letters for publications, it is therefore difficult to judge the representativeness of the sample.
2. From 21 printed replies, 17 (81%) were either strongly supportive or generally supportive.
3. The generally supportive group, 9 (43%), wanted modifications to the award criteria. Some proposals were-
 - a two-tier structure with high scores, and past winners elevated to a higher standard, similar to the Deming.
 - More emphasis to be placed on the usefulness of the model as an appraisal and benchmarking tool, and less emphasis on the award and competitive elements
 - Inclusion of some financial measures.
4. Of the 3 respondents strongly against, 2, Edward Deming, and Philip Crosby, are generally regarded as Quality Guru, Deming, aged 81, gave a very short paper saying that the award has become focused purely on results and that Garvin's article "transgresses all that I try to teach". Crosby sees the award process as potentially destructive and states 6 areas where it is flawed; lack of a definition of quality, lack of customer nominations, old-fashioned criteria, some examiners with a clear conflict of interest, encourages executives to delegate responsibility for quality, few winners. He calls for "a more serious approach."
5. Among the strongly supportive group are predominantly past prizewinners, consultants, or Baldrige examiners and officials.

In summary the empirical evidence presents a mixed picture with some studies claiming positive evidence of improved performance from TQM, Zairi (1992), Ernst and Young (1992), Ramirez et al (1993), whilst others show less positive results, A T Kearney (1992), The Economist Intelligence Unit (1993), Arthur Little (1993). The failings, however, are largely attributed to a lack of management and planning, rather than to TQM as an underlying philosophy, A T Kearney (1992), Zairi (1992), The Economist Intelligence Unit (1993), Hill and Wilkinson (1995).

Nonetheless, the difficulties in implementing TQM successfully has led some UK organisations to abandon the idea of an overall approach and opt for a partial and selective approach, Cruise O'Brien and Voss (1992), Wilkinson and Willmott (1994). Others have concluded that downsizing and economic recession are causing firms to abandon TQM, Hill and Wilkinson (1995), Niven (1993). Withener (1994) concludes that leaders must take a more committed and long-term view of TQM if it is to succeed.

More optimistically Greene (1995), has concluded that in the US TQM, has become the normal way of managing. Grant et al (1994) conclude that TQM is now accepted in the US as a distinct paradigm of management underpinned by a distinct philosophy embedded in the work of the quality gurus which embraces the purposes of the corporation, the role of work and human nature. Munro (1995) finds that individual managers in the US are viewing quality as the most important discipline for advancing their careers. Other evidence from the US however, presents a more balanced picture, Kano (1993), Eason (1993), Juran (1993).

2.20 Summary

This chapter has reviewed the literature on TQM to provide a function for this study. This chapter also provides a definition for quality managers in relations to the construction industry. It has been emphasised that providing customer satisfaction is a fundamental object of quality in construction.

Section 2.6 examined the major work of the quality gurus, and considered the history of quality management and quality assurance and presented some recent definitions.

Section 2.10 examined evolution of TQM the history and main principles as set down by the gurus, was undertaken. This identified some differences in emphasis and general approach, which some of the literature has explored at length. Many similarities emerged and the common ground was identified.

This section examined recent literature, which has sought to build upon the basic principles of TQM, by identifying the critical factors essential for success.

Methodology

Research Methodology

Introduction - This chapter describes the main research methodology adopted for this dissertation.

This dissertation's primary interest is Total Quality Management (TQM) improvements; proponents suggest that through TQM improvement, operating and financial performance are enhanced as costs are reduced. Experts also suggest that when TQM improves, revenues and market share increase (Deming, 1986, Garvin, 1988).

3 Aim

The principal aim of this Thesis is to identify TQM improvement factors that can predict quality and financial performance, within the construction industry environments.

A review of the literature on research methods for the social sciences was undertaken. Several of the major texts set out recommended frameworks for conducting research. Examples were found in Goode & Hatt (1952), Simon (1969), Sjoberg and Nett (1969), Bryman (1989), Nachmias (1990) and Yin (1991).

3.1 Research Objectives

Given these considerations the research objectives have been defined and are:

1. Investigate the use of TQM with in the Construction industry;
2. Examine the implementation of TQM in the Construction industry;
3. Investigate the effects of TQM on performance;
4. Benchmark different approaches to the implementation of TQM;
5. Develop a framework for implementation of TQM in the Construction industry.

3.1.1 The Research Objective, Purpose & Value

The Research Objectives for this study have been identified from the review of literature (chapter 2) and from exploratory research (chapter 7). This approach ensures that the study may be best focused on key area, and is consistent with the recommended approach in Simon (1969), Nachmias and Nachmias (1990) and Patton (1987). For example:

- Key areas important to industry practitioners have been identified from the literature review and from the exploratory research.
- Gaps in empirical research and in literature have been identified which this study can address.

3.2 Research Approach

Data for this research was obtained through an investigation into leading construction companies involved in the TQM process. To provide the necessary data for accomplishing the objective, the research approach was divided into a planning phase, questionnaire phase, interview phase and report phase.

A comprehensive literature search was conducted as a continuous part of all phases. The main goal of the literature review was to develop a knowledge and understanding of previous work and activity in the field of TQM in Construction. The literature review was also important because it raised the author's awareness of the main findings, trends, areas of debate, controversy and neglect. The review of literature helped to assure that the newly generated results would be fitted and cemented into the "*Wall of Knowledge and Theory.*"

So what is the most appropriate research design to adopt given the nature of the research questions posed? The research objectives, hypotheses, delimitations, assumptions and their relative significance were determined prior to establishing the

strategy for gathering and interpreting the relevant data. This enabled the author to arrive at factually based conclusions and recommendations set out in chapter 10.

Adams & Schvaneveldt (1985), pointed out that:

'A research design refers to a plan, blueprint or guide for data collection and interpretation, sets of rules that enable the investigator to conceptualise and observe the problem under study. The purpose or intent of a study defines the type of design that should be used.'

This study is seeking new information about the difficulties facing the construction industry in achieving TQM.

From the literature 2 distinctive approaches to scientific research are identified. Nachmias & Nachmias (1990), describe these as “Theory then Research” and “Research then Theory.”

Theory then Research is described as a deductive approach. It is based on the formulation of a research hypothesis. The researcher starts with a theory about a research area formulates a hypothesis, then seeks to gather data, which will prove or disprove the hypothesis.

Research then Theory is described as an inductive approach. The research will seek to build theory by discovery development, and verification through the systematic collections an analysis of data. Grounded Theory is based on this approach Glaser and Strauss (1967).

Given the nature of this study, and the research objectives identified, it is proposed to principally follow the research then theory approach. This will best enable the how, what and why questions to be addressed.

3.2.1 What is Qualitative Research and how is it achieved?

On first hearing, the answer seems disarmingly simple. It is a systematic, empirical strategy for answering questions about people in a particular social context. Qualitative Research methods are the principal elements of Grounded Theory, Glaser and Strauss (1967).

Oakley (1994) suggests that the word 'qualitative' is used to describe research, which emerges from observation of participants. Teschj (1991), identified 3 categories of approach to the analysis of qualitative data:

Language based – focuses on how language is used and what it means – discourse analysis, ethno methodology and symbolic interactions;

Descriptive or interpretive – attempts to develop a coherent and comprehensive view of the subject material from the perspective of those who are being researched; the participators, respondents or subjects;

Theory – Building – seeks to develop theory out of the data collected during the study; Grounded Theory is the best-known example of this approach.

Qualitative Methods will therefore be principally used in this study. The strategies of the open-ended research approach are encapsulated in Grounded Theory (Glaser and Strauss 1967), which involves the discovery of theory from data. The technique involves the gathering of data from observation of the sample. Next, the researcher examines the data from the perspective of the issues to be investigated through the research and identifies categories of the data. Further collection of data follows until, with continual examination of the data and the categories, the researcher is satisfied that the categories are suitable, meaningful and important.

In using Grounded Theory and analytic induction (step by step process of iteration and evaluation), Strauss (1987), emphasises that researchers must be, "*fully aware of themselves as instruments for developing that Grounded Theory.*" The statement means that the researcher must be rigorous and highly objective in analysing the data

to yield the categories and hence theory. In the research process, to ensure accuracy and validity, the research must avoid bias.

As will be discussed shortly, grounded theory is an approach technique for the aims of this research. Extensive work by McAdam (Leonard & McAdam, 2001) supports and justifies the use of grounded theory approach specifically in the case of TQM research.

In carrying out studies which require the development of theory from data and the subsequent testing of the theory, where data collection, analysis and development of theory proceed together iteratively, Schatzman and Strauss (1973), advocate segregation of the researchers field notes into:

1. Observations notes which concern the recording of 'events experienced principally through watching and listening.'
2. Theoretical notes, are 'self conscious, controlled attempts to derive meaning from any one of several observations notes.'
3. Methodological notes concern how the fieldwork is carried out and record any necessary changes, the reasons for such changes and when the changes occurred.

Much qualitative research concerns the generation of concepts through the researcher getting immersed in the data collection in order to discover any patterns. It is essential that the researcher must be aware of his own preconditioning and views (potential bias). By using case studies this enables thorough investigation and helps to address the research objectives.

3.2.2 *The Principal Criticisms of Qualitative Methods*

The main concern is issues of validity and reliability: Bryman (1988) states that problems associated with interpretation are the main area for complaint against the use of qualitative methods. Inherently there are problems of researcher bias, and of representativeness. Bryman presents 2 models to help the researcher. The first is based on methods he describes as analytic induction (is a step by step process of

iteration and evaluation). Figure 3.1. The second is a summary of Grounded Theory (Glaser and Strauss 1967) Figure 3.2.

Figure 3.1 Steps in Analytic Induction

The Chief Steps

1. Rough definition of the problem;
2. Hypothetical explanation of problem;
3. Examination of cases to fit problem;
4. If lack of fit either – hypothesis reformulated, or problem re-defined;
5. Hypothesis is deemed to be confirmed after a small number of cases has been examined; negative cases required further reformulation;
6. Procedure continuous until no further negative cases have been encountered and a universal relationship has been established.

Figure 3.2 The Chief Components of Grounded Theory

Adapted from Bryman (1988)

1. After exposure to the field setting and some collection of data, the researcher starts to develop ‘categories’ which illuminate and fit the data well.
2. The categories are then ‘saturated’ meaning that further instances of the categories are gathered until the researcher is confident about the relevance and range of the categories for the research setting. There is recognition in the idea of ‘saturation’ that further search for appropriate instances may become a superfluous exercise.
3. The researcher then seeks to abstract a more general formulation of the category as well as specifying the criteria for inclusion in that category.
4. These more general definitions then act as a guide for the researcher as well as stimulation further theoretical reflection. This stage may prompt

the researcher to think of further instances, which may be subsumed under the more general definition of the category.

5. The researcher should be sensitive to the connections between the emerging general categories and other milieux in which the categories may be relevant. For example, can categories be extended to encapsulate other social settings?
6. The researcher may become increasingly aware of the connections between categories developed in the previous stage and will seek to develop hypotheses about such links.
7. The researcher should then seek to establish the conditions in which these connections pertain.
8. At this point the researcher should explore the implementation of the emerging theoretical framework for other pre-existing theoretical schemes, which are relevant to the substantive area.
9. The researcher may then seek to test the emerging relationships emerging categories under extreme conditions to test the validity of the posited connections.

Lincoln and Guba (1985) propose that qualitative researchers must answer 4 basic questions, which they describe as the canons of qualitative research. Again this is best illustrated in summary form and the model is shown in figure 1.4.

Figure 3.3 How Qualitative Research can be Evaluated

“4 Canons”

Adapted from Lincoln & Guba (1985)

1. How truthful are the findings of the study? By what criteria can we judge them?

Credibility

The strength of the qualitative study that aims to explore a problem or describe a setting, a process, a social group, or a pattern of interaction, will be its validity. An in depth description showing the complexities of

variables will be so embedded with data derived from the setting that it cannot help but be valid.

2. How applicable are the findings to another setting or group of people?

Transferability

The burden of demonstrating the applicability of one set of findings to another context rests more with the investigator who would make that transfer than with the original investigator. The original researcher can aid the process by establishing parameters, keeping data, presenting analysis, mixing research methods, and repeating studies.

3. How can we be reasonably sure that the findings would be replicated if the study were conducted with the same participants in the same context?

Dependability

Take care to document, record, analyse data in a systematic way. Follow a pre-determined analytical process. Recognise that the world is a changing place.

4. How can we be sure that the findings are reflective of the subjects and inquiry itself rather than researcher bias?

Conformability

Or objectivity. Whether another could confirm the findings. Place emphasis on the data. Show analysis. Show researcher interpretation and evaluation.

Yin (1991) has developed criteria for judging the value and quality of research designs. He suggests 4 areas should be tested:

1. Construct validity – establish correct and relevant operational measures.
2. Internal validity – establish cause and effect. Establish internal inferences.
3. External validity – establish representativeness.
4. Reliability – establish if the study can be repeated.

Yin goes on to develop a diagnostic model for case study research, illustrated in figure 3.4.

Figure 3.4 Case Study Tactics for Four Design Tests

Adapted from Yin (1991)

Tests	Case Study Tactic
Construct Validity	Use multiple sources of evidence. Establish chain of evidence. Have key information review draft reports.
Internal Validity	Do pattern matching Do explanation building. Do time series analysis.
External validity	Use replication. Use multiple case studies.
Reliability	Use case study protocol. Develop case study database.

Adoption of the main principles embodied in these models will provide a sound basis for designing the qualitative research aspects of this study.

For designing data collection and analysis tools, an interview pro-forma, and interview transcription pro-forma have been designed to ensure that the process of data collection is systematic, and the method capable of repetition. Multiple interviews, multiple sources of data, and pre-case study trials, have been incorporated into the research design.

Analysis and evaluation of the research data follows the principles of Grounded Theory, Glaser and Strauss (1967).

See section 3. Case Studies and figure 3.2 Grounded Theory.

3.2.3 Combined Methods

In this study, a case study approach permits a more in-depth examination of a TQM implementation and places it in the context in which it occurs. This approach has been put forward as one of the primary research designs in which quantitative and qualitative methods will be combined. It has been argued that it is unusual for

quantitative and qualitative research methods to be located an equal role with in the overall research design. This study is no exception in that greater emphasis was placed on qualitative methods. Quantitative methods will also be used to improve the validity and reliability of the research findings.

Quantitative methods centre on techniques of randomised experiments, paper and pencil “objectives” questions etc, and statistical analysis. In contrast qualitative methods include case studies, in-depth interviews and participant observation. Qualitative research methods based on Grounded Theory have been determined as the primary methods most appropriate for this study.

Several authors recommend this approach, Brannen (1992), Bird (1992), Sykes and Warren (1991), Burgess (1984).

Burgess (1984) says, *“Researchers ought to be flexible and select a range of methods appropriate to the research problem under investigation, and increasingly that field methods that do not encompass observation, interviewing and sampling are seen as narrow and inadequate.”*

Brannen (1992) argues that the weight of opinion has shifted such that most academics would now conclude that, *“Methods are selected appropriate to research objectives and happily mix and design appropriate to needs.”* Brannen explains that the use of multiple methods in a research project is often termed triangulation. Such approaches are used to improve validity by either confirming similarities or by emphasising differences.

Bird (1992) suggests triangulation helps the researcher to get closer to the truth. He states, however, that it is not appropriate to attempt to integrate findings, but present them independently.

3.2.4 Quantitative Methods

The use of quantitative methods will be to support the case studies, providing a means of validating findings, comparing and contrasting results. This will add validity and reliability to the research design.

Essential quantitative approaches involve making measurements by collecting data. Two major questions are:

- What is to be measured?
- How should those measurements be made!

The major objective is that the research is 'value-free;' that the work is unaffected by the beliefs and values of the researcher. In conducting quantitative research, 3 main approaches are employed: asking questions of respondents by questionnaires and interviews; carrying out experiments; and desk research using data collected by others. It is essential to investigate the nature of the data collections mechanisms in order to be aware of the limitations of the data and their validity, notably comparability.

The principle areas where quantitative methods will be used are:

1. In measuring the impact of TQM on performance to support the case study findings;
2. In validating and testing the findings from the case studies.

To a greater extent, the use of quantitative versus qualitative methods was contingent upon the stage of the research process. For example, at the commencement stage of this research unstructured interviews and documentation provided contextual information with regard to previous organisational changes and TQM implementation. Subsequently, quantitative methods come to the fore in terms of providing a baseline measure upon which to assess the extent of change between the collection of the baseline questionnaire and the second questionnaire (some months later), interviews

which were highly unstructured and quite ad hoc fulfilled 2 roles. First, a way of monitoring the progress of TQM and second, as a source of additional questions to be included in the second questionnaire.

Simon (1969), the principal areas to address in preparation for quantitative research are in relation to defining the empirical variables, and identifying the functional relationship between the variables.

3.2.5 *Defining the Empirical Variables*

Hicks (1982) defines an experiment as a 'study in which certain independent variables are manipulated, their effect on one or more dependent variables is determined and the levels of these independent variables are assigned at random to the experimental units in the study.' However, Hicks' definition raises the issue of the way in which the independent variable is 'manipulated;' although random variation is one approach, commonly, particular values within a 'range of interest' are assigned to the independent variable. This method provides practicality, but also some restriction on the inferences, which can be drawn from the results.

A common approach is to undertake comparative studies on similar projects executed at about the same time by similar firms employing similar organisational arrangements. Such a case study could investigate the impact of different management styles of quality managers on organisation performance, measured values of time, cost, quality, ect.

Several of the major texts consulted provide detailed guidance on this process, principally Simon (1969), Brannen (1992), and Nachmias & Nachmais (1990).

In the context of this research, TQM has been defined from the review of literature (chapter 2) and the critical factors, principles, and techniques identified. It was argued in chapter 5 that these could be fitted within an established TQM framework, and the EQA model was chosen as the most appropriate for this study. A methodology for measuring TQM is inherent within the EQA model.

The approach identifies that in the context of this research TQM is the independent variable eg the cause which is to be investigated. The dependant variable is performance eg the effect to be investigated.

An approach proposed by Nachmias and Nachmias (1990) was chosen and followed. Figure 3.5 illustrates their definition of the variables, which need to be determined.

Figure 3.5 Definition of Variables

VARIABLE	DEFINITION
Independent Variable (X)	Whose affect upon the dependant variable you are trying to understand. In cause and effect investigations this is the <i>cause</i> variable.
Dependant Variable (Y)	That quality whose change or different state the researcher wants to understand, explains, or predict. In cause and effect investigations this is the <i>effect</i> variable.
Control Variable	Used to reduce the risk of attributing explanatory power to independent variables that are not responsible for the occurrence of variation in the <i>dependant</i> variable.
Ceteris Paribus	Latin expression for the other thing being equal. The task of the researcher must be to arrange affairs so that other things are reasonable equal.

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- [2] Productivity Team Report – UK & USA Construction Industries 1951.
- [3] Emmerson, H. A survey of problems before the construction industry. HMSO 1962.

This is based on the application of a 5-point rating scale. Examiners are required to measure each part of the enabler's criteria (leadership, policy and strategy, people management, resources, and processes) in 2 areas. Firstly, in terms of approach:

- The appropriateness of the methods, tools and techniques;
- The degrees to which the approach is systematic and prevention based;
- The use of review cycles;
- The implementation of improvements resulting from review cycles;
- The degree to which the approach has been integrated into normal operations.

Secondly, in terms of deployment:

- Vertically through all relevant levels;
- Horizontally through all relevant areas and activities;
- In all relevant processes
- To all relevant products and services.

Using an assessment score chart the examiner then rates on a 5 point scale eg for approach ranging from anecdotal or non value adding (0%) to clear evidence of soundly based systems (100%). Similarly for deployment eg ranging from little usage (0%) to applied to all relevant areas (100%).

A similar exercise is repeated for the results criteria (people satisfaction, customer satisfaction, impact on society and business results).

This methodology was used to evaluate TQM within each of the organisations case studied. The full evaluation criteria are in appendix 4, the individual assessment sheets for each case study are in appendix 4, and the analysis and evaluation are discussed in chapter 4.

The advantage of this approach is that it provides a systematic methodology for evaluating TQM. The Literature Search and Review identified that such self-assessment tools are now popular. The research design incorporates multiple data sources and multiple interviews to limit the possibility of error, bias, and subjectivity.

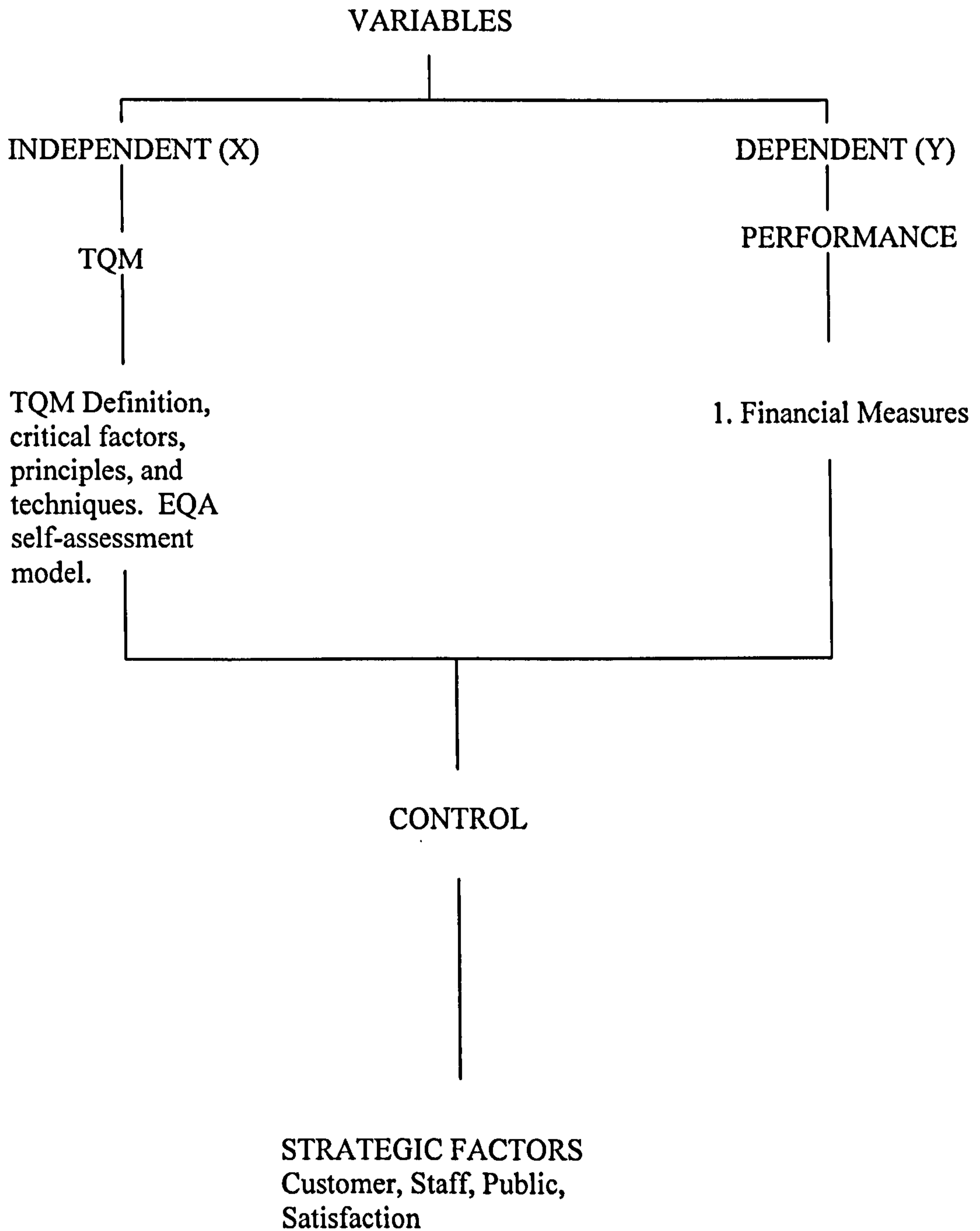
Discussion of the outcomes was also undertaken with respondents on completion of the exercise to verify the findings.

The measurement of TQM in this way provides the basis for defining the independent variable. The dependent variable performance may similarly be measured applying the EQA methodology. For this study, however, it was discovered within the case study investigations that measures of customer satisfaction, staff satisfaction, and impact on society, were not well developed within Construction Industry.

In contrast, measures of financial performance were well defined, universally applied, and a methodology for aggregating results was being consistently used within the industry (discussed in chapter 4). For these reasons it was determined to use financial performance as the measure for the dependant variable in this analysis, however, other measures of customer, staff, and society, are considered in the case study analysis. In this respect these other strategic factors (such as geographic location, diversification, long term verses short term issues).

This analysis of variables, based on the methodology prescribed by Nachmias and Nachmias (1990) is shown in a diagrammatical format in figure 3.6.

Figure 3.6 Analysis of Variables



3.3 Validating & Testing the Case Study Findings

A final questionnaire survey will be conducted using a large sample of Quality Managers within the Construction Industry. The purpose of the survey will be to validate the critical factors, principles and techniques of TQM applied within the case

studies. This will provide a basis for comparing and contrasting the results from the 2 studies.

The Literature, Search and Review revealed the critical factors, principles, and techniques of TQM, have largely been developed from a manufacturing background. To this extend the survey will provide some new insights into the importance and relevance of the criteria in the Construction Industry.

3.4 Research Process and Grounded Theory in TQM

Research can be defined as a *“Process of systematic investigation of a subject for the purpose of adding to the body of knowledge about that subject.”* Contained in that definition are 3 key points (Hancock, 1998): research is a process carried out in stages; investigation is carried out systematically, ie it is planned; and research is intended to add to the body of knowledge, ie its purpose is to inform.

TQM is historically rooted in practice (Krishnan et al, 1993) and a rich source of data and experience exists from which theory can be developed. It is essential that research methodologies which seek to develop richer pictures of TQM avail of this resource and, in the words of Carson and Coviello, *“have an integrated approach,”* which involves both researcher and practitioner.

The aim of this research is to describe a grounded theory research method for TQM in construction organisation, which enables TQM theory to be developed based on rich empirical data from multiple construction company.

Management research is predominantly based on deductive theory testing and positivistic research methodologies (Alvesson and Willmott, 1996). These approaches incorporate a more scientific approach with the formulation of theories and the use of large data samples to observe their validity. However, these approaches, by in large, fail to give deep insights and rich data into TQM in practice within organisations:

In many areas of the social services existing deductive, theory testing research methods do not adequately capture the complexity and dynamism of the context of organisational settings (Perry and Cotte, 1994).

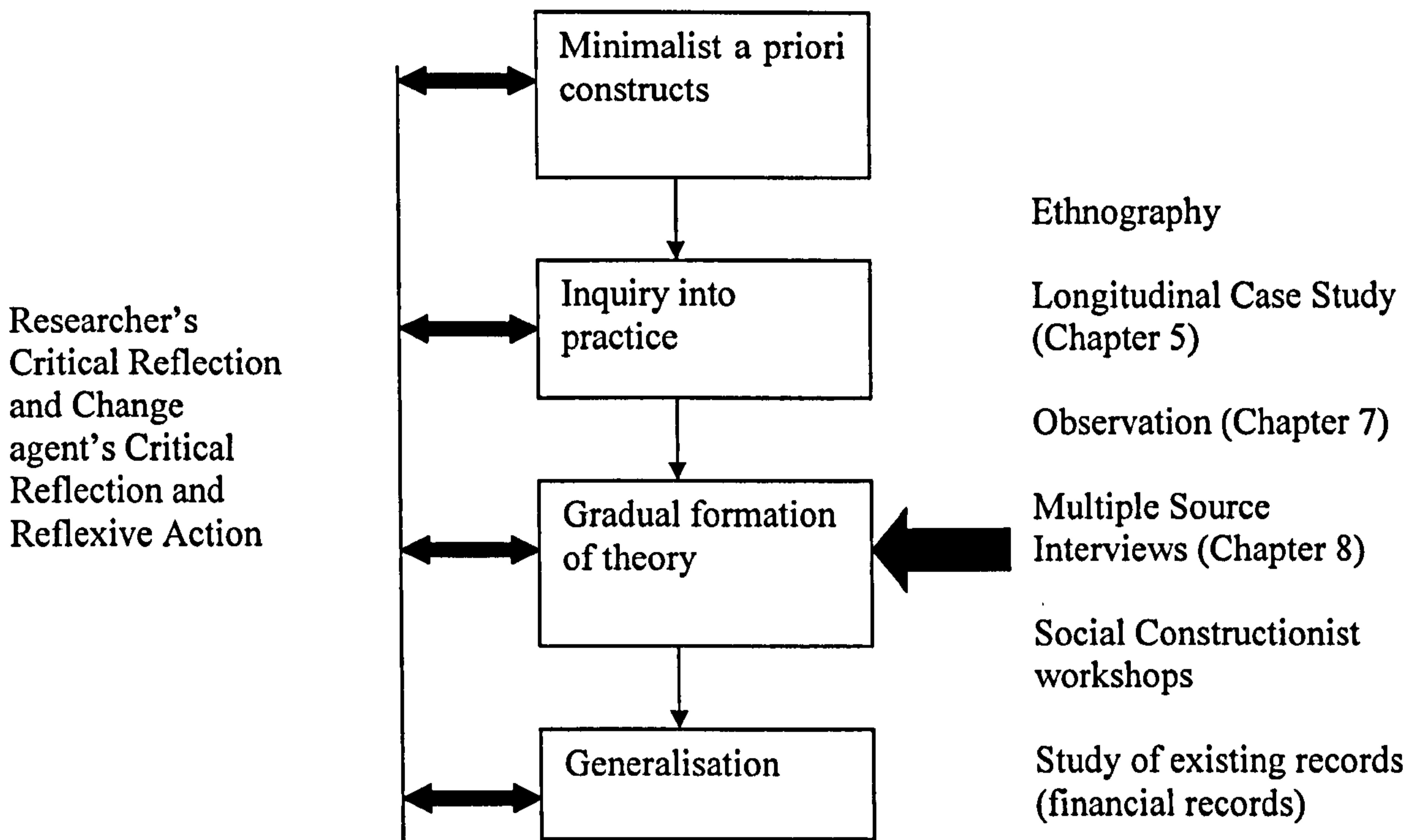
Juran (1991) and Wilson and Durant (1994) emphasise this point by saying there is a, "*Paucity of systematic and rigorous evaluation*" in many TQM studies. Furthermore, Wilson and Durant state the need for more theory grounded and contingency based research rather than be restricted to deductive approaches.

3.4.1 Grounded Theory

One of the most developed inductive research methods is that of grounded theory (Glaser and Strauss, 1967). In this methodology Figure 3.7 the researcher starts with minimalist a priori constructs, inquiries deeply into organisational behaviour and events and gradually tests and forms theoretical constructs.

The researcher being able to develop theory through comparative methods looking at the same event or process in different settings or situations." (Easterby-Smith et al., 1993). Sitter et al., 1997 state that grounded theory uses abstract concepts to describe and analyse a series of general phenomena, but based on practical experience. It is this intrinsic link to practical experience that makes the method attractive to theory forming within the practice of TQM.

Figure 3.7 Generic Grounded Theory Research Methodology (modified from Strauss and Corbin, 1990)



One of the inductive research methods most suited to longitudinal case studies is that of grounded theory (Glaser and Strauss, 1967). In this methodology the researcher starts with minimalist a priori constructs, inquires deeply into organisational behaviour and events and gradually tests and forms theoretical constructs.

Sitter et al (1997) state that grounded theory uses abstracts concepts to describe and analyse a series of general phenomena, which are based on practical experience. It is this intrinsic link to practical experience that makes the method attractive to theory forming within the practice of TQM. Ropo and Hunt (1995, 1994) emphasise the recursive processual nature of grounded theory, consistent with critical action learning which leads to an interplay of organisational and individual characteristics across time and grounded in experiential data.

To avoid being perceived as an “a theoretical black box,” a systematic and rigorous approach to TQM theory building must be adopted. The grounded theory approach to TQM theory building encourages practitioner insights and data. Multiple sources of data are embraced and engaged in a recursive sense making process. Thus theory

building by grounded capitalises on the rich practitioner based knowledge base of TQM. Sources of data can include TQM team meetings, interviews with TQM managers and TQM case studies (Perry and Coote, 1994).

Glaser and Corbin (1990) show how such data can be gathered from “streams of research” (Carson and Coviello, 1996) and data interpretation can be guided by existing literature and theory. This is a highly recursive process between theory building and theory testing (Wolfgramm et al., 1998). Thus the grounded theory research methodology was used to realise the potential of rich practitioner TQM data and enabled coherent TQM theories to be developed. In a reflexive manner this theoretical development led to more informed organisational applications and TQM award models.

Grounded theory is a longitudinal research methodology, unlike many deductive approaches, which intrinsically rely on questionnaire data taken at a given point in time. Wolfgramm et al. (1998) describes grounded theory as inquiring into the, *“processual pattern of change at institutional, organisational and strategic level.”* Grounded theory can focus on the temporal dimension of a TQM based organisation setting and investigate contemporary phenomena within its real life context. (Van de Ven, 1992 and Yin, 1993). They also argue that case studies are especially appropriate within grounded theory methodology where real life contexts are being investigated over a period of time. The longitudinal case study inquiry must be highly recursive to ensure that theory is continuously tested as well as built (Wilson and Durant, 1994). Thus the grounded theory approach was integrated with the rapid cycling within the critical action learning process.

Hancock(1998) stated that, the main feature of grounded theory is the development of new theory through the collection and analysis of data about a phenomenon. Actually, it goes beyond phenomenology because the explanations that emerge are genuinely new knowledge and are used to develop new theories about a phenomenon. Grounded theory is a longitudinal research method that intrinsically relies on gathering data taken at a given point in time (Leonard and McAdam, 2002). Therefore, grounded theory as inquiring into the processual pattern of change at institutional, organisational, and strategic level.

To implement those strategies in qualitative research, a number of methods for gathering data can be employed. The main methods of collecting qualitative data are structured, semi-structured, and unstructured interviews; focus group; passive or participant observations; and documentary analysis. For the purpose of this thesis-structured interviews were conducted (chapter 6), financial analysis of each organisation was also reviewed (chapter 7).

3.4.2 Accuracy – Triangulation

Ultimately, any research study into TQM must be based on reliable data. In deductive methods the debate is centred on sample size, however, in grounded theory the reliability issue depends more on multiple sources of data (Eisenhardt, 1989; Berg and Smith, 1998). Within each data source there is an emphasis on depth and quality rather than population size (Eisenhardt, 1989). The process of comparing different sources of data to obtain valid theoretical constructs is referred to as triangulation (Carson and Coviello, 1996). Grounded theory research methods in TQM can therefore include data source, which possibly were previously discounted by deductive methods. Typical data sources could include interviews, observations, archived material, current documentation, etc. Once again, practitioner-based data sources and inputs are essential to ensure triangulation and theory building and testing within the research methodology (Strauss and Corbin, 1990).

3.4.3 Level of Participation

The objective of this research was to provide rich, deep data that placed an emphasis on the practitioner's view, with an attempt at letting the practitioner speak, this placed a large focus on language, meaning and description. There are 2 main ways to write the results of a case study, the first is descriptive, the second is to combine analysis and descriptions where quotes from the interviewee would be included as an essential element of the analysis and description (Simon et al., 1996). By adopting the second approach and mixing direct quotations into the analysis and description, the practitioner's are allowed to speak and the full meaning and richness of the opinions and attitudes can be allowed to come across. This allows the practitioners to have a

greater input and hence to be critically reflexive: This approach was adopted in all phases of the research.

3.4.4 Grounded Theory Justification

The aim of this research is to use grounded theory method for TQM in organisations, which enables TQM theory to be developed, based on rich empirical data from multiple organisational sources.

The methodology makes a contribution from 2 aspects. First, a comprehensive grounded theory approach for developing TQM theory based in practice was developed and applied. Second, the methodology enabled the practitioners involved in the study to be critically reflective and reflexive in their thoughts and influence throughout the study. This reflexivity resulted in the case study organisation evaluating and implementing TQM based change throughout the study.

As said earlier Leonard and McAdam, (2001) are keen advocates of the use of grounded theory in TQM research. They consider an inductive research method to be of great importance in management research and contend that one of the most developed inductive approaches is that of grounded theory.

The grounded theory approach to TQM theory building has potential for further development. This methodology does not exclude practitioner insights and data; rather multiple sources of data are embraced and engaged in a recursive sense-making process. Thus theory building by grounded theory capitalises on the rich practitioner-based knowledge base of TQM. Sources of data can include TQM team meetings, interviews with TQM managers, TQM case studies, etc (Perry and Coote, 1994).

Jones and Craven (2001) point out that longitudinal case studies have much to offer as part of grounded theory. Much deductive research in TQM involves a strict separation between the researcher and the practitioner. This polarity is viewed as preserving 'objectivity.' However, as pointed out by Alvesson and Willmott (1996) such subjectivity cannot be preserved while dealing with socio-political issues that are

central to TQM theory building. The grounded theory methodology not only realises the impossibility of excluding these factors, rather the methodology incorporates these factors as increasing the richness of the data and understanding of the phenomena involved. Thus, ethnography can be used within grounded theory, where researchers actually participate in TQM based organisational change programmes to gain greater insights into the issues.

Thus, the TQM based grounded theory research methodology encouraged and developed practitioner involvement, reflection and reflexivity to enhance both theory and practice (Joan Henderson, 2006).

The goals of the research were to develop learning and understanding in regard to TQM implementation in the construction industry. The research study needs a long timescale to observe the TQM development. In addition, a wide range of managers and staff were interviewed to provide a range or layers of attitudes and to avoid bias or unqualified opinion, which can be a problem in single respondent studies.

A structures questionnaire was designed based on the EQA framework and which covered the critical factors and principles and techniques of TQM identified from the review of literature.

3.4.5 Finally

It was found that the grounded theory research methodology could add considerably to the body of knowledge on TQM and help establish hitherto elusive grounded TQM theories that have been rigorously tested and triangulated by multiple data sources.

The grounded theory approach incorporated longitudinal case study data analysis, which helped maximise the contribution from practitioners. The increased critical reflections and reflexivity of the practitioners contributed both to the theory building and the ongoing organisational change effort.

3.5 The Research Design

3.5.1 The Purpose of the Research Design

The purpose of the research design is to pull together the methods that will be used to collect, analyse, and interpret the data Nachmias and Nachmias (1981).

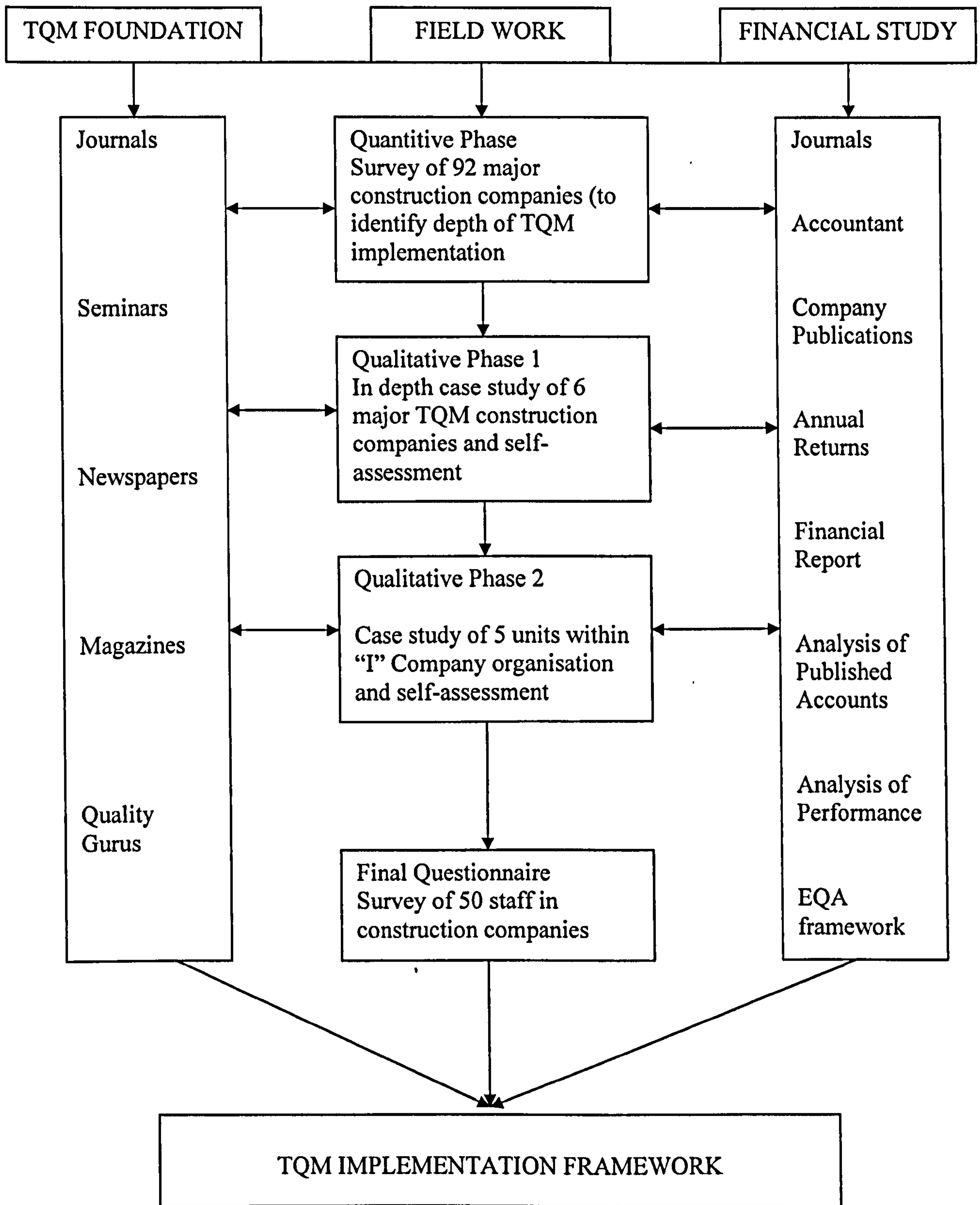
Yin (1991) says that research design is the logic that links the data to be collected to the initial questions of the study. Every empirical study has, he argues, an implicit, if not explicit, research design.

