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TQM IN THE RUBBER INDUSTRY

'A CASE STUDY ON ORGANISATIONAL CHANGE'

by

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A Thesis Submitted to the
University of Glasgow
for the Degree of
Doctor of Philosophy

Department of Management Studies

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ABSTRACT

Total Quality Management (TQM) has been established in the western world for over 15 years, yet attempts to implement it have reported mixed success. Although the technique adopts a planned prescriptive approach to change, organisations have not found it so easy to implement and to achieve the expected benefits. This thesis attempts to identify the factors, which influence both the implementation and success of TQM, and to establish whether TQM actually improves business performance. The aim of the study is to reach a better understanding of the most important influences on TQM, and thereby provide some insights into the reasons for its apparent low success rate. Six international manufacturing plants belonging to the Gates Rubber Company have been selected for this case study on organisational change.

Part one provides a historical review of the Gates Corporation and the quality initiatives, in order to understand the background to the research. Chapter three selectively reviews the current literature on organisational change and discusses some of the theories and models relevant to our area of study. In chapter four we cover the area of TQM and in chapter five we develop a theoretical framework for the empirical analysis, based on the incentive, receptivity and ability factors identified. Chapter six discusses the methodology adopted to capture the data. This is followed by an overview of each of the plants involved in the study.

Part two, chapter seven, presents the results of the survey of the six manufacturing plants, located throughout the USA and Europe, in an attempt to identify the factors influencing TQM and discusses the correlation between TQM adoption and performance success. The research suggests that the incentive to change, the receptiveness of the environment of change and the ability of management to cope with change, are all major factors of influence on the success of a TQM programme. The thesis identifies four plants which

appear to fit the hypothesis that successful TQM implementation results in improved performance, albeit selective measures, and that poor implementation results in poor selective performance. Two plants do not fit the hypothesis and are discussed in part three.

Part three, chapters eight to ten, discusses the two exceptional plants in more detail and concludes that strategic diversion in the form of rapid business growth adversely affected one plant (Balsareny) which resulted in a good attempt at TQM implementation not providing results improvement in selected performance measures. In the case of the second plant (Dumfries) a combination of selecting specific elements of TQM and the influence of both business growth and automotive customers resulted in a less successful TQM implementation programme, but achieved good improvement in selected performance results. The research suggests that the implementation of TQM is influenced by many interrelated factors, which can vary across plants and over time. Nevertheless there does appear to be a link between successful TQM implementation and improved business performance results. It also highlighted that a selective approach to TQM does appear to work in some cases. The thesis concludes that the future for TQM still appears uncertain possibly due to the limited literature on success stories and also organisations reluctance to embrace an approach which, although publicised by consultancy groups as being effective, has still to receive full recognition and acceptance in the business world.

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LIST OF MAIN ABBREVIATIONS

BPR:	Business Process Re-Engineering
EQA:	European Quality Awards
GEM:	Gates Enriched Management
GBLP:	Gates Business Leadership Process
GQC:	Gates Quality Commitment
HRM:	Human Resource Management
ISO:	International Organisation for Standardisation
JIT:	Just In Time
LP:	Lean Production
MBNQA:	Malcolm Baldrige National Quality Awards
PT:	Power Transmission
SPC:	Statistical Process Control
TQC:	Total Quality Control
TQM:	Total Quality Management

CHAPTER 1

INTRODUCTION

Why study TQM ?

One of the key developments in the business world over the last few years has been the increasing awareness of the importance of quality management. The economic success of the Japanese has for a number of years been ascribed to a strong focus on quality improvement, and research in this area is increasingly highlighting that practitioners in the west, particularly in the United States, are focusing attention on quality improvement in order to maintain the advantage over their competitors. (Redman, 1995).

In addition to this, certain fundamental changes in the product market environment in recent years have prompted numerous individual organisations in advanced industrialised economies to rethink and reformulate the nature of their competitive strategies. One of the most high profile directions of proposed and actual change in this regard has been the discussion and implementation of total quality management (TQM) programmes (Lawler et Al, 1992). These TQM programmes have been viewed as an instrument of organisational development and change which have potentially greater staying power than their linear predecessor, quality circles.

The last decade has seen this new organisational innovation in the western world develop to the stage where it is frequently proclaimed to solve the problems facing organisations in

the new global markets, yet apart from the major case studies and success stories, there appears to be a general lack of understanding of TQM and a belief by managers that TQM may not have the ability to improve all types of organisation and cope with all situations. The author's first hand experience of attempts to introduce TQM into an organisation has confirmed this lack of understanding and reluctance to embrace the TQM philosophy and this has prompted a need to understand more about TQM.

This chapter gives a brief history of how TQM evolved and how it has been received by organisations, it then explains the purpose of the work, including the motivation for the research. The chapter then identifies the key research questions to be addressed and the methodology used to obtain the data. Finally, it outlines the plan and structure of the work.

The Evolution of TQM

Organisational change has been taking place since the industrial revolution started, however the emphasis on quality is more recent. Since the early 1950's the Japanese have been applying the tools and principles of quality, with results that are the envy of the industrialised world. They have become a major force in automobiles and motor cycles, television and stereo equipment, calculators and copiers. Much of their success can be traced to a handful of men, the so-called quality gurus. Among those who influenced the quality strategies of the Japanese were, W. Edwards Deming and Joseph M Juran, both distinguished American statisticians. They each offered theories on quality that after World War II were initially better received in Japan than in the United States. The western world took a bit longer to realise the importance of the quality principles. Tuckman (1995) outlines the development of TQM in the west in a four phase model, fig 1

First phase: Late 1970s to - early 1980	Some experimentation with Quality Circles. Mostly affected by firms in direct competition with industrial sectors in which Japan had concentrated, e.g. electronics and motor industries.
Second phase: The 1980s	Major companies, often affected by world recession, concerned with control of suppliers and subcontractors.
Third phase: From mid 1980s	A growing concern with customer service, particularly in the service sector.
Fourth phase: From late 1980s	Penetration of concerns with customer service in areas which previously had not recognised the existence of customers.

Figure 1: The Development of TQM in the West

Roberts and Corcoran-nantes (1995) highlight that during the 1980s TQM became a world-wide management fashion and by the early 1990s a survey of BIM members found that 71% of the respondents' organisations had claimed to have formally implemented quality programs.

The revolution in the USA, which was one of the first major western countries to adopt TQM, formally began under the Reagan - Bush administration, 1980's, with the establishment of the Malcolm Baldrige National Quality Awards, MBNQA, appendix I. The US Department of Defence responded to this new emphasis on quality with the broad designation of their quality renaissance as Total Quality Management. General Dynamics and other companies, through the industry associations, responded with all the studies and lessons learned over the past two decades. Fortunately a number of companies had already anticipated the Quality call. Some of these visionary and world competitive companies were Boeing, IBM, ITT, Florida Power and Light, Motorola, Ford Westinghouse, General Dynamics and Xerox (Talley, 1991). Xerox like many other companies in the seventies had relied on previous market dominance and had lost sight of the customer's needs. This left the door open for new more progressive organisations to compete. The most notable being the Japanese, who had twenty years of experience in the new quality principles. Faced with such competition western companies, including Xerox, saw their market shares drop and experienced mounting losses.

TQM at Xerox

In 1982 the Xerox Corporate Management Committee led by chairman David T Kearns concluded that Xerox needed to implement a Total Quality Process if the company was to remain competitive in the global marketplace. The committee realised that quality was a very powerful vehicle for change. Proof of this was evident in the experience of the Japanese. In 1984 the Xerox corporation initiated a total quality strategy that changed the way it did business. The strategy was based on the premise that Xerox could best satisfy customers by producing quality goods and delivering quality services. Xerox was a Baldrige winner in 1989 which was the culmination of a long hard road to recovery (Xerox, 1990). In 1988 Xerox approached some of its main suppliers with a view to cascading their TQM philosophy throughout its supplier base. Gates was one of these suppliers which accepted the offer.

TQM at Gates

Gates started on the road to TQM in 1989 with the help of Xerox personnel and training resources. Like many other organisations Gates was aware of the rising influence of TQM throughout the business world and the wealth of information proclaiming that TQM could make organisations more competitive. After all, if it had improved the major US organisations mentioned above, then it could improve Gates. Many companies including Gates entered into the TQM philosophy with these and other expectations, however somewhere along the way came the realisation that TQM was not a short term project and success was not guaranteed. Some organisations became disillusioned and disappointed with TQM and sought other forms of change strategy i.e. Business Process Re-engineering, some adopted parts of TQM, but few appear to have shown outstanding success with TQM. This disappointment experienced with TQM by the author at the Gates plant in Dumfries prompted the author to investigate TQM further.

Motivation for the Research

The motivation for this research came from three main areas. First, the author became a TQM facilitator in 1993, involved in presenting a three day TQM training course with Gates Power Transmission. This experience not only gave more awareness of TQM but also the issues involved in implementation. The contact with shopfloor employees on the course highlighted the general lack of understanding and acceptance of the new initiative. This prompted a need to understand more about TQM and its implementation across the Gates plants.

Second, it became apparent that although TQM had been in existence at Dumfries since 1990, it had not delivered some of the benefits expected. There was more customer and quality focus, but there was a distinct lack of teamwork and participation by the shopfloor employees. There was a need to understand what had happened at Dumfries to cause this situation. In order to understand this it was necessary to look at other plants within Gates, which had also introduced TQM and also to examine how each plant had approached the implementation of TQM and to identify the factors that appeared to influence their approach. This might help to identify the best way forward with the TQM initiative at Dumfries.

Third, there was a distinct lack of research into how TQM impacted on plant performance levels. It was necessary to find out if there was a link between the level of successful TQM implementation and plant business performance. This would also help to identify if there was a preferred route to implementing TQM, other than the established models, and also whether alternative routes could produce similar business performance results.

Purpose of the Work

The purpose of this work is

- (i) To gain a greater understanding of how best to implement TQM, through the lessons learned from the various Gates plants.
- (ii) Through the implementation and subsequent results, to evaluate the worth of TQM i.e. is it worth investing the time, cost and effort in such a quality programme?

Key Research Questions

Two key research questions follow from the purpose of the work, these are;

- (i) How have each of the Gates plants approached the implementation of TQM ? Are there significant differences in objectives, methods and outcomes? Why do such differences exist?
- (ii) How does successful implementation of TQM affect results performance?

Methodology

The research entails a comparative study of the introduction and effects of a corporate TQM programme into the plants of a single company operating in different countries throughout the world. The plants selected for study range throughout Europe and the United States. It was felt necessary to visit the plants in person in order to obtain an accurate feel for the implementation of TQM and its effects and also to avoid any misinterpretation due to language differences e.g. Spanish, German, Belgian. However, it was felt that questionnaires could also be useful to assist the information gathering, as long as the questions were clear and the results cross checked with observations and information obtained during the plant visits. The data fell into two main categories. First, there was data which was quantifiable such as performance data which could be obtained by questionnaire. Questionnaires could also be used up to a point, if laid out properly, for capturing views and perceptions. Second, where discussion was required and where different views were required to obtain a balance and avoid selective perceptions, face to face interviews would be required. This would require each of the plants in the study to be visited. The first research question on how each plant had implemented TQM was addressed by using a pre-prepared guideline on TQM implementation and then comparing this against each plant's approach. This required face to face discussion to ensure full understanding of the questions and to filter out irrelevant or misleading information.

The second research question required data on performance results and this could be obtained by direct questionnaire e.g. yearly defect levels 1990 - 95. However, face to face contact allowed clarification where direct plant comparison was misleading i.e. how were the figures calculated? what was included or omitted?

Because the visits to each plant were approximately two days each, it was necessary to fax and post questionnaires and intended areas of interview prior to the visits, to allow plant personnel time to prepare and understand the requirements. It was however important that the exact interview questions were not mentioned at this point in order to avoid pre-prepared answers being given. The questionnaires were posted two weeks prior to the visits

and followed up with phone calls to ensure each plant was ready. Chapter six will discuss the methodology in more detail.

The Plan and Structure

The aim of this thesis is to provide an analysis of the TQM approaches adopted by six plants throughout Europe and USA belonging to the Power Transmission division of the Gates Rubber Co Ltd. It will also attempt to determine whether links exist between successful implementation of TQM and plant performance results. The thesis will be structured in three parts.

Part one will provide a historical review of Gates and the corporate quality initiatives, in order to understand the background to the research. Second, it reviews the current literature on organisational change and discusses the framework developed to provide a context for capturing the empirical data. Third, it provides an overview of the TQM approach to change and develops the conceptual framework adopted to understand the variables involved. Finally, an overview each of the plants involved in the study. Chapters one to six will be devoted to this review.

Part two will be devoted to the analysis of the empirical data from the six plants. It will identify the factors which appear to influence TQM success and discuss the correlation between TQM adoption and performance success, and how well each of the plant results fits the hypothesis that successful TQM implementation results in improved business performance. Chapter seven will be devoted to this analysis.

Part three will discuss any of the plants that do not fit the hypothesis, with suggested reasons for any apparent lack of fit. It then concludes with a summary of the work, a critique of the methodology used, including the lessons learned from the study and the overall value of the work in terms of its contribution to the literature, and suggestions are given for further research. Finally, it discusses the future of TQM. Chapters eight to ten will be devoted to this review.

CHAPTER 2

COMPANY CONTEXT

Introduction

This chapter outlines the history of Gates, including the Dumfries plant, and will describe the organisation structure and goals of the corporation. This is followed by a review of the quality initiatives and finally a brief overview of Gates new owners, Tomkins. During the period in which the research was carried out, i.e. January 1995 to June 1996, the Gates corporation was a privately owned company. However, in July 1996 Gates became part of the Tomkins empire, an industrial management company. Gates is now one of seven subsidiaries of Tomkins.

The Gates Corporation

The Gates Corporation was a privately owned multinational, operating in 13 countries throughout the world. It employs 13,500 people, at 38 plants and 23 distribution and sales facilities, with sales of 1.4 billion dollars, (1994). The company was founded in 1911 by Charles Gates in Denver Colorado. In 1917 Charles's brother John developed the first vulcanised rubber V-belt to replace the round hemp rope used to drive the fan on a 1917 cole coupe (Erickson, 1987). Within a few years V-belts began to dominate the market and the expansion of the company started. Rubber hose production began in 1927 and in 1963 Gates opened its first European facility in Belgium, now European headquarters. Gates made various acquisitions between 1982 and 1994, including Uniroyal's Power Transmission division and Kleber Industries belt and automotive business. New Timing belt manufacturing

facilities were opened in Spain, Scotland, and Korea in 1989. The corporation consisted of four subsidiaries,

1. Gates Land Company
2. A BAR A Ranch
3. Cody Resources
4. The Gates Rubber Company

Gates Rubber Company, the largest of the subsidiaries employing 13,000 people, manufactures Rubber products for Automotive and Industrial markets. These subsidiaries operate under three geographical areas,

1. European Rubber Operations
2. North American Operations
3. Asia, Pacific & Latin American Operations

These areas are controlled by group Vice Presidents, reporting to the President of the Gates Rubber Company. Our study will centre around selected plants from the Power Transmission (P.T.) divisions of European and North American Operations (Fig 2).