Simon (1969) describes the research design as an overall plan. It provides the logic for selection of appropriate methods and demonstrates how these relate to each other.

Brannen (1992) suggests research design is critical when mixing methods. It enables strengths and weaknesses to be more clearly identified, vital in the selection of methods, which compliment each other.

The research design for this study is illustrated in figure 3.8 and a discussion of the main elements follows directly.

Figure 3.8 Research Design



3.5.2 Literature, Search and Review

The research design illustrates the 2 areas where literature, search and review were carried out, firstly in relation to TQM, and secondly, in relation to the construction industry. The purpose of those reviews was to develop an understanding of the subject matter and the main concepts. Simon (1969) describes this process as the vital first stage in a research study, enabling the researcher to develop tentative ideas and theories.

The outcome of the literature, search and review are principally covered in chapter 2.

3.5.3 Field Work

The research design identifies 4 distinct fieldwork elements. These are – an industrial analysis and financial study, an initial questionnaire, secondary questionnaire, case studies and a final questionnaire.

The industrial analysis and financial study, and the initial questionnaire, set out to discover some basic facts about the status of TQM within the Construction industry within the UK. To this extent the studies are exploratory, aiming to build upon the review of literature and identify areas and organisations for further study.

The case studies are the primary method, used to probe the how, what and why questions in this study.

The final questionnaire is used to validate the findings from the case studies. The critical factors, principles and techniques of TQM are tested on a large sample of industry representatives and the findings compared and contrasted with the outcomes from the case studies.

3.5.4 Exploratory Research – The Industrial Analysis and Financial Study, and the Initial Questionnaire

The questionnaire used both closed questions, designed to capture basic factor (yes, no, how many), and open style questions, designed to allow respondents to describe the situation. The advantage of this approach is that new insights might be discovered from the descriptive responses. Open questions were evaluated using a content analysis approach describe by Patton (1980). Criteria are identified, either from a study of the data itself (discovery) or from others (validation), and the data responses are analysed for the presence of the criteria.

3.5.5 Primary Research – The Case Study

This phase provides an overview of the process involved in planning and designing the structural interview of the case study. Framework for conducting research. The steps in an empirical research study adapted from J L Simon (1969):

Step one – Ask what do I want to find out?

Step two – Establish the purpose of the project.

Step three – Determine the value of the research.

Step four – Choose the empirical variables.

Step five – Calculate the value of accuracy and cost of error.

Step six – Saturate yourself in the problem.

Step seven – Determine the most important research obstacles.

Step eight – Choose methods.

Step nine – Prepare a detailed design of the method.

Step ten – Collect the data.

Step eleven – Analyse the data.

Step twelve – Write up the research work.

This framework has been used to guide the process of determining appropriate methodology and research design for this study.

The structured interview was designed on the information source, subject to an interview constraint. The structured interview consisted of 8 sections:

1. The company details;
2. Confirmation of organisational characteristics;
3. TQM policy formation;
4. TQM implementation;
5. The effects of TQM on business performance;
6. Quality activities investigated which quality activities were used, how they were implemented and their effect on business performance;
7. Effects of quality activities investigated the comparative effects of quality activities on business performance;
8. The structured interview content gave the interviewee an opportunity to make additional comments, and suggestions on the content of the structured interviews.

(Refer to Appendix 1B).

The structured interviews were designed to be rigorous in the first 5 sections. These sections concentrate on the planning, steering and implementation of TQM. The remaining sections were more flexible investigation area of particular interest or novel approaches of using quality activities. These sections, in particular, would supplement the information obtained in the questionnaires.

3.5.6 Validating Research – The Final Questionnaire

The purpose of the final questionnaire was to validate the critical factors, principles and techniques of TQM applied within the case studies. This will provide a means for comparing the outcomes from the 2 studies. It will also provide new data on the relevance and importance of TQM criteria in the Construction Industry.

A large sample, 85 were determined, representing most major Constructions Industries. A mailing list was compiled principally from internet and the Building League Table.

Questionnaires were issued addressed to the Manager of Quality or to Senior Management.

The results identify the critical factors, principles, and techniques of TQM considered most relevant and important in the Construction Industry.

The findings from this survey are presented in chapter 10.

3.5.7 Developing a Framework for Implementation TQM in the Construction Industry

Finally, the outcomes from all the research will be used to formulate a new framework for implementing TQM in the Construction Industry.

This new framework will be based on the critical factors, principles, and techniques, found to be most relevant and important, and on the evidence of best practises.

The framework will be presented, along with a summary, of the principle research findings, in chapter 10.

3.5.8 The View from the Sharp End

Recent evidence indicated that organisations succeed or fail in their desire for positive management in direct proportion to the amount of visible commitment from senior management level (McCabe, 1999). He argues that quality managers involved in TQ initiatives insist that good leadership is essential to success. Furthermore, they have no difficulty in explaining what leadership is. Descriptions include, “*ability to inspire,*” “*you have to earn the trust and respect of the guys out there,*” “*listen to their problems and concerns, discuss how to deal with them and get consensus for solution.*” There are all qualities, which might reasonably be classified as ‘relationship oriented’ attributes, but they do not preclude: “*you have to be able to adapt. Sometimes it is necessary to use a big stick.*”

His research revealed (from 12 quality manager interviews) the actual process by which TQ was achieved.

In summary he suggested 3 factors necessary to successful TQ leadership. One is adaptability. The successful TQ leader has to be oriented towards both relationships and tasks; and to know which particular orientation is appropriate at any particular time. In addition, the TQ leader must have developed appropriate techniques for quality improvement. Finally, neither adaptability nor technique can be effective without commitment.

These organisational level surveys are useful in providing an overall picture in relation to the Quality Management and adaptation of TQM practises and their impact on the construction industry. This type of research needs to be complemented with case studies that provide greater detail and are more analytical in orientation.

Subsequent case studies examined specific issues or aspects of TQM. McArdle et al. (1995) explore issues such as empowerment and involvement in the context of TQM. The results suggest that empowerment did not occur in terms of extending employees' rights, rather work intensification in conjunction with greater monitoring and control of work occurred. Webb (1995) concentrates on the role of management in TQM. Her case studies suggest that TQM has radical implications for managerial and technical roles.

The case studies conducted to date have noticeable absence of longitudinal studies aimed at systematically evaluation TQM interventions.

3.6 How Research was Conducted

The principle purpose of this chapter is to present the way research is conducted.

3.6.1 Creation of the Survey

In the creation of the questionnaire the common base requirements to be addressed: (Freber 1987) there are:

- ensure the questions are easily understood, answerable and precise;
- it is not time consuming;
- the questionnaire has an attractive appearance;
- has logically set questions;
- contains open ended questions for extra comments;
- format of scoring is unambiguous;
- no duplication of questioning.

3.6.2 Question Design

Questions were designed based on the information required and the information source, subject to a questionnaire completion time constraint. The questionnaire consisted of 5 sections: -

Section 1 – The ‘Company Details’ recorded information on the name of the respondent and the company;

Section 2 – The ‘Company Profile’ recorded information on organisational characteristics and business performance (example number of employees, ownership, turnover);

Section 3 – The ‘Quality Details’ recorded information on the quality activities implemented and their effects on business performance;

Section 4 – ‘People,’ recorded information on the education and training of employees and the methods used to motivate employees;

Section 5 - ‘Total Quality Management,’ recorded information on the effects of TQM on business performance.

3.6.3 Introductory Study

Phase one a list of 208 construction companies was selected from the 1998 computer updated version of Kompas, each company were contacted by telephone (after a short explanation) ask them are they willing to participate in TQM research. 165 companies agreed to receive the questionnaire.

3.6.4 Data Collection

Phase two 165 questionnaires were issued to construction companies. The approach was initially by a personal, and individual letter, addressed to a named senior executive, normally either the chief executive or an executive with direct responsibilities for quality, TQM, corporate strategy. These individuals were the most likely to be able to answer the questions accurately.

The principal purpose of the questionnaire was to determine the level of interest and to gain valuable contact person in the organisation (opening communication channels). Questionnaires were posted with a self-addressed envelope. To make completion as easy as possible a page was attached to each questionnaire describing its purpose and an introductory covering letter was also included.

The response rate was improved by posting a reminder letter (3 weeks after the initial questionnaire). A copy of stage two questionnaire is displayed in appendix one.

3.6.5 Phase three - Planning and Designing the Structured Interviews

To address all the research area it was decided that both questionnaires and interviews would be used. This decision was taken after studying a few publications on research methods for example (Gordon 1975, Moser and Kalton 1979, and Dijkstra and Vanden Zouwen 1982).

The combination of both qualitative and quantitative research techniques enables an overall picture of TQM implementation to be formed while allowing for specific detailed studies. In general, questionnaires were used to obtain a large database of

information with a low level of detail. Structural interviews were used to obtain specific information. Companies to interviews were selected from the questionnaire and (phase 2) respondents who indicated they would participate in future research. Structured interviews were used to:

- 1) Investigate the Quality Activities of TQM;
- 2) Investigate which organisational characteristics influence the effectiveness of Quality Activities;
- 3) Investigate the rate of TQM implementation;
- 4) Review the current approached to TQM implementation;
- 5) Formulate the TQM implementation guidelines.

3.6.6 Information Source

It was necessary to determine the sample of companies, the person(s) in the organisation to be targeted and the number of companies to be interviewed. Each of these will now be discussed. The decision of which of these companies to interview was based on three criteria:

- A. Enthusiasm towards this research (the level of detail). The respondents' enthusiasm for the research was indicated by their questionnaire responses, individuals who responded enthusiastically to the research were more likely to be participative at the structured interview stage.
- B. Level of Development – companies were required to have been implementing TQM for at least 3 years. These companies would be experienced with regards to TQM implementation and the effects of TQM on business performance.
- C. Level of Seniority – respondents with a high level of seniority, for example those on the management board, were more likely to know the information required. The number of interviews was decided by considering the information obtained against the cost of further interviews and the time required for analysis.

3.6.7 Contacting Companies

Initial samples of 48 companies were targeted as possible contacts in March 2000. These all satisfied the criteria specified.

Each of these companies was sent a letter detailing the proposed research and requesting their participation. In addition they were sent a copy of the paper 'Methodologies For the Implementation of TQM within the construction companies,' the letter informed the company to expect a phone call, with a view, to arrange an interview.

Forty-two companies were contacted in total with 6 not willing to be interviewed. To save time each company was asked to have a copy of their quality policy, vision statement, and organisational and quality department structure available at the interview.

3.6.8 Final Company List

All companies contacted had been working on TQM for at least 3 years and the author was aware that in some cases this time frame may have been too short give company size and the long term nature of the TQM process. A total of 48 companies were contacted and 42 responses were received. The structured interviews began in April 2001 and were completed by April 2003. The data emphasis is on gaining an insight into how companies approach measurement of TQM progress across the broad hard and soft areas. The intent was not to force fit the data collected, the author recognised that due to company size, nature of business and other factors various approaches would be used by each company to the measurement of TQM progress but that all categories would have been addressed.

Information was primarily recorded by note taking although a tape recording of each interview was also made. The tape recording was used for validating purposes when the notes were incomplete or difficult to understand. Notes were typed into a computer as soon as possible after an interview to ensure all the details were fully

understood. If still some of the information was unclear it was validated by a follow up phone call.

3.6.9 The Follow Up Study Research Method

In order to clearly define the specific survey requirements, and also in order to develop a comprehensive questionnaire, the design of questionnaire was repeatedly scrutinised and subjected to the following questions: -

- Why is the information needed?
- What is a method of collection?
- Who is it to be collected from?
- What information is to be collected?

Providing answers to these questions helped shape the interview format and characterised individual questions within the questionnaire.

The choice of which research methods to use depends on the aims and objectives of the research itself and the constraints within which it must be carried out (eg time, cost and willingness to co-operation).

The primary objective of the follow-up research was to establish the perceived degree of benefit derived from TQM implementation, by the sample organisations.

The follow-up study was also aimed at gathering additional information on:

- a. Managerial perception and understanding of TQM;
- b. TQM Practices relative to, strategic management and leadership of TQM;
- c. The underlying measurement practices, and implement levels, in key areas of TQM implementation, concerning customers, employees, and process management.

There were many reasons for seeking such additional data. This data served first of all as a means of investigating the internal consistency of the information provided by

the organisations, and hence constituted a means of establishing confidence in the validity of the research process overall. Thus:

- a. One would expect claimed levels of success with TQM to be reflected in similar degrees of improvement achieved in customer, employee, and process management;
- b. One would expect claimed successes in overall TQM to be associated with stronger underlying TQM practices; across the range of background data gathered.

Conversely one would not expect organisations with weak practices to be claiming success from their TQM implementation. The basic assumption of this thesis is that a TQM organisation is defined as one whose senior executives profess to be the TQM philosophy, and who claim to have made a conscious attempt to implement that philosophy within their organisation. They may choose to call what they do by another name, but the aim and content are synonymous with TQM.

3.6.10 Phase 4 Case Studies

From the outcomes of the first 2 studies, organisations were selected for case study. The Phase 4 data served to give the author a first hand view of how companies approach measurement of TQM progress in real life situations. It should be noted that Phase 4 companies represented a purposeful sample and were selected to maximise exposure to organisation advanced in the TQM process.

The criteria for inclusion of companies in Phase 4 of the research were:

- a. Each company was operating a TQM process for more than 3 years;
- b. Each company was based in the UK and was accessible to the author for follow-up visits;
- c. Each company was well disposed to research in the area of TQM and was willing to participate with author research.

Face to face (case study) company visits were carried out in a structured interview format. A structured questionnaire was designed based on the European Quality Award. Framework and which covered the critical factor, principles and techniques of TQM identified from the review of literature.

Interviews were transcribed then arranged into a structured framework, again using the EQA model to guide the process. The choice of the EQA as a framework had the advantage of providing a logical and established structure, whilst at the same time being sufficiently flexible to incorporate the critical factors, principles and techniques of TQM identified from the review of the literature. This overcomes the principle criticism of the EQA model that it is not designed from a basis of empirical research Porter (1992), Black (1993).

3.6.11 Pilot Study

Initial trials of the interview were carried out in 2 stages.

Stage 1

The Pilot study was carried out to test the validity and reliability of the Phase 3 survey. The initial draft of the survey was administered to a total of 15 people; this group represented for the most part people who were typical of the population to whom the final version of the survey interview would be sent. In addition a number of quality management consultants, project managers, academic staff psychologist and commercial lawyers were solicited for their input. This group were asked to review the survey draft and give their opinions in a comprehensive manner to obtain both positive and negative comments on the survey. By carrying out the pilot study in this manner it was possible to find out the respondents frame of reference.

Based on the answers offered by the respondents the survey layout and individual questions were reshaped in accordance with the purpose of the study.

The author was particularly sensitive to the use of questions, which might be perceived as threatening by respondent companies and might affect the response rate of the final survey. The rationale and justification for each question was subjected to

detailed scrutiny based partly on the results of the pilot study and the purpose of the question.

Eisenhardt (1989) point out that theory building involves checking the outcomes against other studies to either support or contradict the findings, and to identify new findings emerging from the research. Also he said when the analysis stage has reached saturation and is effectively completed, evaluation and theory building then commences.

A number of pilot surveys were administered in order to gain verbal reactions to the survey and test clarity of survey instructions for completion.

Stage 2

It was important to establish a time span for the survey, so that suitable interview period could be arranged with target respondents. The pilot test in stage a revealed the likely completion time to complete the interview was 2 to 3 hours. The contact procedure aimed first of all at establishing an appointment time for the interview, with subsequent execution of the interview as arranged.

Pilot testing involved random selection of a small sample of 7 construction companies. The contact procedure was divided into 3 stages.

Contact 1 – Step 1 – telephone the construction company;

Step 2 – introduce the nature of the enquiry; ask to speak to the contact by name, with the aim of engaging their cooperation for the survey and arrange a suitable time for interview;

Step 3 – If the contact responsible was unavailable arrange a suitable time for contact 2.

Contact 2 – Step 1 – attempt once more to speak to contact;

Step 2 – If unsuccessful arrange for contact 3 , leaving instructions that a message be passed to your contact explaining the intention of the call (at

this stage some target respondents had left instructions in reply to contact.

Contact 3 - Final contact - at this point if the respondent was not engaged for interview and not suitable alternative had been arranged (eg call back from the respondent, or definite immediate contact time) the attempt be abandoned.

The results from the initial pilot test were as followed:

- Contact 7 companies;
- Communication was established with contacts after a maximum of 3 separate calls with 4 companies however with the other 3 companies they did not want to be interviewed.
- Two of the above companies who refused to be interviewed claimed they did not have time to participate in a 2-3 hour interview. They did suggest an alternative if I could give them a written questionnaire which they could complete in their own time. However, the other company did not want participate at all.

3.6.12 Phase 5 - The Status of Total Quality Management in the Construction Industry (Exploratory Research)

An Analysis of Published Accounts and Annual Returns:

This section describes the analysis of published accounts and annual returns of the 11 construction companies over a 4-year period.

The object is to discover what is available to indicate the existence of TQM, and the particular factors and techniques associated with TQM considered to be important within the industry (Chapter 8).

3.7 Summary of Chapter

A review of the literature on research methods for the social sciences was undertaken. Several of the major texts reviewed provided analytical frameworks. These were used to guide the process of determining the most appropriate methods and building a sound design.

Section 3.1 considered purpose, objectives, and values of the research. The objectives derived from a review of literature in the subject areas. It was presented that the study objectives will address import and issue for industry practitioners and will also provide new empirical evidence in an area poorly served.

Section 3.2.1 examined the use of qualitative research methods and described how, case studies will be used. Issues of validity and reliability were examined and measures taken to address these were presented.

Section 3.2.4 discussed the use of quantitative methods and identified how these would be used in this study, principally to support and validate the case study findings.

Section 3.4 described the research approach determined to be most appropriate for this study. Grounded Theory was presented as the most appropriate approach given the research objectives.

Finally 3.5 presented the research design and described the principle elements. It is proposed that the design provides a logical and comprehensive framework for this study. It identifies that data will be drawn together from multiple sources and that both quantitative and qualitative methods will be used to improve the validity and reliability of the research findings.

Chapter 4

The purpose of this chapter is to further validate the principal findings from this research. In reviewing the literature and research on TQM, it was determined that TQM might be best defined as a mixture of critical factors, principals (from the work of the Quality Gurus), and techniques (literature and research).

The outcomes from this survey provide new empirical evidence of the important elements of TQM in the construction industry and provide a basis for comparing the results with the case study findings.

4.1 A Review of the Critical Success Factors for TQM

This section will review recent research, which has sought to develop the basic principles of TQM by examining what are described as the critical factors for success. Five different studies were carried out – Black (1993), Ramirez et al (1993), Bossink et al (1992), Porter and Parker (1992), and Saraph et al (1989).

Black (1993) surveyed, *'quality experts,'* from both industry and academic in the UK and Europe. Using a new ration scaling technique respondents were asked to rate important factors which had been identified from the literature and from interviews with a *'small panel of experts.'* From his analysis 10 critical factors (32 sub items) emerge which were ranked into major, intermediate, and minor categories.

Ramirez et al (1993) surveyed US firms from both the manufacturing and service sectors of the economy that had managed to achieve both success and recognition using the Malcolm Baldrige National Quality Award (MBNQA). The study concludes with a list of 22 activities, which are described as critical elements of TQM.

Bossink et al (1992) have developed what they describe as a *'quality diagnostic instrument.'* This is based on research in Europe, which identified the basic operational elements of TQM. Eight basic operational elements were identified and

described. From these a methodology has been developed for carrying out assessment of TQM within individual organisations.

Porter and Parker (1992) have developed a list of 8 critical factors based on an extensive review of the literature on TQM and on several implementation case studies. To validate the findings research was conducted which involved survey interviews in 10 different organisations.

Part of the study conducted by Porter and Parker involved the comparison of critical factors with other studies, Saraph et al (1989), and with the MBNQA criteria. Porter and Parker concluded that there was a close fit with Saraph et al, and 2 differences with the MBNQA. These differences however, they have accounted for in that both related to measurement of results (necessary for the award criteria) which Porter and Parker and Saraph had treated as the consequences of TQM rather than the critical elements of it.

Similarly, Black (1993) compared his findings to the Saraph study. He concludes that there is a strong match of factors but identifies 2 new areas in customer orientation and in teamwork infrastructure and therefore suggests that there are differences in emphasis at operational level.

To illustrate these findings a table has been constructed adapted from Porter and Parker and from Black with the addition of the European Quality Award criteria. Table 4.1 illustrates the critical factors identified from 3 research studies and the factors used by MBNQA and EQA. It illustrates the relationship between the factors identified in each study and highlights those areas where the authors have perceived differences.

Table 4.1 The Critical Success Factors Compared

Porter & Parker	Saraph et al	Blacks	MBNQA	EQA
Management Behaviours	Role of top Management and Quality Policy	Corporate Quality Culture	Leadership	Leadership
Strategy for TQM	Role of top Management and Quality Policy	Strategic Quality Management	Strategic Quality Planning	Policy and Strategy
Organisation for TQM	Role of Quality Department	Teamwork Structures Operational Quality Planning		Resources
Communication for TQM	Quality Data & Reporting	Communication of improvement information	Information and analysis	
Training for TQM	Training	People and customer management	Human Resource Development and Management	People Management
Employee Involvement	Employee Relations	People and customer management	Human Resources Development and Management	People Management
Process Management and Systems Management of Process Quality	Process Management and Systems Product/Service Design	Operational Quality Planning	Management of Process Quality	Processes
Quality Technologies	Quality Data and Reporting	Quality improvement Measurement Systems	Information and Analysis	
	Supplier Quality Management	Supplier Partnerships External interface management Customer satisfaction Orientation	Customer focus and satisfaction Quality and Operational results	Customer satisfaction Business Result People Satisfaction Community Satisfaction

Table 4.1 illustrates that in comparing the critical success factors arising from recent empirical studies, areas of common ground emerge. For example, there is a consensus on the need for strong leadership for TQM, that TQM must be a part of the corporation strategy and planning process. There is a consensus that TQM implies a distinctive way of managing people. There is focus on processes and the techniques need to understand and manage them.

The 3 empirical studies each emphasise the need to organise and commit resources for quality. Black (1993) goes further than the two previous studies emphasising teamwork structures and integration as critical factors in organising for quality.

The two self-assessment frameworks match closely the empirical studies, leading to the conclusion that the key learning's from the empirical studies may be included within the self-assessment framework.

Two areas of apparent difference are evident from table 4.1 when comparing the empirical studies with the self-assessment frameworks. Firstly, the empirical studies identify communication and information analysis as critical. Whilst this is accounted for in the MBNQA no specific part of the EQA covers this. The second area of difference is that the 2 self-assessment frameworks give greater attention to the measurement of results. The emphasis on balanced results, taking customer satisfaction as well as business results, is consistent with an underlying TQM principle of customer orientation. The EQA also extends the measurement of results to include people (staff) satisfaction and impact on society.

4.2 The Techniques Associated with TQM

Several recent studies have concluded that self-assessment techniques are becoming popular as a means of implement TQM – Black (1993), Sinclair (1994), Hill and Wilkinson (1995) and Greene (1995). However it is also imperative to review the Deming Prize, MBNQA and the EQA.

Figure 4.1 List of Criteria for Deming Application Prize

	Item	Particulars
1.0	Policy	1.1 Policies pursued for management, quality and quality control; 1.2 Method of establishing policies; 1.3 Justifiability and consistency of policies; 1.4 Use of statistical methods; 1.5 Transmission and diffusion of policies; 1.6 Review of policies, and the results achieved; 1.7 Relationship between policies, long and short term planning.
2.0	Organisation and its management	2.1 Explicitness of the scope of authority and responsibility; 2.2 Appropriateness of delegations of authority; 2.3 Interdivisional co-operation; 2.4 Committees and their activities; 2.5 Use of staff; 2.6 Use of quality circles activities; 2.7 Quality control diagnosis.
3.0	Education and dissemination	3.1 Education programmes and results; 3.2 Quality and control consciousness/understanding; 3.3 Teaching of statistical concepts and methods; 3.4 Grasp of the effectiveness of quality control; 3.5 Education of related companies; 3.6 Quality circle activities; 3.7 System for improvements.
4.0	Collection dissemination and use of information on quality	4.1 Collection of external information; 4.2 Transmission of information between divisions; 4.3 Speed of information transmission; 4.4 Data processing, statistical analysis of information.

4.3 The Deming Prize

The Japanese Union of Science and Engineering (JUSE) instituted the Deming Prize in 1951 in recognition of Dr W Edwards Deming's contribution to the development of industry quality in Japan. The Prize is awarded to enterprises (or divisions of enterprises), which are judged to have achieved the most distinctive improvement in performance through the implementation of company wide quality control. Applicants are assessed against a list of criteria, illustrated in figure 4.1. The Prize has been described by some as providing a major impetus to industry in Japan (Mann

1985). The success and prestige afforded to the award has influenced Western thinking Kanji et al (1992).

4.4 The Malcolm Baldrige National Quality Award (MBNQA)

The MBNQA was founded in the period of 1986 – 1988. It was named after the Secretary of Commerce (1981-1987), the principle aims are: -

- To build active partnerships in the private sector and between the private sector and government;
- Improve the quality of goods and services produced in the US;

The MBNQA recognises the effect of foreign competition on the US and aims to improve the effectiveness and competitiveness of US industry. The Malcolm Baldrige National Quality Improvement Act became public law in 1987, and established 3 different organisations to manage the award. These organisations are: -

- The Foundations for the MBNQA (FMBQA) – to raise funds and support the program;
- The National Institute of Standards and Technology (NIST) – to manage the award program (part of the Dept of Commerce);
- The American Society for Quality Control (ASQC) – to assist NIST in the administration of the Award Program.

Awards cover 3 categories – manufacturing, services and small business. Past award winners include – AT & T, Texas Instruments, The Ritz Carlton Hotel Company, The Granite Rock Company, Selectron Corporation, Zytac Corporation and Marlow Industries.

The MBNQA describes 10 core values and concepts for quality improvement, which are embodied within the award criteria framework of 7 categories: -

- Leadership;
- Information and analysis;
- Strategic quality planning;
- Human resource development and management;
- Management of process quality;
- Quality and operational results;
- Customer focus and satisfaction.

4.5 The European Quality Award (EQA)

The European Foundation for Quality Management (EFQM) was formed in 1988 to establish and administer the EQA. The European Commission and European Organisation backed the initiative for Quality. The principal aims of the EFQM are similar to those established in the US for the MBNQA. The EFQM aims to enhance the competitive position of European companies in the world markets by reinforcing the importance of quality in achieving competitive advantage and stimulating and assisting the development of quality improvement activities.

“The battle for Quality is one of the pre-requisites for the success of your companies and for our collective success.”

Jacques Delors

President of the European Commission at the signing of the letter of intent to establish the EFQM, 15 September 1988.

The EFQM present that the EQA is founded on the principles and core values of TQM. These are embedded in a European model for TQM, which forms the basic framework for the award. The model is illustrated in Figure 4.2.

The purpose of the survey was to determine the relevance and importance given to the critical factors, principles and techniques that are associated with TQM in the context of modern day construction industry.

4.6 Elements of Success

There are many articles in quality books and journals on the techniques required to initiate and sustain a successful TQM process. The wide diversity of prescriptive approaches to the implementation of TQM, available in the literature, is illustrated by the following examples.

Davies (1989) in a series of articles outlines the pitfalls that beset companies setting out on a TQM process. These include:

- 1) Lack of imagination;
- 2) Confusion between effectiveness and efficiency;
- 3) Sticking to old performance measures;
- 4) Overemphasising product quality;
- 5) Reliance on training alone;
- 6) Understanding people's potential;
- 7) Not communicating management commitment.

Davies then discusses each area offering his views on how best to prevent these things happening.

Schlick (1989) describes a successful TQM organisation as one which:

- a) Makes a commitment to quality;
- b) Provides new skills for all personnel;
- c) Provides opportunities to solve operational problems;
- d) Provides leadership in the use of new skills;
- e) Provides rewards for using the new skills on operational problems and provides long-term continuous quality improvement.

He states that these conditions must be present in a successful TQM process.

Leonard and Sasser (1982) argue that for a Quality Programme to have a real chance of success it must have:

- a) Top management's strategic support;
- b) Organisational analysis;
- c) Responsibility – organisational goal;
- d) Open participation;
- e) Quality calculus;
- f) Quality assurance and control;
- g) Training and development;
- h) Personal attributes.

They infer that managing quality well requires attention to the quality related implications of every decision at every stage from design of product to sales and requires careful identification of the most effective levers for improving the quality of each product line.

Brown (1989) argues that the number one reason why TQM is not implemented successfully is lack of top management commitment. He lists 10 action items which company Executives can carry out to counteract this problem:

- 1) TQM education;
- 2) One-to-one coaching;
- 3) Develop a comprehensive TQM implementation plan;
- 4) Establish reasonable quality goals;
- 5) Implement your own quality improvement projects;
- 6) Talk about TQM with employees;
- 7) Allocate appropriate resources for TQM;
- 8) Use the best measurement technology you can afford;
- 9) Be patient;
- 10) Measure the cost of quality as part of the accounting function.

4.7 Leadership

One of the key issues concerning the TQM process that emerges from the literature is leadership. The literature on TQM contains a huge volume of articles on the topic of leadership and its role in the Total Quality process. Lack of top management

leadership has repeatedly been highlighted as the single greatest reason why Total Quality initiatives incur problems during implementation. Leadership is also one of the more intangible areas of TQM and there are many conflicting reports on the mechanism by which leadership can be created in Total Quality initiatives.

Clark and Clark (1989) reported the findings from a conference held in San Antonio, USA (1988) by 80 of the foremost names in leadership research. Twenty-nine studies supported evidence of the following:

- 1) There is no single comprehensive list of leadership qualities; leadership is not a single trait, easily recognisable;
- 2) There is no single psychological measure that will pick out leaders from managers, leaders from followers or predict with perfection those who will some day be leaders;
- 3) There is no single path to leadership;
- 4) Leaders cannot be clearly distinguished from non-leaders, most people have exercised leadership in some way or other, maybe well, maybe poorly;
- 5) Leadership involves an interaction with followers, the ineffective leader is oblivious to his/her effect on others;
- 6) Winning the top position does not make a person a leader;
- 7) Leaders are more made than born;
- 8) High intelligence is a great asset, leaders need all the education and 'smarts' they can muster;
- 9) Leaders will not always bring to the position all that is required to perform effectively, often they must learn on the job;

While the findings of this conference ie money cannot create leadership, business schools cannot teach leadership and most researchers cannot tell the difference between leaders and non-leaders, would tend to dampen the enthusiasm for popular leadership theories, the question remains why is the media obsessed with this topic – leadership?

Persico (1991) offers some explanations for this phenomenon stating, "Concern with leadership seems to be tied to 2 common sense observations about leaders:

- 1) Leaders get things done;
- 2) Leaders motivate other people.

People who can accomplish both of these objectives become leaders in any society or organisation.”

Plowman (1990) in a survey titled ‘The effectiveness of Quality Improvement Programmes in British Business’ cites cultural change as one of the major barriers to the successful implementation of Total Quality (TQ) and 91% of companies in this survey reported this as a problem. He outlines 2 of the major contributing factors to this barrier:

- a) Management’s authority to change the process but limited knowledge of the process;
- b) Employee’s intimate knowledge of processes but inability to authorise change.

In order to break this impasse he proposes that TQ leaders must decide what their company needs to do to be successful and establish performance measures to check if it is achieving its objectives.

Dumaine (1990) argues that cultural change must come from the bottom of an organisation and the Chief Executive Officer (CEO) must guide it. The CEO must show the direction of the change to make it happen coherently. “A cultural transformation is a change in the hearts and minds of the workers and will not happen if the CEO just talks.” He states that the keys to this culture change are:

- 1) Understand your old culture first. You cannot chart a course until you know where you are;
- 2) Encourage those employees who are bucking the old culture and have ideas for a better one;
- 3) Find the best subculture in your organisation and hold it up as an example from which others can learn;

- 4) Do not attack culture head on. Help employees find their own new ways to accomplish their tasks and a better culture will follow;
- 5) Do not count on a vision to work miracles. At best it acts as a guiding principle for change;
- 6) Figure on 5-10 years for significant organisation-wide improvement;
- 7) Live the culture you want – as always actions speak louder than words.

4.8 Information and Analysis

Central to the TQM process is the provision of information to sustain the activities of continuous quality improvement throughout a company. This information needs to be accurate, timely and accessible to personnel as required. In addition to data collection the quality improvement process requires analysis of data to facilitate monitoring and follow-up of quality improvement activities. The literature on TQM information and analysis contains some discussion of this topic as follows.

Garvin (1991) states that a quality information system must be comprehensive, accessible and well –validated. The quality information collection must encompass customers, employees, suppliers, competitors and internal processes. This data must be easy to find and use. One of the most important areas covered under this category is benchmarking which is used by companies to gather information about another company's processes in order to incorporate into their strategic planning process.

Schonberger (1986) outlines some of the methods for analysing quality improvement data. These include:

- a) Process flow charts;
- b) Pareto analysis;
- c) Fishbone charts;
- d) Histograms;
- e) Run diagrams and control charts;
- f) Scatter diagrams and correlation.

These six tools are thoroughly explained in Ishikawa's book 'Guide to quality control (1972).' In addition to the process data collected, TQM data encompasses supplier ratings, quality system audit reports, customer satisfaction data etc.

Benchmarking data is of particular use in assessing a company's competitive performance. The term 'Benchmarking' was first used in the computer industry in the early 60's to describe the speed performance of computers. Xerox corporation use the phrase 'Competitive Benchmarking' to describe a process used by the manufacturing function to revitalise itself by comparing the features, assemblies and components of its products with those of competitors.

Ishikawa (1985) underlined the importance of middle managers in acting as channels for the distribution of information from worker level to top management. "It is the task of middle management and managers to purify data collection in the Total Quality process ensuring accuracy of data and enabling the company to know the true facts."

If leadership is seen as the driver of TQM process, quality information is the primary ingredient that fuels the day-to-day operation of Total Quality. The intelligent application of TQM throughout a company's operations requires objective, accurate and timely data to facilitate fact-based decision making at all stages of the TQM process.

4.9 Strategic Quality Planning

The view of quality as a strategic management issue began to take root in the late 1970's; one example of this shift in emphasis is illustrated by the experience of manufacturing companies in the semiconductors industry.

In 1980 Hewlett Packard Data Systems Division reported that after testing 300,00 16k RAM chips from 3 US and 3 Japanese manufacturers they discovered that there were wide disparities in quality. At receipt inspection the Japanese chips had a failure rate of zero, the comparable rate for US manufacturing was 11-19 failures per 1000. After 1000 hours of use the failure rate of the Japanese chips was between 1-2 per 1000, while the US failure rate was 27 per 1000. Market analysis at the time noted how

differences in quality coincided with the rapid ascendancy of Japanese chip manufacturers. The message was that quality could be a potent strategic weapon, which deserved to be elevated to the agenda of top management business planning.

Garvin (1988) propose 8 critical dimensions of quality that can serve as a framework for the Strategic Quality Planning (SQP):

- 1) Performance;
- 2) Features;
- 3) Reliability;
- 4) Conformance;
- 5) Durability
- 6) Serviceability;
- 7) Aesthetics;
- 8) Perceived quality.

He suggests that a company use this framework to explore the opportunities it has to distinguish its products from other companies and that by using a suitable mix of these dimensions companies can pursue a selective quality niche.

The SQP aspect of TQM integrates closely with leadership in the sense that quality management is elevated to the status of a strategic business imperative and should be planned by top management with equal importance as other strategic business variables. Total quality is not a bolt-on initiative but is an integral part of a company's business.

4.10 Human Resource Development and Management

One of the primary components of TQM Human Resource (HR) Development and management is education and training. Education is needed on the concept of TQM and training is necessary for employees in an organisation to utilise the various techniques available to support the TQM process.

Asher and Dale (1989) compare the Japanese and European approaches to TQM education and training. "In Europe there is generally a failure to develop training

strategies and rarely do companies set improvement objectives for the training carried out. In Japanese companies the training instructor will carry out an audit to see how effectively his trainees are using the skills he has taught them. Because of the lifetime practices in Japan it is possible for companies there to invest heavily in a long-term programme of education and training to develop their employees' capabilities. In Europe there is more prevalence of people training in one company then moving to another company which benefits from their education and training."

Robson (1988) describes the rewards that are typically offered in company quality rewards and recognition schemes. He concludes that recognition is a key element in sustaining the TQ process:

- a) Momentos – folders, pens etc of suitable quality;
- b) Awarding of certificates;
- c) Awards of dinners, theatre tickets etc;
- d) Management presentations, conferences etc;
- e) Money.

The themes of education and training, employee accountability, employee empowerment and reward and recognition receive extensive coverage in the TQ literature on Human Resource Development and Management. This focus on the people issues is one of the major areas that differentiates TQM from more systems based quality philosophies eg ISO 9000.

4.11 Management of Process Quality

Management of process quality involves managing the continuous improvement of products, processes and services. A successful TQM system ensures that process quality activities are implemented in each phase of the product development cycle. This aspect of TQM incorporates traditional quality assurance activities and there are numerous references to the ISO 9000 series of quality systems standards in the literature.

Eicher (1992) outlines the extent to which the ISO 9000 quality systems standards have impacted the quality movement:

- 1) The ISO 9000 standards have been directly adopted without change as national standards in greater than 50 countries including all of the EC and EFTA countries, Japan and the US.
- 2) Awareness of the standards is high, a survey of 2500 'blue chip' companies in 1991 revealed that 52% of companies claimed familiarity with the standards, with 64% seeking audit and registration.
- 3) Third party assessment and registration services exist for recognising conformance to ISO 9000 in greater than 30 countries.
- 4) The standards have been cited as a basic building block for the development and operation of the European Organisation for Testing and Certification (EOTC).
- 5) Many nationally and internationally recognised product certification systems have incorporated the standards as a first phase requirement for approval to use their mark in specific product certification schemes.
- 6) Numerous large corporations have initiated vigorous programmes to implement the standards at their operation sites.
- 7) Numerous large government purchasers have made ISO 9000 registration a requirement for their large contract suppliers.

Management of process in quality in TQM requires that companies examine both manufacturing and business processes and identify the critical variables that need to be controlled to maintain consistent high quality of these processes. The ISO 9000 series of standards, internal quality audits, supplier quality planning and the use of SQC are frequently mentioned throughout the literature and have traditionally related to QA activities in the construction industry. The TQM approach is wider in scope and examines all processes ie construction and business processes with a strong emphasis on how these processes influence the customer-supplier chain.

4.12 Quality and Operational Results

The results and value of a total quality initiative to a company cannot be accurately gauged with known and accepted indices or measures. In the business world there are many performance measures mostly financial based eg market share, sales, turnover, exports, profit yield programmes, share price, number of employees, construction output etc. In the area of total quality the picture is more complicated.

One of the areas, which received frequent mention in the literature on the results of a total quality initiative, is quality costs. Morse (1983) states that quality costs may be used:

- 1) To promote quality as a business parameter;
- 2) To give rise to performance measures;
- 3) To provide the means for planning and controlling quality costs;
- 4) To act as motivators.

The traditional method of classifying quality costs as outlined in BS 6143: Pt 2 1990 has been to assign costs and prevention, appraisal and failure categories.

Plunkett and Dale (1985) offer the following criteria to categorise quality costs for any cost collection exercise which will help ensure that data collection are understood and can be qualified:

- a) Purpose;
- b) Relevance;
- c) Ease of collection;
- d) Size
- e) Accuracy;
- f) Completeness;
- g) Potential for change;
- h) Recording and presentation
- i) Uses.

They conclude that of the available literature on quality costs few give specific guidance on the collection and use of quality related cost data.

De Young (1990) reports that even after years of improvement in quality it is still very difficult to measure, track and report quality progress on a financial statement. He states that a typical company's total quality costs range from 25-30% of annual sales prior to embarking on TQM. He also declares that "It is generally accepted that a well executed TQM process yields a return investment of 7:1 ie you get back \$7 for every \$1 invested in quality."