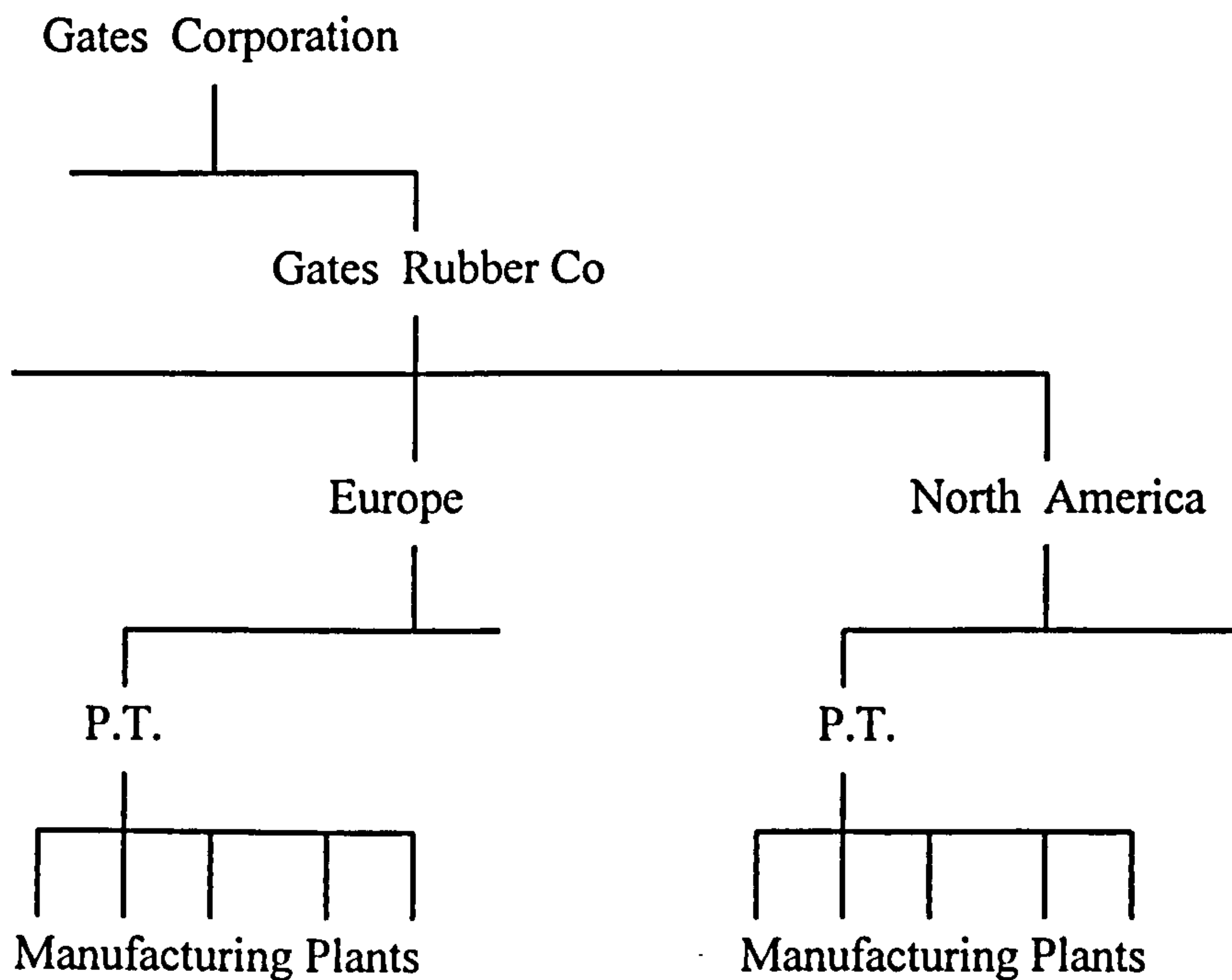


Figure 2: Gates World-wide Power Transmission Organisational Structure

A major part of the Gates Power Transmission division was acquired from the purchase of Uniroyal in 1986. This comprised plants in Moncks Corner USA, Dumfries in Scotland and Aachen, Germany. Additions to these plants along with the existing Gates PT plants gives a total of 8 plants in Europe and North America dedicated to the manufacture of PT products. PT in the USA is headed by a senior VP who reports to the President of North American Operations (Fig 3).

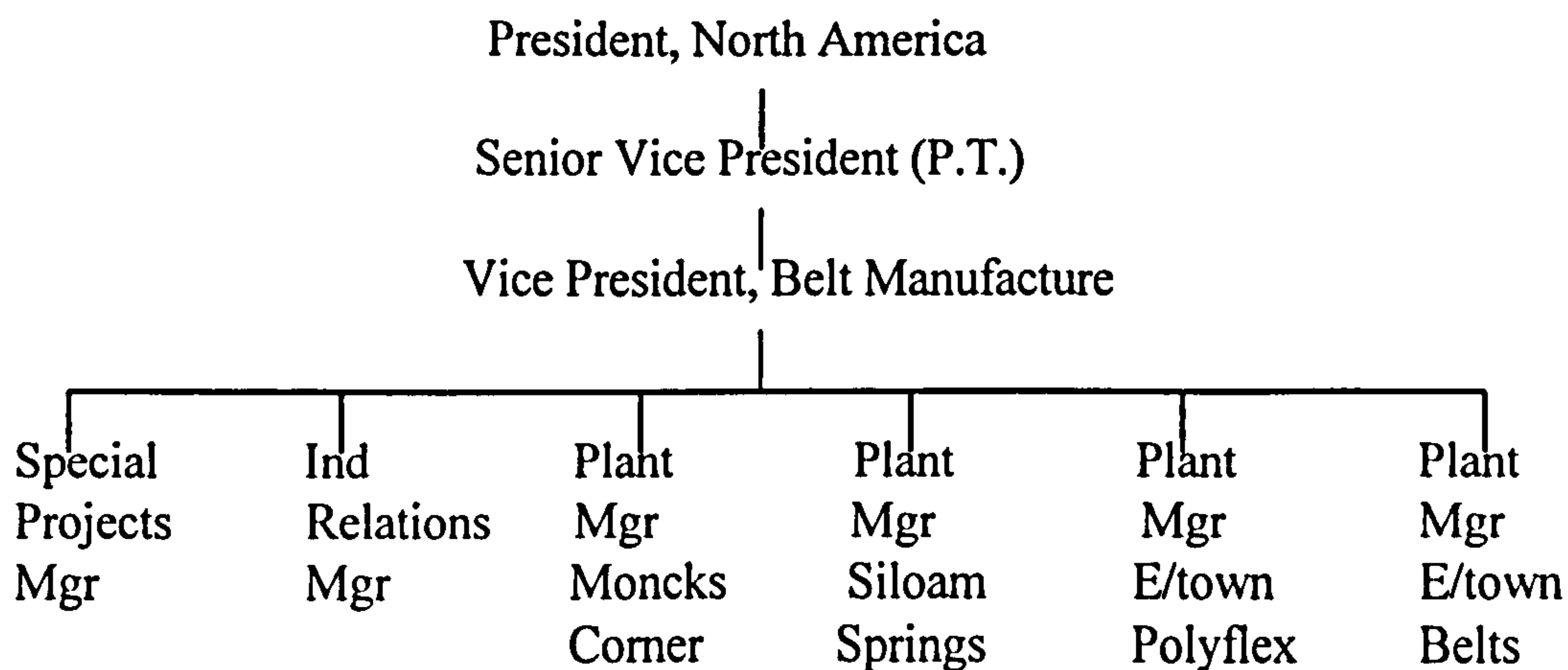


Figure 3: Gates North American Power Transmission Organisational Structure

This structure incorporates the US plants involved in the study, i.e. Moncks Corner, South Carolina and Siloam Springs, Arkansas. In Europe PT is headed by a VP who reports to the President of European Operations (Fig 4).

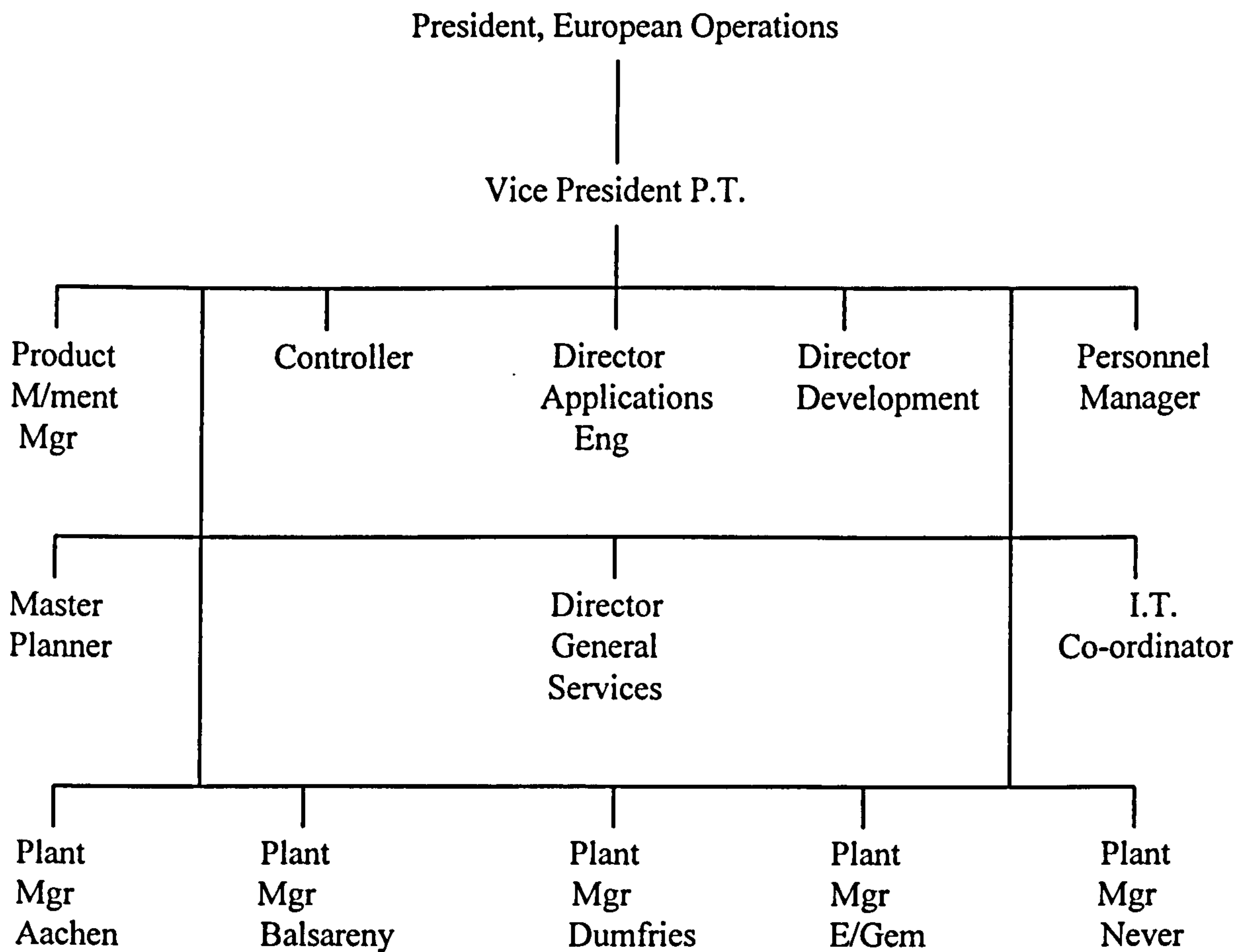


Figure 4: Gates European Power Transmission Organisational Structure

This structure incorporates the four European plants involved in the study, i.e.

1. Dumfries, Scotland
2. Aachen, Germany
3. Balsareny, Spain

4. Erembodegem, Belgium

Each plant is controlled by a Director of Factory operations, who has his own management team.

Corporate Goals

The Gates corporation was, up until July 1996, a family owned business and not accountable to shareholders. The head of the company, Charles C Gates, was a multimillionaire and his main goal was to grow the company in size and be the biggest and best in the world. This being the case, profits were ploughed back into the expansion and development of the company, and there was less emphasis on formal business plans and financial reporting systems, as seen in public owned companies. 1994 saw a change in the company's strategy with regard to a proposed merger with a public company. The merger was designed to give the Gates family members the option of selling their share of the company if they so wished, since the owner Charles C Gates was reducing his involvement in the running of the company, and the family members had interests in other areas. In 1994 the strategic goals of the company started to change to reflect those of a public company. Attached are the strategic trends and goals presented by corporate in 1994. These success factors or goals represent areas for improvement and can be categorised under broad headings at corporate level, and become more detailed as they cascade to lower levels in the hierarchy. At corporate level within Gates these goals are;

1. *Profitability*

5% after tax, 25% Return on Total Capital Employed, (ROTCE)

2. *Growth*

7% per year on a world-wide basis

3. *Customers/ Market Leadership*

Meet or exceed customers expectations, Be number 1 or 2 in our markets

4. *Organisation / World class*

Cycle time -- 40-50% improvement by the year end of 1997

Inventory turns -- 5.5

Service levels -- Auto OE -- 100%

Industrial OE -- 95%

General Mrkt -- 97%

First Pass Yield, Process Capability, Resource Utilisation, Throughput time versus added value time

5. Environment & Corporate Responsibility

Reduce Waste generation by 10% per year

Reduce injury accidents by 20% per year until accident free

Documented compliance to ISO 14001

Evidence as a good corporate citizen in our local communities

At operational level under each of the respective corporate goals are;

1. Budget Commitment, Cost Reduction.
2. Manage the Change Projects.
3. Technical Plan, new products.
4. Customer Service, Quality Integrity.
5. Safety, accident levels, environmental protection , waste management.

These goals are cascaded throughout the 3 geographical divisions of Gates, and then into the individual plants where they become part of the business plans, appendix 2 gives an example of the European 1995 objectives. The Gates board see the achievement of these goals as

determining the success of the company. The TQM initiative within Gates fits into Goal 4 Quality Integrity, which embraces the Gates Quality Commitment (GQC) process.

The Products

Power transmission belts have played an important role in the industrial development of the world for more than 200 years. Flat belts of piled-up leather and regular cotton or hemp rope running in V- grooves (sheaves) were predominant in early industrial history. These belts transmitted power from large steam engines or water wheels to various types of production machinery, usually through a series of line shafts. Individual machines were driven from the line shaft by flat belts that could easily be shifted between a driving pulley and an idler pulley to start and stop the machine.

Power transmission by belts is best described as the transmission of power from a prime mover to one or more driven machines by means of a flexible non-metallic member. The belt operates in conjunction with a pulley or sheave mounted on each of the rotating shafts. Power is usually transmitted by frictional forces developed between the belt and the pulley or sheave. A frictional drive like those using V-belts or flat belts does not give exact driven speeds. There is a certain amount of belt creep, which makes it impossible to drive machinery such as indexing heads of machine tools or the camshaft of an internal combustion engine where synchronisation is needed. This was a segment of the power transmission market not open to belts until about 1950 when the synchronous belt was developed.

The synchronous belt is an exception whereby the belt teeth make positive engagement with the teeth of the pulley. Synchronous belts are capable of transmitting power through the positive engagement of the teeth on the belt with corresponding teeth on the pulley. This creates the synchronisation between the driver and the driven shafts which is essential for some types of application. Synchronous belt drives have a distinct advantage over gears or chain drives because they can transmit reasonably high loads at a wide variety of speeds, with low noise level and without lubrication. Fig 5 details the component parts of a synchronous belt