Quality and operational results focus on the outcome of the TQM process and are strongly data dependent. The areas most frequently addressed in the literature are the use of quality awards and quality costs.

4.13 Customer Focus and Satisfaction

In the TQM philosophy the goal is to habitually and competitively meet customer requirements. Buzzell and Gale (1987) offer the following definitions for quality, "Quality is whatever the customer says it is, and the quality of a product or service is whatever the customer perceives it to be."

Peters (1989) stresses the importance of customer perception concluding that "Quality is in the eye of the beholder." He maps out 5 steps that a company should take if it is to attain Total Quality as perceived by the customer:

- 1) Conformance to specifications;
- 2) Ask whose specifications?
- 3) Move beyond specifications and consider the issue of perception;
- 4) Get all employees out in front of the customer
- 5) Remove internal barriers and external borders.

The relationship between external and internal customers receives frequent coverage in the literature on customer focus and satisfaction.

Banks (1992) outlines a 5-question approach to be used when evaluating customer requirements:

- 1) What can I expect when I buy the product/service? – Specifications;
- 2) Is it what I expected? – Conformance to specification;
- 3) Does it continue to do what I expected? – Reliability;
- 4) How much do I have to pay? – Value for money;
- 5) When can I have it? – Delivery.

The goal of the TQM process is customer satisfaction, which in turn leads to repeat business and increasing profits. The concept of customer satisfaction is not new to TQM but has been a staple of sales and marketing theory for many years. However the internal – external customer interaction is strongly emphasised in TQM. In addition to quality and operational results, which are internally focused, customer satisfaction is essentially the payback for the efforts put into the TQ process.

These seven elements leadership, information and analysis, strategic quality planning, human resource development and management, management of process quality, quality and operational results and customer focus and satisfaction are not mutually exclusive but overlap in forming a systematic multidimensional model for TQM.

4.14 Summary

This chapter has identified from the literature several techniques, which have come to be associated with TQM. Whilst this is not an exhaustive list it will provide a basis from which further research can be designed to examine the use of techniques within the construction industry.

Chapter 5

5.0 Questionnaire Response Rates (Phase One)

A sample of 165 construction companies was selected from the 1997 computer updated version of Kompass. A response rate of 56% (92 companies from 165) was recorded. A good number of construction companies which responded there were either described as TQM orientated or were large multinational organisations likely to be highly quality developed. This sample was expected to contain highly quality-developed companies. This would enable a comprehensive study of the effects of TQM and other quality activities on business performance. The sample size was limited to the number of companies, which could be identified as probable TQM companies.

Information was obtained from 92 companies determined the level of interest and a high proportion of respondents considered TQM relevant and important. From this study 92 companies emerged as front-runners with openly declared commitment to Quality Management and TQM. TQM was now a fundamental part of their future strategy.

Phase 2 of the questionnaire presents those organisations, which emerged from the analysis as the highest adopters of TQM.

5.1 Mailing Questionnaires (Phase 2)

Mailing questionnaires are often criticised because they:

- Can achieve low response rates;
- The respondent is force to work in the interviewers terms which may not be appropriate;
- The cause of non-response is unknown and could lead to bias in subsequent data analysis;

- Only a superficial level of enquiry can be established; any depth in questioning can lead to confusion, make the survey too long, and hence reduce the likelihood of obtaining responses;

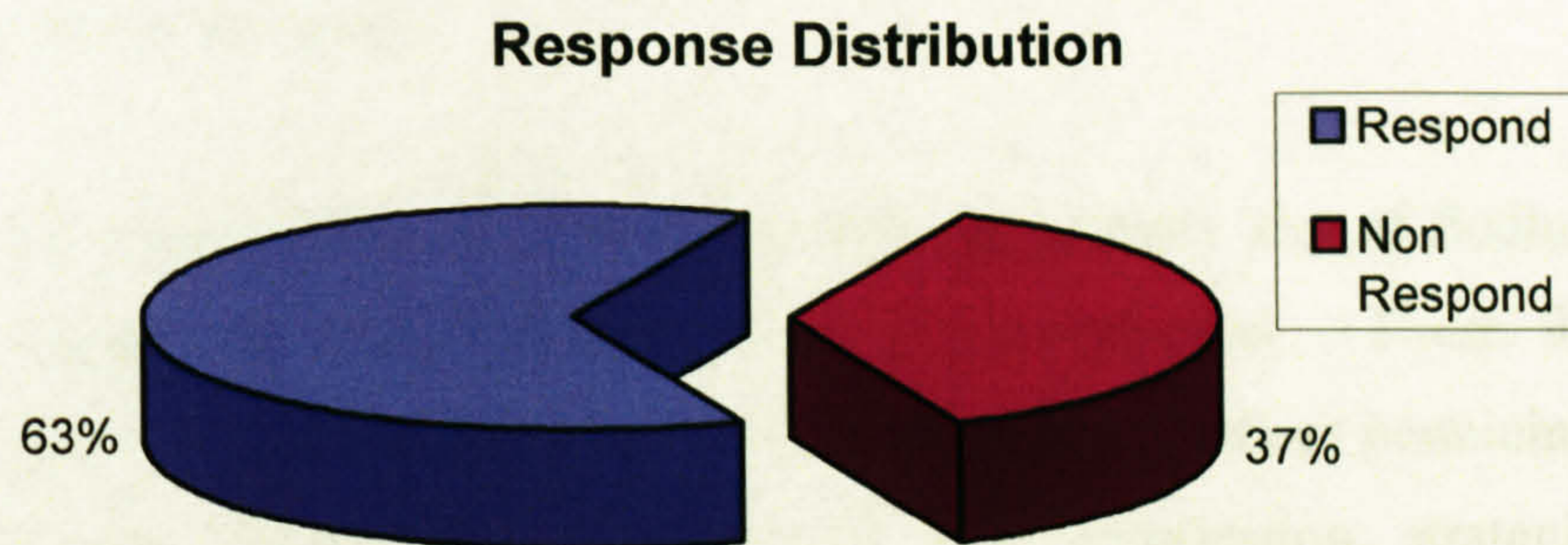
The respondent is force to interpret the questions unaided and may not do this correctly.

Ninety-two companies were contacted by telephone to thank them for completing the first phase of the study. Further consent was then ascertained for involvement of the second phase of research. The telephone contact was intended as a method of boosting response rates by trying to build relationships with the target organisation.

In phase two of the questionnaire a response rate of 63% or 58 companies from 92 construction companies was recorded.

5.2 Response Rate

The response distribution for the postal survey is indicated below:



The final sample size consisted of 92 organisations. A total of 58 replies were received from these organisations giving an overall response rate of 63%. This excellent response response rate may have been a result of many factors:

- 1) The sample organisations were targeted from a previous study they had a proven interest in the topic of the survey;

- 2) These organisations had already participated in a previous post survey (stage one). They had therefore demonstrated sympathy with the research method; organisations, which had failed to reply by the end of the survey, had resisted five contacts;
- 3) The scope of the questionnaire was deliberately short, and non-complex.

5.3 Points to Consider Prior to Analysis

There are some inherent weaknesses of the questionnaires. When analysing the questionnaire it was important to bear in mind the following:

- Respondents may tend not to answer questions, which would show them or their company in a negative way;
- The results may be affected by the position of the respondent in the company;
- Individuals who are most interested in the questionnaire are likely to respond. This is likely to cause a respondent bias with the more highly quality developed companies responding.

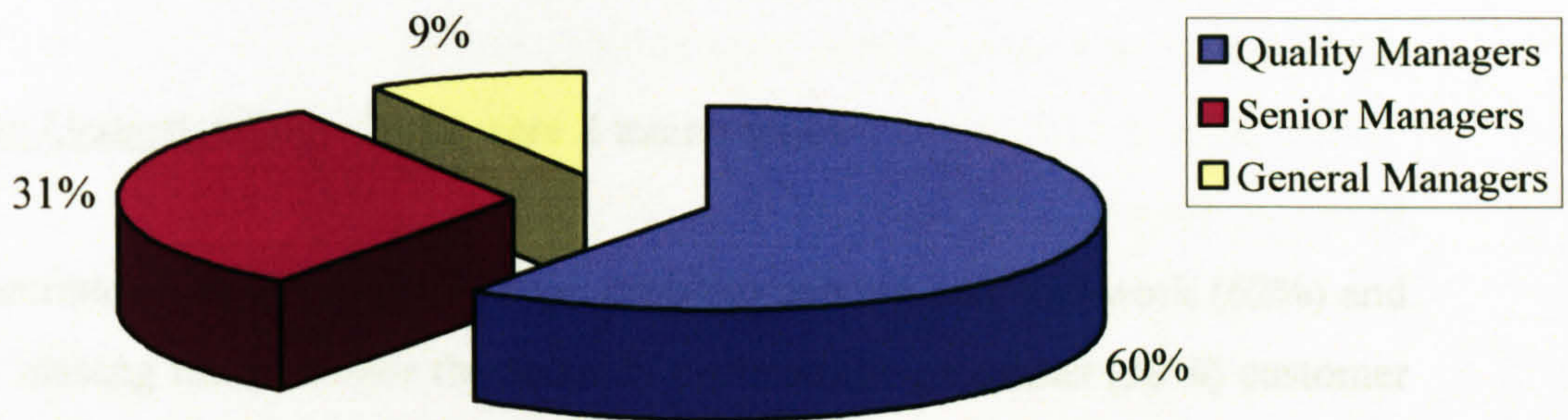
5.4 An Analysis of a Research Survey

A total number of 92 organisations were surveyed, with the primary aim of finding out what TQM's impact on them had been since its introduction. These 92 organisations were also asked about other aspects of their quality practices pertaining to employees, customers, process management, ISO 9000 certification, strategic management and understanding of TQM.

Such information permits further insight into TQM practises underlying claimed outcomes. Claimed improvements can therefore be examined to verify if they are to be examined to verify if they are accompanied by sound TQM practises. The questionnaires returned were checked to ensure completeness, coded.

Question 1, Of these 58 organisations it was anticipated that there would be a strong similarity between replies to this question.

Question 1



Question 2 Organisational Sizes. From the sample taken, 58 companies replied (63%). Of these 58 companies they were all claiming to be implementing TQM. It emerged that as organisational size increased organisations were more likely to tackle TQM. This confirms findings in other surveys.

Number of employees employed:

100-499 (46%)

500 or more (53%)

ISO 9000 System. All 58 respondents held ISO 9000 certification. However, 32% of the respondents also held other certification for their quality system. Evidence of other certification was taken as evidence of good process management behaviour. Of all organisations holding certification 29% did not hold it for all of their activities. These organisations held certification only for on site or for on product. This demonstrates that ISO 9000 system were not total in their coverage and evidenced partial commitment to ISO 9000. Some organisations may commission consultants to write documentation, eg work procedures, to enable them to achieve certification to ISO 9000. Some 58% of organisations admitted that external consultants had written all of their documentation. Such practises are likely to end up with bureaucratic system, which hinder them as much as they help. Encouragingly 68% saw it in wider strategic terms as discipline production or goods and services for customers. However, 24% who viewed it with a narrower internal focus in terms of delivering quality products or improving operational control. Seven percent who saw ISO 9000

as a demonstration that theirs was a total quality company. Such replies demonstrated a fundamental weak perception of TQM; if TQM is viewed as nothing more than ISO 9000 then there are serious problems for managers. These replies were taken as evidence of flawed perceptions of quality management in general.

Management Understanding. There were 2 main replies:

Firstly – continuous improvement through problem solving and teamwork (62%) and Secondly – making the customer the focus of all business processes (38%) customer focus is one of the corner stones of TQM. It should be addressed by any organisation proffering to be pursuing TQM. The evidence does suggest that 55% of organisations in this question mentioning issues associated with customers. Thirty-eight percent financial improvement and 7% to increase market share.

TQM is an advanced as a competitive improvement initiative and sound systematic business practise would dictate a need for organisations to make some assessment of the return on their investment. Such behaviour requires a systematic and objective approach to TQM implementation it focuses attention on quality not for its own sake; but as a step towards business improvement.

In general there were optimistic perception on the impact of TQM. Some 71% of organisations felt TQM was having a dramatic impact on improvement. Of the remainder, most felt that it was too soon to tell what the impact had been. Most of the organisations argued that those with TQM in place for 3 years or more should have known.

Company Culture, 49% of respondents found that a substantial modification to the existing structure occurred. There was a high positive response with most organisations in this category already involved in TQM programmes. 31% of the respondents found that a minimal reorganisation of the organisation's structure occurred when implementing their TQM and 21% felt that no change occurred with respect to organisational structure.

All of the respondents felt that the changes that have occurred have been beneficial to the organisation. Those who said that quality management was their number one strategic issue were also more likely to have a higher proportion of employees involved in TQM; reinforcing the view of this as a strong indicator of good commitment to TQM. 87% felt that the changes have been beneficial to customers. It was also found that 93% of respondents found overall efficiency had increased since implementing their TQM. 88% of respondents found their turnover to have increased since implementing TQM. 74% of respondents found that wastage had decreased since implementing TQM. 66% of respondents found their productivity to have increased since implementing TQM. However, no strong statistical trends emerged to support this hypothesis. It would be surprising for any organisation not to say it was doing something to improve performance, regardless of whether or not they were implementing TQM. The fact that these organisations had an extremely weak perception of the purpose of TQM, and also that of ISO 9000 suggests that they were not really implementing TQM at all and as such would hardly gain success from it.

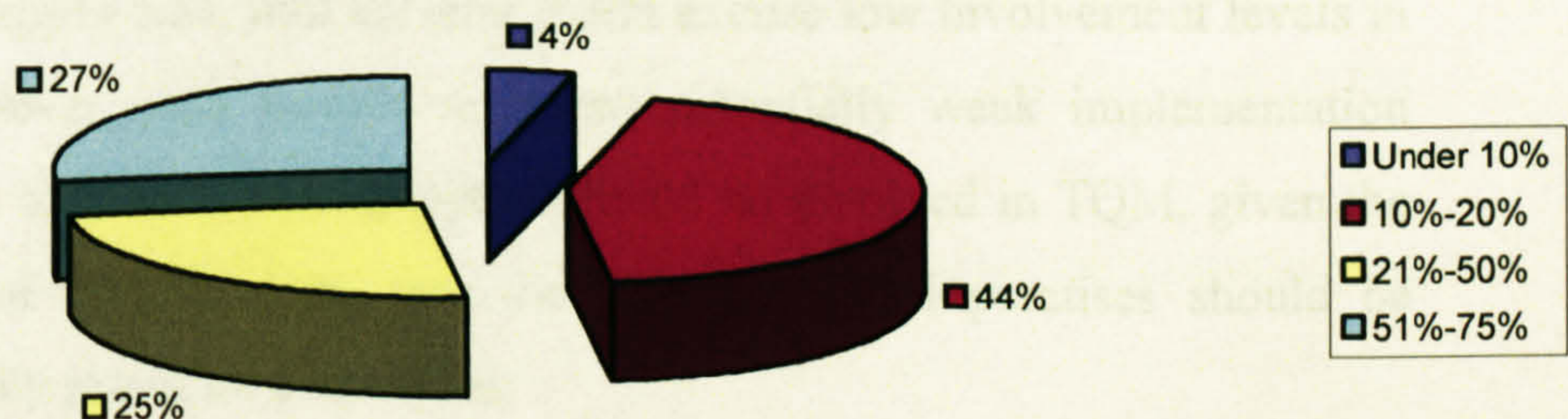
It should be noted that comments were also made in relation to increases in turnover and profit by some of the organisations. They feel that these increases are not necessarily due to the implementation of TQM but are more dependent on other factors such as mergers and the general market.

Impact of TQM Although it can be difficult to establish what benefits are directly attributed to TQM, keeping an eye on financial data helps focus attention on the real impact, which TQM is having on organisational improvement. Organisations were asked directly whether or not they measured the benefits of TQM in terms of costs and sales. Most of those using financial measurements used costs. Only 33% of surviving organisations claimed that they quantified impact in terms of sales. Most of these organisations also tended to measure impact on costs showing a strong focus on financial quantification overall. TQM is put forward as a means of enhancing competitive advantage, with an obvious view to strengthening financial performance. Organisations cannot control or assess their programs in any systematic way if they do not attempt to quantify its impact objectively on the financial bottom line.

Organisations were asked in open format how is the impact of TQM measured or quantified. This format was intended to gather data on the primary methods used to quantify TQM impact. Such replies would, it was assumed, reflect the deeper managerial focus on the role of TQM in their organisations, their focus of measurement would reflect their understanding of TQM's role. Good TQM practitioners should have indicated several methods of quantifying impact, demonstrating a balanced approach to improvement. The most popular method of measuring TQM impact was by using customer satisfaction measures (38%) with employee satisfaction measures (26%), and process measures (18%). However, improvement in these areas is only of use if they translate into improved performance for the organisation as a whole. Moreover, a sole focus on processes, and employees, can be said to represent inward looking TQM initiatives. Some 19% of organisations claimed to be used sales, or market share improvements, to measure impact. This at least attempts to quantify external competitive improvement in objective financial terms. Costs were equally popular, and again acceptable in that they attempt to provide objective evidence of internal efficiency improvements. Although the exact nature of the individual measures involved was not specified, on the surface at least this answer must be accepted as adequate. It seems to capture a more balanced approach to across the board TQM improvement, rather than depending on measurements in a small number of isolated areas. This item would provide an important area of focus for future research within these organisations.

Respondents were also asked to indicate the levels of employee involvement in TQM, and the methods used to involve them. The intent of this question was to address the issue of deployment of TQM companies wide and the appropriateness of employee involvement.

Employee Involvement Levels in TQM



Forty-eight percent of organisations had less than 20% of their employees involved in TQM. The percentage of employees involved did not vary significantly with the company size. It is not so much the proportion involved, but rather how they are involved that matters. It could be argued that “problem solving” and “project teams” are narrow focusing on problem solving. “Improvement teams” seem to be better capturing the essence of the value of TQM continuous improvement philosophy, although this could quite legitimately be said to a pedantic distinction. It was notable that almost all organisations announce to use work groups were claiming success from their TQM implementations.

Mechanisms for involving employees, see table 5.1 below, ranged from the quite acceptable teams, to the dubious “information packs” included under “other.”

% Of Cases Using	Number of Respondents
28%	Improvement Teams
25%	Problem Solving
18%	Meeting
21%	Workgroup
10%	Audits/Appraisal
22%	Training
12%	Inspection
5%	Quality Circles
23%	Other

TQM seeks to unleash the potential of employees in pursuit of improvement opportunities, and more efficient and productive work. This use of employees in team-based work a key leverage point for the TQM philosophy. Taking time since introduction, and company size, into account might excuse low involvement levels in some instances, however such figures represent potentially weak implementation mechanisms. Ideally over 40% of employees should be involved in TQM, given the average small size of organisations, and the fact that TQM practises should be integrated into the daily job of all employees.

The vast majority (91%) of respondents claim they had written business plans, and of these, 80% claimed to have written quality plans and objectives. However, this leaves some small percent of surviving respondents without written quality plans. These organisations lack an explicit strategic aspect to their TQM initiatives. In truth all companies claiming to be implementing TQM should have had strategic quality plans. The weakness of this practise was reflected in higher associations between those failing to use plans, and disappointment with TQM outcomes.

Ninety-seven percent of respondents felt that TQM is amongst the top 3 strategic issues. 3% of those who completed this question felt that, TQM is number one issue.

Question 24 asked for problem in relation to the implementing and registration of Total Quality Management system.

- 74% of respondents found the expense and time required implementing their TQM a problem;
- 48% of the respondents found their TQM complicated and hard to maintain.
- 48% of the respondents found their TQM to create bureaucracy-stifling creativity.
- 31% of respondents found training of staff to be a problem in implementing their TQM.
- 55% of the respondents found initial and annual assessments to be a problem in implementing TQM.
- 38% felt that internal auditing to be a problem.

These questions served as a means of examining the extent to which managerial perceptions had changed over year's period.

- 69% of all respondents believe that management ensures that all employees have a full understanding of the needs of the customer and the uses of the product or service that the organisation is providing.
- 31% of all respondents claim that management delegates the responsibility of ensuring that all employees understand such needs.

- 53% of all respondents feel their communication within the organisations is only moderate.
- 41% of all respondents feel their internal communications network is good and 6% of respondents feel their communication network within the organisation is bad.
- 41% of all respondents rate their external communication network as moderate.
- 62% of respondents considered formal communications across their whole organisation to be top down.
- 17% of respondents were of the opinion that formal communication across the whole organisation was one way.
- 21% of all respondents felt that formal communication across the whole organisation was two-way.

The response to this question identified a company who were not afraid of change but would plan for change involving all levels of staff and management.

The general consensus was that the company prepares for change but only management prefer senior staff for change 88% of respondents felt that is the case.

Training and Education

- 67% of organisation provides training for all their employees;
- 33% of organisation only provides training for certain employees;
- 45% of the organisations felt that 5-10 days training per year per employee would be provided;
- 19% of the organisation provides 2-5 days training per year per employee;
- 36% of the respondents felt that their organisations provide more than 10 days training per year per employee;
- 67% of the respondents claim that organisations use benchmarking.

Some 39 organisations 67% claimed to carry out external benchmarking as part of their TQM effort. However, there are no details as to the nature or scope of these activities. It was evident from aside comments (from 4 organisations) that at least

some of these benchmarks were carried out by customers, ranking the company relative to competitors, or general issues of product quality, in the development of customer rating list – a fairly passive form of benchmarking.

It can be seen that 67% had a comprehensive strategic planning dimension to their TQM initiative, back up with self-assessment. There was a strong indication that those carrying out self-assessments were more likely to carry out benchmarking, emphasising the use of balanced measurements in support of strategic level planning, focusing on current internal organisational performance and comparisons with external competitors.

This question asked for personal suggestion on how TQM has been successful in organisations:

- 13% of the organisations respondents claim that they are not as successful as anticipated;
- 72% of the respondents claim that their organisations had been successful;
- 15% of respondents found their organisations very successful.

5.5 Conclusion

It has been argued that TQM work for all organisations regardless of size. Some have even claimed that it is easier for small or medium size organisations to implement and derive benefit from TQM because less complex structures, and fewer communications levels, makes it easier for them to control their implementation. The original sample of 58 organisations had been split between small, medium and large organisations. There were strong suggestions that those struggling with TQM were those with weak implementation and measurement methods, and conversely that those with strong practises were associated with successful outcomes.

It was reinforced by a hint that organisations confusing TQM and ISO 9000 were also more likely to be small in size.

- Internally motivated companies were more likely to fail at TQM. In general these organisations had relatively strong TQM practises.
- Those with internal motivations were less likely to use benchmarking with competitors.
- Those with the customer focused understanding, of TQM were more likely to have quality plan, and to carry out self-assessment, suggesting that such understanding reflects superior TQM practice. Such superior practise related to better TQM results.

Chapter 6

6.0 Company Visit Template

Based on the data collected in the literature search a template was developed see table 6.1, by the author to be used in site visits as a guide with sufficient latitude to cover all 9 major TQM areas. In many cases companies did not stick to this format and it was necessary to discuss in detail companies interpretation of all TQM areas outlined. For some companies the author felt as well as the TQM managers and MD's that TQM was not advanced enough to be subjected to detailed scrutiny in all 9 areas.

Therefore, the template is divided into 3 columns definitions, suggested measures and characteristics for the 9 elements of TQM as defined by European Quality Award. The suggested measures were used as prompts to guide the author and the company TQM manager being interviewed through the different elements of TQM measurement and results. The characteristics column lists certain attributes that one would expect to find in companies with strong measurement in the particular area under investigation.

At the end of each visit a report was written and it was necessary to revisit a number of companies to clarify points raised in the initial meeting however, the Company Visit template was the basis of my primary research used for collating information for each of my case studies.

The Company Visit Template is seen below:

Table 6.1 Company Visit Template

TQM CRITERIA	DEFINITION	MEASURES	CHARACTERISTICS
Leadership	The people who coordinate and balance the interests of all who have a stake in the organisation. Creating quality values and in building the value into the way the company operates (clear vision and value).	Leadership time and commitment to quality activities, attend quality training, knowledge of day-to-day quality improvement activities. Resources allocated to TQM system.	Setting standards, top management commitment to constant improvement, effective communicator, knowledgeable.
Policy & Strategy	How the organisation formulates, deploys, reviews its policy and strategy and turns it into plans and actions.	Quality goals, and are understood throughout the organisation, what will be improved and why?	Regularly updated and improved, developed, uses benchmark data and internal standards, customer and supplier planning.
People Management	The company maximises opportunities for all employees to secure use of full potential through the processes of recruitment, training and development.	Empowerment, satisfaction, involvement levels, turnover, suggestion scheme, teamwork, training and development.	Reward and recognition, quality of working life and active listening.
Resources	How organisation manages financial information, supplier relationships, technology and intellectual property resources effectively and efficiently	Financial resources; evaluation of plans; quality cost; control of suppliers and inventories; evaluations of technology use of assets.	Improvement use of product or service, better financial performance, benchmarking, use of process control, problem solving statistical skills.
Processes	The organisation identifies, manages, reviews and improves its processes. Reviewed and targets are set for improvement.	Identify processes; list key processes; documentation of processes; setting performance standards; improvement strategies; measurement of customer and employee satisfaction.	Error reduction; value enhancement by doing things better; fast response; technology evaluation.

This chapter presents a qualitative analysis of the case studies. Six construction organisations were case studied. Section 6.1 presents those organisations, which emerged from the analysis as the highest adapters of TQM. Judged against the self-assessment framework, and critical factors, principles and techniques.

A self-assessment analysis was completed for each of the 6 case studies and the individual evaluation form for each organisation are in chapter 8.

6.1 High Adapters of TQM in their Organisation

There are 3 organisations, which are presented in this group.

6.1.1 "H" Company

"H" Company is located in Scotland.

Number of Staff 1200

Turnover around six hundred million

Market Share (Home Building/Engineering)

The organisation underwent a radical change of direction in 1996. It was widely reported that the organisation was troubled. It has been said they spent some 1 to 3 million on possible floatation plans before pulling out. Millions were said to have been spent on trying to change the organisation brand image – which had been confused for either a building or construction engineering company.

In the early 1990's the organisation was also said to be considering closing its Scotland HQ and relocating to a London base. The company was reported to be seeking acquisition across a broad range of the construction industry.

By 1996 it had reached a low point in terms of financial performance. It finished very low, in the top 100 (1996) ratings. It was losing market share in core business of construction and home building. The organisation had lost its direction and after months of speculation at the end of the 1996 the chief executive had resigned.

Within a few months of the new CEO being appointed a change of direction was announced. The organisation would re-focus on core business of engineering and home building. It would go for organic growth by winning customers through quality of product with less emphasis on acquisition growth. It closed its central England engineering base merging this with the PM department all location in its Scotland Head Office.

After about 6 months the new executive team had fashioned a new mission. This was based on meeting customer requirements through quality of product. The new statement emphasised that the organisation was going for a quality philosophy linked very heavily with marketing.

Leadership

The new executive team have laid out a new mission from 1997; to satisfy our customer's requirements through high quality products, providing high standards of training for all staff and managing finance.

Ten quantitative goals are defined in the strategic plan based on financial ratios. In addition, and carrying equal weight. 'H' Company define 3 qualitative goals covering customer relationships, quality of organisation and quality of people.

The plan identifies key corporate values covering customer relationships, quality, team play, individual contribution, achievement, recognition and reward.

The plan is based on a return to core values and core business. It identifies quality and marketing as the 2 key philosophies driving the organisation towards its customer requirements.

A new organisation structure has been implemented. The challenge was to create an organisation capable of competing in an environment of change where the basis of success is understanding and anticipating customer's requirements. The organisation design has been created to provide the shortest possible route between direction (Board and Executive team) and customers.

The organisation is now represented by a series of interlocking ellipsis, which illustrate a direction management process, customer requirements, customer engagement, and others all part of a total understanding process. Gone are traditional hierarchies with line and staff relations. Now are teams and processes. Twelve grades have been reduced to just 4, and 6 levels of management to just 3.

In addition to the direction documents which outline the mission and strategy for 1 year and 3 years ahead, 'H' company's top team have also created implementation management process documentation, roles and responsibilities statements, implementation process definitions for the team, competency potential assessment documents for the team players. 'H' company also claim that everyone has received training within the last 2 years on the new plan and underlying philosophy and has been involved in team play. All players partake in regular direction events and understanding events. Events at 'H' company are defined meetings for a pre-determined purpose, where each player has a defined role.

There is no doubt that 'H' company have taken dramatic steps to change direction and turn things around. Whilst they believe the new mission is a clearly based on sound academic principles of quality management and marketing some commentators have cast doubt on the soundness of the new approach claiming that it is radical and has gone too far too quickly.

The implementation of all of the 'H's new organisation design is far from complete. The first 2 years have focused on re-organising the top layers are re-engineering business processes. Very little in the way of implementing new processes has yet taken place, implementations are planned in 1999 and 'H' are expecting a key competitive advantage to emerge. They stress that the strategy is long-term and subject to continuous improvement.

Policies & Strategies

Since 1997 the organisation had devoted much of its time to refocusing behind its new mission, which has involved:

- Re-designing the organisation structure;
- Developing a new culture based on teamwork;
- Understanding the principles of quality and of marketing;
- Defining its objectives, quantitative and qualitative;
- Defining its strategy and values
- Implementing the new strategy through a process model, which involves direction events, understanding events, implementation processes.

A newly created team based in new locations has developed much of the new organisation design. There is a stress on the new organisation structure which 'H' company says will give it greater flexibility to respond to changes by using rapid response teams, fewer layers which gives the shortest path between 'H' customers and the direction team.

Three management processes are defined in the new structure, a direction management process (DMP), an implementation management process (IMP), and an implementation process (IP). Within each process responsibilities and roles are described. This say 'H' company pre-determines the mix of skills that will be needed in assembling the teams required. It also communicates and clarifies the roles of players within each team, so leads to better input, participation and output from players. For example the IMP process identifies 5 roles;

Process leader;

Process facilitator;

Manager of implementation;

Process systems requirements manager

Human resources requirements manager.

Each of these roles is defined within the 'H' company direction document.

'H' company at what it describes as "events" and not meetings also places much stress. An event it says are occasions when players will come together at a pre-determined review date for a defined purpose (and with teams, players and roles all

being pre-defined). An event is an integral part of a process cycle. It stresses that event is not another word for meeting. It recognises that meetings may occur outside the process.

Most of the high level teams have now been established for about 4 years and a process of business process re-engineering has been underway on a massive scale. For example 'H' company claims to have mapped out all its major processes in fine detail and has in many areas created a vision of how it sees changes developing. It has not yet moved to implementation except for 2 or 3 areas – for example it has updated its purchasing department and estimating, accounting departments and had introduced a document handling system to manage its internal communications. Indeed it makes a point of noting that some planned IT projects have been on hold pending the review of all processes. The next 18 months will be critical it says as some of the work begins to roll out across the organisation. It is keen to stress however, that process improvements are long term and continuous and that implementation is just one part of a process cycle.

It is apparent that the new strategy is entering a critical phase. 'H' company will need to demonstrate that they can identify and deliver services, which meet customer requirements. They will be looking to grow market share in their core business and at the same time will be under pressure to reduce costs. This will not be easy in the short term; there will inevitably be IT design implementation costs to face. The organisation is also part way through a process of updating its Head Office and will take on costs during 2002. It will be a test of whether the organisation has really signed up to the concept that TQM can be a long-term journey if short-term financial performance starts to slip.

People Management

'H' company have developed an approach to “developing ourselves” which is outlined in their direction document. Three objectives are stated; developing team of teams understanding of direction and philosophy, developing team and individual contribution, developing understanding of implementation. To achieve the objectives 4 stages are identified and described, making up a total process, these are;

understanding – of direction, roles, and style of play, understanding events, quality of management development programmes, team effectiveness events.

competency – in application of individual qualities across processes, competency development programmes, coaching in teams.

capability – specific capabilities required by roles within a process, internal and external courses, computer based training, multi-media/ interactive video.

programme – information needed to implement specific programmes and projects self-assessment guides, programme bulletins.

The 'H' company are also trying to be innovative with reward structures. 'H' have developed a solution which they say aims to make the most of the investment in people by rewarding individuals contribution and competencies, whilst at the same time providing them with the opportunity to optimise the make up of their pay and benefits to meet their own personal requirements. Individual contribution is assessed by means of individual appraisal. Team leaders will assess the contribution of their players using an appraisal process which provides for up to 21 possible areas for consideration. On the face of it this seems to be simply a development of their traditional performance appraisal system, which may be now inconsistent with their strategy for teamwork and quality. 'H' company however, counter this by pointing out that their new pay approach is in the early stages of its development and they do foresee major changes in the years ahead. For example, in some parts of the organisation, some of the established teams have been moved away from individual to team based performance appraisal. This involves each individual player in a team being openly assessed by all other team players in a performance review event.

This also extends to the dividing up of performance related pay award by team players. Whilst ultimately the team leader will have final sanction, it is an attempt to democratise a part of the reward structure and early reactions from those participating teams seems to be favourable. 'H' company propose to roll out this option gradually to cover the whole organisation and claim that demand is high from players and team

leaders. This system appears to be more supportive of the team/quality approach and gives weight to the change of leadership style towards coaching and facilitating.

Resources

'H' company approach is aimed at directing the whole organisation towards its mission of satisfying customer requirements. It has developed a new organisation structure, which places emphasis on teams. It envisages that the new organisation and teams will be flexible and responsive to change. The new structure has just 4 levels, which are viewed as part of a total process. These levels are:

Direction Management Process (DMP) – the Board and Executive teams.

Implementation Management Process (IMP) – Process leaders, Process facilitators, Implementation managers, Systems manager and HR manager.

Implementation Process – Team leaders, team players.

Teams – Team players

'H' company believe that they are unique within the UK construction industry sector in adopting such an approach. They see quality as an overall approach to running the organisation and not a separate, functional division, as is often the style adopted. Also key to 'H' company's new design is the elevated role of marketing or as it is now re-titled customer requirements. This sits at the heart of the organisation and provides what 'H' company see as a vital link between the 2 key management philosophies underlying their strategy of TQM and marketing.

The process of change is recognised as a long term one and 'H' company believe that they are as yet still in the early days. In some parts of the organisation it admits that as yet little has actually changed and functions are performed in much the same way as pre 1997. It has however, laid out the foundations for its new design and structure. Some managers and executives have been developed and trained to understand the new process and at higher levels in the organisation the new team structure has been implemented. The proposal is to roll out gradually with more and more teams being created as it implements the stages of its Business Process Re-engineering (BPR) review.

Processing

The 'H' company now describe themselves as a process based organisation. The effort put into BPR in the last 2 years has been huge and is central to their strategy. They have based the process design on 3 questions;

- What do we want to do?
- With what do we need to do it?
- How are we going to do it?

The whole organisation is viewed as a series of interlocking, overlapping processes, within an overall process. Teams run different processes or parts of processes. They have developed a new organisation design, which reflects this concept, and have also developed a process model, which features in the 2003 Direction document.

The head of quality management division points out that the first two years have concentrated on identifying the key processes, mapping them, and on issues of structure, behaviour and organisation design also:

- 14 key processes were identified and mapped;
- massive process of re-design has been taking place;
- new internal communication system and document handling system has been implemented.

Overall, the results indicate that a massive and significant change has occurred within this (H) organisation. "H" company still have a long way to go, and "H" company expects implementation to gather more momentum on the financial year of (2004-2005) and said to be anticipating expenditure on development of luxurious 2 and 3 bed apartments.

6.1.2 "I" Company

"I" Company is a major international force in civil engineering and has particular expertise in the construction of complex infrastructure projects such as road, tunnels, railways, power stations, dams and water treatment plants. "I" Company is one of the UK's leading construction companies; the company has experience of major projects in more than 40 countries. Its Head office is based in London and more than 10 branches are allocated over the UK with annual sales approaching £2 billion and over 15,000 employees. "I" Company had pursued a strategy of rapid growth in the late 1970's and 80's, which included aggressive bidding policies, joint venture, merger activities, and diversification. By the early 1990's the organisation was beginning to become one of the largest electrical contractors in the UK and one of the largest international engineering service organisations. In addition to traditional contracting, the group's expertise encompasses design and builds and designs and manages.

On visiting the organisation's HQ's in London, the positive atmosphere and mutual respect are evident. The workforce at management level is relatively mature, with 60% having more than 10 years of service, however, something began to change during 1992 as people refer to it now as the beginning of a, "6 year search." In 1992 organisations were beginning to come under closer scrutiny and there was a realisation that growth alone would be no guarantee for survival and prosperity, heavy competition within the UK and out of the UK, changes in technology and material. Quality improvement departments started and the senior management team using invaluable information for their guidelines was driving initiatives.

On interviewing the Head of the Quality improvement department he stated, *"Over the past years, we have changed our culture within "I" Company to focus on Total Quality. Today, this concept is well-established and the essentials of guaranteeing customer satisfaction are in place, but we must realise Total Quality is a continuous process and our journey along this path is never-ending."*

At "I" Company there are 3 components to customer satisfaction through Total Quality:

- 1) Customer focus;
- 2) Continuous improvement; and
- 3) People involvement.

“More than any other factor, dedicated “I” Company employees contribute ideas through teamwork which is vital to our continued success.”

In the mid 1995 a new strategy (as he called it) was launched aiming at bringing the organisation to its core business skills, improving competitiveness, reducing costs and improving profitability. According to the paperwork, chart and strategy document, Joseph, M Juran and Phillip Crosby were most influential, being considered and evaluated with some interest. It is also important to note that at “I” Company perspective and contribution from both the Americans and Japanese Management were also considered and evaluated with some interest due to the international connection of “I” company. Following the success of the ‘new strategy’ at the management and professional support levels, effectiveness teams were created amongst the workers. Effectiveness teams were made up of employees from some areas of the organisation working together regularly to solve specific quality, production and customer service problems.

Leadership

In the summer of 1996 the Board appointed a new Chief Executive. His background was in management. Within his first 6 months he had launched a Total Quality Management strategy:

- Reduce costs by reducing the workforce;
- Introduce a new purchasing strategy;
- Build a new cost effective but functional Head Office;
- Improve communications by the use of ICT;
- Encourage empowerment within the workforce; and
- New training procedures to be implemented.

With rapid change, new corporate strategy, a new organisational structure, new executive team, a changing role for many managers and staff "I" company was financial successful in 96-97. At the top of the organisation there was now a clear focus and direction.

This quality programme at "I" company did not following any specific teaching of a particular quality guru. Instead the company had extracted what it considered to be the key elements for the teachings of numerous gurus. For example, Deming's "Constancy of Purpose" was adopted in order to drive out fear in the organisation and, in line with another of Deming's philosophy, the company had attempted to create an 'Open Culture'. Efforts to improve the relationships with suppliers were rooted in Juran's teaching. There is no doubt that at the top of the organisation there is a clear focus and direction.

Extensive training began at "I" Company to give managers the knowledge and skills needed to monitor their workforce, look for and recognise variances, and know what to do when they identified problems.

"I" Company had re-positioned its strategy away from pure growth to a longer-term strategy of differentiation based on a quality philosophy, which is broadly based on the EFQM framework. Implementation is top down and is broadly similar in approach to process quality management team (PQMT) (Porter and Oakland 1993).

The strengths of this approach are its recognition and prioritising of key processes and critical success factors of establishing appropriate teams to tackle the tasks of ensuring quick alignment and integration of activities within the corporate plan. Problems tend to appear in the area of alienation of some managers and staff who find difficulty in adapting to change. This can be particularly acute among middle managers that can find themselves in a role crisis. The shedding of many jobs can only have added to the insecurity.

All managers have received training on Quality principles and techniques and on taking part in the corporate planning process. A leadership style based on 'coaching' principles is favoured.

“I” company described their leadership style as traditional, top-down, financially focused, autocratic, they were moving to a more participative style more consistent with European Quality Award Model (EFQM). According to Quality Manager a TQM programme at “I” company covered:

- customer service improvement through targeting improvements;
- just-in-time methods to reduce inventory and buffer stocks of stores;
- massive training in quality methods to raise skills across the whole workforce;
- to communicate effectively.

It is evident that the organisation has been restructuring itself with a big effort to reduce its costs and streamline. “From about 1997 there was a growing realisation that Total Quality Management was the right approach and the message came down from the CEO and 2 Board Directors to each line executive.” Within a period of 18 months, this led to some structural changes within the division. “Each division now has a Quality Manager or Head of Quality, with responsibility usually directly to the Divisional Director.”

Within the Engineering Division, which is responsible for the technical operation, surveyors, engineering design, a head of quality was appointed responding directly to the divisional director and running a small team of 8 senior officers. These officers provide a consultancy service to the engineering network and organise and run special projects. One such project was started in 1999 and ran for 2 years under the title of “Operational Management Best Practice for Division.” This project used the techniques of “Internal Benchmarking” to identify division managers deemed to be the “best performers.” These managers were subjected to analysis until a best style was developed.