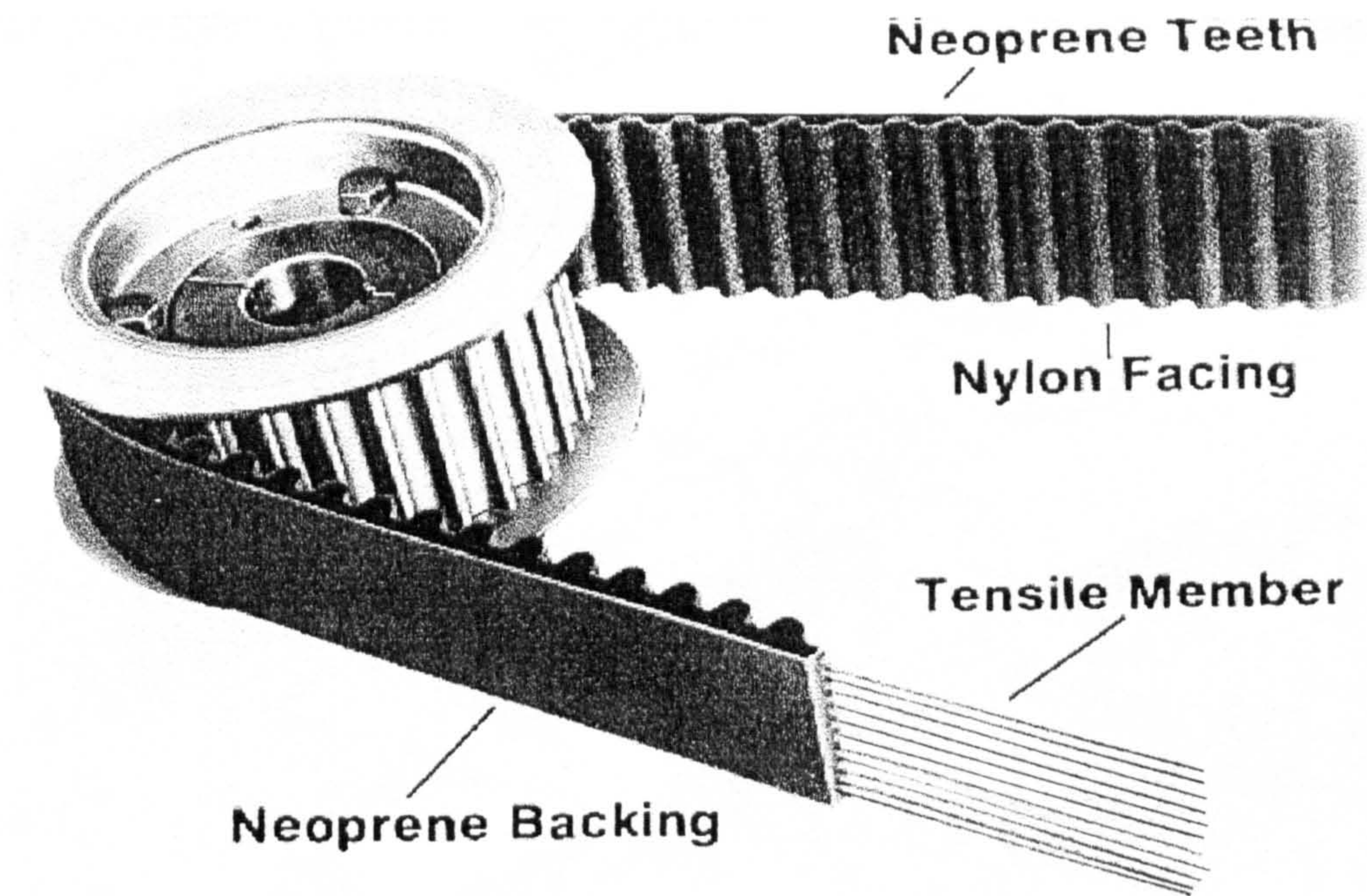


Figure 5: Component parts of a Synchronous Belt

The application scope of power transmission belts is virtually without bounds, ranging from drives which can be held in the palm of the hand to drives several feet in width, and using belts over fifty feet in length. Power transmission capabilities can vary from less than 0.1 horsepower (HP) to several thousand HP (Figs 6 & 7). Figure 8 shows an automotive applications which accounts for a large percent of the timing belt market.

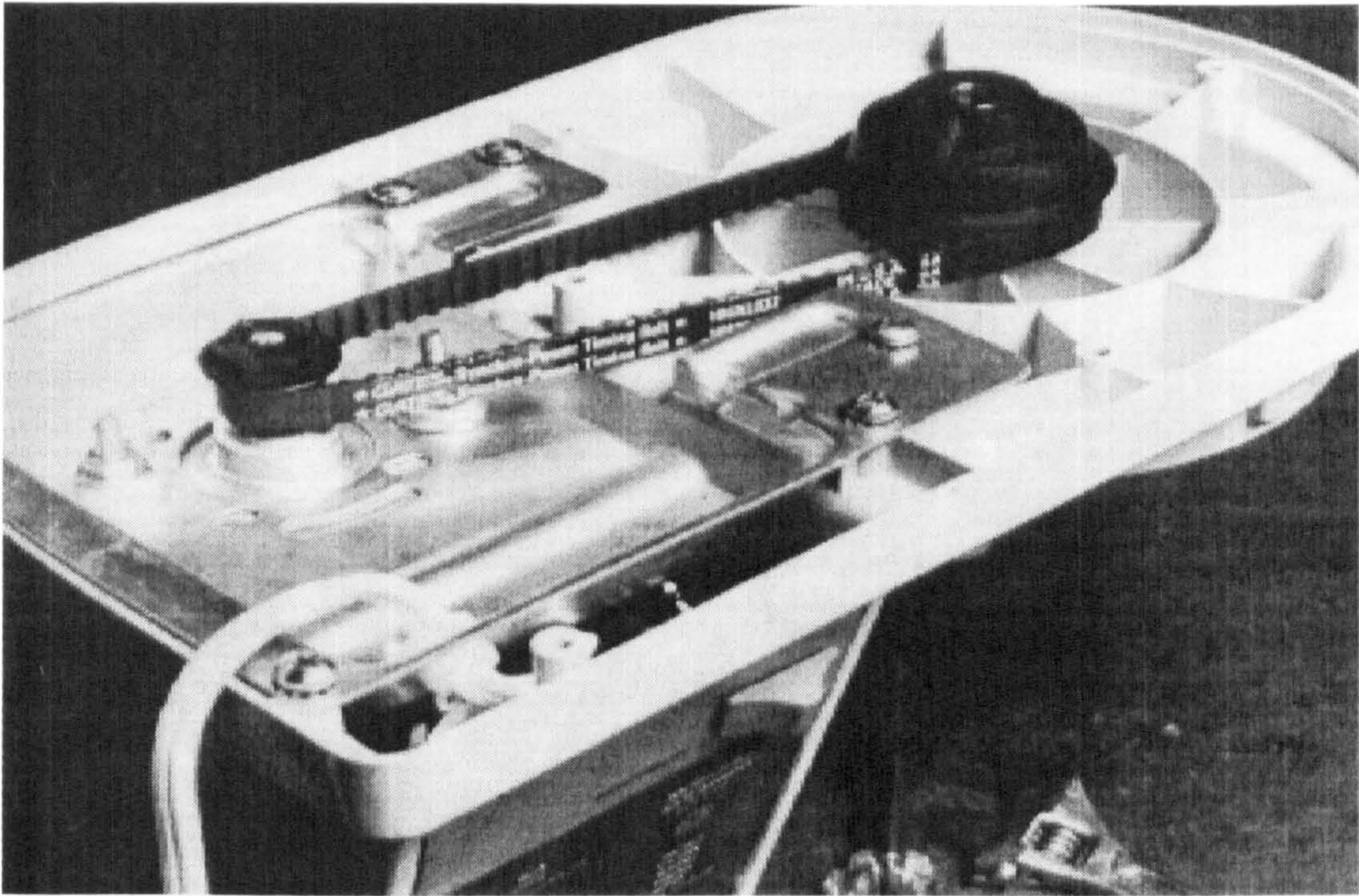


Figure 6: A kitchen food processor using an MXL synchronous belt.

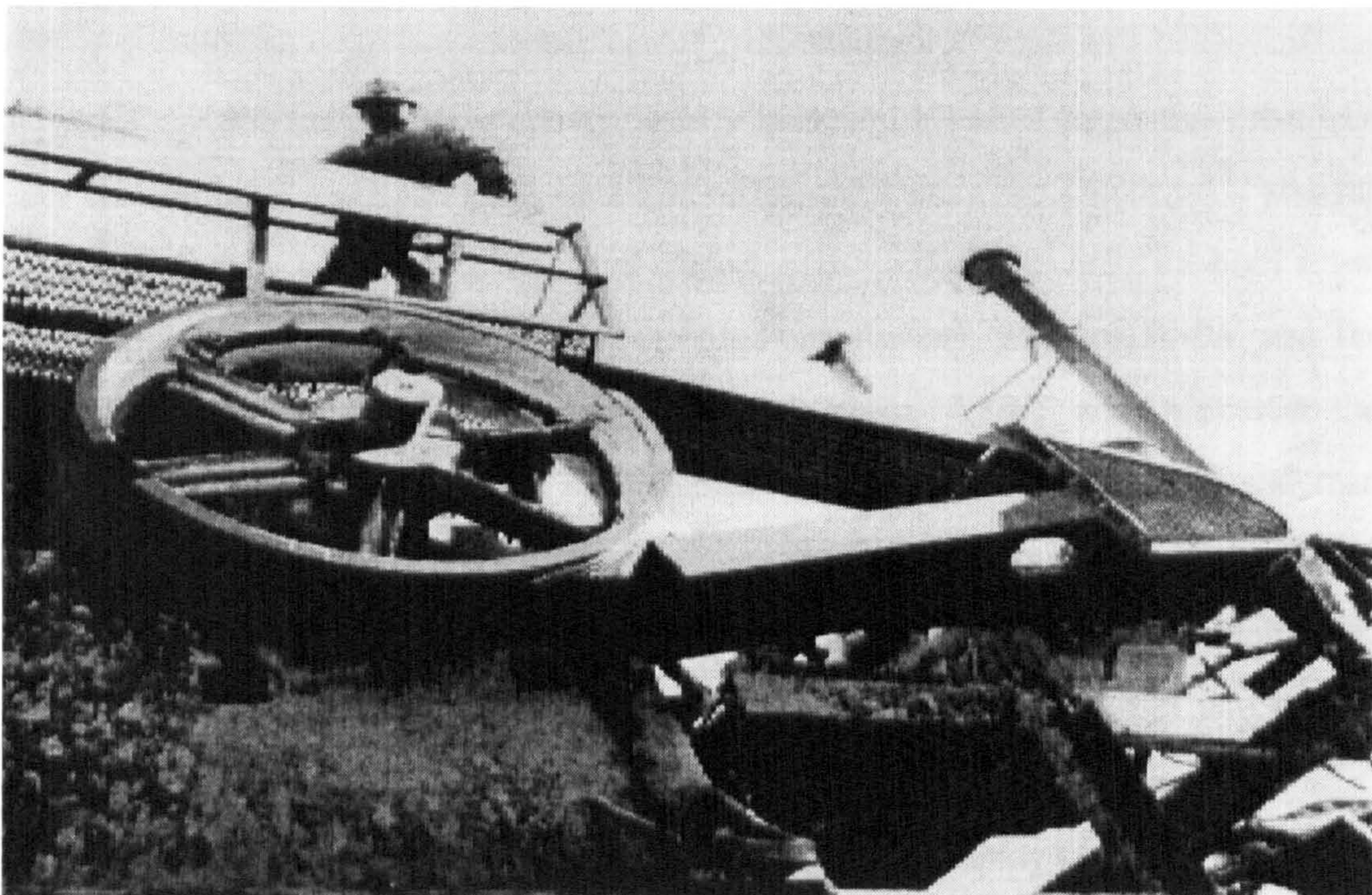


Figure 7: A large industrial V- belt drive on a rock crusher is subjected to pulsating loads.

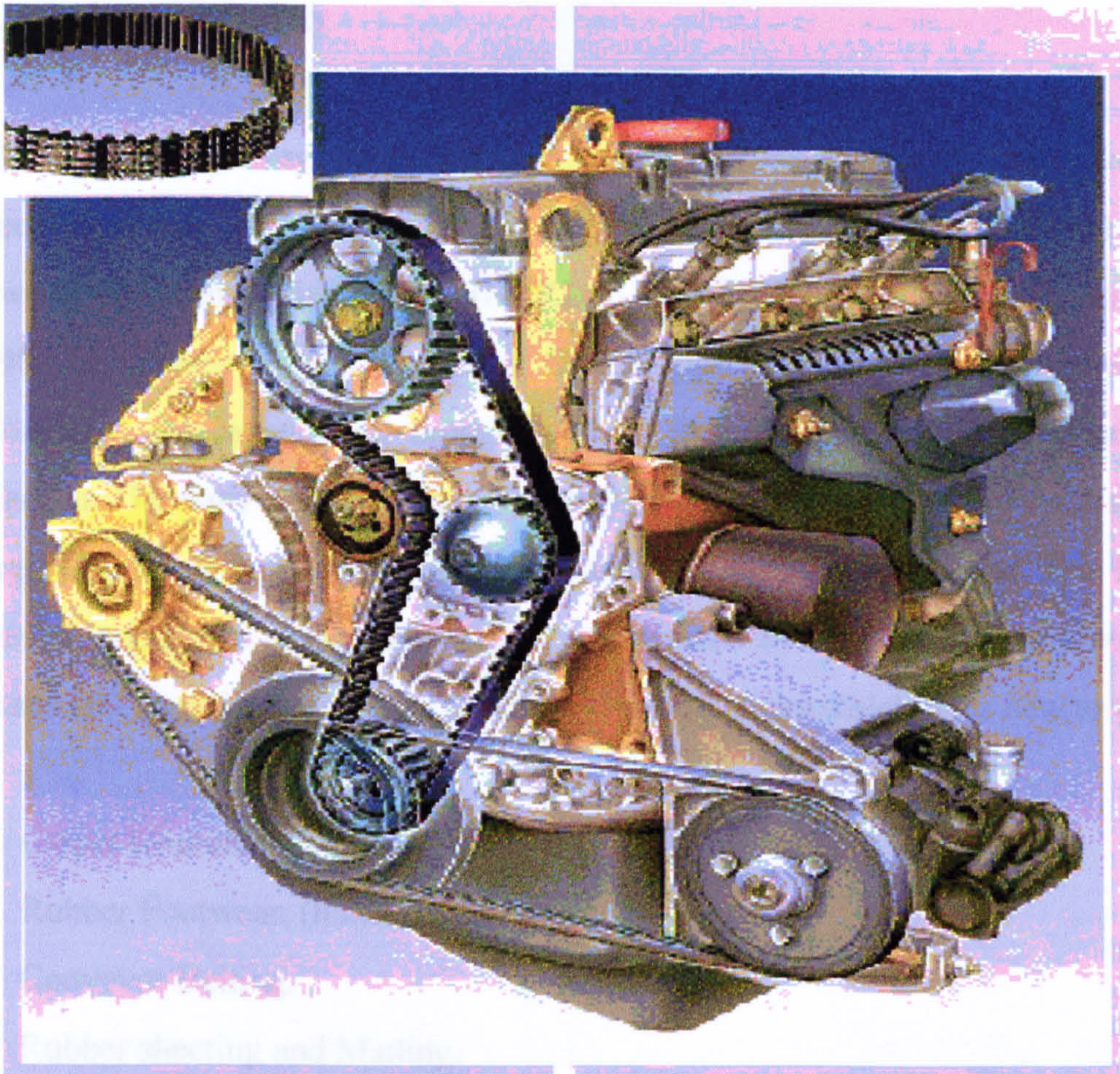


Figure 8: An Automotive Application

The PT division manufactures conventional V belts and V ribbed serpentine drive Micro V belts for the automotive original equipment and replacement markets. The division also makes heavy and light duty V belts for the industrial market, and Synchronous belts for both automotive and industrial customers. Major customers include Ford, Renault, Peugeot, BMW, and Toyota in the Automotive market and Black and Decker, Rank Xerox, AT&T, and Qualcast in the Industrial market. In addition the division has established a technical support team and manufacturing facility in Aachen, Germany, to develop synchronous components and accessory drives for European customers. Agriculture, construction, mining, oil field and transportation industries are some of the markets served. Vehicles of every kind, including bicycles and high horsepower industrial equipment such as mine ventilation systems and tooling machines, and light machinery including sewing machines, computers and photocopiers, employ Gates belts.