The project was generally viewed as “successful” and an “important catalyst to changing behaviour.” It received “close” attention from the top and was given a “high profile.”

Policy and Strategy

The group had developed a mission statement and a vision and values statement. “These were published and released to all staff for the first time about 5 years ago.”

The “I” company has been through a difficult period and this has brought about much “internal soul searching” over the past 5 years. The emphasis has changed to “putting customers first by providing products and a quality service.”

Senior executives are personally and visibly involved in quality improvement process, leadership has experienced first-hand the consequences of not being customer-focused and not having sufficiently shared quality values. Leadership works to create a shared quality vision and meets the needs of customers, suppliers and co-workers. The new leadership model has shifted from telling co-workers, contractors what to do and “getting things done through people to meeting the needs of co-workers as they work to accomplish their jobs and achieve process supremacy and customer satisfaction.”

“I” company’s route to process improvement:

Phase 1 (1998-2000)

The first phase of quality at “I” company consisted of a detailed process management system along with a sophisticated statistical quality control system for continuous construction.

Phase 2 (2000-2001)

The year 2000 was an important turning point where leadership committed all parts of the company to total quality management. To firmly and consistently establish our commitment to this new approach over time, “I” company hold quality leadership conferences every other year, bringing together up to 85 top managers and selected participants from within their organisations to unite and consolidate “I” company’s leadership behind shared principles.

At the end of 2001 TQ leadership began to move into its current and most advance stage. *“We realise that we needed to be more dynamically involve our people as*

individuals and team members in feeling personal responsibility for and ownership of the “I” company quality environment and the values that support it (Quality Manager).”

Phase 3 Quality Integration (2001 – current)

The third phase of quality at “I” company build on the first 2 phases and adds the strength of recent teaching in partnership/high performance work system (HPWS), diversity, and quality leadership.

Leadership team developed a foundation for improved total quality leadership and culture change, which included:

- 1) Establishment of a new purpose and vision based on achieving success through meeting the needs of key partners in our business. The customer, contractor, the co-worker, society and the stockholder;
- 2) Adoption of the EFQM model for business excellence criteria as the improvement framework, naming it the “I” company continuous improvement criteria.
- 3) Creation and adoption of the self management team process to deal with the human side of quality for all organisation members;
- 4) Recognition that we need to create an atmosphere characterised by valuing the individual, respect, and trust, responsibility, teamwork, support and anticipation if we are to be successful in making the broad changes needed.

Each member of the leadership team is committed to spending a minimum of one-third of his/her time on quality related activities such as customer contacts, establishing values, and supporting organisation members. In 2002 each functional division was responsible for developing its own mission statement, which must satisfy the overall mission.

Line executive develops strategies and these are cascaded down the organisation using principally the individual appraisal system. Each staff member has a quarterly appraisal, which is linked to key performance objectives. The system was described as “well established within the organisation, well understood.” The principal

advantages were seen as “allowing line, project, or side managers discretion to set objectives and measure performance and have a say on pay awards.” There is recognition at senior levels that, this approach is a big feature of the new strategy. Some disadvantages noted were “performance still tends to be judged on sales volume.”

In the last 2 years the emphasis has switched to cost reduction, by reviewing construction processes and introducing just in time for material.

People and Management

“I” company leadership team (LT) is committed to continuous improvement in leading the quality effort, they regularly conducted “staff surveys” and for 2003 the analysis has showed disappointing results and heightened concerns amongst staff. There was some evidence of low morale. A number of factors had accounted for this:

- 1) “I” company has been making a very big effort to reduce its operating costs and this has led to re-structuring more jobs transferring to local and national contractors because of this action redundancies followed;
- 2) The organisation has suffered from bad publicity over the past 2 years, which has been prominent in the media.

On the positive side it was seen as some of the traditional practices were changing, for example flexible working hours, job sharing schemes had all been introduced as a direct response to staff feedback. The “I” company philosophy of decentralisation, seeking to place decision making near to customers in the local office, remains strong. The organisation continues to invest heavily in training.

Organisation Human Resource Management approach is a vital part of achieving member partnership. The HR goals reflect a commitment to people development, from the constant goal of improving safety to the short and long-term goal ensure company future. To achieve long-range goals, organisation identifies their global capital equipment, facilities, education and training, and personnel requirements for

their plans and strategies. Specific long-term goals include being the low cost producer of industry and having the number one market share.

In mid 2004 organisation instituted the co-worker climate survey to measure co-worker's attitudes, understand the issues affecting staff, measure the progress and assess the future cause. The survey monitors 2 key indicators among all members such as well-being, satisfaction and involvement. Management compares survey results among sites against the corporate leadership survey (initiated in 2003) and against the 5 other major construction companies. The co-worker climate survey and continuous improvement criteria process are also used to measure changes and identify areas for proactive or corrective action. Three tools are used regularly to evaluate and develop improvement plans for awareness and integration of quality values:

- 1) The EFQM model for business excellence;
- 2) Co-worker climate survey;
- 3) Customer satisfaction survey.

Resources

Since 2001 the organisation has seen quality as the key strategy to pursue. The top executive team have pushed the quality message hard. Responsibility for quality has been put on the head of the respective divisions.

The problem is that effectively quality has been delegated to functional heads who in turn have usually delegated to specialist quality managers within their functions. What gets done depends on the value placed on quality by each divisional head. Some still see it as a fad, which will pass.

Part of the problem seems to be related to the style of management. This is very much a management by objectives type of culture. Setting hard targets, which are fed progressively down the line, deploys the organisation strategy. Objectives are largely financial driven and relate to sales. The strategy over recent years has been seen as

'boom and bust.' Against this background and the particular recent pressure to cut costs, quality had not been a primary concern in practice.

In terms of resources this is a bit of a contradiction. "I" company has appointed a number of 'quality managers' across its functions and departments. Whilst some success is claimed, such as the best practices in planning and tendering initiatives, by large progress has been slow, limited to specific projects and generally lacking co-ordination.

Process

Again so far activities have largely been confined to the structural divisions. Two years of cost reduction and re-structuring have lead to fewer layers but little seems to have changed at the top management levels. Part of the problem seems to go back many years and points to a failure to reconcile cultural differences following the merger with another construction company. This organisation had a heavily centralised culture and "I" company's culture was de-centralised, with branch managers being more authorised and in control of their own branch activities. For years it seems that "I" company was to try to steer a middle ground, satisfying all different needs. This seems however, to have ignored the battles being brought on the ground to establish supremacy and ultimately causing problems for customers caught up in the middle. "I" company claim there is no doubt that very big efforts have been made and significant change has occurred.

6.1.3 "F" Company

This company is a subsidiary of a major UK engineering corporation, having annual turnover over £1.3 billion in 2004, the group came into being in the 1980s after evolving from some 30 engineering and construction businesses. "F" company combines design, construction and project management. The parent organisation has had a major influence on the direction of TQM in the "F" company. TQM was started in 1994 and the senior management team using the European Quality Award Guide lines has driven the initiative. There are 2 basic themes in the company's TQM process:

- a) Leadership – to clarify the vision and to guide people along the road to it by the personal example of each manager.
- b) Education – to ensure that all employees share a common quality vision and goal.

Leadership

When the company initiated its TQM program, it decided that employees had to be a big part of the process. With this in mind, workers are now required to set performance goals that they have to achieve for the upcoming year. To help them meet these objectives, training courses that are linked to personal and professional goals are provided for them. “F” company officials also made it a point that achievement of such goals be formally acknowledged through rewards and meetings. Promotion from within was also employed to motivate employees and improve their skills. Lastly, teams were encouraged to participate in decision-making and problem solving. These employee-orientated TQM efforts have paid off for “F” company in the form of improved services and increased morale. The importance of quality is reinforced throughout the top team by the use of quality improvement teams (QITS) and seminars where company members have spoken. The TQM manager admits that while there is strong commitment to TQM more could be done in the area of leadership.

Giving employees the knowledge and power to say yes to any customer request, “we realise that we could compete with them in terms of dollars”, says co-president of “F” company, created 9 corporate objectives that gave the development of “F” company people equal priority to such other objectives as profit, product quality and customer satisfaction. It communicated these objectives to everyone in the company; the organisation leadership then took steps to ensure that the people development objective was attained. These steps included: offering extensive training opportunities linked to individual professional and personal goals; implementing recognition programs to acknowledge accomplishments; strengthening its promotion form within policies; and increasing employee involvement in decision making and problem solving. Goal setting is backed by training opportunities. The company links

training to the quality improvement plan. Based on the goals that employees set, managers, as a result of round table discussions, make suggestions on types of training courses that will help their employees accomplish their goals. The training to be taken is then finalised by the employees and their managers. To satisfy employee's training needs, the company offers an extensive list of courses on-site through what it calls "F" company learning school. Types of offerings generally fall into 5 categories: quality-process skills; maintenance skills; sales and service skills; product knowledge and technical skills; and instruction on better health, wellness and personal growth. Courses on these topics are scheduled continually.

The TQM manager states that by using the (EFQM) criteria for leadership the company can gauge commitment and involvement of the top management to TQM.

Policy & Strategy

When the company first started the individual development process and made the decision to allow workers to attend any training (on company time) regardless of its relevance to their jobs, MD says that there was some fear that people would sign up for classes just to get out of working. That has not been the case. The company ensures that employees understand that their work still needs to be done. Also, workers must make a commitment when signing up for classes. They are expected to participate and bring value to the class as well as to their jobs when they return to work.

Annual recognition days are an opportunity for all employees to toot their own horns and be heard. Once a year, members of the executive committee, along with workers, from various sites, visit each of the branch locations to hear first hand about what's been happening. Recognition days are a chance for employees to share what they have done with members of management and others within the organisation, MD says, "*Recognition days focus on the entire team at the location and the things they have done together as a group or as individuals. People who were once scared to talk to members of management now are proud to share because we come to their environment. We've seen these people grow professional.*"

Employee growth is demonstrated as well through promotion. In 1997 the company only filled about 36% of its open positions with internal candidates. Today, that number has increased to 78%. This increase is due in parts to the increased development of employees. It also has come about from strengthened policies on promotions from within.

People Management

TQM has been introduced with very much the soft side first e.g. human resource development/leadership followed by hard issues e.g. quality operational results.

Empowerment is actively pursued with a strong emphasis on education and training, which is carried out using in-house materials based on the quality gurus and input from the European Quality Award. Quality education has a significant role as part of induction training for all new employees. The company's reward and recognition scheme exists to reward employees and contractors based on achievement of quality objectives.

The company has adopted the principle of performance management using personal performance guides:

- 1) Main task – purpose of doing this job?
- 2) Critical success factors – what area must I get good results?
- 3) Mapping operation goals – what do I need to do to achieve results?
- 4) Performance standards – what does excellence look like?

The objective is to have employees look at their job as a process and by doing this remove any lack of clarity over roles and responsibilities. The case study shows that the quality message in "F" company will cascade down to all levels. Due to the nature of the company's operation with a large number of employees and contractors involved in number of sites, management experience great difficulty to develop and implement TQM in "F" company.

It is refreshing to think, in light of global competition, management and contractors alike could be open to new ways of doing business.

Resources

Through years of implementation “F” company continues to buy into TQM and invest significant amounts of time and expense educating supervisors and employees to be effective team members. The group’s TQM manager officer has made quality presentations and the line management team have attended training in quality off-site. Work is in progress on developing information and analysis to support quality activities. The TQM manager states that the company does not have sufficient data gathering and analysis and needs to question in more detail the reasons behind data collection e.g. is this the correct data? How does the data contribute to overall integration of TQM in the company? Benchmarking is used to some extent both internally and externally, the company has sought the advice of Consultants Corporation on benchmarking. By 1990, increased competition began to take its toll. It was clear that drastic changes would be needed for “F” company to remain competitive in the mid 90’s; the company had achieved high levels of customer satisfaction and experienced rapid sales growth. Thanks to implementation of TQM.

“F” company ‘leadership through quality’ process is aimed at fundamentally changing the way “F” company people work and manage so they can continuously improve the way they meet the requirements of their customers according to company literature. The 6 mechanisms for change, including management behaviour and actions, transition teams, tools and processes, training, recognition and reward, and communications clearly mapped and visible. In addition, benchmarking against other world-class companies and other measurement system are key to visualising the desired state. “F” company began their quality initiative by benchmarking 14 performance elements; today they benchmark 280+ elements, taking care to analyse all this data not only by the number but also by processes.

Another result of TQM implementation has been increased on customer focus and satisfaction: the company has adopted a mechanism called value improvement process

to understand better products and services from customer's viewpoint and compare with competitors.

This model employs the following steps:

- 1) identify the various elements of value that might be perceived by the customer;
- 2) validate perceptions with the customers;
- 3) compare our products with those of competitors against our customer's agreed criteria.

6.1.4 "G" Company

The "G" company's headquarters is located in Scotland and solely operates in the UK, engaging in engineering and construction. Its members are responsible for the management and construction of large industrial projects such as power stations, steelworks, the erection of steel bridges as well as industrial plants and large housing projects. "G" company has an annual turnover of over £800 million.

"G" company began a program of TQM implementation in 1990. The program's mission statement said: "we aim to be the best in the business through the strongest commitment to quality and customer service." In order to achieve such a culture (Business philosophy) every employee in the organisation was informed through the corporate mission statement which study showed has worked very successfully.

In 1990 the never-ending road of TQM programme started with the strong backing of the MD. As part of the TQM programme "G" company concluded a number of industry surveys. In addition to highlighting many weaknesses within "G" company organisation then also concluded that the major obstacle to waste and increasing the level of customer service. In mid 1991 "G" company appointed a new Quality Director, his background was in industrial engineering and he was also a university graduate. TQM Phillip Crosby heavily influenced his vision, within the first year the new QD:

- launched a totally new strategy;
- created a virtually all new quality team;
- introduced a new organisation structure based on a changed team;
- put in place a plan to reduce the number of contractors.

He stated that this whole new concept has to be adopted within the company from the top to the bottom, and not just by the contractor, but also by the clients. These concepts have to be worked at and invested in.

The new QD's vision on TQM is, "I see TQM as the catalyst for changing the culture from top to bottom which in turn creates the environment in which partnering can thrive and grow." "G" company's leadership believe there is so much to play for in the construction industry. The client gets a better product and the contractor gets a satisfied customer. Both therefore get better value from the job.

Leadership

A recognition of poor performance to 1990 had created a climate for change. The new Quality Director (QD) an outsider to the industry and the new team brought new ideas based on "the contractor must be able to demonstrate that he is reliable and the confrontational approach of 'us and them' must be dropped." Of course, there must be a determination to succeed. On a partnering contract we would all be seeking win-win solutions. 1991 to 1993 have been periods of rapid change and at times described as traumatic, with a new corporate strategy, new organisation structure, new executive teams and about 250 job cuts, and role changes for many managers and staff.

A cornerstone for this was that all parties to the contract place value on long-term relationships. Partnering is not just for today. It is not just for the current contract. Partnering, if it is to work must be seen as long-term "built on mutual trust and openness." There is a recognition at senior levels that a total change of style and culture did take 5 to 6 years to achieve.

“G” Company did re-position its strategy away from pure growth to a longer-term strategy of differentiation based on a Quality Philosophy, which is broadly based on the EFQM framework. Problems tend to appear in the area of alienation of some managers, staff and contractor who find difficulty in adapting to change. This can be particularly acute among contractors who can find themselves in a role crisis. There is a recognition at senior levels that openness is an essential ingredient between both parties. It is this aspect that reveals to the contractor what his customer really wants, what his specification and design parameters are, how much he can really afford and what his real time constraints are. There must be trust, confidence and commitment at the highest level.

Trust, (QD repeated) is a vital element. Trust removes confrontation and removes the need for customers to employ layers of people to check the contractor, which eliminates cost, simplifies communication.

Policy & Strategy

During the 1990's, the construction industry was hit particularly hard by a combination of foreign competition, the worldwide recession, and the strength of the pound. “G” company required a new strategy. A 6-year corporate plan has been developed by a new executive team, which seeks to identify key business areas. A team structure has been introduced, overlaying a flattened organisation structure, to ensure the key areas are given appropriate attention. The new strategy placed a higher emphasis on customer satisfaction, risk management, simplified communication, projects delivered on time and within budget, good partnering and performance. Leadership belief, good partnering and simplified communication are good business. It cuts time and increases flexibility – an essential factor when responding to changing market conditions. It can help speed cash flow, and reduce administrative cost and stockholding. This policy has been described as a return to “partners in quality” and a move away from “pure growth.”

The plan is given high profile among staff and contractor, also customers. All staff top to bottom have received training on the plan, all have a copy, and all are

encouraged to contribute to the planning process. Communication is via team or line manager's briefings and progress reviews, which are set to take, place monthly.

In 2001 quality goals were established for clients, employees and management. Measures called "evidence of success" were developed. Annual planning includes both a quality as well as a business plan in which the "evidence of success" serve as a game plan for the entire company. Each year, the plan is reviewed by the quality steering committee and changed as appropriate.

There is no doubt that great efforts have been put into the corporate planning process and there exists an apparent desire at the top of the organisation to involve staff and customers in the process. Some areas recognised as needing further attention. Not all staff appears to be integrated into the process. Those in the project management are directly involved in key, high profile issues, and are involved and receive regular feedback on progress. Many other staff are not so directly involved as yet and are subject to line manager briefings and personal appraisal, which may not always be so effective.

Despite a heavy spend time and money on training there remains a feeling that the process remains top down with little evidence yet of empowerment or prevention based principles. The culture is still considered to be a "control culture."

People Management

One of the cornerstones of TQM is empower employees to take positive steps to improve all aspects of the company.

The feeling emerged that the society had a long way to go to bring the total culture change it is seeking but that it had laid the foundation. The case study shows some of the organisation's personnel policies and practices were seen as outdated and not in line with current thinking. For example, a poor reward system, and an appraisal system, which needed review.

According to an attitude survey conducted by the human resources department:

- 1) Worker satisfaction had been declining and had reached an all time low in 2001.
- 2) The supervisors and project managers were generally of the opinion that many of the problems and poor workmanship were the fault of the contractors who did not care about quality.

A major initiative for 2001 was to be the establishment of several more project teams. Team members were given opportunities to tackle further key issues and also allow further training opportunities for team member in team and problem solving techniques such as, benchmarking, flowcharting, cause and effect.

The “G” company strongly recognised that empowerment and participation were important issues but that these concepts would take along time to get across. There is a recognition at senior levels that empowerment is actively practised with decision making driven down through the organisation. Total quality education and training is based on awareness days that span all levels, functions, disciplines and geographical regions. This training is top-down reaching employees at all levels throughout the company. Quality is highlighted as being the responsibility of every employee and is formally included in all job description. Total quality training is based on a mix of Crosby, Juran and Deming concepts. Quality problem solving courses are held regularly. Every quarter the reward and recognition scheme exists for the employee who has contributed most to quality and performance. Numerous quality initiative exists in the company, eg the MAD (make a difference) campaign to generate idea for cost improvements in all business areas. High priority is given to QWL (quality of working life) and an open door management style exists in the company. Each team’s yearly performance appraisal is tied into quality improvement objectives and according to the TQM manager through this process an employee’s negative attitude to the total quality initiative would rapidly be detected.

The “G” company was very proud of its efforts on the training side over the last 2 years. All staff had received training on the corporate plan, and on quality principles and techniques. There was a commitment that all staff should receive a minimum of 8 days training per year with the main theme being re-enforcement of the company mission and strategy.

All employees are encouraged to contribute ideas and suggestion to improve their work practices. In 2002 workmanship surveys have been conducted, and results are reported to all staff, contractors and the executive team are assigned specific actions to tackle the most common cause of complaint. A number of issues have already been resolved and this was regarded as a highly important, visible, and on-going part of the new strategy. A limiting factor was that as yet communications had largely been via manager briefings and it was the intention to introduce more open methods from 2004.

Extensive measures are in place to chart improvement in all business areas, but some of the training, particularly on techniques, had not really been evaluated and there was feeling that as yet the use of techniques was very limited.

Resources

In 2001 3 departments, which had previously been largely responsible for change and development within the organisation, were dismantled (management development, business planning, organisation and training). The new strategy involves managing change via change team. The executive team firstly identified key business areas critical to the success of the business. From this 14 change teams were set up to take forward the key areas. The "G" company corporate plan refers to this new organisation structure as the first step to an empowered organisation structure.

Change teams consist of, an executive sponsor, project manager as team leader, and team members. The team report directly to the top executive team normally on a monthly basis. Initially 14 teams were established but more are planned for 2005.

By adapting this method "G" company feel that they have succeeded in quickly deploying resources onto key issues and aligning activities to the corporate plan. They accept that there is a long way to go. Teams are not yet skilled in the use of techniques such as benchmarking, business process re-engineering, flowcharting, these are high on the list of priorities for 2005 and at the time of this study a new senior executive responsible for BPR (Business Process Re-engineering).

Processes

In the mid 1991 “G” company management committed the company to total quality management and continuous process improvement. Managers began a sustained effort to promote the understanding and improvement of the capabilities of the “G” company processes. Many of the initial efforts focused on classic design problem including inventory and construction time reduction, improvement in outgoing quality, and on-time delivery performance. These efforts have rewarded with improvements in some cases dramatic improvements in these measures.

About the same time, “G” company management began of focus on forging a closer working relationship with its many suppliers. This supplier-management effort was driven by the knowledge that “G” company ability to meet the quality, cost and performance needs of its customers would be determined by its suppliers. In order for “G” company to perform better, it had to improve the performance of its suppliers. Another management view was in the mid 1990’s processes were described as old and out-modelled in many areas. In part this was seen as a hangover from the 1991’s when “G” company had pursued an aggressive growth and manager strategy. In particular the lack of a central customer and contractor database, was seen to be an area, which put them at a disadvantage over competitors. In some areas the organisation was claiming to be particularly innovative. One project in particular was raised. The “G” company is among the first major construction company to have gone for just-in-time process. Although the organisation had the collective knowledge to understand and describe the entire process, they created the process flowchart capturing the current process and the time requirements for each step in that process with over 85% efficiency. In some areas however, it was believed that high technology solutions had been simply imposed over existing practices with the result being little real change.

In the 3 years to 2000 the “G” company had ranked bottom of the top 50. By comparison 2001, 2002 results show significant improvements in all areas measured. In 2003 profits increased by 23%, the new strategy suggests a higher concentration on quality and delivery time.

“The aim of every business is to have satisfied customers. After all satisfied customers come back with repeat business and, furthermore, they tell their friends. It is all very simple.” (“G” company’s MD).

6.1.5 “P” Company

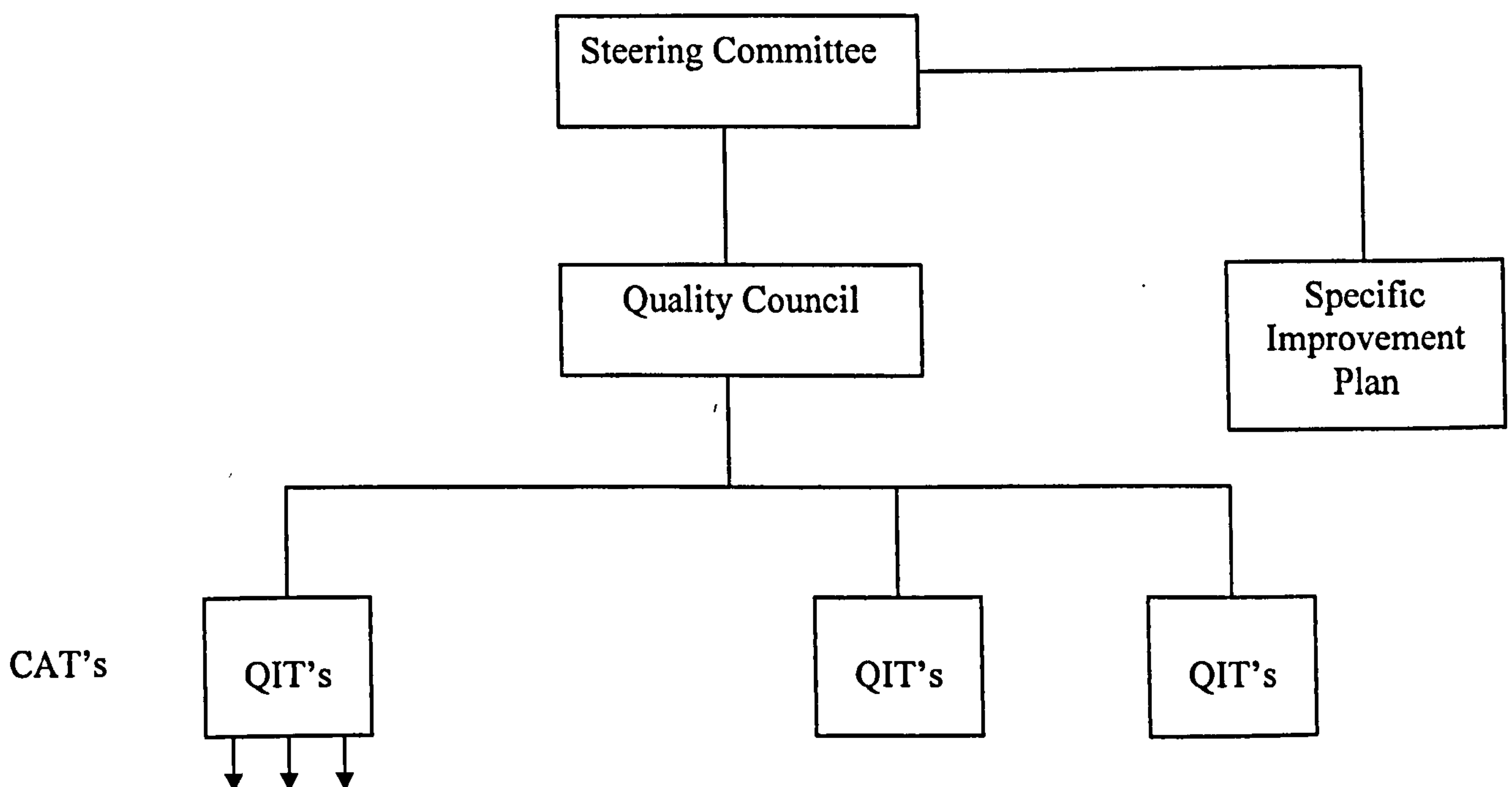
This company is contractor and house builder employing 3000 personnel with a group turnover of approximately £1.12 bn. In 1984 the company achieved BS5750 registration and commenced Leadership

The company’s TQM structure consists of a Steering Committee, Director of Quality and Quality Consultancy Department. The Director of Quality reports to board level and advises Top Management of Quality progress. The Quality Consultancy Department’s main role is to support the TQM process.

The company’s Managing Director has spoken on TQM and Customer Focus at numerous management conferences. An outline of the company’s approach to TQM is illustrated in Figure 6.1 below TQM a year later winning the British Quality Association BQA in 1990. The TQM process was set up based on the Crosby approach to Total Quality.

Figure 6.1

COMPANY TQM STRUCTURE



The Steering committee directs the TQM process and consists of the group director and the board of directors.

The quality council consists of the Quality Improvement chairman and is a forum for new ideas and concepts and for monitoring the implementation and management of TQM process.

Quality Improvement Teams (QIT's) implement and manage the Quality Improvement process.

Corrective Action Teams (CAT's) are set up to solve specific problems.

Active Change Teams (ACT's) provide all employees with the opportunity to become involved and solve their own work-related problems.

Specific Improvement Projects are allocated by the Steering Committee to named Directors or to Senior Managers.

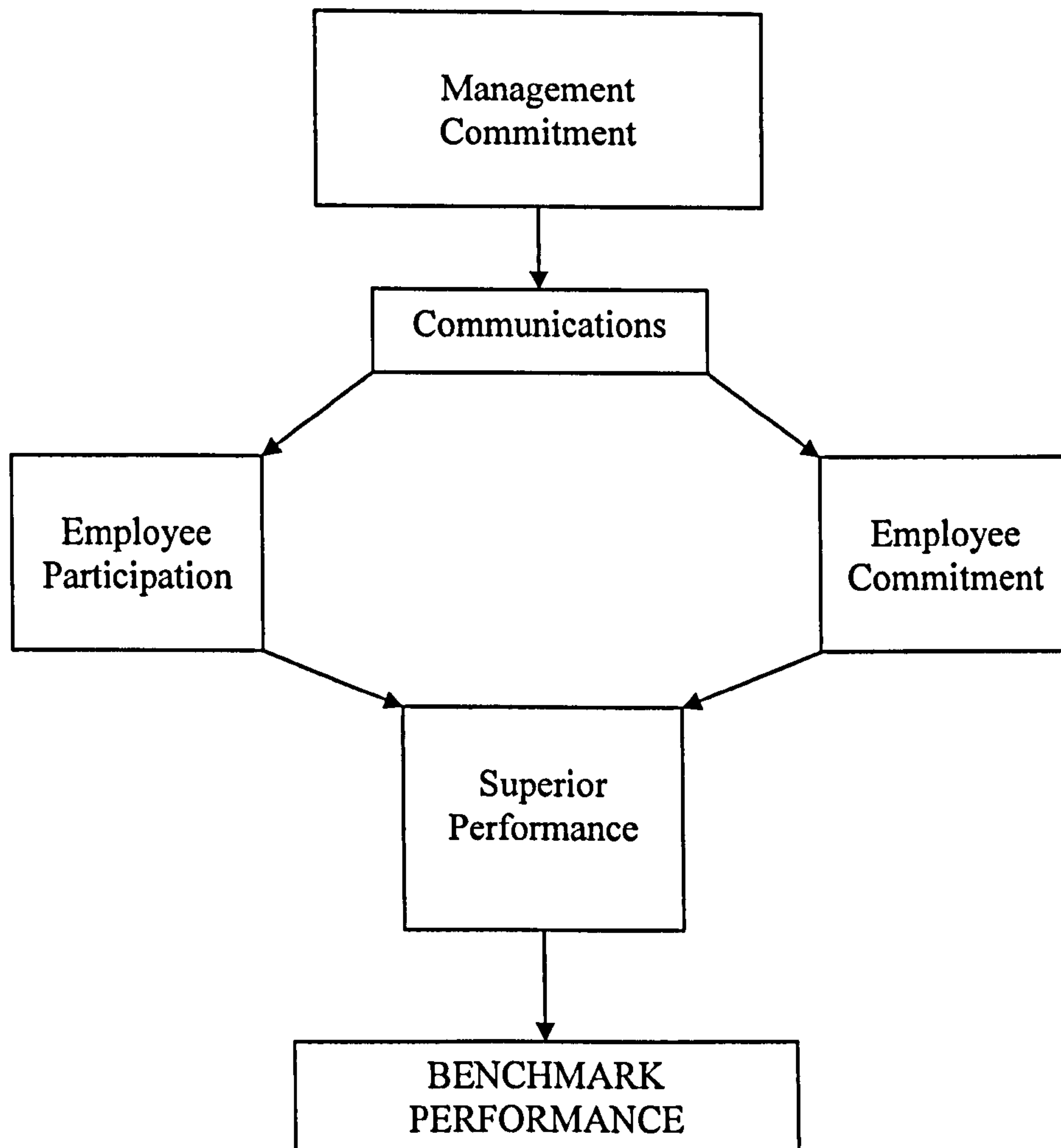
Information & Analysis

Extensive quality data is available in engineering, materials and transportation departments. Unfortunately insufficient information is being collected in the support areas. The people concerned must rectify this. The Quality Consultancy Department offers the following services in the areas of TQM, Advice and Information, Education and Training, Registers of Quality improvements, Corrective Action Teams and Active Change Teams.

There is a strong emphasis on the need for fact-based decision making throughout the company. The benchmarking model developed by the company shown in figure 6.2 below.

Figure 6.2

BENCHMARKING PROCESS MODEL



Quality & Operational Results

The company collects attribute, variable and trend data in the areas of supplier rating, customer satisfaction, benchmarking and internal quality improvement activities, to track the results of their TQM process. Measures include cost of quality, supplier quality ratings, delivery performance and frequency of QIT meetings. Measures are broadly categorised into 4 headings:

1. Management
2. Employee Participation
3. Customers
4. Performance

The Director of Quality mentioned that the company had recently achieved a break through in quality when the finance department announced that an improvement in the company's finances was attributed to the TQM initiative.

Customer Focus & Satisfaction

In the middle of 1991 the company's customer focus initiative was launched to try and examine how the company deals with its customers and how their customers in turn actually perceive them. One of the key features of this initiative was the setting up of performance targets.

A customer charter has been issued showing the goals necessary to achieve customer satisfaction. In future the quality improvement strategy will be solely centred more on the needs of their customers and how the use of effective processes will help achieve the performance improvements not only demanded but also expected by their customers.

Education, awareness and training modules are required to support this customer-focused initiative for all employees. The training elements are specific to individual functions whether it is sales or engineering and highlight how these areas can actively support the company's key customer interface personnel.

Human Resource Development & Management

There is a strong focus on the culture change required within the organisation to sustain TQM. The voluntary active change team are based on the same criteria as the quality circles concepts serving as a problem solving function. The use of ACT's are seen as one of the principal methods of empowering employees to implement policy throughout the company. Hosting yearly awards and presentations of quality improvement projects to the company's director or to the members of the board carry out reward and recognition.

In order to measure employee's perception of TQM 2 staff attitude surveys have been carried out in the past 5 years. A large budget is set aside for quality education and

training with training materials being developed in-house. All employees have participated in TQ education and training.

Strategic Quality Planning

Quality goals are set in the business plan with specific quality targets agreed for all management personnel. The plans are deployed across all departments stipulating their goals and measured lists for them. Top management is involved in all stages of the quality policy planning.

Management of Process Quality

Process thinking has been stressed throughout the company with the emphasis on ownership of processes. For example one person is nominated to own the process and thus has the responsibility to take effective action to remedy problems should they arise. Process thinking has been applied equally to the building management and support areas of the company. Three key measurement areas have been identified performance, benchmarking and quality costs. Measurements of product performance are made against certain aspects of the company's systems and of improvements against time.

Benchmarking techniques are applied to both products and processes. Management are encouraged to benchmark only in their own areas of expertise. The quality costs monthly report identifies costs under 3 categories – prevention, appraisal and failure and is tagged for the immediate attention of all managers. Supplier quality audits are also carried out on a regular basis. It is extremely apparent that significant improvements have been made in both product and software quality and these improvements are being pursued relentlessly. The company rates its top 25 suppliers in terms of product quality, service and delivery. Every 3 months the company's officials meet these suppliers to review their ratings to develop mutually agreeable quality improvement action plans.

6.1.6 "R" Company

This company is owned by an US multinational with an annual turnover around £260 m in 2002. "R" company employs 560 people in the constructional engineering field. In 1993, the management began to introduce TQM within the company workforce. As it had always been teamwork orientated. It was felt at this time that the Crosby approach and philosophy would be the best means of providing a suitable structure to enhance the companies teamwork philosophy and to further co-ordinate its TQM future.

Leadership

Management commitments to TQM was seen by the company as the starting point in the process with particular focus on management's understanding that quality is infact definable, measurable and manageable, and that management must communicate to all employees its understanding and commitment.

Information & Analysis

In the early stages of TQM a vast volume of data was gathered on the progress of the TQM initiative for example looking at rejects, absenteeism, and the number of quality improvement projects taking place. This data was then presented at top-level meetings.

As the TQM process evolved the company moved to a position where each manager collates and presents his own quality data. At company review meetings each manager was held accountable for the quality performance of his/her department.

Strategic Quality Planning

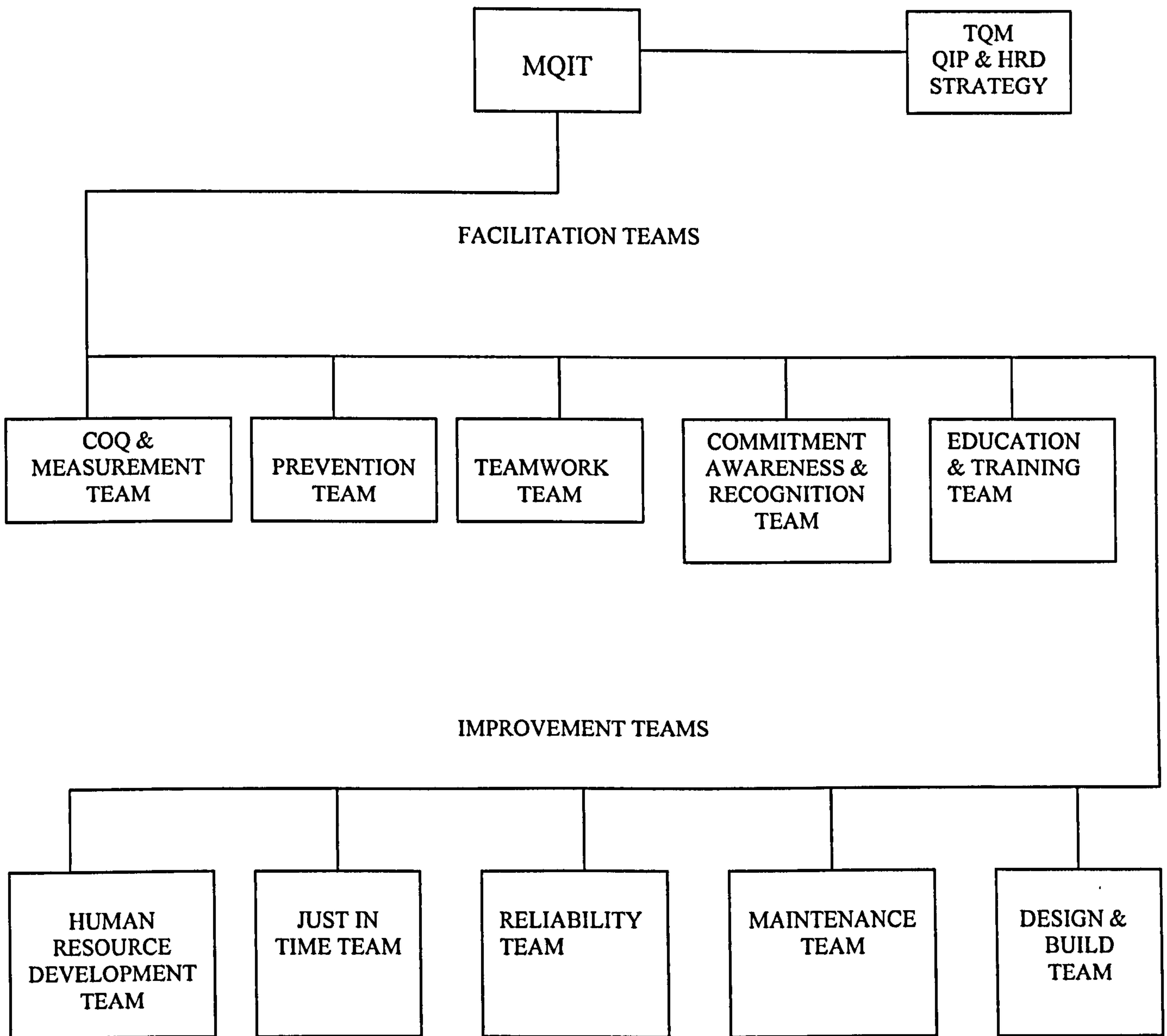
Due to the structure of TQM teams the process of strategic quality planning is subject to constant review. The management quality improvement team (MQIT) has not changed since TQM inception with the Chief Executive and his direct reports having continuous membership of his team. The MQIT has a clear understanding that its

major responsibility is the facilitation of the TQM process into the company but that the implementation of quality improvement activity is a functional responsibility. The strategy teams are like working parties of MQIT and are responsible for developing the vision of how the company should look in the long-term (3-5 years). According to the TQM manager systematic review of the TQM process by the top management ensures that the company doesn't get itself involved in any activity that will not bring it closer to its TQM vision.

Human Resource Development & Management

Throughout the TQM initiative the company stressed the need for 100% employee involvement and the company's strategy for achieving this has been through the use of dedicated teams. Education and training has been vital and was carried out to enable all employees a greater understanding of their role and have the correct skills and ability to fully participate in what ever activity they were asked to do. Comprehensive lists of education and training courses are available to all concerned.

Figure 6.3 Company TQM Team Structure



There are 3 formal teams:

Quality Improvement Teams (QIT's) – management teams working on company-wide problems, projects and improvements;

Quality Support Teams (QST's) – management, engineering, planning working on inter-departmental problems;

Quality Work Teams (QWT's) – workgroups working on customer care orientated problems, improvements and enhancements.

The needs of these teams are constantly being analysed and the effectiveness of training measured.

The company's management style encourages all employees to take responsibility for their processes and is strongly supportive when problems arise. The trend has been for less and less employee supervision with workgroups evolving into autonomous self-directing groups with supervisors and managers assuming the role of coaches. The company's reward and recognition scheme is straightforward. At any time a group of employees may nominate an employee whose contribution to the quality improvement process has been significant and this employee is given an award with the emphasis on the recognition part of the process.

On-site and off-site recreation activities are supported and attendance at approved continuing education courses are paid for. Employee turnover, absenteeism, illness and safety issues are all monitored.