2. Hose and Conveyors

3. Consumer and Industrial Products

The Dumfries Facility

The Dumfries facility occupies a long established manufacturing site, prior to 1946 it was used to manufacture cars and aero engines for Arrol Johnstone, from 1946-1968 it was owned by North British Rubber (NBR). In 1966 NBR changed its name to Uniroyal Ltd. In 1986 The Gates Rubber Company Co Ltd purchased the Uniroyal Power Transmission Company; this acquisition brought with it Synchronous belt manufacturing facilities in Aachen, Germany and Dumfries, Scotland, as well as a fully developed customer support organisation serving a broad array of customers throughout Europe. The Dumfries factory was unique in the sense that, while it was viewed as a Power Transmission acquisition by Gates HQ, it did contain some specialised product lines which were new to Gates, e.g.

1. Carpet Underlay, (Tredaire).
2. Rubber Footwear, (hunter boots).
3. Conveyor Belting.
4. Rubber sheeting and Matting.

The Dumfries factory was operated as a multi-product site up until 1989, when due to capacity restrictions, the Power Transmission product line relocated to a new purpose built factory, approx 100 meters from the original site. The relocation comprised significant new manufacturing equipment, but retained the same workforce. This move signified a major change for the PT dept. The new technology contained a substantial amount of automated equipment and significant changes to layouts and established working procedures. The move to the new facility commenced in Sept 1989 and was phased over 12 months to ensure continuity of service to the customer base. In 1991 Gates Europe reorganised by product line, consisting of three divisions;

1. Power Transmission
2. Hose and Connectors
3. Consumer and Industrial Products

The Power Transmission facility at Dumfries is a separate plant, and its only connection with the older Dumfries plant is by belonging to the same subsidiary, i.e. Gates Rubber Co Ltd and the continuation of some services bought in from the older plant, e.g. Payroll, security, canteen. The facility is dedicated to the manufacture of synchronous belts for Industrial and Automotive markets. The plant employed 316 people and worked a 24 hour operation, with a turnover of 30 million pounds in 1994.

Quality Initiatives

Gates quality initiatives span 30 years. Prior to 1961 the traditional Quality Control system was adopted, using designated production employees as line inspectors. In 1961 the first corporate quality manual was published. 1963 saw the establishment of a full time Quality Assurance group with a separate, corporate Quality entity. At the same time separate quality departments known as Quality Control began at the plant sites. Another major quality related initiative was the Gates Enriched Management System, (GEM), introduced in the mid 70's. Gates were expanding at this time and had experienced some serious work stoppages and employee discontent. The GEM philosophy states that " Employees are the experts at their jobs, people respond best when they have feelings of self worth and involvement, and employees identify with the success of the total organisation". It is in essence a participative approach which encourages involvement and empowerment. Because of its importance to the change process at Gates GEM will be discussed in more detail in the next section.

The first plant to receive GEM was Iola, Kansas in 1976, with a further 12 plants by 1983, all union free. GEM was introduced to union facilities in 1990, Balsareny. 1980/1 saw Quality Circles introduced to the manufacturing plants and Statistical Process Control (SPC) training commenced. In 1982 plant Quality control departments became Quality Assurance, to signify and formalise a change from detection to prevention of non conforming products. Statistical techniques were taught and used to develop the prevention approach. 1988 saw the corporation level Quality Assurance group become the Quality Management department with Total Quality Management (TQM) at Gates as its mission. A Vice President of Quality was appointed in 1991 and the implementation strategy for Gates Quality Commitment (GQC) was developed, followed by the GQC training process. The Gates Quality Commitment and Quality Improvement Process can be summarised as;

Everyone in every function involved, empowered and committed to continuous quality improvement, using systematic approaches and processes.

These approaches entailed the use of Problem Solving Processes (PSP). Cross functional teams were trained to work on selected problems.

The Dumfries plant went through a similar evolution process with regard to moving towards a separate Quality Assurance department and the use of SPC. In 1990 the Power Transmission plant was approached by Rank Xerox and offered advice on Total Quality Management programmes. Rank had started a programme in 1988, 'Leadership Through Quality', and was considering the inclusion of main suppliers. The European TQM (Xerox model) programme commenced in 1990 with senior management from Dumfries and the Aachen plants participating in a 3 day workshop designed to cover TQM principles, e.g. communication and teamwork. In 1991 the Gates corporate GQC programme was integrated in the European programme. The programme was then cascaded to the shopfloor level, and by February 1995 all personnel at Dumfries Power Transmission had completed the course.

In 1995 the corporate lead follow-on to the GQC was the Business Leadership Model, which embraces the self managed team concept. This consists of;

1. The Team 2000 model, a 12 module team training course.
2. Leading in a Team environment, a 3 day course for supervisors and managers.

In March 1995 discussion took place between European and US management, to decide on the follow to the GQC initiative. Corporate management developed The Business Leadership Model. This model utilises the Gates Business Leadership Process, GBLP, which stands for a global approach to business excellence and is based on previous quality themes i.e.

- * The introduction of the Corporate Quality Assurance Manual (1963)
- * The implementation of the corporate quality system audit process (1979)
- * The launch of the global SPC (Statistical Process Control) programme (1984)

- * The introduction of GQC (Gates Quality Commitment, 1991)

The GBLP manual compiles all corporate business quality policies and replaced the latest edition of the Corporate Quality Assurance manual. It provides a centrally controlled comprehensive internal audit scheme which extends to all levels, sections and functions in the organisation, rather than being limited to technical functions. The GBLP approach extends the use of measurable statistical (SPC) criteria such as capability and feasibility into the evaluation of all the organisations activities. Finally, GBLP presents the commitment, vision and mission, values, and quality definition expressed in GQC as the key drivers for the business. Internal assessment covers all levels and sections of the company. In essence the GBLP focuses the organisations efforts in support of the corporate goals.

Gates Enriched Management

This section reviews the evolution of the Gates Enriched Management (GEM) approach to change. The end of the 70's recession in America saw a period of increased growth and manufacturing looked towards increased output and expansion. Attempts to increase employee productivity in existing Gates manufacturing facilities were opposed by employee's bargaining representatives, and costly work stoppages were frequent. This inability to improve productivity, and the need to obtain continuous operation of facilities contributed towards Gates decision to obtain increased production capacity through construction of new manufacturing facilities in non union areas, as opposed to expansion of existing plants.

Having recognised certain deficiencies present in existing facilities, management initially began exploring ways to permanently avoid these problems in the new facilities. Although no single approach to attaining the desired goals was initially agreed upon, there was general agreement that Gates productivity goals would not be practical with the presence of a union. There was further agreement that the avoidance of a union would require substantial departure from traditional management approaches.

On September 16, 1974, a task force committee was activated. This committee was charged with the responsibility of developing and recommending, to the assessment committee, a management system which would attain the companies objective with regard to maintaining improved productivity at an acceptable cost. The committee reviewed many management systems. Among these were the Spaulding Corporation and the following manufacturing facilities;

1. General Foods, Topeka, Kansas
2. Uniroyal, Kennett, Missouri
3. Eaton Corporation, Kearney, Nebraska

Although each of the key facilities visited by the Task Force demonstrated unique characteristics, all operated under a very similar philosophy, which can be summarised as follows; Humans will respond best and be productive when there exists a high feeling of self worth, and identification with the success of the total organisation. Achievement of these response factors requires existence of other elements and must be a part of a total system. By incorporating features of systems used by other companies, the GEM system evolved. At the heart of the GEM philosophy are the principles that, employees are the experts at their jobs, people respond best when they have feelings of self worth and involvement, and employees identify with the success of the total organisation. The GEM system says that with the right person in the right environment, you will attain the right results, high profitable productivity and customer satisfaction.