Management of Process Quality

The internal customer supplier concept has strongly influenced the company's approach to process quality. During the early stages of TQM in the company, workgroups were internally focused and only tackled problems within their area of operations. As TQM developed there was more information sharing about how employee's quality problems affected their internal customers. During this time agreements between internal customer and supplier groups were set up and these agreements recorded the level of service expected by the internal customer. Measurements are in place to keep track of performance to these agreements.

Workgroups carry out their own safety and housekeeping audits and almost all groups carry out ISO 9002 internal quality audits and report the results on a monthly basis with an action plan devised to correct any non-conformances. There is a strong focus on the quality of supplied materials with all suppliers being quality approved either by the company or by a third party certification body (ISO 9002).

Quality & Operational Results

Since TQM began in 1993 the employee participation rate in quality activities has grown to 100% with 36 teams in operations throughout the company. Quality costs have been reduced significantly; new operation lead-time has fallen from 95 days in 1996 to 49 days in 1999 (on-time deliveries). The number of defects has also reached its lowest ever rate.

Key measures exist for top management and lower echelons to achieve quality-planned goals. Some of the quality related area addressed includes:

- Benchmarking
- Self-assessment European Quality Award
- Use of cultural data

Since the company was set up in 1978 it has had an unbroken record of profitability and in latter years the growth in company profits has been directly attributed to the effects of TQM.

Customer Focus & Satisfaction

The overall goal of the TQM initiative is total customer satisfaction. Customers are benchmarked and customer requirements designed into products. The company has scored very highly in independent surveys of customer satisfaction.

The company is moving to a position where workgroups interface directly with external customers. Thereby consolidating its approach to complete customer satisfaction.

Chapter 7

Introduction

This chapter presents the analysis of the case studies and evaluation of main findings. The main contribution of the case studies to the research goals is to provide the first hand information used in conjunction with the knowledge gained from the literature review and questionnaires.

7.1 Evaluation of TQM in Construction Industry

Oakland (1989) stated that, *“Total Quality Management is an approach to improving the effectiveness and flexibility of business as a whole. It is essentially a way of organising and involving the whole organisations every department, every activity, every single person at every level. For an organisation to be truly effective, each part of it must work properly together recognising that every person and every activity affects and is, in turn, affected by others.”*

The methods and techniques used in TQM can be applied throughout the construction organisation. Implementing Total Quality is about consciously modifying an organisation's culture and changing the way in which the company develops its procedures and its policies. Implementing Total Quality is a major commitment.

This study has shown that many of the early initiatives in TQM have been dominated by external consultancies, quality circles, and delegation of quality by top management. Failure of top management to become involved and lead quality has become a consistent reason attributed for the failure of TQM, Ashridge Management School (1992), Garvin (1992), Juran (1993).

This study has also shown that a high proportion of executives are sceptical about TQM. Principle reason are examples of initiatives which have delivered less than expected benefits and also a belief that a conflict arises between short term financial results/bottom line requirements and TQM as a long term strategy.

Despite these findings this study shows that a high proportion of industry Executives believe TQM to be strategically important and believe it will be a part of their organisation's strategy over the next 3 years. Many respondents pointed to a lack of expertise with in the industry and saw this as a barrier to development in the short term. Many of the techniques were unfamiliar, even in the largest organisations.

7.2 New Empirical Evidence on the Status of TQM with in the UK Construction Industry

Much has been written, both on systems and behaviours, which are important elements in successful TQM implementation. This study demonstrates in particular, the role of leadership, employee management, organisational cultures the roles and involvement of teamwork.

A first organisational impediment to TQM success arises for those with a short term focus on results, for example, construction company whose shares are traded publicly on the stock market, and whose investors expect strong annual, or even quarterly financial returns (Deming, 1986, Roth, 1993, Wilkinson & Witcher, 1991). Also included in this group are organisations, which are struggling for survival. Mann (1995) argued the need for a reasonable degree of financial security as a pre-requisite for successful TQM.

It is often unrealistic to expect such gains within the first 3, some have even argued 5, years. Also relevant to the argument on time perspective, Mann (1995) identified the need for an existing strategic, long-term planning, mind-set, among senior managers. Without this managers were unlikely to develop a strategy for implementing TQM successfully, over a number of years.

7.2.1 Financial Quantification of TQM Impact

This section presents the results of the exercise carried out to measure the performance of each organisation studied, focusing principally on financial measures. For the purposes of this analysis performance will principally be restricted to measures of financial performance. The primary motive for organisation to adopt and

implement TQM is the hypothesized positive impact on organisational performance. While the espoused goal of TQM is often to increase the efficiency of the organisation (Spencer, 1994). This is accomplished by reducing organisational cost in terms of scrap, rework and inspections (Crosby, 1979). The volume of construction works carried out by the industry is reflected in their annual turnover. In 2000, the output of the top 100 contractors was about 50 billion. The financial accounts and directors' reports are generally available on request.

For the purpose of this analysis financial performance was studied over a period of 5 years 2000 to 2004. Financial criteria covering areas of total turnover, number of (contracting, housing), number of staff, profitability, market share, the resulting figures for each organisations are in Appendix (A4).

7.2.2 Financial Accounts

Most major construction companies under UK law, limited companies must published annual returns and accounts principally to report to members or shareholders on progress. Given that many of the organisation under consideration were medium and large in size this method was selected as being likely to produce a sizeable, or representative response level. Over the years these documents have developed in to substantial and comprehensive reports providing not only financial data and analysis but also including more general information given insight into corporate mission, strategy and business objective.

From the literature review (Chapter 2) a list of TQM factors were identified (appendix 2). Each company was examined over the three-year period. Positive evidence of the presence of each factor was recorded using a simple spreadsheet technique. The results were summarised, and are illustrated in table 7.2. An analysis of the published accounts and annual returns of 11 construction companies, 2001, 2002, 2003 and 2004 for TQM factors.

7.3 Discussion of the Main Findings

A list of TQM factors were identified from the literature review and are illustrated in Table 7.1 TQM Factors in Construction Industry Study below.

PROCESS	TECHNIQUES	PRINCIPLES
TQM	Quality Circles	Continuous Improvement
Quality Improvement	Process Costing	Empowerment
Quality Management	Staff/Customer Surveys	Prevention
Strategic Management	Project Team	Participation
Change Management	Leadership Coaching	
Quality Policy	Benchmarking	
Quality Standard	Training/Education (Quality)	
Customer Focus	Quality Function Deployment	
	Quality Systems (BS5750 & ISO 9000)	
	Self Assessment (EQA/MBN QA)	

A list of TQM factors were identified, using a spreadsheet technique.

A simple rating scale was developed to present the results a range of positions from highest adopters of TQM to lowest adopters of TQM.

Organisation’s annual reports were investigated for 4 key factors:

- 1) There is clear evidence that TQM is part of the organisation;
- 2) Quality Management are stated as important objectives. No evidence of factors were found;
- 3) There is no evidence of a commitment to TQM or to a substantial quality or customer service programme, however some specific projects, techniques or factors are evident;

- 4) There is no reference to TQM specifically but there is reference to substantial QM program, which form a part of strategic objectives. Several of the factors are evident.

Table 7.2 Presence of TQM Factors in 11 Construction Companies in the UK (shown below).

COMPANY NAME	Key Factors			
	Factor 1	Factor 2	Factor 3	Factor 4
Company A		*		
Company B		*		
Company C				*
Company D				*
Company E				*
Company F	*			
Company G	*			
Company H	*			
Company I	*			
Company P	*			
Company R	*			

Table 7.2 illustrates the results of the analysis in summary form. A simple rating scale was developed to present the results showing a range of position from highest adapters of TQM to lowest adapters of TQM. The rating scale is explained in the 4 key factors, which shows the definition used to rank the participants.

7.4 Category 1 – High Adapters

Six organisations emerged from this exercise as high adapters of TQM. All had recently adopted TQM as a central part of their corporate strategy and the principles and techniques were strongly in evidence.

7.4.1 Category 2 – Medium Adapters

Two organisations in this study were also clearly associated with any aspect of TQM. The 'B' organisation presented evidence of substantial investment in TQM training and consultancy work largely aimed at establishing quality circles. However, it was also evident that in later reports the work was to be scaled down and to become more focused.

In categories 2 organisations were identified with some interest in particular aspects of TQM. 'A' Company also made reference to an internal benchmarking project aimed at division managers.

7.4.2 Category 3 – Low Adapters

Those remaining fell within category 3. All organisations appear to recognise the importance of customer service and quality improvement. With this category several of the smaller organisations were located. It was also apparent that several within this category preferred to concentrate on presenting a more purely financial based focus in their documents. The lack of evidence must therefore be viewed with some caution.

The findings that are within the UK construction industry, TQM deployment is in an early stage of growth and development (5 to 9 years for the most committed organisation). This study has also revealed that many of the early initiatives in TQM have delivered less than expected benefits, however, despite this, a high proportion of executives remain committed to TQM and believe it to be strategically important.

7.5 Analysis of Self Assessment Scores

For the purpose of this study self-assessment based on the EQA criteria and following the methodology described in chapter 3, were carried out.

7.5.1 Self Assessment

Self-Assessment is a comprehensive, systematic and regular review of an organisation's activities and results referenced against a model of business excellence for example the European Model for Total Quality Management. The self-assessment process allows the organisation to discern clearly its strengths and areas in which improvements can be made and culminates in planned improvement actions, which are then monitored for progress. Increasingly, construction companies accept that TQM is a way of managing a business to gain competitive advantage thereby ensuring longer term success – meeting the needs of their customers, employees, financial and other stakeholders and the community at large.

Table 7.3 shows the final overall scores with the organisation ranked in the form of a table. The scores are based on the Enabler's Criteria, which covers areas of leadership, policy and strategy, people management, resources and processes. Points are out of a total possible 500. The in copy of the interview pro-forma used and the EQA based evaluation pro-forma are in appendix 4.

Table 7.3 Self Assessment Scores

Rank	Organisation	Points out of 500
1	H	255
2	I	230
3	F	217
4	G	213
5	P	202
6	R	191

The table shows 6 case studies completed.

Self-assessments are difficult and time consuming to complete Garvin (1991), Kano (1993), Easton (1993), EQA (1994). Applicants for external assessment for the EQA, for example, would be subjected to several site visits by appointed examiners and

several personnel would be interviewed. Scores are achieved only after long and considered discussion among examiners EQA (1994), MBNQA (1993), Garvin (1991), Easton (1993).

Despite the care, long term planning, background and preparation, participation and involvement of key staff, it has to be acknowledged that point scores are difficult to prescribe. Other examiners following the same step might well achieve a different absolute point score. Subjective judgements are required, albeit gathered within a systematic and simplified framework. Indeed there has been much debate about the merits of such self-assessment models – and this issue was considered at some length within Chapter 2. Notwithstanding this debate there is evidence that many organisations place considerable value on self-assessment Garvin (1991), Kano (1993), Easton (1993), EQA (1994), MBNQA (1993).

There also appears to be some measure of agreement from senior examiners that relative values are more easily judged and are of greater reliability Garvin (1991), Kano (1993), and Easton (1993). This type of analysis was therefore pursued to look at 2 areas of relativity (as Easton suggests). Firstly, relativity within the group of case studies, eg their relation to each other. Secondly, relativity of the group to groups eg in this case profiles of past medium; mature and prize-winning groups are used.

7.5.2 *Relative Scores – Within this Study*

According to Easton (1993) once a group of assessments are completed a pattern will begin to emerge. From the pattern it is easy to identify best, worst, and middle ranks. Organisations can be benchmarked against each other. Judgements of rank and distance between ranks, can be made and are of greater reliability, he argues. This type of analysis is followed by Garvin (1993) and Kano (1993).

Using this method Table 7.3 is re-drawn to develop Table 7.4. Organisations have been compared and benchmarked against each other to produce 3 groups, which are labelled here high, medium, and low. The cut off point for each group for this exercise is 230 points for high, 200 for medium and others below 150 are low.

Table 7.4 Company Ranks

High Ranked Companies	Medium Ranked Companies	Low Ranked Companies
H	F	R
I	G	
	P	

7.5.3 Critical Factor Scores

Many managers feel the need for a rational basis on which to measure TQM in their organisation, especially in those companies 3 or 4 years into TQM that would like the answers to questions such as *'where are we now?'* *'where do we need to be?'* and *'what have we got to do to get there?'* These questions need to be answered from internal employee's views, the customer's views, and the views of suppliers.

The *'motors'* driving an organisation towards its mission must be linked to its 5 stakeholders: customers, employees, suppliers (determinants) and shareholders, community (resultants). [Oakland, 1994].

Internal assessment provides the author with vital information in monitoring organisations progress towards their goals and total quality. To complete this section of the analysis based on the self-assessment exercise table 7.5 presents the critical factors and list those organisations with the highest scores per factor. Clearly, it is necessary for any organisation to rationalise all the criteria used by the various awards.

The European Foundation for Quality Management (EFQM) Awards assessment model recognises that processes are the means by which organisations harnesses and releases the talents of its people to produce results. Moreover, the processes and the people are the enablers, which produce results. The results show that in this table 7.5 some organisations in the construction industry have achieved high scores for processes, investing considerable effort and resources in this area within the last few

years. Relatively low scores, however, are achieved for people management and for resources (for TQM).

Table 7.5 Highest Scores per Critical Factors

CRITICAL FACTORS	ORGANISATIONS	SCORE	MAX
Leadership	H	58	100
	I	70	100
	F	80	100
	P.	45	100
	G	80	100
	R	35	100
Policy & Strategy	H	38	80
	I	60	80
	F	40	80
	G	35	80
	P	45	80
	R	40	80
People Management	H	45	90
	I	40	90
	F	35	90
	P	37	90
	G	40	90
	R	40	90
Resources	P	40	90
	H	34	90
	R	35	90
	G	20	90
Processing	H	70	140
	I	60	140
	F	42	140
	G	33	140
	P	35	140
	R	41	140

7.6 *The Potential For Using Self-Assessment*

The regular and systematic review of the organisation's activities and results. This process allows the organisation to clearly discern its strengths and the area in which improvement can be made (EFQM, 1992). Assessment plays a central role in the implementation of TQM. Bossink et Al (1992) contented that it is key activity in full integrating TQM into the organisation as a systematic activity to help enforce, or maintain, current standards, and improve these through innovation and change.

Self-assessment is an important weapon in the struggle to reduce levels of failure, by forcing managers to pause and reflect on the adequacy of current practices, and the likely prognosis of the effect of these practices on the organisation. The survey found that the vast majority of organisation's (4 organisation) use their own resources to manage the self-assessment process. The use of external consultants was the least preferred option (2 organisations).

Central to this thesis is the assumption that associated with self-assessment is an implicit prognosis of the likely consequences of current behaviour. In the same way that health experts seek to make prognoses of eventual effect on individual health, based on an assessment of current lifestyle; or, future corporate financial problems can be predicted from an assessment of current financial ratios; the eventual impact of TQM, in terms of its success as an improvement tool, can be predicted from an assessment of the strengths, or weaknesses, in current TQM practices.

Self-assessment is a reflective activity, which should enable the development and extension of managerial knowledge. Proper assessment requires an understanding of how TQM should work, together with knowledge of how it currently works. It also requires the development of managerial understanding of holistic business practices and their interconnections; how changes in one area impacts on aspects of business performance. From investigation, related to assessment, managers can identify what changes, or systems, have key leverage for bringing about desired improvements. Hillman (1994) argued that one of the key roles of self-assessment was to establish a common understanding, or perception of TQM's effectiveness among senior managers, based on systematic investigation. Such commonality in understanding

would seem imperative in gaining senior level commitment to the TQM process, and ensuring useful debate and decision-making on TQM's development.

Self-assessment also underpins organisational confidence that its TQM activities are achieving their desired goals, as well as serving as an early warning system of ineffectiveness.

In order to create a system (how to implement self-assessment) there is obviously a need to gather knowledge. The knowledge for this system, was elicited from a variety of sources:

1. Published literature (an extensive review);
2. Quality Award Criteria (EAQ);
3. Empirical Research Data (case studies of 6 organisations);
4. Human Expert (explanation).

Knowledge was gathered from an expert on quality management assessment. This expert was a qualified assessor of the EQA. The expert provided access to the empirical data set, and also guidance on how this data could be interpreted, and used, for assessment of TQM in construction organisation. Knowledge was acquired from the human expert, initially in a series of one to two hour interviews, beginning with unstructured interviews, but moving on towards semi-structured interviews, as prototype development progressed. During these interviews notes were taken as the expert explained, in terms of good or bad practice, and outlined what association one might expect to find in such data. The expert also suggested patterns of weak practice among organisations.

Self-assessment is the comparison of a description of current practices to some model of behaviour, to see how closely it corresponds to the requirement of that model usually describes an ideal situation; the assessment results in a description of the degree of deviation from that ideal. Similarities, to the ideal situation, mark strengths in current behaviour, and divergence represents weaknesses.

Assessment has no explicit assumption that a problem exists. Indeed the aim of self-assessment is to establish if there is a problem in implementation or divergence from the ideal at all.

Self-assessment was driven by a set of data, which described current practices. It usually entails a given set of core categories, making up a framework within the assessment proceeds. These core categories represent issues, which should ideally be, present, or absent, in current practices.

It could be argued that the greatest potential source of error from this approach was that managers would claim unsubstantiated success for ineffectiveness, given the propensity for people to want to look good when asked about their practices by outsiders. To counter this problem, it was intended to elicit further details on TQM implementation and understanding to highlight organisations claiming successful outcomes, but with a weak underlying basis for these claims. Moreover, other interim indicators of success directly influenced by TQM are possible; for example, measures of employee satisfaction, and measures of internal operational improvement. These could be said to represent objective evidence of TQM effectiveness, in non-financial terms. One would expect to see any claimed TQM successes reflected in improvements in these areas. Such improvements could therefore be used to verify claimed successes in overall TQM impact.

7.6.1 An Overall Assessment of Empirical Evidence

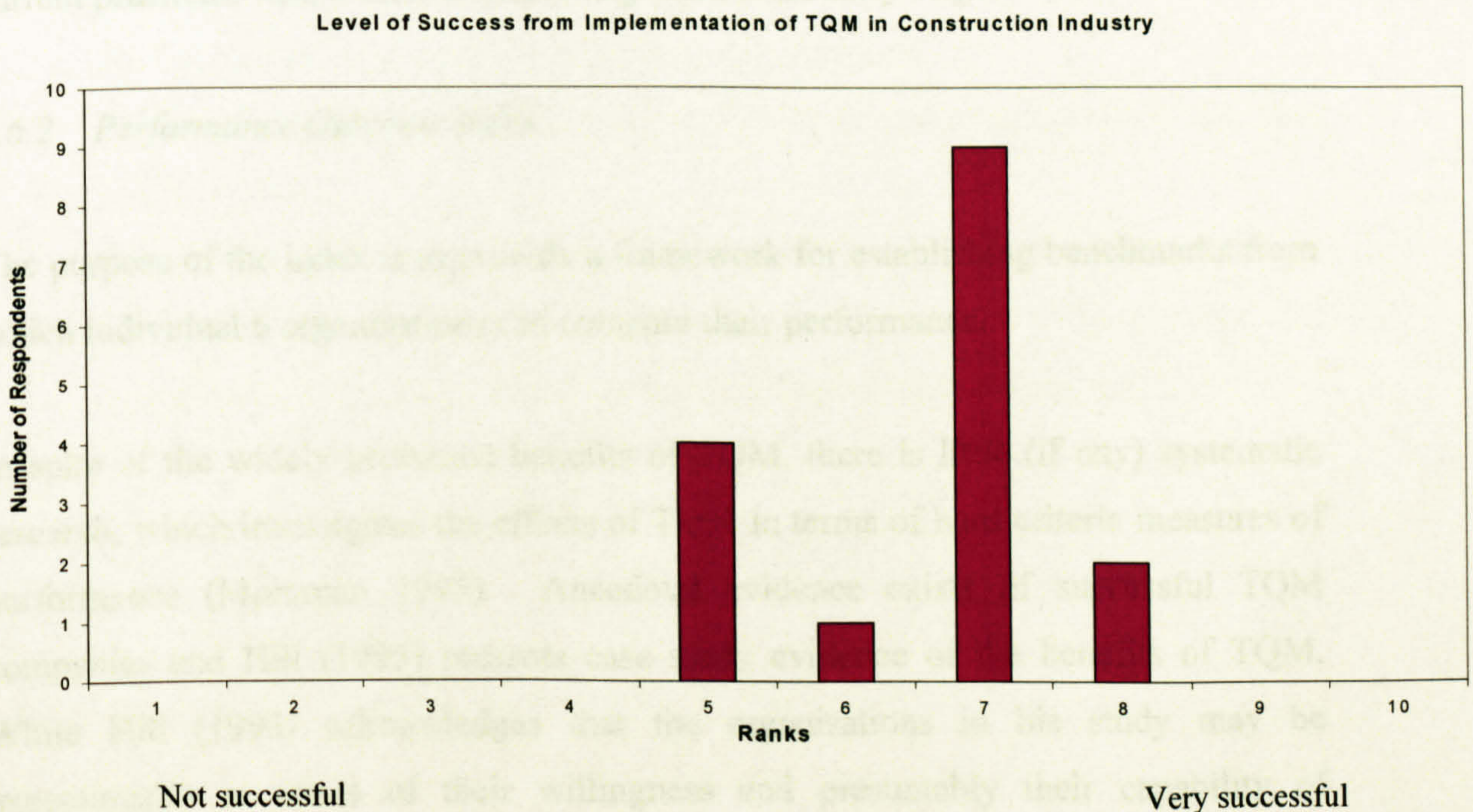
This section presents the relationship between the self-assessment and performance. From the case studies it has emerged that the highest scorers organisation on self-assessment had commenced their TQM programmes only 8 years ago. This section focused on measuring the amount of change in financial performances over the period, 2000 to 2004. The case study evidence shows that those organisations pursuing TQM strategies and achieving high assessment scores have achieved performance improvement. In some cases quite marked. Reiman (1995) claimed *"I think both quality and business communities agree that quality cannot be seen as separate from overall performance on the bottom-line."* Even so other commentators argue that reliance on profitability and financial performance, as the true indicator of TQM

benefit, is unjustified. Stratton (1993) has argued, "There are too many internal and external variables involved to irrevocably inter-twine corporate quality improvement of financial performance."

Garvin's assessment seems to be a sensible one: the link between quality improvement and financial performance must be measured over a suitably long time horizon because quality is an investment. The argument is not that quality and financial performance are unrelated: it is that the linkage is a difficult one to measure with precision because there are so many confounding factors. In 2 case studies ("I" & "H") both organisations had started TQM in the early 1990's. Both have suffered declining performance and some internal turbulence. Similarly both have displayed signs of disillusionment with quality programmes. The reason for this, however, show that there were shortcomings in leadership commitment and an over reliance on a limited quality circle type approach.

In attempting to determine the overall success of TQM, Arthur asked organisations to rank on a scale from one (low) to ten (high) how well TQM had been delivering its expected benefits; in other words to rate the success of their initiatives on a scale from one to ten figure 7.1

Figure 7.1 Level of Success from Implementation of TQM in Construction Organisation.



Two organisations with a score of 8 were very happy with their initiatives, and those with a score of 5, were disappointed and they are working to improve implementation, and 9 organisations score (81%) above 6 were succeeding with TQM implementation. The results from case studies show that quality management was widespread but its application was still not total or true TQM. Moreover, organisations tended to perceive “softer” improvement – customer satisfaction (56%), teamwork (38%), communication (32%) – more easily than financial improvements or cost savings – profitability (28%), productivity (22%), turnover (11%). Case Studies also find out that 67% of those with TQM initiative in their organisation felt that these had brought at least minor improvements in profitability, and 53% claimed some improvements in sales.

Survey revealed that: evidence of weak practice is not, however, evidence that TQM is “floundering” it is evidence that organisations are failing to address TQM properly. It is interesting to note that: only 43% of workers were involved in TQM, one should expect that TQM should involve the entire organisation.

Some organisations have made no clear distinction between TQM and vague quality improvement initiatives. Most of the work has concentrated on large companies, yet small companies (sub-contractors) make up a significant proportion of the construction industry base. This hints at a clear need for organisation assessment of current practices, with a view to improving them at an early stage.

7.6.2 Performance Outcome Index

The purpose of the index is to provide a framework for establishing benchmarks from which individual 6 organisations can compare their performance.

In spite of the widely presumed benefits of TQM, there is little (if any) systematic research, which investigates the effects of TQM in terms of hard criteria measures of performance (Mohrman 1995). Anecdotal evidence exists of successful TQM companies and Hill (1995) presents case study evidence of the benefits of TQM. While Hill (1995) acknowledges that the organisations in his study may be exceptionally in terms of their willingness and presumably their capability of

committing resources to the implementation of TQM, the other companies heralded as successful examples of TQM have been successful prior to the introduction of TQM.

Five-performance area are used covering profitability, costs, capital strengths, market share are resources. Measures are taken at the start of the period (1999 as previous) and at the end of the period (2004). The 6 construction organisations are used to compose the index, which is detailed in the appendix (A4).

Arthur acknowledges the limitations of this study; in particular it's cross sectional nature and its reliance on the perceptions of a single senior person in each organisation. Individuals were asked whether their own performance and that of their work group had improved compared to the year before (prior to the implementation taking place). In addition, they were asked whether improvements had been in how they did their job. As the majority of questionnaires were completed on a one to one basis, efforts were made to reduce an individual inclination to inflate perceived performance improvement.

To examine further the association between TQM and financial performance a self assessment/performance index has been developed, each of the construction organisations case studies were measured and compared against the performance index using the following steps:

1. Financial Ratios are calculated for each organisation;
2. Improvements or decline is measured over the period under study, in this case (1999 – 2004);
3. Each organisation is then compared against the industry performance index;
4. The results are presented in a table 8.4.2, which illustrated best, worst, and marginal performances, whilst the index of figures is in Appendix (A4).

Table 7.6 Construction Company Performance Index (1999 – 2004)

Name	Self-Assessment Score	Cost	Profit	Market Share	Revenues
H	High	M	B	W	M
I	High	M	M	M	B
F	Medium	M	B	M	B
G	Medium	M	M	M	M
P	Medium	M	W	W	W
R	Low	M	M	W	W

Key: B best performance – exceed index by >10%
M marginal performance – within index +/- 10%
W worst performance – below index by <10%

Table 7.6 illustrates the most improved performance and the worst. The criteria were selected after considering:

- criteria used by the industry, from an examination of published annual accounts;
- from a consideration of quasi-statutory requirements published reports and guidance notes of the DTI, DEP of environment, the company reports and industry surveys;
- the most improved performance was achieved by F company and I company. Both achieved significantly higher improvements in profitability and in market share. Both improved in 3 areas out of 4.
- the poorest performance were P company and R company. H company and G company have both suffered market decline in market share and profitability.

The “F” company overall maintained its high absolute performance level and remains the overall best performance in the period. It has consistently achieved the lowest cost of production figure of all organisations, reflected on self-assessment achieving 217 score against the factor processes.

The results of this analysis support the previous findings. In the key test of empirical performance, it showed an encouraging level of accuracy, particularly good at the identification of weak initiatives. Such identification could provide a valuable tool for self-assessment of TQM initiatives, while organisations still are committed to making them work by highlighting symptoms of weakness and providing indicators of where the problems may lie. The study has demonstrated what can be achieved using only a few key indicators of TQM strengths.

The limitations of this approach are that measurement has so far been limited to a short time from 4 years, and a relatively small sample of organisations case studied (six organisations).

The development of a performance index to more clearly provide benchmark to measure, and demonstrate performance change is an important step forward. This is particularly an area where further research is suggested to improve and build upon the ideas developed in this study (Appendix 4.2, 4.3 and 4.4).

For example the study might be expanded to examine the impact of different performance measures by the introduction of different TQM critical factors. Other measures, such as customer satisfaction, staff satisfactions, might also be brought in, to improve the range and balance of measures. Consideration might be given to building an index, which would compare all groups within construction industry.

Other studies have similarly sought to develop a performance index to more clearly link the results from introduction TQM or best practices, with bottom line results.

For example, Rommel et Al with Mekinsey's (1994), have examined the automotive supply industry in Europe and Japan measuring the effect of different quality practices. To provide a benchmark a "process quality index" and "design quality index" is developed. The authors argue that the measurement tools provide a sounder basis for judging the effects of quality practices and for inter-firm comparisons.

Hanson et Al with IBM Consulting Group and London Business School (1994), have developed a practice performance index to provide a benchmark for best practice performance index to provide a benchmark for best practices in manufacturing in Europe. The project, made in Europe: a four nations best practice study identifies measures for operational performance – examples are:

- Practices – processes, teamwork, empowerment
- Performance – process measures, market share, customer satisfaction.

These studies highlight the growing need to more clearly demonstrate the effects of TQM and best practices on performance.

7.7 Summary

This chapter has presented further analysis of the case studies and an evaluation of main findings. The results of the self-assessment exercises carried out for each organisation. The results show that the leading organisation are 4 to 5 years into TQM and are achieving scores of 200 to 300 (evaluated using the EQA method, enablers criteria only).

This chapter also shows the results of the exercise carried out to measure the performance of each organisation studied, focusing principally on financial measures. The results provide a basis for comparison with self-assessment scores. Finally draws together the results from the self-assessment and performance measurement exercises (Appendix 4.4).

The results show that those achieving high self-assessment scores achieved most improved financial performance over the period. Those results provide some new evidence to support the link between TQM and performance.

Chapter 8

8.0 Introduction

This chapter presents a further case study involving 5 units within a major UK Construction Organisations (“I” Company). The purpose of this study was to repeat the methodology (Chapter 2) to broaden and deepen the analysis and examines the different approaches to TQM evident from case studies (Chapter 6). An establishment analytical framework is used to evaluate the principle findings. This provides further data and evidence to compare with previous case studies and with the outcomes from the final research questionnaire (Appendix 5). This assists the process of validation of the overall research finding, the results of this study in relation to previous case studies (Chapter 6) and in particular the emerging evidence of self-assessment, performance, best practice and different approach to TQM.

8.1 Background to TQM at “I” Company

Company “I” is 1 of 10 largest UK Construction companies with annual sales approaching £2 billion and over 16000 employees, the company has experience of major projects in more than 45 countries, “I” company is a major international force in civil engineering and has particular expertise in the construction of complex infrastructure projects such as road, tunnel, railway, power stations, dams and water treatment plants. “I” company has got several units located throughout the UK. Corporate Head Quarters is based in London. “I” Company became interested in TQM in the mid 1980’s. The HQ issued a series of discussions papers to the head of the Business Unit. With HQ a central team was set up to manage and co-ordinate quality and performance measurement. Within each business unit service, performance improvement managers (SIMS) were to report directly to the central HQ, but were based in the business units throughout, within each business unit the head of unit, senior managers, and SIMS, formed a steering group (SEGS). SEGS were responsible for determining objective and strategy for the unit, in line with corporate objectives. The main aim of SEGS was to elevate SIMS to the top team and place quality and service improvement high up on the agenda. In most of the business units

the SEGS team introduced service improvement teams (SITS), largely made up of line managers and supervisors, to review processes. SIT teams were to identify potential projects for service improvements which the SEG team would approve and determine resources. "I" Company claim that the main benefits from their approach have been:

- increasing the awareness of managers and staff to the importance of quality issues;
 - introducing a structure and process for continuous review and improvement of customer services. However, it is acknowledged that the initiatives have so far had only limited success and the principle drawbacks are presented as:-
- ❖ the underlying principles of balanced performance measures are not yet well developed, with the financial measures still dominating;
 - ❖ many of the measures are effectively imposed by HQ and not based on process capability;
 - ❖ service improvement have been largely incremental and low level, confined to functions and units with little cross functional activities;

Overall there remains a perception at HQ that the "I" Company has a long way to go to develop a TQM culture. In many areas customer satisfaction surveys are generally indicating good results.

Staff satisfaction surveys are showing there is improvement. At the beginning of 2000 the "I" Company announced a major organisation re-structuring. The central operations team was disbanded, and SIMS are now to report directly to business unit heads. This is an attempt to further integrate quality to main business. At the time of this study these changes had just been formalised and has received a mixed response from SIMS, with some seeing it as logical and progressive step others fearing that quality would be given a lower priority by some unit heads. At HQ, top executives; have re-affirmed the organisation long-term commitment to TQM. The main strategic focus is based around, "*First choice 2005*," a mission to put the organisation ahead of its competitors in quality and customer service by the year 2005.

8.2 Approach to Case Study of "I" Company

The approach taken follows the methodology described in chapter 3 and used on earlier case studies presented in chapter 6.

Initial interview with SIMS, and these were followed up by interviews with unit heads, line managers and supervisors.

Additionally this study had the benefit that the project was in co-ordination with the central HQ operation team. This gave considerable access to internal data and documentation, such as performance measures, and also facilitates greater feedback on the study and the main findings.

8.3 Discussion of the Results of Self-Assessment

Table 8.1 illustrates the self-assessment scores (totals) for the 5 enablers' factors of the EQA model.

The results show that one business unit has achieved a high score relative to other units and to other adopters of TQM in the UK construction industry. This unit had followed self-assessment for between 2 and 3 years, and had adopted most of the critical factors of TQM.

Two units were scored as medium to low. Both had only recently completed first self-assessment. Prior to this TQM was focused on performance measurement, and customer service initiatives.

Two units were scored as low. Realistically neither had started TQM. Although parts of the quality structure introduced by the company were in place, unit's heads had not supported the initiatives and were generally very sceptical of TQM.

The self-assessment scores were also compared with the scores achieved overall by the UK construction industry (from case studies in chapter 6), with average and best

10% EQA submissions, and by factor against best in class in the construction industry.

The results show that overall the organisation is achieving only a medium score and is below the best 10% EQA by a significant margin (184 compared to 255) and below the EQA average (184 compared to 217).

Compared to the Benchmark (best in the class) for each of the enabler's criteria, "I" Company scored lower, with the exception of resources. This result supports the case evidence that in many areas resources were being deployed but were less than effective.

Feedback from respondents at "I" Company was positive, demonstrating the value of self-assessment as an important benchmarking tool for TQM overall, TQM critical factors, and individual TQM activities.

Table 8.1 Self-Assessment of 5 Business Units – "I" Company 2003

NAME	LEADERSHIP	POLICY & STRATEGY	PEOPLE MANAGEMENT	RESOURCES	PROCESSES	TOTAL	RANK AGAINST INDUSTRY
	(100)	(80)	(90)	(90)	(140)	(500)	
A	55	45	40	35	60	235	HIGH
B	40	35	30	40	50	195	MEDIUM
C	29	32	27	45	49	182	MEDIUM
D	25	25	25	35	45	155	LOW
E	25	25	25	40	40	155	LOW
<i>Average</i>	35	32	18	39	49	184	MEDIUM
Average EQA apps. 2002	48	38	46	45	69	217	
Top 10% EQA apps. 2002	65	60	63	72	98	255	

8.4 Validation of Self-Assessment and Performance

The results of the study were presented to unit heads, SIMS, and representatives of the central HQ operation team.

There was broad agreement that the self-assessment scores reflected a fair presentation of the status of TQM within the organisation, and the relative position of each unit.

Managers representing Unit “A” (the highest scorer), and the HQ managers, supported the findings that “A” had achieved best performance in the group in terms of financial results, customer satisfaction and staff satisfaction.

8.5 Confirmation of Case Studies (Best Practices)

The findings from the study show that never ending or continuous improvement is the most powerful concept guiding A unit management. During the case study unit “A” management emphasis the following criteria factors:

- Leadership for TQM – Management team of unit A committed to achieve this objective and improve continuous quality management. Recognising customers and discovering their needs.
- Setting standards that are consistent with customer requirements.
- Controlling processes, and improving their capability.
- Establish plans for TQM on each ‘site.’
- Set up and review the process quality team.
- Improve communication through teamwork.
- Training cycle of improvement and review effectiveness of training.
- Understanding high use of techniques and process.

The author has found that one of unit “A’s” successful formula is the in-company training course plus the follow-up workshops. These factors are consistent with the case studies in Chapter 6, feedback from respondents at “I” company was positive. Successful implementation of TQM in “I” company would help to improve the quality

of product and services, enhance corporate performance and may boost the demand of unit A of I company products in international and national markets.

8.6 Critical Factors Questionnaire

The degree of support and commitment by top management is critical for TQM success. Top management must show unwavering support to quality and excellence, and must promote the effort aggressively in order to ensure support among middle managers and workers.

Several critical factors would favour the introduction of TQM in the construction organisation. A further investigation of critical factors was conducted with in the “I” company. A survey of 50 of the organisation’s employees who are involved in the quality management was conducted. This involved rating the importance of 22 factors of TQM. The survey questionnaire is in Appendix 6.

8.6.1 Qualitative Information about Critical Factors

This section presents the findings from 5 units within “I” company, questionnaires were directed towards those 50 employees who are in the process of, or have already implemented TQM, having identified the individuals selected to participate, they were asked if they would be willing to complete questionnaires and informed that it was completely voluntary. Supervisors, managers and engineers completed questionnaires this provided a further opportunity to gain information regarding the organisation and its climate. Within TQM implementation there is an implied ideal of what should be assessed. The more of the key areas addressed the better and the greater the chance of success. Any deviation from the ideal model is a weakness. The more deviations, the more serious the weaknesses, and the less likely the organisation is to gain benefit from their TQM initiative.

The results show that great importance was given to the factors of leadership. All 5 units strongly agreed that managers and team leaders must be pioneers of TQM implementation. Case studies show that, in the most successful companies strong leadership drives TQM from the top.

Strategic planning, customer satisfaction, culture changes also score high number that illustrates a systematic planning phase for quality improvement has widely advanced as a key aspect of strategic quality management. Another key aspect of strategic management, as has been argued in this thesis, is the need for company level assessment of TQM behaviour, and performance, benchmarking and education was very important in the studies.

By comparison lowest importance was given to: statistical process control, quality steering group, and problem solving. Management point out that current construction culture is perceived by some as suffering from entrenched attitudes, poor communication, lack of trust and they are working to change the attitudes and behaviours associated with these practices, significant progress to improving their cultures has been taken place.

The case studies show the significant results and achievement through unit teamwork when a group of individuals work together (5 or 8). Although such improvement is a fundamental part of TQM, improvement in the area of employees and customers are essential if TQM is to continue to evolve and realise its full strategic potential.

One of the significant factors which influenced unit "A" as being a high scoring unit, was due to unit "A" receiving a relatively higher investment of resources and education and training than the lower scoring unit.

8.7 Summary

The case study of 5 branches of "I" company provide further data and evidence to compare with previous case studies. Several subsystems or components of a TQM approach were examined in "I" company. The most critical of these components is employee involvement, and it is the one around which management system of TQM should be based.

Each participant in this study is in different stage in this evolution toward quality improvement. However, each has identified its business processes as sets of linked activities or operations that drive key outputs: customer satisfaction, cycle times and

product quality. These companies are paying attention to key processes such as order fulfilment, procurement and production, in contrast with internally focused functions such as sales inventory and operations. This might not appear on paper to be a big different, but for these companies' customers, the difference is fundamental. As key processes begin to prevail over functions, organisational structures and internal boundaries are being redrawn, and the results are improved service quality and shorter cycle time.

At each organisation, the author interviewed a wide cross section of people, both in focus groups and individually, about their quality successes. Questions were about what had worked and how they would do things differently next time. The people that the author met with were candid and forthright. They pointed out that the road to effective and sustainable quality improvement processes lies in redefining traditional boundaries and the communication channels that make up an organisation.

These organisations have redrawn boundaries and redefined communication channels by supplanting some functions in favour of redesigning processes, by empowering teams of employees to achieve clearly defined goals and by recognising achievements.

Chapter 9

9.0 Introduction

The purpose of this chapter is to seek further validation of the findings by analysis of a survey to determine the critical factors, principles, and techniques of TQM considered most relevant and important in the construction industry.

9.1 Who is Leading the Pack?

In the organisation that is to survive over a long term, performance must begin to be measured by the improvements seen by the customer. It has long been recognised that the construction industry must increase its efficiency and productivity, in the cycle of never ending improvement, measurement plays an important role in (Oaklands, 1989):

- Identifying opportunities for improvement;
- Comparing performance against internal standards (process control);
- Comparing performance against external standards (bench marking).

Increased competition from other firms, changes in workload and work mix and the methods of change management are the challenges that construction firms in the UK face. In order to solve the many new and complex issues, which confront management teams in the construction industry, Lansley (1987) suggested the need to develop and demonstrate a wide range of reasoning and problem solving skills. One of the prime requirements, he opined, is to be able to realign limited physical, technical and human resources to meet rapid changes in the construction markets. Such flexibility requires highly innovated and creative problem solving skill as well as organisational structures and managerial value system, which support and encourages the development of such skills. A logical approach is to identify a need (demand), evaluate the scale of the need and the likelihood of satisfying it at a profit, plan how demand can be satisfied, and implement the plan, i.e. marketing. Marketing is thus identified as a central

function crossing all internal and external boundaries. Unfortunately, the construction industry, like many other service industries, face the usual problems associated with the marketing of services.

Consequently, marketing is less well developed in the industry as a whole and performed in most firms on an ad hoc basis (Morgan and Morgan 1990). The 1980's saw a change in the attitude of major construction clients who were determined to exercise greater control over the construction process. Cost inflation, disharmony among construction team members, excessive project times and poor quality, were no longer to be tolerated. Furthermore, unfavourable comparison between UK construction industry performance and the industries of other countries also became very much in evidence (Flanagan and Norman, 1989). Structural change in the construction industry requires that the firms diversify and at some time adopt a strategy for integrating design and construction processes. If ever an industry needed to take up the concept of total quality management (TQM) it is the construction industry.

As described in one of its own publications (Institute of Engineering, 1991), "it is an industry associated with a patchy reputation, with public belief that many projects ran late and are over budget. Such a reputation for quality and reliability is ill suited for meeting the competitive challenges of today's fast changing markets, where competitive edge is with those who manage their resources most effectively and offer a timely response to the demands of the market." (DTI, 1990).

Although the industry has a poor reputation for quality, the principles of TQM that have been successful in manufacturing, are equally applicable to construction.

The importance of quality as a key element of world class performance has been highlighted by Lee Mortimer, 1991 who paraphrases Schonberger's emphasis on serving "the internal and external customer's 4 basic needs:

- Ever lower costs;
- Ever better quality;

- Ever greater flexibility;
- Ever quicker response.”

Only if an organisation can meet these needs can they achieve world-class performance. Stand-alone departmental strategies are therefore no longer possible. Competition and threats to survival are driving construction companies to pay more attention to the life cycle of the product or service.

It would seem that the effective resource allocation does not, in itself, guarantee successful strategy implementation because programme, personnel, controls, and commitment must breathe life into the resources provided. The successful implementation of TQM programmes hinges on manager's ability to motivate employees and also on interpersonal skills. The challenge is to stimulate managers and employees throughout the organisation to work with pride and enthusiasm towards achieving objectives.

9.2 Concepts of TQM

According to the Federal Quality Institute: “In a Total Quality Management context, the standard for determining quality is meeting customer requirements and expectations. The first time and every time.”

The American Philosopher, John Dewey, argued that decision makers have to extract problems from the situation in which they find themselves. They do so by analysing the situation. Hence problems are products of thought acting on environments; they are elements of problematic situations that are abstracted from the situation by analysis. Therefore what we experience are problematic situations, not problems, which like atoms and cells are conceptual constructions. Ackoff (1974) noted that no problem ever exists in complete isolation. Every problem interacts with other problems and is therefore part of a set of interrelated problems, or a system of problems. However, he call it ‘a mess.’ He defined a mess as a system of external conditions that produces dissatisfaction. It can be conceptualised as a system of problems in the same sense in which a

physical body can be conceptualised as a system of atoms. Thus problems can be decomposed to simplex problems, and ultimately, simple problems, like ultimate elements, are abstract subjective concepts.

9.3 Competitive Strategy

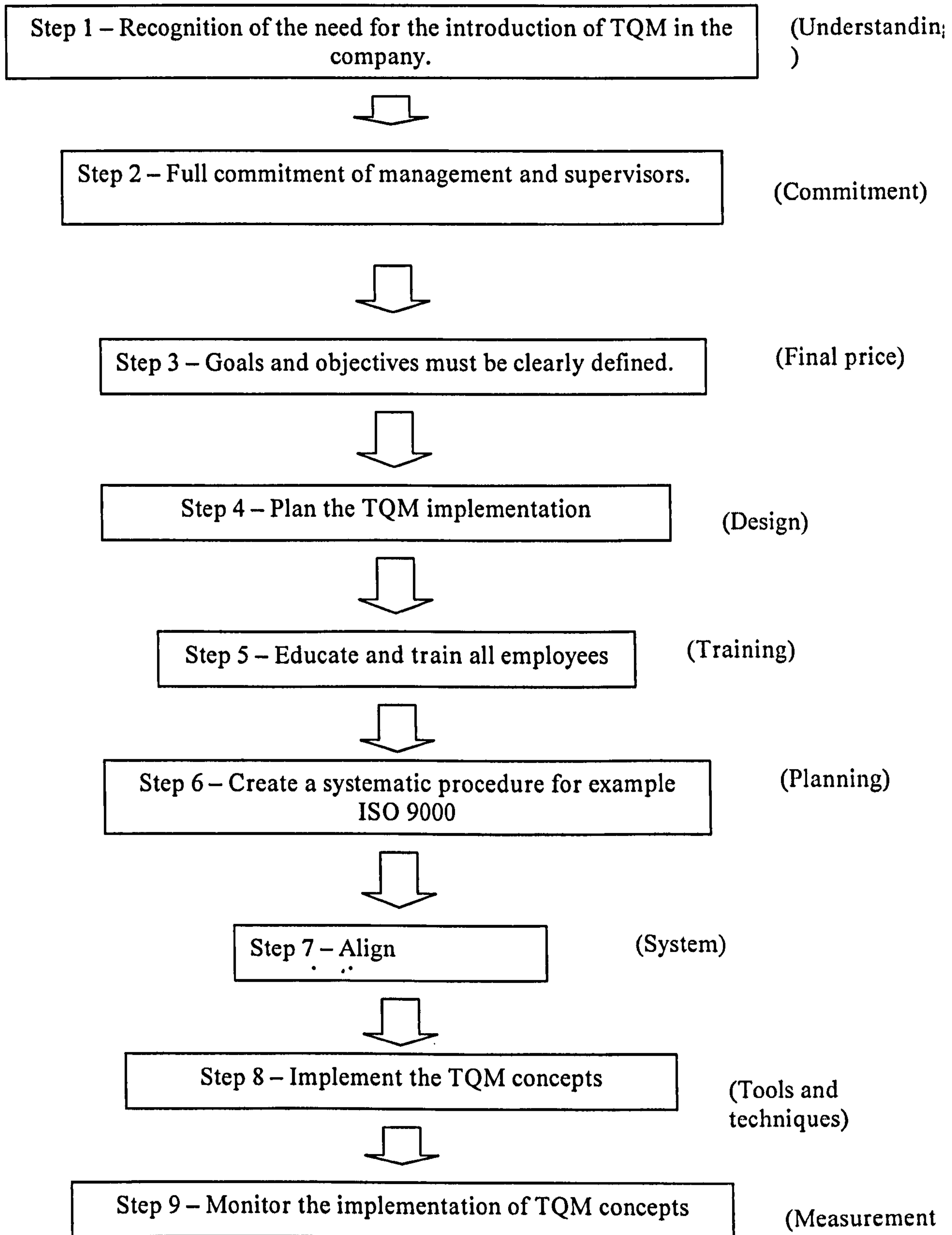
Study shows Total Quality Management is both a philosophy and a set of guiding concepts, principle, and practices that represent the foundation of a continuously organisation. It is a means for improving personal effectiveness and performance and for aligning the focusing all individual efforts throughout an organisation. TQM is not a destination but a journey toward improvement studies of construction company's strongly show that up 90% of senior management commitment was vital to the success of TQM.

Case studies show that up to 75% of TQM programmes failed to deliver expected benefits, and that the reasons for this were largely attributed to a filing of senior management to plan, implement, and integrate TQM into their business. Senior managers in some organisations recognise the need for change to deal with increasing competitiveness in construction market, but lack of an understanding of how to implement the changes. Also some of the obstacles to TQM implementation and resistance to change may be overcome through education, communication, participation, facilitation and support. All companies participated in research suggested that the 'blitz' or rapid change approach should be rejected in favour of a slow and planned purposeful one, starting at the top. Then commitment is the foundation of an effective TQM initiative. Without it even the most careful designed programme will never work.

9.4 Key Step for Implementation of TQM in the Construction Companies

From the case studies, steps necessary for the successful implementation of TQM in construction companies were identified: (figure 9.1). The task of implementing TQM can be daunting, and most organisation managers point out that, the first decision was so difficult, where to begin. Total Quality Paralysis (TQP)!

Figure 9.1 A Framework for Implementation of TQM in UK Construction Companies





The process of **Step 10 – Engage in continuous improvement by going back to step 1** is vital (Support)

steps that also form the foundation of the whole TQM structure. Overall, the results highlight while an intellectual understanding of quality (ISO 9000) provides a basis for TQM, it is clearly only the planting of the seed. The understanding did translated into commitment, policies, plans and actions for TQM to germinate. It is necessary but not sufficient that the top managers develop a thorough understanding of the concepts and issues. This understanding should be extended to other managers and supervisors. The “I” company case study showed that the development of a clear understanding among managers and supervisors would enhance incidence acceptance and smooth the implementation path.

Creating a TQM environment was “I” company’s ultimate goal. “Operational excellence” was the vehicle chosen to attain this goal. “I” company had adopted an aggressive strategy coupled with stretch goal settings in pursuit of a TQM environment. Its goal was internal and supplier zero defects within 3 years.

9.5 Organisational Strategy & Culture of Excellence

The effectiveness of an organisation and its people depends on the extent to which each person and department perform their role and move towards the common goals and objectives. Construction Organisations do not become market leaders as a result of good organisational structure, technical and financial system, or the state of the surrounding environment, although that may be of considerable help. Their success stems from the simple fact that the services and/or products they produce enjoy sustained or increased aggregate demand by their customers. This is by default what the quality philosophy is aimed to achieve, using the Total Quality Management as a vehicle. 65% of respondents agreed or strongly agreed that TQM was important for long-term prosperity and should be adopted as part of the organisation mission and strategy. However, the findings also show that 30% neither agreed nor disagreed. This might reflect some concerns, evident from case studies that some TQM initiatives were running out of steam.

It emerged during the study that, the role of the chief executive as the head of the strategic apex is of paramount importance, because Total Quality Management requires first an aspiring leader to instigate, and second a strategic direction allow it to continue to prosper. Therefore, total quality management must start with the chief executive and proliferates through down the various parts of the organisational structure. Therefore, workers and managers may be made responsible for their own high standards quality workmanship. Evidence of two main attributes for the foundation of excellence, they were: strategic thinking and corporate culture being observed in all organisations.

It was also apparent (from the case studies) that within the construction industry there are significant proportions of TQM sceptics. Many approaches to organisational effectiveness stress the importance of achieving the commitment of the workforce. TQM is not an exception to this; 84% respondents suggested that their organisation achieving a complete cultural change, old attitudes being washed away by new thinking based on customer satisfaction, eliminating waste and continuous improvement.

This thesis maintains that TQM policy is a strategic objective, and that the TQM orientated organisations are strategically orientated towards satisfying their customers. This is why it was stressed in earlier chapters that quality efforts, which are not continuous supported by their chief executive, are short lived. Furthermore, customers of TQM orientated organisations must be both internal and external to the organisation. Thus, every department, team, or worker, must take into account the next person, next team, or next department in the process, as well as the owner and the ultimate end user.

The benefit came from realising the talents, energy and commitment of everyone in the organisation. The finding in this section support case study evidence that there are uncertainties about implementation strategies and the impact on organisation structures. Whilst 85% of respondents strongly agreed or agreed that structures should be process orientated. 29% of respondents believe it is fundamental for organisations to restructure.

Case studies show that 2 main attributes for the foundation of excellence were found strongly in the majority of construction organisations, they were: strategic thinking and corporate culture. Both work in tandem and to marry the two together, 90% of organisation leaders were interviewed show they have both skill and vision. However, all firm follow some kind of strategy and function with some form of culture, but many do this half heartily.

Sir Fraser, Morrison's Construction Chairman and Managing Director have showed an example of the kind of commitment needed to succeed. Morrison Construction Group have had a quality improvement programme in operation for more than 10 years, which had grown into a successful total quality programme within the first 3 years. However, Morrison adds: *"We are still introducing it. It means enormous long term commitment from directors and managers, but quality has gone up without question and it improves not only the job people do, but their way of life."*

Through case studies many of the industry leaders point out at the beginning they were sceptical of TQM (Mid 1980) and gave permission rather than commitment for quality programmes and short term results were of most importance and quality was dropped if hard times came along. However, that a change of emphasis was detected in the early 1990's with a more positive attitude to quality being evident. One of the principle reasons for this the emergence of the ISO 9000 and the European Quality Award, Malcolm Baldrige.

Some of the evidence from this study would support this view for example the high levels of interest in benchmarking and self-assessment. Also, major construction companies are becoming more serious about quality issues. Study show this is driven by a need to reduce costs substantially and by recognition of the need to improve customer relations.

This study has revealed that construction organisations have been slow to adapt to changing environmental and customer requirements, relative to the manufacturing industry. This is mostly in relation to the management of human resources, innovation and marketing.

9.6 Leadership

“A leader’s main obligation is to secure the faith and respect of those under him. The leader must himself be the finest example of what he would like to see in his followers.”

(1948 Homer Sarachn in Japan)

The construction industry is one, which is under serious scrutiny by professional institutions. The activities of the enterprises within the industry are subject to several restrictions and guidelines. Contractors and designers alike are constantly looking for new methods of production, which are cost effective, with a view to ensuring cheaper estimates and tighter quotations. Hence the question of how to improve production standards in terms of time, cost effectiveness and quality assurance is under constant reviews. The general attitude has been that good work will attract new jobs, as will moving in circles in which the might be encountered. As previously stated, quality is everyone’s responsibility. TQM is a method by which all people can be involved in improvement.

The philosophy and techniques used in TQM can be applied throughout the organisation. To be successful in promoting business efficiency and effectiveness, TQM must be truly company wide and it must start at the top management level. 95% of respondents agreed or strongly agreed that CEO involvement and commitment was vital to the success of TQM. Similar results were also achieved for executive and senior management. From the literature, perhaps the most widely cited reason why TQM fails, is lack of senior management commitment and support (porter and Parker, 1993, Lund and Thomson, 1994) underlying this perception of deficient commitment is the insinuation that senior managers deliberately refuse to take responsibility for leading TQM. This could be manifested through delegating responsibility to lower managers, or the quality department. It is assumed that senior managers do not give quality improvement strategic, or high level, priority. For this reason, they will not devote time to it, and leave it to lower levels.

The findings indicated that there are other compelling reasons why senior managers might fail to demonstrate commitment to the TQM process. Perhaps the most important are a fundamental lack of understanding of the role of TQM in their organisation, and a failure to perceive tangible results from the TQM initiative.

If managers do not perceive TQM to be a company wide competitive improvement tool, they are unlikely to give it priority. Also if they are not aware of the key features, which should be addressed, they are unlikely to cover them. Lack of focus on results could lead to lack of significant change, and consequent disillusionment with the change process. 65% of organisations had a comprehensive view of what they want to achieve from using TQM, and the time within which they wish to accomplish these achievements. Overall the survey found that some 56% of organisations managers understood TQM in terms of customer focus. A disconcertingly large proportion however still sees it in terms of problem solving (37%) or even worse guaranteeing high-grade products (8%). The construction industry faces a continuous circle of changes in workload, work mix and the method of managing the changes and, by definition, changing its product all the time. One of the consequences of these many changes is that the construction firm are moving closer to their clients who are themselves becoming more sophisticated and are often now the driving force for improvements in the construction process. Changing construction, and any other business organisations involves changing people. It is people who carry out construction projects, not just conditions of contracts. Employees must be motivated to alter their work practises, learn new skills and change their attitudes. Employees, directly involved in the process of change, will need encouragement and training in generating creative ideas and putting them into practice.

Crosby (1979) called for the need for awareness training as a fundamental starting point for TQM implementation. Oakland (1993) also included understanding as the first step towards TQM implementation. It would, therefore, seem evident that examination of awareness and understanding should be one of the first TQM assessment activities.

The findings indicate that the lack of understanding as being a widespread problem. 47% of organisations thought understanding to be a major difficulty, there is therefore a need in any assessment to explicitly establish that managers have a correct understanding of TQM; of its role in improving the external organisational performance regarding customer satisfaction market share, and profits; and of quality management as a company wide, strategic, improvement tool, requiring senior management support.

9.7 People Involvement

What seems to emerge from this study is that attitudes and behaviour of organisational members have substantial effect on the implementation in question. It was important to see first, has the implementation had an impact on individual attitudes? Secondly, has there been an overall improvement in the system? For example, the implementation may have a significant effect on team orientation at the individual level but there may not be an overall improvement in team orientation throughout the organisation as a whole. What this suggests is that the implementation in principle can have an effect on team orientation and raises the possibility that greater time is needed for the effect at the individual level to develop into an improvement at the system level. Another scenario may be that the implementation has no effect at the individual level but there has been a significant improvement at the system level.

The result from the case studies showed that the impact was indirect; that is, supervisory reinforcement of the implementation had a significant effect on trust in colleagues, which in turn, had a significant influence on team orientation. This raises the question of whether the effect of the intervention on team orientation is mirrored for other core elements of TQM. Therefore, this line of investigation continues and assesses the impact of the implementation on commitment to improvement and intrinsic motivation.

Several concepts such as commitment to quality, commitment to continuous improvement and intrinsic motivation are widely used in the literature in what seems to be an interchangeable manner. On one hand Deming (1986) Crosby

(1986) and Dale and Cooper (1992) place great emphasis on motivation. They argue that employee de-motivation is a result of primarily management practises. The prescription is quite clear; by changing management practices thorough adopting and pursuing TQM, employees will experience greater motivation. Here, the underlying assumption is that employees are in fact motivated and want to do a good job, if this does not occur; there is a strong likelihood that the reason is due to management practices. Juran (1989) and Wilkinson (1992) argue that by giving employees responsibility for the quality of their work, this will improve their motivation. It has been recommended by large numbers of construction managers that empowerment be defined in terms of motivational processes. The Case Studies highlight that TQM interventions may be viewed as empowering through managerial actions to remove obstacles that muddy the link between effort and performance thereby increasing intrinsic motivation. In this sense, empowering is the act of taking away de-motivators. Individuals who have a high need for achievement and satisfaction through work are hypothesized to be more likely to be committed to improvement. This is based on the assumption that engaging in continuous improvement is a source of satisfaction and achievement for individuals. One could argue that individuals who are strongly committed to the organisation and exert effort to attain those goals. Thus, if the organisation has as its goal continuous improvement, highly committed individuals are more likely to be committed to continuous improvement. There is some evidence that committed individuals are more likely to engage in extra role behaviours such as creativity and innovations (Katz and Kahn, 1978).

The Case Studies suggest that commitment translates into greater effort by workers. Individuals are expected to accomplish their formally defined tasks directing attention to obstacles that prevent such accomplishment. They are also required to think about ways of how they can improve the way they do their job as well as the work of their group and overall activities of the organisation. Thus, commitment to improvement goes beyond an individual doing the best job they can, it requires an individual to generate ideas for improvement and take action on those ideas. Then the concept of continuous improvement is a key component of TQM.

Total Quality Management places a greater emphasis on including all employees (Lawler, 1994) with the notion of “total involvement” (Oakland, 1989). This raises the question of the nature of voluntary participation of employees in TQM. One could argue that as TQM places supervisors in a crucial position regarding implementation sustaining quality improvement at the lower levels in the organisation and in conjunction with the proximity of the supervisor to employees, it may be more difficult to operate employee participation on a voluntary basis as advocated by numerous writers (Julian 1989, Ishikawala 1989). Throughout this investigation, supervisory behaviour was highlighted as having an important influence in affecting employee attitudes. Supervisors’ participative styles and supervisor’s commitment to quality respectively were found to have a significant effect on team orientation and commitment to improvement. Subsequently, it was shown that the participative style of the supervisor was an important determinant of employee participation in the TQM intervention.

The importance of supervisory behaviour has long been recognised as having a major influence in organisational life. In investigating supervisory attitudes towards employee involvement programs, illustrate that supervisors rarely exhibited overt resistance to top management initiatives. Occasionally supervisors criticised the programs with peers and subordinates but more often they remain silent or communicate mild enthusiasm. Subordinates interpret this as a lack of support for the program.

Overall, the case studies indicate several interesting findings. Firstly, the significant changes that have taken place in the group of supervisors have been mirrored in the group of employees. In both groups, there have been significant positive changes in general orientation to quality, improvement as part of the job, organisational commitment and perceived management commitment to quality.

In this study, it may be the case that supervisory attitudes and behaviour need to be stimulated or reinforced by other mechanisms in the organisation in order to take hold. Consequently, it cannot be ruled out that in the long term, supervisory attitudes and behaviour may alter significantly along a wider range of dimensions.

One significant finding to emerge from the case studies was that employees do carry with them their previous experience of a participative program, which influences their assessment of future participative programs. Consequently, the supervisor's superior is an important source of reinforcement. The significant effect of perceived benefit suggests that organisations need to ensure that individual supervisors are aware and informed of the benefits from implementing TQM.

9.8 Employee Management

Employees are advanced as a key resource within the TQM philosophy. It is claimed that organisations should seek to involve as high a proportion of employees as possible in the TQM initiative. Overall, the results highlight the importance of employees. They determine how far and how fast the business will grow. As head of one organisation points out that employees are the engine of an organisations. The evidence from case study suggests that, employees need to know clearly what is expected of them and how they can contribute to the attainment of their organisation's goals.

Ernst and Young argued those involvement levels of under 25% represents weak, and 50%, represent good practice. Where only a small percentage of employees are involved this suggests that TQM initiative are merely added on to existing work, or delegated to some specialist group.

Evidence from case study suggests that large organisations personnel participation is achieved through the formation of quality improvement teams, which are usually composed of experienced members from varying disciplines. These teams enable experienced members to demonstrate technical, communication and leadership skills while they provide inexperienced members an opportunity to build and develop those skills. TQM advocates total involvement of employees in decisions that affect their work, and is firmly grounded on the notion of respect for the individual and shared commitment for the organisation. TQM also requires that management utilize transparent, clearly understood and fairly administered reward and recognition systems. The case studies tended to support that, when employees believe that they are treated

with respect, when they are empowered to make decisions in matters related to their work, and when they are rewarded fairly for their efforts, they tend to be better motivated. Employees should also be encouraged to use measurements of process performance, to determine whether or not processes remain in control and if not to take decisions to correct problems

Overall, the results highlight the importance of empowerment. One means of involving employees (almost all 16 organisations) is to create groups, to solve problems, and identify improvement opportunities.

Problem solving and teamwork also require employees to have certain abilities, such as analytical capabilities, or basic statistical capabilities. Training is therefore widely cited as a key area of TQM focus. Training can aim at improving employees existing job skills, or developing competencies for TQM activities, such as statistical ability, or team work skills. There is disagreement on the most effective method of training, 72% of organisation recommend widespread cascade training for all levels of the organisation, as a pre-requisite for TQM implementation; where as other 35% claim that such an approach will cost much and change little.

It has also been emphasised that training is a means to an end. Progress in quality management cannot be measured by indicating the number of people trained or the financial resources spend on education and training, but the results achieved through training (EFQM, 1992).

Guest (1992) categorises employee involvement initiatives as follows: increased information to employees; increased information from employees; changes to the design of work; changes in incentives and a more participative style of management. Far remove from the notion of industrial democracy; employee involvement in the context of TQM takes the form of direct involvement in quality and improvement. This may take the form of greater responsibility for quality in their job, contributions to improvements in their work area and may involve a restructuring of work along the lines of semi autonomous work group. The key question being addressed is whether employee participation in the implementation has any effect on organisational commitment and trust in

management. This analysis was restricted to the employee sample at site, 265 employees from 16 organisation participated. Employees were asked a number of questions relating to the impact of the TQM implementation on management employee relations. 83% agreed there is improved communications between management and employees. 78% TQM bring better relations between management and employees. 62% resulted in greater teamwork between management and employees. The results here would seem to support the employee involvement organisation commitment link.

There is clear evidence that the intervention has a significant effect on organisational commitment at both the individual and system level. Trust in management has significantly shifted in a positive direction; overall, the evidence suggests that the TQM implementation has a significant impact of employee involvement.

9.9 Benchmarking

There is much evidence from research to support a strong link between benchmarking methods and an overall strategy for TQM. The findings from the case studies support this view with evidence that those organisations with a high rating for benchmarking tend also to be pursuing an overall strategy based on TQM principles. The link is very straightforward. TQM is an overall and long-term differentiation strategy for building superior performance and competitive advantage. Benchmarking sits comfortably within such an overall strategy proving a powerful tool for identifying and examining best practices from the best companies, internal and external to the industry. It is likely that those organisations that understand and adapt to benchmarking techniques within an overall strategy of TQM will be best placed.

9.10 Training

Today's UK Construction industry developed to meet the demands of the industrial revolution and the rapid growth of population during the nineteenth century. Construction education and training, according to Harris (1991), gradually evolved into a system producing a few "highly scientifically trained

engineer graduates” from universities, with the majority of tertiary studies for craft, technician and professional groups mainly delegated to day release instruction at local colleges. These engineers and technicians, Harris added, are often reluctant to take on a wider, as distinct from a purely professional, engineering role in general management.

No organisation or individual can escape change: change is a fact of life in organisations. Hence construction firms must anticipate change and develop and offer training and development workshops so that managers and employees can adapt to these changes. Changes and the need to cope with them must be communicated effectively.

In today’s business environment, more than any preceding era, the only constant is change. To be successful, organisations must manage change effectively, continuously adapting their bureaucracies, strategies, systems, products training and cultures to survive the shocks, and prosper from forces, which decimate the competition. The successful implementation of TQM programmes hinges on managers’ ability to motivate employees and also on interpersonal skills. The challenge is to stimulate managers and employees throughout the organisation to work with pride and enthusiasm towards achieving objective. The aim of leadership in construction firms should be to improve the performance of men and machine, to improve quality, to increase output, and simultaneously to bring pride of workmanship to people. To help people to do a better job with less effort.

Training is an activity out to provide knowledge, develop skills or to change attitudes. As “H” Company Quality Manager pointed out in an interview (value and respect for the individual) we realise that only by achieving the growth and development out of people can we attain our quality and performance objectives. Education and training are important for developing “H Company” people, and we apply these methods to promote health and safety, co-worker development, involvement, skill development, diversity, and greater customer focus. With intensifying competition, we need greater involvement with our customers. We implement TQM training, customer requirement training, and quality skill training.

It would seem that at the individual level, job training is jointly determined by task and personal development objectives. For example, as individuals and team move to greater self-management, they need the tools/ skills to perform their present task or prepare for the next ones.

9.11 View of "I" Company.

In a total quality environment, we expect people to do the right things and to do them right first time. Training for quality should have, as its first objective, an appreciation of the personal responsibility for meeting the 'customer' requirements by everyone from the senior executive to the newest and most junior employee. Responsibility for the training of "I Company" employees in quality improvement rest with management at all levels and, in particular, we have to have someone for the co-ordination of the organisation's quality effort.

Quality training will be fully effective if people need:

- To know what to do and why they are doing it;
- To know how to do it;
- To have the ability to do it.

In our company "I" responsibility for the quality policy rests clearly with the Chief Executive. The Chief Executive and his team of strategic policy makers are of primary importance, and the role of training here is to provide awareness and instil commitment to quality. The importance of developing real commitment must be established; and often this can only be done by a free and frank exchange of views between trainers and trainees.

The evidence suggests that quality and related training has increased significantly. Training areas include: quality orientation of policy, principles, values, safety rules and procedures, equipment operation, dealing with hazardous materials, controlled operating procedures, quality checks, communicating quality issues, coordinating quality with internal suppliers and customers, statistical process control and problem solving. When operators

transfer from one area to another, they are trained on the equipment and standard practices for their new area of responsibility.

Average participation in self-management team training in 2002 was 21.3 hours for every co-worker in "I" Company.

9.12 Teamwork

Total Quality Concepts have been in existence for decades. Regardless of the title given to the program and the company implementing it, the common purpose is increased profitability, productivity, job satisfaction, workplace efficiency, product design, and employee morale.

Although it must be recognised that TQM and employee participation are separate issues, one of the most critical aspects of a successful TQM program is employee participation. If employees do not actively participate, the program will likely not succeed. TQM recognises that employee involvement is vital. Employees are often in the best position to recognise problems and have the ability to come up with solutions (as one Chief Executive of a large construction company said) and improvements if they are interested and equipped to take steps to make improvements. The hope is that if key people involved in a process work together to make critical decisions they will work harder to be successful because they will feel more involved and more effective. The use of committees or teams and the concept of employee involvement are deemed crucial to the success of a TQM program. The European Quality Award winning companies believe that employee empowerment is an underlying framework for Total Quality Success.

The complexity of most of the processes that are operated in the construction industry places them beyond the control of any one individual. The only efficient way to tackle the process improvement or problems is through the use of some form of teamwork.

Teamwork throughout the organisation is an essential component of the implementation of TQM, for it builds trust, improves communications and develops interdependence (John S Oakland 1994).

The evidence from the case study suggests that teamwork provides an environment in which people can grow and use all the resources effectively and efficiently to make continuous improvements. As individuals grow, the organisation grows. It is worth pointing out, however, that employees will not be motivated towards continual improvement in the absence of (John S Oakland 1994):

- Commitment to quality from top management;
- The organisational quality 'climate.'

A mechanism for enabling individual contribution to be effective. Teamwork plays a vital role in TQM. Prior to the introduction of the system, people at "H Company" performed their work to high standards, but did not necessarily do so in a spirit of information exchange and cooperation. "*They lacked the awareness of what their internal customer needed,*" he says (Quality Manager). Each department, in other works, set its own standards and procedures without consulting other departments.

An important part of TQM involves turning this mentality around to one of teamwork and cooperation. "The idea is to define how the organisation as a whole wants to do business." (says Mr H).

Effective teamwork will be achieved only if members are bound together by mutually set, internalised goals rather than by contractual arrangements alone. From the TQM point of view, effective teamwork means good cooperation within each team, as well as within them. There is evidence to show that the better the cooperation within each team, the more antagonism and rivalry between each team. 68% of responders, in the question of potential improvement due to good teamwork included the following point:

- Reduced cost of construction;

- Less problems on 'who is doing what;'
- Better lines of communication;
- Responsibilities are allocated with no confusion to the department.

Most companies who were visited had not done very extensive studies to assess the effectiveness of their teamwork programs. Evaluation was based mainly on the number of projects completed or improvement in employee attitudes and skills. In general, there was found to be an improvement in attitudes and skills which, of course, could be attributed to the so called "honeymoon effect."

Between customer and suppliers, teamwork manifests itself in cooperation efforts to achieve benefits in terms of synergy and loyalty (Dean and Bowen, 1994). Cross-functional teamwork is based on the optimisation of the whole system rather than the attainment of functional outcomes. Functional barriers are dismantled through the creation of a cross-functional teamwork culture via the internal customer principle.

At "H" Company the research indicates that teamwork between managers and employees is based on cooperation: employees cooperate by contributing to continuous improvement; highlighting problems that prevent them from doing quality work and suggesting ways that their own work, the work of their group or the activities of the organisation may be improved. Management reciprocate by facilitating employee contributions to improvement in terms of providing training, setting up mechanisms by which suggestions are reviewed and action taken. The evidence suggests that, the only efficient way to tackle process involvement or complex problems in the construction industry is through teamwork. The team approach allows individuals and organisations to grow. Therefore, teamwork for quality improvement is driven by a strategy, needs a structure, and must be implemented thoughtfully and effectively.

9.13 Communication in the Construction Industry

The ability to effectively communicate at all levels of a business is now seen as a major component of the foundation for continuous improvement. Construction

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companies have known about the importance of communication, but only recently have they realised that evaluating the effectiveness of their internal, as well as external, communications functions is an essential part of the improvement process.

If TQM is to succeed in any organisation, it is important for all managers, supervisors, and staff to recognise the value and influence of good communication as vital links in creating and maintaining standards for quality. Moreover, they must learn the characteristics of the various methods of communication and select the one most appropriate for the situation. This process is very much accelerated by an appreciation of how people learn to assimilate knowledge since this will encourage people to make use of all the senses when communicating. Overall, the results indicate that some significant changes have occurred within this industry, most Executives (87%) realise that there is a direct correlation between the effectiveness of the communication system and the effectiveness of their overall quality effort.

It would seem that the communication audit is perhaps the most effective and widely used method for evaluating the effectiveness of a firm's communication process.

Effective communication is at the heart of any quality improvement program. The evidence suggests that good leadership is mostly about good communication, and the language used between departmental or functions group will need attention in many organisations. Reducing the complexity and jargon in written and spoken communications will facilitate comprehension.

Quality improvements of "H" Company point out that to promote a free flow of co-worker communication, we have an open door policy and open line written process. Co-workers can discuss and suggest, problems, concerns or ideas with any member of management and receive an immediate response. This is consistent with our move from hierarchical management system to a teamwork/involvement culture, encouraged by the Chief Executive. 68% of respondents stated that 25% of man-hours being spend exchanging information (meetings, conversations, instructions, reports) effective communication is key.

Information must be clear, complete and accurate, conveyed concisely and in an understandable language.

TQM must be presented as the key to help them turn the people who work for them into TQ. Communication is a two way interactive process. Listening and seeking feedback is as important as speaking and writing.

It would seem that through good communication resistance is reduced, by ensuring that the reasons for the change are clear, the degree of urgency is understood and that all concerned know what the change means. This will clear up the misunderstandings and resistance will subside. This can be achieved through one-on-one discussions, memos, group presentations, reports or emails. Direct and clear communication is required from the top management to all staff and employees to explain the need to focus on the processes. Everyone will need to know their roles in understanding processes and improving their performance.

9.14 Management Style & Qualities of Leadership

“I” Company leadership outlines the process through which leaders influence culture in growing organisations. He states that the leadership externalises its own assumptions and embeds them gradually and consistently in the mission, goals, structure, and working procedures of the group. Once the organisation develops a substantial shared history amongst its members, culture becomes more of a cause than an effect. In our organisation, culture now defines what is to be thought of as ‘leadership.’ In organisations with established cultures transformational leadership is required to manage the process of cultural change. Indeed, this function marks a distinction between transformational as opposed to transactional management.

“A transformational leader is a person who can literally transform an imbedded organisation culture by creating a new vision of and for the organisation and successfully selling the vision by rallying commitment and loyalty to transform the vision into reality.” (“I” Company’s Directors view point).

Total Quality Management (TQM) is a business philosophy whose fundamental principles are the achievement of a competitive edge through cost control and the maximisation of customer satisfaction through high quality products and services. Some managers have broken away from the traditional style of management. They have made a 'managerial breakthrough.' This new approach puts their companies head and shoulders above competitors in the flight for sales, profits and job. Once top management has made the long-term commitment to TQM, the most important and critical ingredient to achieve a quality, commitment throughout the organisation is the employee involvement, empowerment, training and teamwork.

"A leader's main obligation is to secure the faith and respect of those under him. The leader must himself be the finest example of what he would like to see in his followers." (Homer Sarasohn in Japan, 1948).

Employees need to be provided with right level of education and training to ensure that their general awareness of TQM concept, skills and attitudes is appropriate and suited to the continuous improvement philosophy. Education and training also provide a common language throughout the business. Comments from some respondents indicated that the lack of understanding and the failure to see personal benefit in a TQM system cause some reluctance to change in behaviour and attitude. Interviews suggested that the most pragmatic way to overcome this problem is to train and guide employees (onsite and at the head office) through the change process and full support from senior management. More than 87% agreed with this statement to be successful in promoting business efficiency and effectiveness, TQM must be truly organisation wide, and it must start at the top management with the top executive or equivalent. The most senior directors and management must all demonstrate that they are serious about TQM. The middle management has a particularly important role to play. Since they must not only understand the principles of TQM, but they must go on to explain them to the people, which are responsible and ensure that their own commitment is communicated. Only then the TQM will spread effectively throughout the organisation.

The evidence suggests from the case study of "I" Construction Company one of the greatest potential for delivering quality improvement rests with employees at

the lower levels of the organisation. The responsibility for not capitalising on this potential rests with management. It is the responsibility of all managers from the project director down to ensure that they provide an environment, which will encourage involvement and initiative from everyone.

The results from the longitudinal analysis identified 3 effective management style model:

The Three Systems suggested by Likert (1961)

System 1 – Participative Group: leadership involves trust and confidence in subordinates, with motivation based on rewards for achieving pre-set goals. There is participation and a high degree of teamwork and communication. The responsibilities for achieving the goals are widely spread throughout all levels of the hierarchy (7 firms out of 11).

System 2 – Consultative: leadership in this system provides one trust in subordinates, with motivation based on rewards as well as some involvement. A reasonable degree of teamwork exists, and communication takes place vertically and horizontally. The responsibility of goal attainment is spread more widely throughout the hierarchy (3 out of 11 organisations).

System 3 – Benevolent Authoritative: poor leadership with limited teamwork and communication dominates this. Most important decisions are taken at the top, but not at the lower level of the hierarchy. The subordinate's opinions are listened to, but whether or not to be implemented is subject to the supervisor's own discretion rather than on discussion or agreement. The motivation for the job is based on a system of rewards (1 out of 11 organisations).

The evidence suggests that companies applied the system one (participative group) approach to their operations has greatest success as leaders. Furthermore, the departments, divisions and organisations run by system one

methods were more productive, and also more effective in setting goals and achieving them.

On the other hand managers adopting this style (system three) get things done at the expense of interpersonal relationships. They know what they want and how to achieve it without causing resentment. They drive rather than inspire.

The overall finding from the qualitative analysis of “G” Company is that major differences of opinions exist within the tendering division regarding the way in which quality improvement is best managed. These differences centre on the emphasis given to the soft as opposed to the hard aspect of quality. Driven by their experience of day to day contact with external customers, tendering division and site construction staff tend to argue that quality improvement requires an increase in the levels of empowerment and flexibility at division level. This is in order that the specific requirements of particular customer might be met, in general terms, the emphasis given by division staff to the safe aspects of quality management is consistent with the espoused values of the “G” Company as present in its vision document.

Line managers in the area and head offices place a great emphasis on quality of conformance by division staff to centrally determined specifications. This is a hard approach to quality management. It is based on standardisation and the co-ordination and control of the behaviour of division staff through routine discretion.

The analysis of the interviews illustrate that the prevailing approach to the management of quality in the site construction, tendering division in “G” Company is standardisation. This is despite attempts to introduce a broader approach to quality improvement through the customer focus initiatives. It was found that the forms in which these initiatives were implemented by area and head office line management differed considerably from the ways in which they conceptualised by senior management. As such, the typical practise of quality management within the tendering division differs from that associated with the values and norms espoused by the ‘G’ Company in its vision document and target branch profile.

9.14.1 Leadership Behaviour

The evidence suggest that TQM leadership starts with a vision and from commitment to this vision the leader will find ways to build trust, to communicate, to inspire and to bring the vision to reality. His authority will stem from his professional commitment to quality and from the strength of will that he displays in not allowing the quality operation to be turned away from its objective. The leader must inspire participation in all quarters and at all levels – he/she totally dependent on other members for the success of the TQM program. “H” Company’s management describes practical leadership as it applies in TQ Environment:

1. Being seen to be in charge;
2. Drive and initiative;
3. Clear thinking and good judgement;
4. Organisational capability;
5. The ability to listen and gather up other people’s views;
6. Being heard when you need to be;
7. Showing appreciation when recognising and achievement and being able to indicate displeasure when it is appropriate deserved it.

The strong impact of leadership in the construction organisation can be seen from the preceding statement. In the endeavour to implement and sustain effective TQM, leadership in underscored by the wide attention that his topic has received both throughout TQM and current management literature.

It would seem that most of the work in any organisation is done away from the immediate view of management and supervision, and often with individual discretion. If the co-operation of some of all of the people is absent, there is no way that managers will be able to cope with the chaos that will result. This principle is extremely important at the points where the processes touch the outside customer. Every phase of these operations must be subject to continuous improvement, and for that every one’s co-operation is required.

Everyone in the organisation, from the top to bottom, from offices to technical services, from headquarters to local sites, must play their part. People are the source of ideas and innovations, and their expertise, experience, knowledge, and co-operation have to be harnessed to get those ideas implemented. Employers and managers must take the lead, and the most senior executive has a personal responsibility for TQM. The degree of management's enthusiasm and drive will determine the ease with which the whole workforce is motivated. Never ending improvement is the process by which greater customer satisfaction is achieved. The objective of TQM in "I" Company is to change the attitudes and behaviour of management and subsequently, the attitudes and behaviour of employees. The prescription from the TQM proponents is quite clear, a change in management attitudes and behaviour will lead to a change at employee levels and a lack of change at managerial levels will presumably lead to a lack of change at employee levels.

9.14.2 Leadership Understanding

The successful implementation of TQM initiatives requires a comprehensive approach and understanding. Research carried out in the UK by the Building Establishment has shown that just above 50% of construction faults were caused by design deficiencies, 10% by-product failure and 40% by poor workmanship. It would seem that 'teamwork,' partnership and better understanding what their customers really expects of them in order for the modern day organisation to survive quality must become a way of life. Organisations need to change. Exhortations such as "Get better or get beaten!" Stress the belief that unless you provide a superior product and service some one else will. Their common objective is for radical improvements in what the customer gets by addressing the internal processes. This may require changes to plant, equipment, but the crucial point is, repeatedly stated in the literature, that often what is more important is for management to analyse ways in which it can alter itself. This is often referred to as managing culture. Arguably, the important element of TQ; the need for senior management to provide effective leadership which allows radical change to occur.

The analysis of the interviews show that the greatest barrier to implementation of TQ is often said to be a lack of management commitment to see the process

through and the lack of understanding commitment is a relatively easy motivational response to achieve at the beginning of any programme; the real issue is that, generally, management had little understanding as to what they were suppose to be committed to.

Such lack of understanding is as important as lack of commitment. Lack of full understanding could also lie at the heart of weak implementation. Managers may be satisfied that the systems they have in place are adequate for TQM implementation, when in fact they are not. Executives become familiar with the buzz-word, and assume they know what it is all about, often basing their views on very limited, perhaps even superficial information. Almost 25% of the organisation's managers on first survey felt that ISO 9000 certification was a demonstration that the organisation had achieved Total Quality status. The issue of management understanding is surprisingly not explicitly treated in most sets of assessment criteria, or discussion of why TQM fails.

The debate as to the role of ISO 9000 in TQM is frequently mentioned in the literature. Elcher (1992) declares that, "the ISO 9000 standards accurately reflect and even help to define the most current state-of-the-art on which Total Quality Management can be built." It is interesting to note that historically a large number of companies have acquired registration to this standard in many cases before the whole thrust of Total Quality began to gain prominence in the Quality movement.

CHAPTER 10

“Companies must institute TQM or become non competitive in the national and internal construction and engineering markets within the next 5 to 10 years.”

(CII Quality Management Task Force April 1990).

10.0 Introduction

The construction industry has unique characteristics, which are related to its structure, production process, physical characteristic and composition. Those characteristics go a long way towards explaining methods of production, organisation, price determination, payment methods, financial decision and control, and an industrial structure unlike those met in the other sectors. The 1980's saw a change in attitude among major construction clients who were determined to greater performance and cost control. Many public bodies like the NHS, prison service and schools are increasingly acquiring trust status, as a result of which they are now becoming self-governing, with very little central controls. For such bodies, emphasis is placed on speed, value-based service and cost-time-quality performance for a particular project and there are clear signs that these clients are becoming increasingly involved in building processes; relationships with contractors appear to be moving towards more of partnering and other forms of strategic alliance.

This thesis attempts a broad review of the current status and possible future of TQM as a major management concept. This study has found that TQM requires continuous change, and is an unending process. It is possible only through top management commitment. Similarly, middle management has to embrace TQM principles as well. If they do not buy into it, implementation of such radical concepts as cross-functional teams is impossible. In common with other empirical studies this research has found that a high proportion of TQM initiatives have failed to deliver expected benefits, Durham University (1992), Ashridge Management School (1992). The reason for this have been attributed more to a failure of management to plan and implement TQ rather than a failure of the underlying philosophy, Hill and Wilkinson (1993), Zairi (1994).

10.1 Discussion & Conclusion

This chapter draws together a summary of the study, presents the main conclusions and recommends a framework, and methodology, for the implementation of TQM within construction industry organisations.

This thesis examines the status of Total Quality Management within the UK construction industry. The research started by an extensive review of the literature on TQM. The review shows that TQM is difficult to define concisely, however there is reasonable agreement on the basic underlying principles as set down by the quality gurus. Recent research, which has investigated issues of implementation, was examined and the critical factors for success compared from several studies. The principal techniques associated with TQM were identified and it was evident that these have grown significantly in scope and range over the past few years.

The review finds that self-assessment schemes such as the Malcolm Baldrige and European Quality Award have had a significant impact on organisation seeking to implement TQM and that they are popular. The evidence suggests that there is reasonable consistency between the self-assessment frameworks and the principles, critical factors, and techniques of TQM, and that this will allow organisation scope to tailor their approach to implementation.

Given this finding, and the evidence that such methods are becoming popular, it was decided to include self-assessment using the EQA framework as a guide to conducting the case study research. An extensive review of the literature also was undertaken on research methods and a comprehensive framework recommended by Simon was adopted to guide the process (12 step in an empirical research study). The purposes and objectives of the study were examined and defined. Drawing from the literature review and from exploratory research. A research design was constructed. The techniques needed to gather, analyse and evaluate the research were examined and determined. It was decided that given the lack of empirical evidence in the area of this study and the complexity of the subject matter, in depth case studies (11 construction organisations) would be most appropriated to tackle the how, what and why questions fundamental to this research. The research design however also

included a large postal survey (92 major construction organisations), which is used to assist the validation process and provide new evidence of the important factors of TQM in construction industry and analysis of leading industry representatives.

The result of the exercises were then compared and examined, the outcome show that TQM was considered to be important in area addressing the following: diversification and innovation, establishing best practice, design of processes, waste elimination, performance measurement, change, customer focus, and continuous improvement. The results also show however, that respondents believe TQM is not a guarantee of long-term survival and is not of itself sufficient, as some have claimed.

Chapter 6 presents descriptive reports of the case studies. It is contended that the studies provide rich data, valuable to researchers and industry practitioners. The studies show how the leading organisations are implementing TQM, and the strength and weakness of each approach. Different approaches are compared and contrasted. A summary of the emerging best practises was compiled and can be seen in figures 10.1 and 10.2 below.

Figure 10.1 Summary of Different Approaches (Type One)

Organisation	Approach	Strengths	Weaknesses
H	Total and radical organisations change through organisation development and BPR. Emphasis on long-term approach to results through long-term customer relationships.	Based on best practices. Use of techniques such as BPR, benchmarking, team play, are highly visible. External expertise is used. Strong leadership evident. Top team owns quality.	Radical departments from traditional. Complex organisation structure and language. Highly dependant on committed leaders/quality champions.
G	Strategy deployment through change teams (PQMT method). Broadly following EQA framework.	Focuses effort on key strategic objectives via change teams. Strong evidence of leadership by top executives who lead teams. Speedy deployment of resources to areas of key need. Brings issues to a head. Focus on changing behaviour through changing activities and roles rather than more abstract "soft" or "cultural" issues.	Some alienation of senior managers and staff outside the change team structure. Some slowness to tackle general problem areas, which fall outside immediate task of change, teams eg BPR and HR policies.
I	Initially Crosby methods 12 steps using external consultants, and quality circles. Moved on to self-assessment using EQA model.	High investment in staff training and culture change. Now following prescribed self-assessment model. Focuses managers on weak areas within their business unit.	Some concerns that initial investment in training and change was high cost for little benefit. Concerns that little change at the top of the organisation. Fears that EQA may be used as another "internal audit" of business units.
F	BS 5750 main driver but now seeking to broaden out to full quality program. Quality initiatives for 6 years – now focusing on MBNQA	Focus on reviewing and documenting key business processes. Provides platform for development of quality. Leadership coming from the parent company with 3 years MBNQA experience.	Major effort to gain BS 5750 may be seen as an end in itself rather than a stop along longer path to quality.

Figure 10.2 Summary of Different Approaches (Type 2)

ORGANISATION	APPROACH	STRENGTHS	WEAKNESSES
P	Service improvement managers in each business unit. Emphasis on performance measurement.	Focus on key performance measures linked to business objectives and co-ordinated by central HQ team. Seen as forerunner to wider quality program eg self-assessment	Performance measures are financially focused, short term, top down and target driven. Emphasis on cost reductions. Process capability not assessed. Some soft issues of TQM not addressed eg HR policies.
R	Tackle projects when business need identified. Prefer to use existing organisation structure and lines of communication.	Focus on business needs. Minimum disruption to organisation structure. Low cost.	Focus on short term projects. Major issues, long term issues, cross function issues not addressed. Culture command and control, little change at top. Low adopters of TQM.

Preliminary analysis of the cases identified 2 basic groups where similar patterns of behaviour were observed. These groups were defined and descriptions of typical behaviours identified.

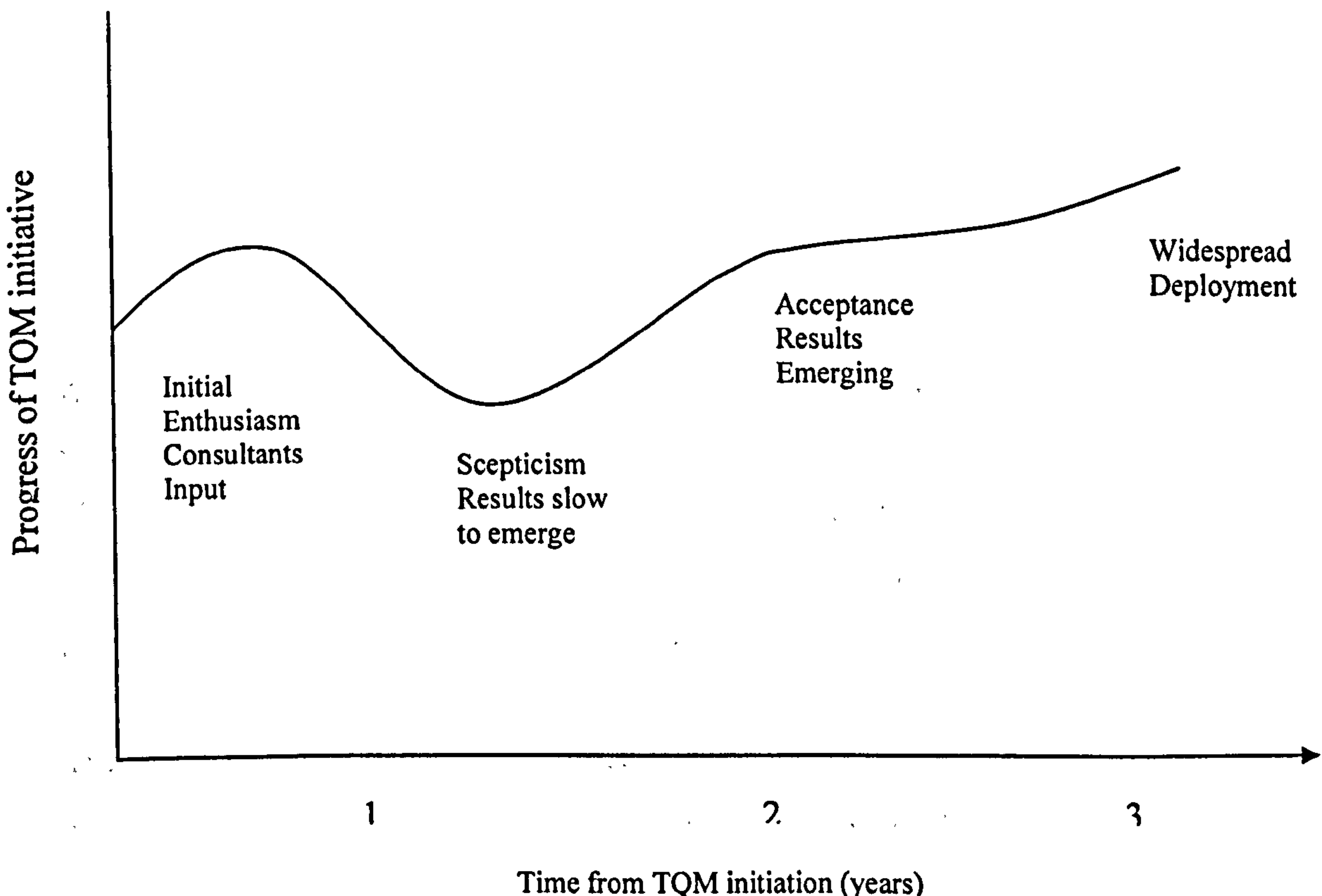
10.2 Secondary Findings

A number of secondary findings emerged from this phase of the study.

- A. Some companies deliberately called their quality improvement initiatives total quality or company-wide quality improvement to avoid the TQM tag which it was felt might create the wrong impression with employees and be perceived as another 3 letter fad. The person responsible for co-ordinating the TQM initiative was usually titled "TQ Manager" and there was a deliberate attempt to separate TQM from traditional QA/QC activities in companies.
- B. In some companies staff resigned or were laid off because they could not reconcile with the concept of TQM.
- C. Some of the companies did not have tangible measures for progress in the area of leadership but were satisfied that there was sufficient commitment and participation from top management to support the TQM initiative.

- D. With the backdrop of economic recession some companies mentioned that the rate of implementation of TQM initiatives was slowed down considerably.
- E. There was widespread agreement in companies that following each advance in TQM a period ensued where it was felt that TQ initiative regressed but that after a time lag the benefits of TQM emerged. This is partly explained by the fact that because of the searching nature of TQM, problems surfaced in areas, which would previously have been swept under the carpet. The resistance of employees to permanent organisational change also causes this phenomenon.
- F. Most companies interviewed identified a period during TQM implementation when enthusiasm for the TQ initiative was at its lowest as plotted in figure 10.1. This period typically ranged 18-24 months from initiation of the TQM process, after the initial interest that accompanied launch of the initiative. The TQ managers expressed the view that during this transition phase there was an urgent need for top management to support the process and believed that during this phase many companies failed in their efforts to introduce TQM. It was generally felt that if a company could ride out this period the benefits of TQM gradually emerged and the whole process stood a better chance of becoming fully integrated into the company's normal business activities.

Figure 10.3 Progress of TQM initiative v Time



- G. In all 6 companies ideas from the quality gurus, and academics were adopted but the TQM process while sharing many similarities was unique to each company and had been customised to meet the company's quality and operational requirements. All companies recognised the need to avoid considering TQM as a panacea and viewed the TQM process more as a vehicle for quality and business improvement rather than an end in itself.
- H. TQ managers expressed the view that the primary reason for failure of TQM in companies was the absence of long-term support from top management for the TQ initiative.
- I. The importance of having a person who is knowledgeable in TQM and has sufficient understanding and influence to drive the process both from top to bottom and across the organisation was repeatedly stressed in companies. It was widely felt that his person's input contributed significantly to the success of TQM. It was interesting to note that a number of companies with a long and successful history of TQM acted almost as quality schools in that a large number of TQM managers interviewed had networked with these companies during implementation of the TQM process.
- J. The reason for commencing TQM varied from business survival to pressure from competition but in all cases the TQ managers admitted that once they had been working at TQM for more than 3 years the scope for improvement projects become more difficult to identify but due to increasing employee acceptance easier to implement.
- K. In all 5 companies TQ managers reported major savings in operational costs. They claim it saves millions of £'s a year through its focus on quality.

A TQM assessment, for each organisation, was carried out, using the EQA framework with critical factors, principles, and techniques incorporated. This assessment identified strengths and weaknesses in different approaches to TQM implementation and in the methods used. Each organisation was subsequently evaluated using the points score methodology prescribed by the EQA.

The results showed that those organisations achieving highest scores in self-assessment had achieved highest improvement in financial performance. From this

analysis, a diagnostic model of different approaches was developed. It was argued that the model provides a new, and important, strategic tool which can help organisations seeking to implement TQM. It may be used for determining individual, and organisation, characteristics, in relation to TQM.

The results from a final survey of senior managers and executives within the construction industry, which respondents were asked to rate the importance of the critical factors, principles and techniques of TQM, in the context of modern day construction industry. The purpose of the survey was to further validate the research findings. The results confirmed which areas of TQM were being given the highest emphasis.

10.3 In Conclusion

This study recommends 2 instruments for measuring the impact of TQM. Firstly, self-assessment procedures provide a methodology for measuring quality across a range of factors and using both quantitative and qualitative measures. The study has found that increasingly high proportion of major constructions companies in the UK, are now using the EQA model as a method of measuring the impact of quality and are moving progressively (as far as this study permits) to embrace balance performance measures which include customer satisfaction, with financial and productivity measures. The Study also shows that EQA and MBNQA are now popular management tools, used across a wide spectrum of industries. Increasingly, therefore, it is concluded that framework will provide valuable internal measures, and also external measures for benchmarking.

Secondly, this study has sought to develop a performance index to measure the impact of change in the areas of profitability, capital strength, market share, costs and revenues. This is particularly an area where further research is recommended to develop and extend the index criteria, for example, to consider how non-financial measures might be incorporated.

This thesis presents the results of 2 exploratory studies, which investigate the status of TQM within the construction industry. The first study involved an analysis of the

published accounts and annual returns of the major construction company for the presence of TQM factors. A simple rating scale was developed to present the main findings, identifying high to low adapters.

The second study involved a survey of senior managers and executives. A high rate of response was achieved and it emerged that 85% of respondents believe TQM to be important to their organisation strategy over the next 3 years. Respondents gave a high priority to issue of implementation and rate self-assessment.

The conclusion reach in this study are that organisations following self-assessment framework have achieved improvements in their performance. In some instances this was significant, particularly for those organisations which had previously been regarded as relatively poor performers. Whilst there are critics of these methods and some potential pitfalls, some studies have confirmed their usefulness Garvin (1992), Sinclair (1994), Kano (1993).

This study has used the EQA framework into which critical factors, principles, and techniques are incorporated found from the research to be relevant for construction industry. Whilst no one best method may be recommended the study supports the use of the EQA framework for construction industry and best practices for implementation, but also emphasises again the need to tailor the approach to suit the construction organisation by maintaining compatibility between implementation and diagnosis.

This study has found that increasingly executives are calling for stronger link and measures between TQ factors and performance factors, if they are to justify investment in TQM. Hanson et al (1994) have attempted to tackle this issue in a study for IBM consulting and London Business School, have developed a performance index for manufacturing industry.

The final stage in the continuous process of improvement is to review progress and act to build on strengths and address weaknesses. This study supports the view that TQM is a long-term process. Garvin (1992) for example, concludes that organisations starting TQM typically take 6 to 10 years to reach mature status. This study has

identified that within construction industry the leading organisations are 5,7 years into TQM.

This study supports the view that TQM review must be high level and strategic, and be integrated with the corporate planning process.

10.4 Key Issues/Barriers

This study has identified a number of key issues, which are in practise limiting the effectiveness of TQM in construction industry, (discussed in chapter 8). Differences emerged between recommended best practice (from the literature and from a research survey) and observe practice; (case study). For example, the literature review and research survey both strongly support the view that TQM and HR policies should be compatible and aligned. The evidence from the case studies however, showed that in practice this rarely occurs, and in some area there are clear conflicts and contradictions. This study had identified 9 key issues. These areas where greater consideration of best practice is recommended are essential for long-term successful implementation.

These key issues are in practice limiting the effectiveness of TQM in construction industry organisations and are creating barriers to successful implementation. These key issues may be summarised as follows:

- 1) Improve leadership for TQ with greater ownership for CEO's executives and line managers;
- 2) Reconcile empowerment and prevention with the need and culture of command and control, internal audit, and internal check;
- 3) Reconcile HR policies and practices with TQ principles and critical factors;
- 4) Broaden and deepen the focus on processes to include such areas as HR, Marketing, Strategic Management, Accounting and Performance Measurement;
- 5) Further develop the principles of balance performance, particularly build effective systems and measure for customer satisfaction, staff satisfaction, owner satisfaction, and the impact on wider community;

- 6) Address the expertise deficiency in the appreciation and use of TQ techniques;
- 7) Increase the emphasis on implementation issues;
- 8) Re-examine relationships with suppliers, broaden and deepen to include agents, and contacts, and service provider.

10.5 Limitation

This study has shown that there is an absence of empirical research within the construction industry in relation to TQM. To this extent therefore, the research must necessarily be considered exploratory. The limitations are that the findings represent a snapshot of the industry at a point in time.

Repeated studies over a longer period would build significantly on the findings. This is particularly the case given that this study has shown that the leading organisation in terms of TQM are reaching a critical phase of implementation ie 3 to 5 years practical experience.

10.6 Final Thoughts

It has found evidence that the critical factors of TQM are relevant to the strategic challenges facing the industry and that there is, therefore, a strong prima facie case for adoption. Unlike some studies, however, it does not conclude that TQM will provide the complete answer. It is recommended that TQM be elevated to strategic level, and used alongside other strategic methods, for maximum benefit. It is also evident that many TQ programmes fail to deliver real benefits. It is difficult to implement, and can be high cost. As a result some have become disillusioned, and have reduced their efforts to support quality initiative. Many organisations have functionalised quality. The result is that quality becomes less influential in overall strategy. This in effect condemns it to long-term failure.

Given the complexity of TQM and the numerous factors, which can lead to success or failure, it would be naïve to expect a narrow data set to correctly forecast all initiatives correctly. There were suggestions that the unexpected successes lay

somewhere between the other successes and the failures in terms of many of their practises.

A few of those organisations, admitting that their TQM initiative had not been as successful as they had hoped, had shown considerable improvement also (P and R). If they were to remain patient, which may be difficult given that their initiative were already at least 5 years old, then the results may soon start to come through from the original 16 organisations, 6 organisations, which were expected to have succeeded, admitted that (mid 2004) they had now discontinued their TQM initiative. One company continued to support TQM but was unhappy to participate in this study.

On closer examination, of the final questionnaire responses, one of the 6 companies did give some cause for concern. In this case, that of the only small company in the group (P) with around 560 employees, the TQM initiative had been launched in 1993. However, by 2005 this company had indicated that they still had only 35-45% of their employees involved in TQM. Given the company's size and the date TQM began, this reply on its own should have caused serious doubts as to the likely overall success of the initiative. Any medium organisation with very low involvement levels – certain less than 60% after 12 years of implementing TQM, must cast doubts on the implementation strength of their initiative. In addition, this organisation claimed that it was too soon in 2005 (because management take 3 years to organise and in place teams) to state what benefits TQM had brought. Ten years after the introduction of the initiative, they were able to pinpoint a small number of benefits, and this in spite of the fact that they claimed to have quantified TQM impact in terms of its effect on cost and sales. The suspicion must be therefore that there were no big benefits to report. As such then it should have been possible to predict problems in this organisations' initiative. Study show they failed to indicate TQM as an organisational improvement initiative.

This thesis has suggested that most organisations do not yield anticipated results because of deficient understanding and implementation of the TQM philosophy among senior managers in organisations, from the outset. Given this, there is a need for assessment of TQM activity at an early stage to identify problems and increase the chance of success. It was also argued in this thesis that assessment or evaluation, are

key activities in making organisational practices more robust, and are a central step towards instilling a learning and improvement philosophy within the organisation. There was evidence in the course of this study that organisations who are currently carrying out self-assessment did not have an increased chance of success with TQM, hinting that such assessment was weak.

From the direct contacts that the author has had with various groups of sub-contractors in the construction industry, it could be deduced that the general impression in the industry is that ISO 9000, TQM system is a client demand-pull, general and marketing gimmack. Although it is generally recognised that it has raised the industry awareness about quality management.

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8 Bruntsfield Avenue
EDINBURGH
EH10 4EP

Date

Name
Position
Address

Dear Sir/Madam

As a PHD student of Heriot Watt University (Building Department); I am currently researching the implementation of TQM in the construction industry. I would therefore, be extremely grateful if you could arrange a convenient time for me (if at all possible) to come along to your firm for an informal discussion. This would be an immense benefit for my research.

I appreciate that you will probable receive numerous requests like mine however, your help would be invaluable to my research.

Thank you for your assistance in this matter and I look forward to hearing from you.

Yours faithfully

Saeid Fahid (Mr)

The aim of this questionnaire is to assess the awareness and practise of TQM in the construction industry in the UK. Any information or comments you provide will be treated as strictly confidential and will not be used for commercial purposes.

Q1 Please states your job title.

.....

Q2 How many people does your organisational department employ in the UK?

- 1) 99 or less
- 2) 100 – 499
- 3) 500 +

Q3 Are you aware of the BS 5750/ISO 9000 certification?

- Yes
- No

Q4 How does quality (TQM) rank amongst strategic issues being addressed by your organisation?

(choose one option only)

- 1) Ranked as the number one strategic issue
- 2) Ranked amongst the tope three strategic issues;
- 3) Ranked lower than the top three strategic issues.

Q5 Is your organisation currently certified under BS 5750/ ISO 9000?

- Yes
- No

Q6 What is your understanding of the purpose of BS 5750/ISO 9000?

(choose one option only)

- 1) To demonstrate that products/services are of a high grade or standard;
- 2) To produce paper work to satisfy customers;
- 3) To provide a disciplined means of produce goods/ services for customers;
- 4) To strengthen the control over operations;
- 5) To demonstrate that this is a TQM organisation;
- 6) To provide an alternative to TQM;
- 7) Others (please specify)

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

Q8 How much of your system documentation is being/was written by the external experts?

- 1) None of it;
- 2) Less than 25%;
- 3) 50%;
- 4) All of It.

Q9 In your opinion what has been the impact of BSv5750/ISO 9000 on your organisation?

- 1) Costs money;
- 2) Saves money;
- 3) Has had no impact;
- 4) Too soon to say.

Q10 What is your understanding of the TQM concept?

- 1) A new name for not-so-new management practise;
- 2) A way of guaranteeing high grade products/services;
- 3) Making the customer the focus of all business processes;
- 4) Continuous improvements through problem solving and team work;
- 5) Other

Q11 What was your organisation's primary motivation in pursuing TQM?

.....

.....

Q12 Who led your TQM drive in your organisational department?

.....

.....

Q13 What mechanism does your organisation employ to involve employees in TQM?

.....

.....

Q14 Does your organisation have quantitative data on how TQM has affected its levels of sales or costs?

- 1) Sales only;
- 2) Costs only;
- 3) Both sales and costs;
- 4) Too early to say.

Q15 What impact has TQM had on your organisation performance?

- 1) Positive;
- 2) Negative;
- 3) No effect;
- 4) Too early to say.

(Only answer this question if your answered one to the above)

Q16 Has this positive impact been:

- 1) Dramatic;
- 2) Moderate;
- 3) Marginal;
- 4) Unsure.

Q17 Which category/categories of employees in your organisation make use of process measurement and evaluation?

- 1) Managers;
- 2) Lower grades of staff;
- 3) Supervisors;
- 4) Unsure

IMPACT OF TQM

Q18 Would you say that your organisation has made measurable improvements by following TQM?

- 1) No, not really;
- 2) Not as much as expected;
- 3) Yes, steady improvements;
- 4) Yes, dramatic improvements.

Q19 Briefly, how is the impact of TQM measured or quantified in your organisation?

.....
.....

Q20 Approximately what percentage of your organisation's employees are currently actively involved in TQM activities?

- 1) Less than 10%;
- 2) 10% - 20%;
- 3) 21% - 50%;
- 4) 51% - 75%;
- 5) More than 75%.

Q21 In what ways are these employees involved in TQM?

.....
.....

Q22 Does your organisation have written strategic business plans?

Yes No

Q23 Has your organisation used 'Bench Marking' as part of its TQM effort?

Yes No

Q24 Does your organisation carry out regular systematic assessment or reviews of its TQM practises?

Yes No

Q25 How successful can you say TQM has been for your organisation?

- 1) Unsuccessful;
- 2) Not as successful as anticipated;
- 3) Quite successful;
- 4) Very successful.

Q26 If you had to choose one of the following as the main reason why your organisation is implementing TQM would it be:

- 1) Due to Head Office telling us to;
- 2) To improve employee relations;
- 3) To reduce problems with quality;
- 4) To improve internal efficiency;
- 5) To better meet our customer's needs;
- 6) To increase our market share;
- 7) To become the best in our field;
- 8) To increase our profits.

Q27 What do you consider will be the major strategic challenges facing your organisation over the next 3 years?

.....

.....

Q28 Will TQM have a significant role to play in your strategic plans over the next 3 years? If so, in what ways.

.....

.....

Q29 For which parts of your organisation would you feel TQM is most appropriate?

.....

.....

Q30 What do you consider are the main factors in any TQM program?

.....

.....

Q31 What do you consider are the main drawbacks/concerns about TQM?

.....

.....

Q32 Do you think TQM will become widely established within the construction industry over the next few years?

.....

Q33 Please indicate below by placing a (✓) in the space provided if your organisation uses any of the techniques listed.

	Frequently Used	Infrequently Used	Not Used At All
Organisation development			
Benchmarking			
Quality Circles			
Quality Improvement Teams			
Measurement of Quality Costs			
BS 5750/ISO 9000			
Statistical Process Control			
Department Purpose Analysis			
Strategic Planning			

Q34 How are you implementing TQM in relation to:

(i) **Resources:** *what resources are given e.g. financial, information, material and technology.*

.....

How many staff are directly involved in TQM teams?

.....

(ii) **Processes:** *How are key processes identified, reviewed and changed?*

.....

How are key processes measured for effectiveness?

.....

What techniques are used for review of processes and services?

.....

How are processes controlled and documented?

.....
.....

(iii) People Management: *How does the organisation release the full potential of its people to support TQM?*

.....
.....

How are people involved in TQM?

.....
.....

Are TQM concepts integrated into recruitment?

.....
.....

What training/education is given to staff?

.....
.....

(iv) Leadership: *what style/behaviours in leadership are consistent with TQM?*

.....
.....

How do managers drive TQM?

.....
.....

Is there are preferred leadership style?

.....
.....

Has management developed a clear and published quality policy/programme?

.....
.....

(vi) Policy & Strategy: What do you believe are the main concepts of TQM?

.....
.....

Are senior management committed to it?

Yes No

How are strategies developed?

.....
.....

How are strategies deployed?

.....
.....

How are strategies incorporated into the business plan?

.....
.....

(vi) Results: what has been achieved in terms of business performance, how was it measured and determined?

.....
.....
.....
.....

What does your staff feel about the organisation?

.....
.....

What is the perception of external customers?

.....
.....

Q35 Why did you start TQM?

Cost savings;

To improve working efficiency;

To improve staff morale;

Driven by(e.g. Chief Executive);

Urged by the customer;

To win new customers;

Other.....

Q36 What problems have you had at the time of implementing TQM?

Convincing top management;

Changing the company culture (please give details);

.....
.....

Keeping up the impetus;

Others (please specify)
.....

Q37 How many of these tools do you use? (please tick)

Not At All

A Little

Often

Brainstorming

Ranking & Rating

Pareto Analysis

Flow Charting

Training Workshops

Bench Marking

Staff Surveys

Customer Surveys

Quality Improvement Teams

Q38 Please indicate if any of the following have been seen as a problem in relation to the implementation and registration of your quality management system?

- Expensive and time consuming;
- Complicated and hard to maintain;
- Creates bureaucracy and stifling creativity;
- Internal auditing;
- Initial and annual assessments;
- Training of staff;

Comments

.....

Q39 In implementing TQM what degree of changes were incurred with respect to your organisation's structure?

- Fundamental change;
- Minimal re-organisation;
- No change at all;
- Substantial moderation.

Q40 Do you feel these changes have been beneficial?

- To the organisation Yes/No
- To the employees Yes/No
- To the customers Yes/No
- To the sub-contractors Yes/No
- To the suppliers Yes/No

Q41 Since your organisation implemented TQM what was the reaction to (please tick):

	Increased	Decreased	No Change
Profit			
Wastage			
Efficiency			
Defects			
Productivity			
Turnover			

Q42 Have changes in leadership style occurred during the implementation of TQM?

Yes

No

Q43 How does your organisation deal with employees need for training and education?

Management provide training for everyone;

Training is provided to certain people.

Q44 How much training is provided for each employee?

1 day per year;

2-5 days per year;

5-10 days per year;

More than 10 days per year.

Q45 How often do management meet to discuss TQM related issues?

Daily;

Weekly;

Fortnightly;

Monthly;

Every other month.

Q46 Do management ensure that all employees have a full understanding of the need of the customer?

Management ensure that all employees full understand such needs;

Management believe employees have no knowledge of such needs;

Management delegate the responsibility of ensuring such needs.

Q47 How would you grade your organisation's communication network?

Internal

Good

Moderate

Bad

External

Good

Moderate

Bad

Q48 Do you feel the need for more continuous improvement skills and techniques within your organisation?

Would be helpful

Essential

Not necessary

Q49 What types of training did you receive?

Person centred;

Organisation centred;

Task centred.

Q50 Is there sufficient action taken by management to prepare staff to deal with the forces of change?

Management only prepare senior staff for change;

Management prepares everyone in the organisation;

Management does not prepare anyone for change.

Q51 With regard to changes what actions did your organisation take?

.....

.....

Q52 How do you see the formal communications across your whole organisation!

One - way communication;

Top – down;

Bottom – up;

Two – way.

Q53 Do you think by following project objectives you:

	More important than quality	Less Important than quality	Same Importance than quality
Achieve Budget			
Achieve timescale			
Client satisfaction			
Fulfil the Co's Strategic objectives			
Environmental impact			
Health & safety			

APPENDIX 1B

Total Quality Management Survey of UK Construction Industry

Interview Questionnaire

The aim of this questionnaire is to assess the awareness and practise of TQM in UK Construction Industry.

- Q1 Job Title of Respondent:
- Q2 For how long have you been in this job?
- Q3 For how long have you been working in the construction industry?
- Q4 Which sector of the construction industry do you operate in?
- Q5 How many people does the company employ?
- Q6 Does your company have in place a formal quality management system?
- Q7 Has your company obtained BS 5750 (ISO 9000) status?
- Q8 What is your understanding of the purpose of ISO 9000!
-
- Q9 What is your organisation's primary motivation in pursuing ISO 9000?
-
-
-
- Q10 Has your organisation made use of external expertise in developing its quality management system?
-
- Q11 How much of your system documentation is being/was written by the external experts?
-
- Q12 What has been the financial impact of quality management to your organisation?
- Q13 In your opinion what has been the impact of your quality management?
-
-

Q14 What do you consider will be the major strategic challenges facing your organisation over the next 3 years?

Q15 Have you introduced (or are you considering introducing) TQM into your organisation?

Q16 Will Total Quality Management have a significant role to play in your strategic planes over the next 3 years? If so in what ways?

Q17 For which parts of your organisation would you feel TQM is most appropriate?

Q18 What do you consider are the main factors in any TQM program?

Q19 What do you consider are the main reasons for introducing TQM?

Q20 What do you consider are the main drawbacks/concerns over TQM?

Q21 Does your organisation have a published policy concerning any of the following areas?

Quality

Corporate Values/Ethics

Customer Service/Charter?

If so, please give brief details.

Q22 Do you think TQM will become widely established within the Construction Industry over the next few years?

Q23 What is the perception of external customer? How have you measured this?

**PAGE
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ORIGINAL**

- Q43 How are peoples and teams targets reviewed?
-
- Q44 How do you measure customer satisfaction?
-
- Q45 What is the perception of the organisation of its wider public?
-
-
- Q46 At what stage are you normally involved with new projects?
-
- Q47 How do you instruct your supervisors/contractor with regard to specified quality standards?
-
- Q48 In your experience how are quality standards being explicitly carried out?
-
-
- Q49 Who initiated the TQ review meetings?
-
- Q50 What percentage of employees are involved in TQM activities?
-
- Q51 In what ways are these employees involved in Total Quality?
-
-
-
- Q52 Has your organisation used benchmarking as part of its TQM Effort?
-
- Q53 Does your organisation carry out regular systematic assessments or reviews of its TQM practices?
-
- Q54 How successful would you say TQM has been for your organisation?
-
-
-

APPENDIX 2

TQM Factors – Construction Industry

TQM

QUALITY/QUALITY IMPROVEMENT
CHANGE MANAGEMENT (FOR QUALITY)
ORGANISATION RE-STRUCTURING (FOR QUALITY)
CUSTOMER FOCUS
MEET/EXCEED CUSTOMER EXPECTATIONS
STRATEGIC MANAGEMENT/PLANNING (QUALITY FOCUS)
ORGANISATION DEVELOPMENT
QUALITY POLICY/VALUES
QUALITY STANDARDS

TECHNIQUES/ACTIVITIES

- ❖ Self-Assessment (EQA/MBNQA)
- ❖ Benchmarking
- ❖ Business Process Re-engineering (BPR)
- ❖ Quality Circles/Quality Improvement Teams
- ❖ Statistical Process Control (SPC)
- ❖ Activity Based Costing (ABC)/Process Costing
- ❖ Balanced Performance Measures/Balanced Stakeholders
- ❖ Staff/Customer Surveys
- ❖ Service Standards/Service Agreements
- ❖ Department Purpose Analysis
- ❖ Cross Functional Teams/Project Teams
- ❖ Leadership Coaching
- ❖ Training/Education (Quality emphasis)
- ❖ Quality Function Deployment
- ❖ Quality Systems eg BS5750

PRINCIPLES

- ❖ Continuous Improvement
- ❖ Empowerment
- ❖ Prevention
- ❖ Participation

Q1. What do you consider will be the major strategic challenges facing your organisation over the next 3 years?

Q2. Will Total Quality Management (TQM) have a significant role to play in your strategic plans over the next 3 years? If so in what ways?

Q3. Have you introduced (or are you considering introducing) TQM into your Organisation?

Q4. For which parts of your organisation would you feel TQM is most appropriate?

Q5. What do you consider are the main factors in any TQM program?

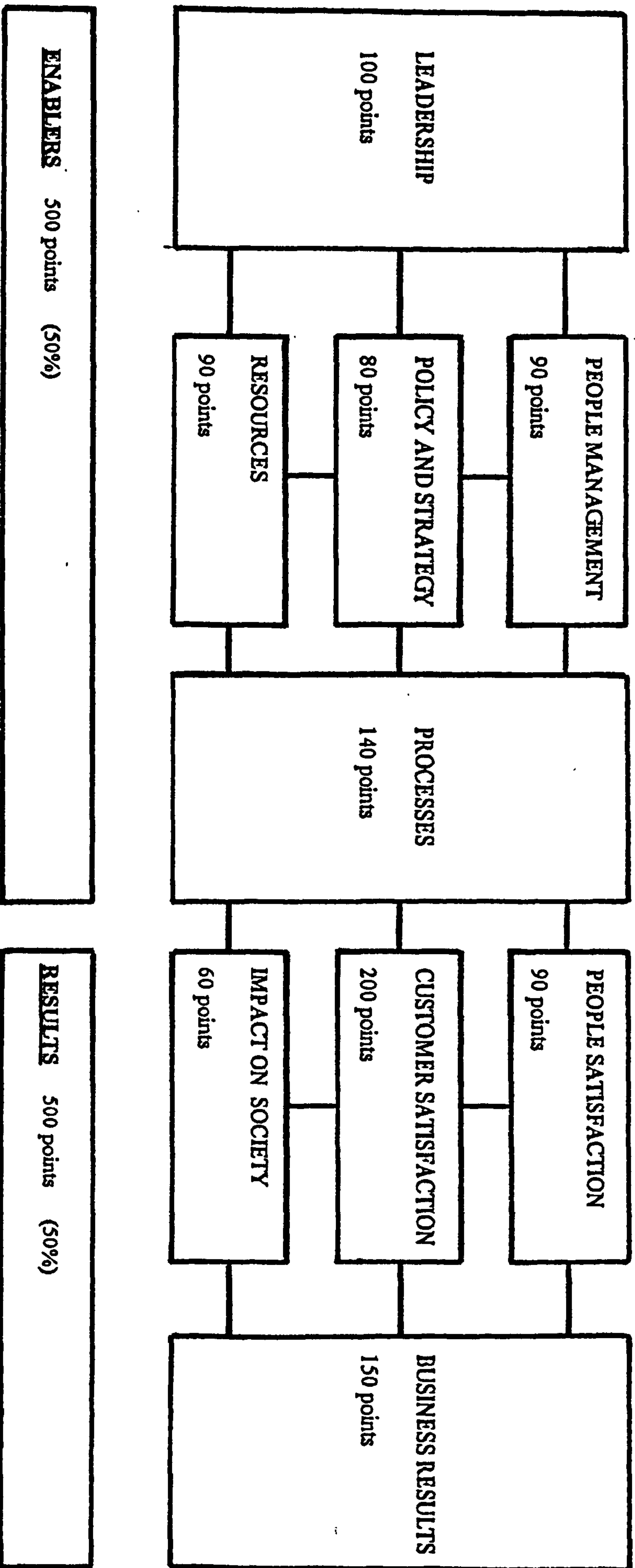
Q6. What do you consider are the main reasons for introducing TQM?

Q7. What do you consider are the main drawbacks/concerns over TQM?

Q8. Does your organisation have a published policy concerning any of the following areas; Quality; Corporate Values/Ethics, Customer Service/Charter? If so please give a brief details.

Q9. Do you think TQM will become widely established within the Construction Industry over the next few years?

Fig. A.1 The European Quality Award Model



APPENDIX 4

- (1) Leadership (100)
 - a) Visible involvement in leading TQ
 - b) A consistent TQ culture
 - c) Recognition/reward
 - d) Provision of resources
 - e) Involve customers and suppliers
 - f) Promote TQ outside organisation

- (2) Policy & Strategy (80)
 - a) How PS based on TQ concepts
 - b) How PS are formed on TQ basis
 - c) How PS are basis for business plans
 - d) How PS are communication
 - e) How PS are reviewed and improved

- (3) People Management (90)
 - a) How CI in people accomplished
 - b) How skills developed
 - c) How people and teams agree targets and CI
 - d) How participation is encouraged
 - e) How effective is communication up and down

- (4) Resources
 - a) Financial resources
 - b) Information resources
 - c) Material resources
 - d) Application of technology

- (5) Processes (140)
 - a) How critical processes are identified
 - b) How processes are systematically managed
 - c) How performance measures and feedback used
 - d) How innovation and creativity stimulated
 - e) How process changes are implemented and evaluated

TOTAL (out of 500)

APPENDIX 4.1

Company () Account

Measure

Years

2000, 2001, 2002, 2003, 2004

Rank/Average

2001, 2003, 2004

Rank by Assets
(The Building Leagues Barbour)

Profitability

Capital Strength

Market Share

Revenues

Note: The actual figures for this analysis are not allowed to be published as the organisations' did not approve.

APPENDIX 4.2

Performance Index Years

Company Name	Profit	Capital Strength	Market Share	Revenues
H				
I				
F				
G				
R				
P				
	<hr/>	<hr/>	<hr/>	<hr/>
	X	Y	M	V
Total for all 6 Companies From year 2001				

APPENDIX 4.3

Change in Performance Index 2001/2004

	Profit (Pre tax)	Capital Strength	Market Share	Revenues
Index 2001	X			
Index 2004	W			
	_____	_____	_____	_____
Change	xxxx			
Change %	xxxx			

Note: The actual figures for this analysis are in A.4.6

APPENDIX 4.4

Best and Worst Performance 2001-2004 Compared to Industry Performance Index

COMPANY NAME	SELF-ASSESSMENT SCORE	PROFIT (PRE TAX) OPERATING %	MARKET SHARE OPERATING %	REVENUE %
Index from A.4.3 Table		3.2	2.9	2.6
H	255	+4.9	+1.8	+3.1
I	230	+3.6	+3.6	4.1
F	217	+8.3	+3.8	6.9
G	213	+3.6	+3	3.3
P	202	+2.3	+2.5	1.1
R	191	+4.1	+2.7	2.5

* Note the actual figures for this analysis are in Appendix A.4.6

MIXED MESSAGES

It's report time again. The good news is that turnover among construction's big-hitters is on the up, especially in the services sector where growth is at its strongest. The bad news is that return on capital is in a dismal state. Analysis by **Jonathan Hook** of PricewaterhouseCoopers.

How is UK Construction PLC faring? Is it in rude health? The headlines in the past few years have been depressing - accounting problems here, bad contracts there and housebuilding bubbles about to burst just about everywhere else. But does this tell the true story?

Here, the PricewaterhouseCoopers construction team does some investigative work and digs up the figures. It has monitored the financial results for 2003 of 37 of the largest UK construction and housebuilding groups, with a combined annual turnover of more than £42bn. The research is based solely on publicly available information.

The reported results have been segmented into construction, housebuilding, services and other.

The overview

The key findings for the group of companies, compared with 2002, were as follows:

- Major UK players grew overall turnover by an average of 12% in 2003
- The services sector had the strongest growth of 25% and now accounts for 17% of total business
- Housebuilding improved average margins by 1.5% to 17.1%
- Construction margins of 2.4% were almost identical to 2002
- There was a major deterioration in return on capital employed from construction from 166% to 112%.

Turnover: A continuing move to services

Turnover grew by 12% and the relative performance of the sub-sectors was as follows:

- Growth of 5.4% includes the full year impact of acquisitions by Lalng O'Rourke and Rok. Excluding the effect of these transactions, like for like underlying growth was approximately 2%.
- Housebuilding growth of 16.3% includes the effect of the Taylor

Woodrow acquisition of Wilson Connolly and after adjusting for that was 14%. A number of the major players such as Persimmon, Westbury, Crest Nicholson and Redrow reported growth in the 7-11% range. Growth of 20% plus though was achieved by Barratt and Bellway.

■ The services sector, which includes activities such as facilities management, utility services and consulting, continued to be the area companies are growing in the most strongly with reported growth of 24%. Once again, there is an acquisition element to this, but the growth highlights the extent to which the construction sector is determined to build a more stable stream of annuity revenue and expand its services offering to clients. AMEC, Alfred McAlpine and Carillion all reported significant growth in this area.

Margins: Any improvement?

The margins achieved in the key sectors in 2003 were as follows:

- Construction 2.4% (2002, 2.4%)
- Housebuilding 17.1% (2002, 14.6%)
- Services 3.7% (2002, 4.8%).

In construction, average margins have remained stable at about 2.4%. Most in the industry should agree that this is a poor return for the risk and complexity of the services provided. There is no real evidence that the larger players are leading the way in improving the industry's margins or that negotiated work, partnering and PFI are paying real dividends yet.

The higher end margins are principally coming from more specialist areas such as rail and M&E. In a period of skills shortages, most of the industry has not yet shown an ability to break out of a low margin environment.

In housebuilding, prices have held up well and this has led to average margins improving from 15.6% to 17.1%.

The margins achieved in services are perhaps surprisingly not higher with an

average of 3.7%, and are down from 4.8% in 2002.

The reason for the move of many contractors into services is the greater level of certainty over income levels and the reduced likelihood of major contract losses. Good margin growth can be expected for many firms in services over the next few years, provided they are selective and stick to a limited number of core specialist services without incurring heavy capital investment.

Return on capital employed:

A deteriorating trend in construction

The relative returns from dividing operating profit by net operating assets in each of the main sectors are set out opposite:

■ While the returns in construction are still good, there has been a substantial decline in the year. The industry appears to be feeling the effects of reduced levels of advanced client monies, bid costs in the PFI and partnering commitments - all of which have resulted in a build up of working capital. The traditional argument of some in the sector "forget about the 1-2% margin, look at the fantastic return on capital" starts to look weaker. In short, the industry should not be afraid to invest, but must start demanding better margins for its efforts.

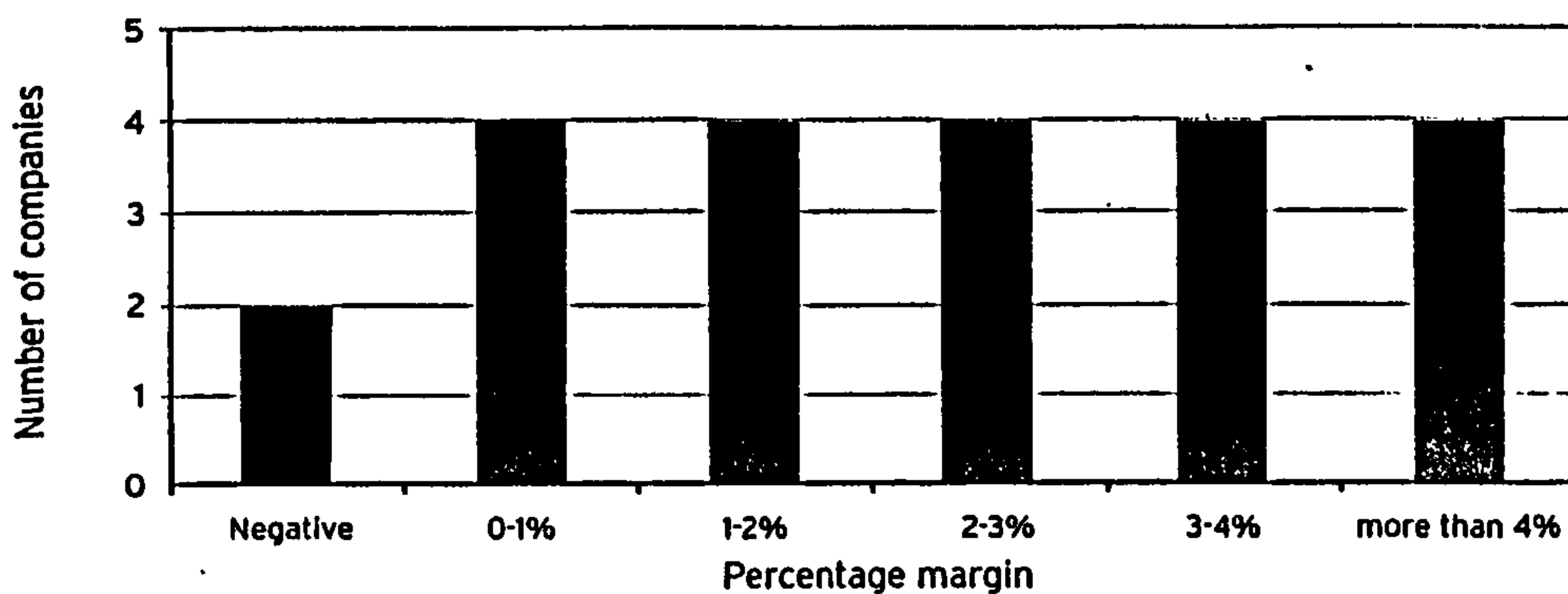
■ In housebuilding, average return on capital is stable at about 25%; however, ranges between companies are from just over 10% up to 80%, the best performers being the likes of Kier and Country & Metropolitan. Some of the groups with lower returns may result from a policy of investing in longer land bank, however, a number are just finding it difficult to turn their capital over as quickly as they would like.

Jonathan Hook is PricewaterhouseCoopers head of UK construction & building

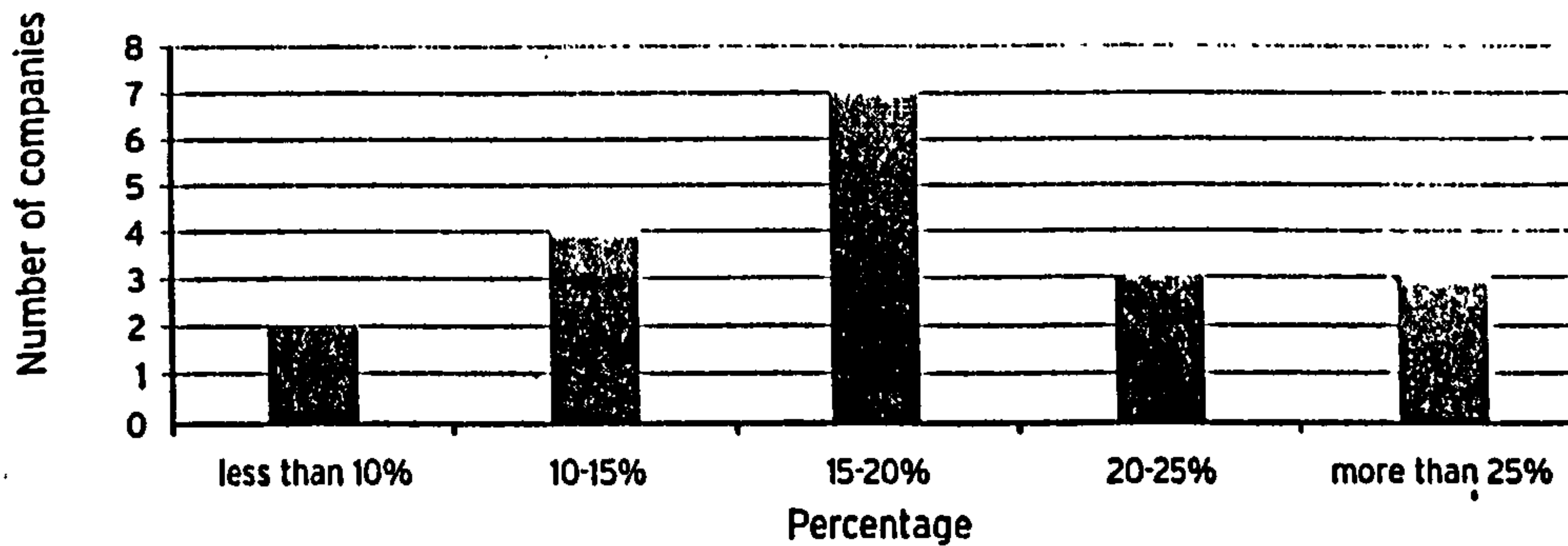
Turnover totals



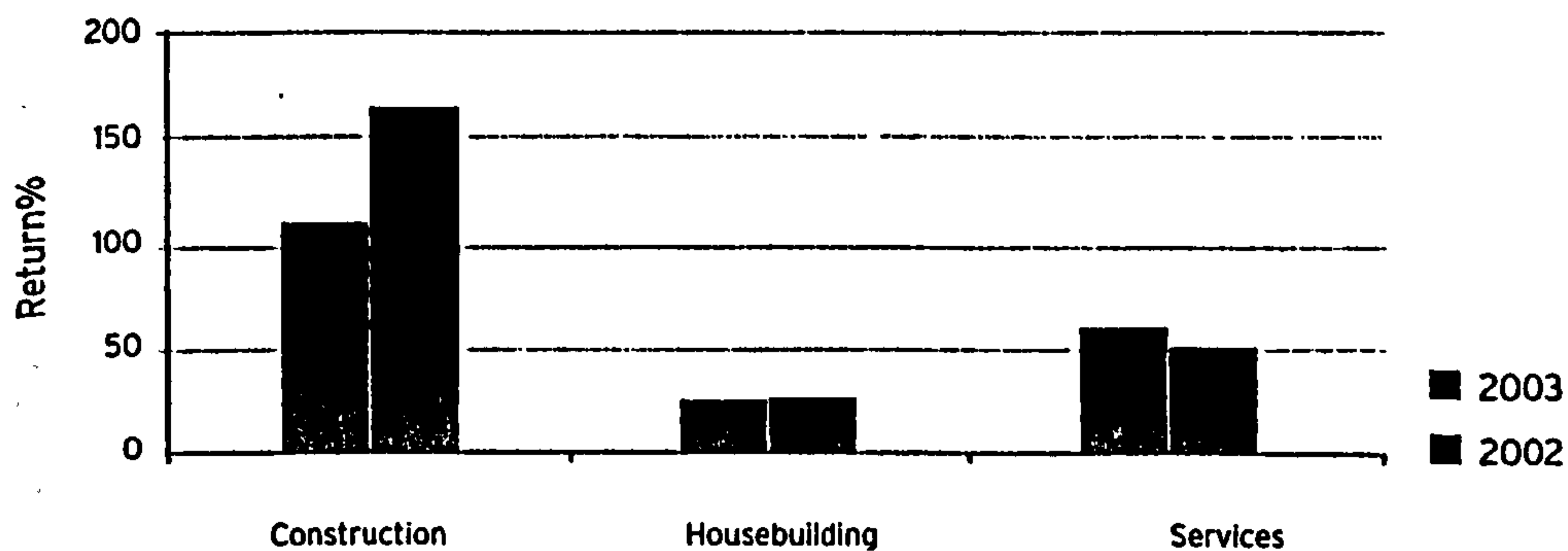
Construction margin spread



Housebuilding margin spread



Return on capital



**TEXT BOUND INTO
THE SPINE**

TOP 100 CONTRACTORS AND HOUSEBUILDERS BY TURNOVER

Company	Total turnover £000	Year end	Contracting £000	Housing £000	Property £000	Services £000	Other £000
1 Amec	4,032,600	Dec-00	2,475,300	-	184,800	1,356,700	15,800
2 Bovis Lend Lease	3,931,034	Jun-00	3,931,034	-	-	-	-
3 Balfour Beatty*	2,603,000	Dec-00	2,504,000	-	-	-	99,000
4 Taylor Woodrow	2,244,700	Dec-00	500,900	1,519,300	141,900	-	82,600
5 Carillion	1,992,900	Dec-00	1,129,400	-	-	614,200	249,300
6 Wimpey	1,702,000	Dec-00	-	1,702,000	-	-	-
7 Persimmon	1,582,764	Dec-00	-	1,582,764	-	-	-
8 Laing	1,574,400	Dec-00	854,200	567,700	61,100	-	91,400
9 Mowlem	1,514,000	Dec-00	1,153,000	-	8,000	226,000	127,000
10 Skanska Construction	1,300,000	Dec-00	1,300,000	-	-	-	-
11 Barratt Developments	1,259,500	Jun-00	-	1,259,500	-	-	-
12 Kier Group	1,034,800	Jun-00	937,400	97,400	-	-	-
13 Alfred McAlpine	981,038	Dec-00	374,075	463,405	10,057	131,451	2,050
14 Berkeley Group	947,489	Apr-01	-	868,948	78,541	-	-
15= HBG/Edmund Nuttall*	929,300	Dec-00	929,300	-	-	-	-
15= Interserve	929,300	Dec-00	453,100	1,900	-	465,800	8,500
17 Wilson Bowden	726,800	Dec-00	-	568,800	158,000	-	-
18 Jarvis	725,779	Mar-01	-	-	-	725,779	-
19 Wilson Connolly	701,100	Dec-00	-	701,100	-	-	-
20 Amey	700,163	Dec-00	-	-	-	700,163	-
21 Morgan Sindall	654,836	Dec-00	317,605	107,709	172	-	229,350
22 Newarthill	640,900	Oct-00	575,053	-	7,720	-	58,127
23 Bellway	634,301	Jul-00	-	634,301	-	-	-
24 Miller	556,479	Dec-00	318,117	158,678	79,684	-	-
25 Crest Nicholson	555,200	Oct-00	133,100	357,100	65,000	-	-
26 Morrison Construction	509,825	Mar-00	246,881	-	134,360	128,584	-
27 Westbury	491,465	Feb-01	-	491,465	-	-	-
28 Galliford Try	458,374	Jun-00	355,427	102,947	-	-	-
29 Mansell*	457,001	Dec-00	457,001	-	-	-	-
30 Shepherd Building Group	454,700	Jun-00	212,144	-	-	-	242,556
31 Birse Group	423,423	Apr-00	414,919	-	4,409	-	4,095
32 Redrow Group	405,694	Jun-00	-	396,700	8,994	-	-
33 Wates Construction	400,758	Dec-00	400,758	-	-	-	-
34 Ballast	390,153	Dec-00	390,153	-	-	-	-
35 Costain Group	386,300	Dec-00	386,300	-	-	-	-
36 Norwest Holst*	381,767	Dec-00	381,767	-	-	-	-
37 Bowmer & Kirkland *	366,837	Aug-00	366,837	-	-	-	-
38 Montpellier	361,304	Sep-00	339,171	18,703	-	-	3,430
39 NG Bailey	358,521	Feb-00	358,521	-	-	-	-
40 Bloor Holdings	354,668	Jun-00	-	230,600	-	-	124,068
41 MJ Gleeson	349,607	Jun-00	241,115	106,969	1,523	-	-
42 Mitie Group	346,514	Mar-00	-	-	-	346,514	-
43 Peterhouse	329,178	Dec-00	129,209	-	-	199,969	-
44 Keller Group	312,954	Dec-00	312,954	-	-	-	-
45 Bovis Homes	304,996	Dec-00	-	304,996	-	-	-
46 Countryside Properties	299,461	Sep-00	-	259,260	40,201	-	-
47 Drake & Scull*	295,692	Dec-00	295,692	-	-	-	-
48 Staveley Industries	281,900	Apr-00	140,100	-	-	54,500	87,300
49 Willmott Dixon*	275,031	Dec-00	275,031	-	-	-	-
50 Fairview Holdings	256,800	Dec-00	-	256,800	-	-	-
51 Prowting	244,750	Feb-01	-	244,750	-	-	-
52 McNicholas Construction	236,926	Mar-00	236,926	-	-	-	-
53 Henry Boot*	226,787	Dec-00	226,787	-	-	-	-
54 Interior Services Group	219,900	Jun-00	-	-	-	219,900	-
55 Lorne Stewart	192,146	Dec-00	-	-	-	192,146	-
56 Bewater	191,200	Mar-00	87,400	-	-	-	103,800
57 O'Rourke	187,148	Mar-00	157,931	-	-	-	29,217
58 Simons Group	186,573	Mar-00	151,192	-	35,381	-	-
59 Ringway Group	181,341	Dec-00	-	-	-	181,341	-

TOP 100

C + H. by Pre-Tax Profit.

Company	Total pre-tax profit** £000	Year end	Contracting £000	Housing £000	Property £000	Services £000	Other £000	Interest etc*** £000
Wimpey	285,900	Dec-02		329,700				-43,800
Persimmon	256,800	Dec-02		299,800				-43,000
Taylor Woodrow	233,100	Dec-02	13,100	245,000	14,700			-39,700
Barratt Developments	220,000	Jun-02		227,900				-7,900
Berkeley Group	196,162	Apr-02		198,992	13,998			-16,828
Wilson Bowden	178,800	Dec-02		166,600	23,700			-11,500
Bellway	125,344	Jul-02		133,055				-7,711
Bovis Homes	104,703	Dec-02		109,591				-4,888
Balfour Beatty	88,000	Dec-02	100,000				49,000	-61,000
Redrow Group	85,100	Jun-02		95,300	3,100		1,427	-14,727
Westbury	83,316	Feb-03		112,632				-29,316
McCarthy & Stone	75,400	Aug-02		75,900				-500
Crest Nicholson	63,000	Oct-02	-3,400	79,200				-12,800
Jarvis	62,700	Mar-03				79,600		-16,900
General London Construction Holdings	60,600	Dec-02		90,151				-29,551
Wilson Connolly	54,600	Dec-02		73,000				-18,400
Carillion	42,200	Dec-02	17,000			36,400	7,800	-19,000
Skanska Construction	39,400	Dec-02	36,100					3,300
Amec	39,200	Dec-02	53,800		12,900	75,600	6,200	-109,300
Interserve	37,200	Dec-02	18,000			25,800	9,300	-15,900
Bloor Holdings	36,621	Jun-02		41,249			-8,385	3,757
Countryside Properties	34,313	Sep-02	2,639	39,376				-7,702
Mowlem	33,100	Dec-02	30,800		-100	14,100	6,100	-17,800
Mitie	30,357	Mar-02				29,967		390
Kier	28,000	Jun-02	12,500	22,200			-600	-6,100
Miller	27,400	Dec-02	6,200	28,000	11,200			-18,000
Keller	27,330	Dec-02	34,344					-7,014
Linden	22,904	Dec-02		25,436				-2,532
Alfred McAlpine	21,699	Dec-02	16,957			17,798	1,035	-14,091
Bowmer & Kirkland	19,652	Aug-02	16,150					3,502
Galliford Try	18,015	Jun-02	411	22,487			-2,635	-2,248
Southern Electric Contracting	17,605	Mar-02	8,459					9,146
Bett Brothers	17,154	Aug-02		15,288	5,058			-3,192
Henry Boot	17,140	Dec-02	3,648	11,700				1,792
Morgan Sindall	15,530	Dec-02	1,596	5,965			8,130	-161
MJ Gleeson	15,077	Jun-02	10,053	575	10,111			-5,662
HBG Construction	14,800	Dec-02	9,100		12,600		1,100	-8,000
Peterhouse	14,500	Dec-02	3,300			18,800		-7,600
Enterprise	12,900	Dec-02				18,800		-5,900
Bovis Lend Lease	12,798	Jun-02	3,941					8,857
Marshall Holdings	12,400	Dec-01	13,165					-765
Costain	11,300	Dec-02	500		7,500			3,300
T Clarke	10,796	Dec-02	10,182					614
RG Carter Holdings	10,089	Dec-01	6,481					3,608
Vinci	9,927	Dec-02	9,195					732
Wates Group	9,700	Dec-02	11,615					-1,915
J Murphy & Sons	9,077	Dec-01	8,427					650
Stewart Milne	8,508	Jun-02		11,506				-2,998
Ringway	8,166	Dec-01				8,471		-305
Severfield-Rowen	7,519	Dec-02	7,526					-7
NG Bailey	7,268	Feb-02	2,540					4,728
Interior Services Group	7,103	Jun-02	6,712					391
Birse	6,729	Apr-02	2,412		762		2,385	1,170
Fitzpatrick	6,175	Dec-02	5,854					321
EmcorDrake & Scull	5,657	Dec-01	4,773					884
Higgins	5,341	Jul-02	4,266	4,576	492			-3,993
O'Rourke	5,178	Mar-02	6,614					-1,436
Keepmoat Holdings	5,168	Mar-02		4,855				313
Seddon	5,016	Dec-02	4,862					154
Montpellier	4,851	Sep-02	4,926					-75

TOP

100

25 July 2003

CONTRACTORS and Housebuilders Turnover

	Company	Total turnover £000	Year end	Contracting £000	Housing £000	Property £000	Services £000	Other £000
1	Amec	4,381,100	Dec-02	2,410,700		156,700	1,781,100	32,600
2	Balfour Beatty*	3,441,000	Dec-02	3,308,000				133,000
3	Wimpey	2,600,100	Dec-02		2,600,100			
4	Taylor Woodrow	2,215,800	Dec-02	371,100	1,751,800	92,900		
5	Carillion	2,008,700	Dec-02	1,125,400			821,700	61,600
6	Mowlem	1,936,000	Dec-02	1,540,000		1,000	389,000	6,000
7	Barratt Developments	1,799,400	Jun-02		1,799,400			
8	Persimmon	1,711,100	Dec-02		1,711,100			
9	Kier	1,382,700	Jun-02	1,218,400	158,800			5,500
10	Skanska Construction*	1,350,000	Dec-02	1,350,000				
11	Jarvis	1,217,200	Mar-03				1,217,200	
12	Interserve	1,122,900	Dec-02	467,900			544,500	110,500
13	Berkeley Group	1,085,098	Apr-02		1,025,859	59,239		
14	Morgan Sindall ¹	1,038,387	Dec-02	617,592	223,558			197,237
15	Wilson Bowden	983,900	Dec-02		827,000	156,900		
16	Amey*	917,164	Dec-02				917,164	
17	Westbury	790,937	Feb-03		790,937			
18	Alfred McAlpine	783,851	Dec-02	363,786			381,816	38,249
19	Bellway	772,964	Jul-02		772,964			
20	Bovis Lend Lease ²	761,332	Jun-02	761,332				
21	Laing ³	755,000	Dec-02		456,100	43,100		255,800
22	Wilson Connolly	714,900	Dec-02		714,900			
23	Crest Nicholson	699,400	Oct-02	183,900	515,500			
24	Miller	656,700	Dec-02	254,700	280,800	121,200		
25	HBG Construction	654,400	Dec-02	575,400		66,200		12,800
26	Galliford Try	649,783	Jun-02	487,296	161,959			528
27	Sir Robert McAlpine	648,332	Oct-02	648,332				
28	Morrison Construction/AWG ⁴	605,547	Mar-02	372,231			231,656	1,660
29	MJ Gleeson	580,634	Jun-02	428,230	112,970	39,434		
30	Redrow Group	573,300	Jun-02		543,100	30,200		
31	Shepherd Building Group*	557,300	Jun-02	557,300				
32	Costain	543,400	Dec-02	525,500		17,900		
33	Mansell*	528,989	Dec-02	528,989				
34	Mitie	518,852	Mar-02				518,852	
35	Keller	510,971	Dec-02	510,971				
36	Wates Group*	505,000	Dec-02	505,000				
37	Bowmer & Kirkland*	498,148	Aug-02	498,148				
38	Birse	491,641	Apr-02	481,832		1,217		8,592
39	Bovis Homes	461,284	Dec-02		461,284			
40	Countryside Properties	456,081	Sep-02	97,418	358,663			
41	Vinci*	450,740	Dec-02	450,740				
42	NG Bailey	448,894	Feb-02	448,894				
43	Montpellier*	447,856	Sep-02	447,856				
44	Peterhouse	446,500	Dec-02	136,600			309,900	
45	General London Construction Holdings ⁵	435,300	Dec-02		435,300			
46	Bloor Holdings	408,988	Jun-02		277,109			131,879
47	Interior Services Group ⁶	405,654	Jun-02	405,654				
48	Ballast	361,344	Dec-02	361,344				
49	Emcor Drake & Scull*	329,971	Dec-01	329,971				
50	O'Rourke	318,939	Mar-02	318,939				
51	Willmot Dixon*	314,585	Dec-02	314,585				
52	Enterprise	282,300	Dec-02				282,300	
53	Fitzpatrick	262,223	Dec-02	262,223				
54	Simons*	254,731	Mar-02	254,731				
55	Accord	239,684	Dec-02				239,684	
56	Staveley Industries*	239,318	Dec-02	239,318				
57	McNicholas Construction*	238,917	Mar-02	238,917				
58	Rok Property Solutions	234,275	Dec-02	183,786		33,512	10,088	6,889
59	Linden	232,896	Dec-02		232,896			

TOP 100

CONTRACTORS AND HOUSEBUILDERS BY TURNOVER

2005	2004	Company	Total turnover £000	Year end	Contracting £000	Housing £000	Property £000	Services £000	Other £000
1	1	Amec	4,816,400	Dec-04	1,368,400			2,293,800	1,212,100
2	2	Balfour Beatty*	4,171,000	Dec-04	3,883,000				288,000
3	4	Taylor Woodrow	3,361,200	Dec-04	410,400	2,874,000	74,200		
4	30	Bovis Lend Lease**	3,155,360	Jun-04	3,155,360				
5	3	Wimpey	3,005,700	Dec-04		3,005,700			
6	5	Barratt Developments	2,434,100	Jun-04		2,434,100			
7	8	Persimmon	2,131,300	Dec-04		2,131,300			
8	6	Mowlem	2,094,000	Dec-04	1,501,000		100	579,900	12,200
9	7	Carillion	1,991,800	Dec-04	1,010,800			944,900	62,500
10	10	Laing O'Rourke	1,541,136	Mar-04	1,474,958				212,085
11	9	Kier	1,476,500	Jun-04	1,205,000	215,700	46,600		9,200
12	11	Berkeley Group	1,396,133	Apr-04		1,251,139	144,994		
13	12	Jarvis	1,363,400	Mar-04				1,363,400	
14	14	Wilson Bowden	1,282,300	Dec-04		1,166,300	116,000		
15	13	Interserve	1,268,500	Dec-04	545,300			605,200	118,000
16	15	Morgan Sindall†	1,221,574	Dec-04	603,396	364,307			253,871
17	17	Belway	1,092,571	Jul-04		1,092,571			
18	-	Amey UK	960,712	Dec-04				942,253	18,459
19	18	Alfred McAlpine	947,300	Dec-04	330,400			575,000	41,900
20	19	Westbury	893,000	Feb-05		893,000			
21	16	Skanska Construction**	819,628	Dec-04	819,628				
22	25	HBG UK*	809,500	Dec-04	809,500				
23	22	Sir Robert McAlpine	762,141	Oct-03	762,141				
24	20	Miller	752,200	Dec-04	285,400	394,400	72,400		
25	21	Costain	702,900	Dec-04	690,700		12,200		
26	23	Galliford Try	695,400	Jun-04	512,905	182,031			464
27	33	Mitie	694,513	Mar-04				694,513	
28	27	Redrow Group	670,300	Jun-04		662,700	7,200		400
29	26	MJ Gleeson	657,087	Jun-04	528,255	111,298	5,443		12,091
30	31	Crest Nicholson	643,200	Oct-04		643,200			
31	29	Wates Group	640,914	Dec-04	580,015	47,370			13,529
32	28	Shepherd Building Group*	603,400	Jun-04	603,400				
33	30	Bovis Homes	599,464	Dec-04		599,464			
34	32	Keller	595,856	Dec-04	595,856				
35	24	AWG Construction Services	568,734	Mar-04	323,851			244,883	
36	36	Bowmer & Kirkland *	537,488	Aug-04	537,488				
37	34	Vinci*	509,745	Dec-04	509,745				
38	42	ROK Property Solutions	494,500	Dec-04	402,100		60,300	27,100	5,000
39	39	Edmund Nuttall	491,850	Dec-04	491,850				
40	-	Laing	480,700	Dec-04	480,700				
41	44	Bloor Holdings	470,828	Jun-04		337,914			132,914
42	40	Montpellier*	461,695	Sep-04	461,695				
43	37	Birse	417,355	Apr-04	411,600		305		9,588
44	47	Willmot Dixon*	410,393	Dec-04	410,393				
45	48	Enterprise	410,000	Dec-04				410,000	
46	46	Emcore Drake & Skull*	383,213	Dec-04	383,213				
47	43	NG Bailey	382,281	Feb-04	382,281				
48	45	Interior Services Group†	368,866	Jun-04	368,866				
49	41	Countryside Properties	368,366	Sep-04	97,489	270,877			
50	50	Fairview Holdings	365,654	Dec-04		365,654			

NOTES

Turnover refers to group total, including joint ventures

* full split of activities not provided in reports and accounts, therefore turnover and/or profits assigned to main activity

† Bovis data refers to Bovis Lend Lease Group's worldwide operations. Taken from parent group Lend Lease's annual report

‡ Morgan Sindall's housing refers to affordable housing

§ Skanska results taken from Skanska Group accounts, and converted to Sterling values

¶ Interior Services Group data excludes construction management

* Fitzpatrick acquired by VolkerWessels in May 2004



APPENDIX 4.7

Organisation: "H" Company

Criteria	Observed Behaviours
(1) Leadership (100) <ul style="list-style-type: none">g) Visible involvement in leading TQh) A consistent TQ culturei) Recognition/rewardj) Provision of resourcesk) Involve customers and suppliersl) Promote TQ outside organisation	58
(2) Policy & Strategy (80) <ul style="list-style-type: none">f) How PS based on TQ conceptsg) How PS are formed on TQ basish) How PS are basis for business plansi) How PS are communicationj) How PS are reviewed and improved	40
(3) People Management (90) <ul style="list-style-type: none">f) How CI in people accomplishedg) How skills developedh) How people and teams agree targets and CIi) How participation is encouragedj) How effective is communication up and down	45
(4) Resources (90) <ul style="list-style-type: none">e) Financial resourcesf) Information resourcesg) Material resourcesh) Application of technology	28
(5) Processes (140) <ul style="list-style-type: none">f) How critical processes are identifiedg) How processes are systematically managedh) How performance measures and feedback usedi) How innovation and creativity stimulatedj) How process changes are implemented and evaluated	84
TOTAL (out of 500)	255

APPENDIX 5

Critical Factors

Listed below on the right of the page are several statements, which are considered by some to represent the critical factors of TQM. Please indicate whether or not you agree with each statement by placing a tick in the appropriate bracket opposite ().

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	
()	()	()	()	()	<u>Leadership</u> It is vitally important that the CEO becomes personally involved and committed to any TQM implementation. Without this support over a long period it will fail.
()	()	()	()	()	It is vitally important that the executive team collectively own and support any TQM implementation. Without this commitment over a long period it will fail.
()	()	()	()	()	It is vitally important that senior managers become personally involved and committed to any TQM implementation. Without this supportive behaviour over a long period it will fail.
()	()	()	()	()	<u>Mission and Strategy</u> It is vitally important for long term survival and prosperity that construction companies adopt TQM as a major part of their Mission, Strategy and Business Plans.
()	()	()	()	()	<u>Organisation Structures</u> TQM requires organisations to create structures, which support key business processes.
()	()	()	()	()	Functional structures are not well suited to TQM.
()	()	()	()	()	TQM can be implemented successfully using change teams without necessarily changing the existing organisation structure.
()	()	()	()	()	TQM normally requires fundamental restructuring of an organisation.
()	()	()	()	()	<u>Human Relations</u> HR policies and practices should reflect the principles of TQM.

Critical Factors

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree
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()	()	()	()	()
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Processes

TQM requires that key business processes are identified at an early stage, they are mapped and well documented, and are then subjected over time to continuous review.

Performance Measures

Construction Companies who are committed to TQM will seek to measure and improve their performance in each of the following areas:

()	()	()	()	()
-----	-----	-----	-----	-----

Customer Satisfaction

()	()	()	()	()
-----	-----	-----	-----	-----

Staff Satisfaction

()	()	()	()	()
-----	-----	-----	-----	-----

Society in general or the community in which it operates.

()	()	()	()	()
-----	-----	-----	-----	-----

Business results/financial Performance

Others (please Specify)

.....

Principles

Listed below on the right of the page are several statements, which are considered by some to represent the basic principles of TQM. Please indicate whether or not you agree with each statement by placing a tick in the appropriate bracket opposite.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	Principles
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Construction companies must focus on customer satisfaction.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Construction companies must design processes, which deliver products/services, right first time.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Design processes which are error free (zero defects).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Top management should take responsibility for quality improvement.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TQM must be viewed as a long term strategy, not a short term campaign.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Organisations must continuously review and improve their business processes (continuous improvement).
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Processes should be designed on prevention principles rather than with an emphasis on inspection.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Organisations should have an emphasis on creating a culture of participation and empowerment rather than command and control.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Organisations should strive to drive out fear, uncertainty, and insecurity amongst its staff.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SPC is a vital tool in the measurement and control of business processes.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	An emphasis on teamwork is essential for TQM
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Individual performance appraisal is not consistent with TQM.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Organisations should invest heavily in education and training.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Measurement of the costs of quality is an essential part of TQM.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Companies should seek to establish long-term relations with suppliers, agents, and business contacts, viewing them as extensions of the business.

Techniques

Listed below on the right of the page are several techniques, which have been associated by some with TQM. Please indicate whether or not you feel the techniques are useful for construction companies by placing a tick in the appropriate bracket opposite.

strongly agree	agree	neither agree nor disagree	disagree	strongly disagree	
()	()	()	()	()	<u>Techniques</u> BS 5750
()	()	()	()	()	Business Process Re-engineering (BPR)
()	()	()	()	()	Benchmarking
()	()	()	()	()	Statistical Process Control (SPC)
()	()	()	()	()	Self Assessment eg European Quality Award
()	()	()	()	()	Balanced Performance Measures eg balanced Scorecards
()	()	()	()	()	Quality Circles/Quality Improvement Teams
()	()	()	()	()	Leadership style based on Coaching methods.
()	()	()	()	()	Individual Performance Appraisal
()	()	()	()	()	Team based performance appraisal
()	()	()	()	()	Performance related pay
()	()	()	()	()	Competency based pay
()	()	()	()	()	Service Standards
()	()	()	()	()	Service Level Agreements
()	()	()	()	()	Use of external consultants

Others (please specify)

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APPENDIX 6

Critical Factors of TQM

As discussed in our telephone conversation could you please complete the following and return it to me at your earliest convenience. Furthermore, if you have any additional comments please could you also send them to me.

	Neutral	Important	Critical
1. Clear vision, or purpose statement, supporting quality improvement.	()	()	()
2. Cost of quality process to waste, rejects and scrap.	()	()	()
3. Culture change or transformation	()	()	()
4. Customer satisfaction focus	()	()	()
5. Education for all employees on QIP, both formal and on the job.	()	()	()
6. Goal clarity and goal agreement, constancy of purpose toward improvement.	()	()	()
7. Goal setting process.	()	()	()
8. Management commitment and support, actively demonstrated.	()	()	()
9. Measurement processes; simple statistical tracking techniques.	()	()	()
10. Participative management, employee empowerment culture.	()	()	()
11. Problem identification process.	()	()	()
12. Problem solving and tracking process.	()	()	()
13. Project by project improvement process.	()	()	()
14. Published quality successes.	()	()	()
15. Quality Circles, improvement teams.	()	()	()
16. Error prevention processes, as opposed to quality inspection.	()	()	()
17. Recognition program that rewards quality improvements	()	()	()
18. Statistical process control; to identify and reduce variation.	()	()	()

- | | | | |
|--------------------------------------------------------------------------------|-----|-----|-----|
| 19. Steering committee guiding the process, made up of management. | () | () | () |
| 20. Strategic quality planning of the overall quality journey. | () | () | () |
| 21. Vendor partnerships, with a process to ensure high quality input products. | () | () | () |
| 22. Zero defects attitude. | () | () | () |

Others (specify)

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Thank you for your help and co-operation.

Table A6. Summary of Best Practices from Case Study Analysis

<u>FACTOR</u>	<u>BEST PRACTICE</u>
LEADERSHIP	<ul style="list-style-type: none">◆ CEO commitment, lead TQM, involvement not delegation.◆ Understanding and expertise in TQM critical factors, principles, techniques◆ Develop Quality initiatives to suit the organisation - do not rely on packages◆ View TQM as a strategic tool◆ Emphasise long term investment in education, training, research, innovation.◆ Understand key business processes / hands on style◆ Take long term, and balanced stakeholder view of performance◆ Favour coaching style, pragmatic
POLICY/STRATEGY	<ul style="list-style-type: none">◆ TQM part of Corporate Planning Process◆ Integrate TQM into business, and business plans◆ Focus on deployment - reduce communication lines, use cross function teams, team emphasis not individual appraisal◆ Emphasis on Corporate Values◆ Use Self Assessment◆ Use Balanced Performance Measures
PEOPLE	<ul style="list-style-type: none">◆ Align HR policies and practices with TQM◆ Increase emphasis on teams◆ Commitment to long term education and training◆ Emphasis on roles and competency development◆ Feedback and open communication with staff - emphasis on action on key issues◆ Increasing emphasis on team based rewards, competency based pay, gain sharing◆ Decreasing emphasis on personal appraisal, performance related and commission based pay◆ Focus on changing activities rather than more abstract cultural issues
RESOURCES	<ul style="list-style-type: none">◆ Integrate TQM into business◆ Focus on deployment◆ Employ experts◆ Reduce lines of communication◆ Use project and cross function teams◆ Develop flexible organisation structures◆ Focus on roles and competencies rather than individuals and functions◆ Develop external links - for expertise, for benchmarking, for supplier relations
PROCESSES	<ul style="list-style-type: none">◆ Identify and focus on key business processes◆ Develop critical performance measures - few but relevant◆ Develop process organisation culture◆ Hands on style from top◆ High use of principles- prevention, empowerment, continuous improvement, spc and measurement, teamwork◆ High use of techniques- BPR, benchmarking, QFD, flowcharting, quality systems
PERFORMANCE	<ul style="list-style-type: none">◆ Moving to balanced measures / stakeholders◆ Moving to self assessment frameworks e.g. EQA / MBNQA