The first facility to receive GEM was Iola, Kansas in 1976, the GEM system diffused throughout the organisation as follows; Table I

Year	Manf/Dist	Plant	Product
1976	Manf	Iola, Kansas	Hose
1976	Dist	Florence, Kentucky	-----
1977	Manf	Siloam Springs, Arkansas	V-belts
1977	Manf	Boone, Iowa	Hose Assemblies
1978	Manf	Jefferson, North Carolina	Hose
1979	Dist	Chicago, Illinois	-----
1980	Dist	Lithonia, Georgia	-----
1980	Manf	Versailles, Missouri	Hose Assemblies
1981	Manf	Charleston, Missouri	Hose
1982	Manf	Red bay, Alabama	Hose
1982	Manf	Poplar Bluff, Missouri	Hose
1983	Manf	Rockford, Illinois	Coupling Fittings
1984	Manf	Chambersburg, Pennsylvania	Hose Assemblies
1984	Manf	Auburn & East Port, Maine	Trim, Trunk Liners
1986	Manf	Moncks Corner, S'th Carolina	Timing Belts
1990	Manf	Balsareny, Spain	V-Belts
1991	Dist	Salt Lake City, Utah	-----

Table 1: The diffusion of GEM throughout Gates

Being a GEM facility means it is union free, free from third party representation as noted in the GEM constitution, principles and practices. Remaining union free is a significant goal of the Gates Enriched Management system. Unionised facilities do follow and/or modify GEM practices to the extent that their union relationship permits. Over the years, the GEM system

has evolved at different rates in each of the facilities. Longevity of the plants and distribution centres, management leadership styles, management turnover, culture, and age of the workforce are all factors that have affected each plants development towards fully realised participative management. Today GEM is a participative system that expresses itself along a continuum ranging from plants exhibiting old style basics to those who are committed to developing full participation as a means to gain total quality management and to achieve profit improvements. The future for GEM lies in redefining the system to meet the demands of the changing environment.

Tomkins

It was mentioned in the introduction that Gates was a privately owned company up until July 1996, when it merged with Tomkins plc. Gates was sold because Charles C Gates was reducing his involvement in the running of the company and the family members had interests in other areas. The merger was designed to give the Gates family members the option of selling their share in the company if they so wished. Tomkins was chosen by Gates following an announcement by Gates in March 1995 that it was looking for a merger partner which must be a publicly traded company in the auto/industrial sector and not competing directly with Gates. When the merger was announced in March 1995, Charles C Gates said that the Gates Rubber Company had grown to a point where remaining private held did not permit the funding of competitive growth opportunities. When Tomkins was designated as the preferred partner in December 1995 Charles C Gates stated that Tomkins brought Gates the growth opportunity as well as a very promising future for both businesses. Tomkins Chairman stated that Gates would continue to be run by Gates management and the company would grow as a fully functioning wholly owned subsidiary of Tomkins.

Tomkins, an industrial management company, is based in Putney, London, but has its US headquarters in Dayton, Ohio. The group reported profits of \$ 450 million in 1994 on sales of \$5.7 billion. Over half its operating profit is generated in the US. Tomkins has delivered record results for fifteen consecutive years. The firm employs 46,700 at 74 businesses worldwide, 42 as US affiliates and 30 outside the US. Tomkins businesses are organised in six sectors. They are in order of sales revenue.

Food Products

Tomkins food businesses operate in five distinct and separate segments, each characterised by its own growth opportunities, e.g. groceries, cakes, convenience and ethnic foods, ingredients and catering products (22 companies).

Industrial Products

A range of niche, low-risk technology industrial products is manufactured by companies in this sector. Products include plastic and fibreglass mouldings, doors and windows, wheels and axles, rubber components and coated textiles, control instrumentation, metal pressings, precision turned parts, industrial disk brakes, clutches and flexible couplings (13 companies).

Professional, Garden and Leisure Products

This range includes finely engineered products such as power mowers, snowblowers, bicycles, handguns, handcuffs and buckles (5 companies).

Fluid Controls

Products manufactured include water, heating, ventilating and air conditioning valves, engineers' brassware, faucets, radiator and plumbing fittings and components for air handling and distribution (10 companies).

Milling and Baking

Comprising flour milling, bakery ingredients, baking of bread and morning goods and a retail bakery chain (6 companies).

Services to Industry

Services provided are conveyor and material handling systems, valves and fittings, fasteners, automobile components, spring steel, heat treatment, business forms and head-to-toe safety wear (18 companies).

Three key objectives drive the business of Tomkins;

- Generate above average growth in earnings per share.
- Maintain the progressive dividend policy.
- Be broadly based by spreading shareholder's risk over a range of products, customers markets, cycles and countries.

The addition of Gates to the Tomkins empire values the total business assets at over 7 billion dollars. Figure 9 summarises the business sectors and approximate values, (millions), including Gates.

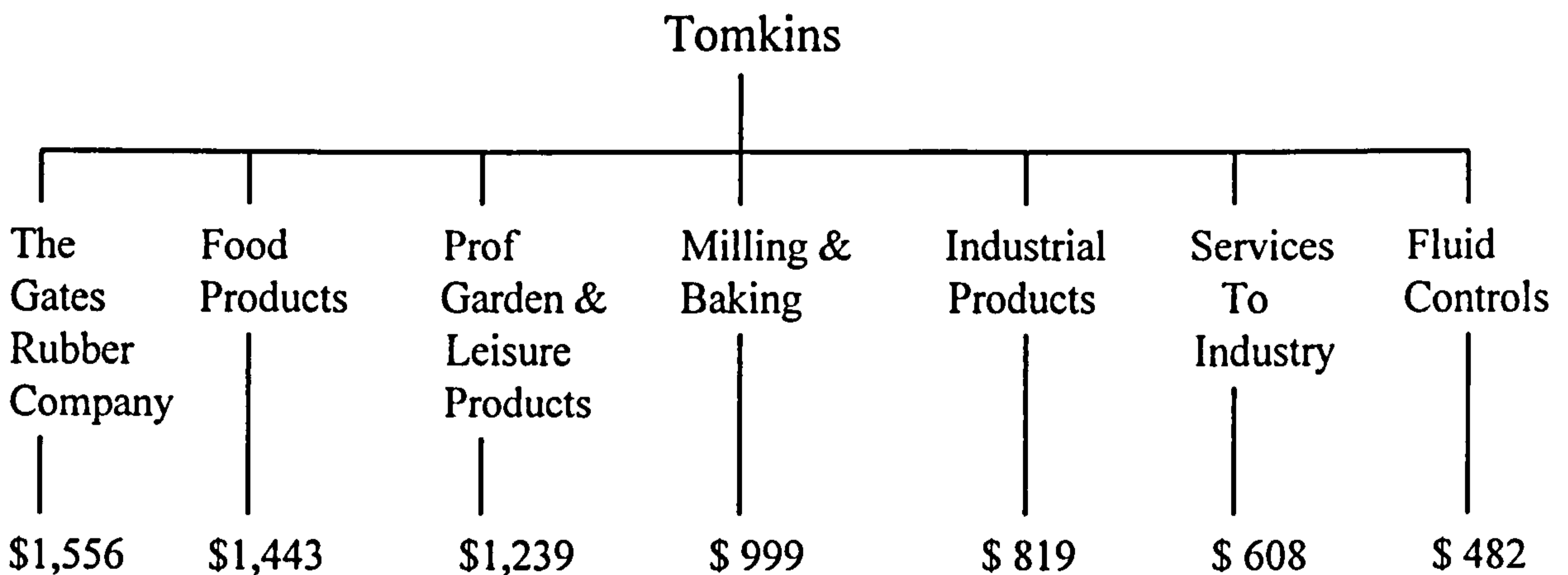


Figure 9: Tomkins business sectors and asset values, \$ millions

Gates future seems secure with Tomkins, who have given Gates management the freedom to develop the company along the same lines as Charles C Gates did. This means that future quality and development initiatives will build on previous initiatives like GEM and GQC, with the opportunity to incorporate any relevant Tomkins systems.

This completes the history and background to Gates. The next chapter, three, reviews the current literature relating to organisational change.

CHAPTER 3

ORGANISATIONAL CHANGE

A SELECTIVE REVIEW OF THE LITERATURE

Introduction

In studying TQM, which is regarded as a form of organisational change, first, there is a need to understand the literature on change in general, and where TQM is located in the organisational change spectrum. To place TQM in context requires a theoretical base from which one can then approach the specific areas relating to this approach to change.

This chapter will give a selective review of the current literature relating to organisational change in an attempt to inform the subsequent empirical research. A voluminous amount of research has been carried out and a large range of perspectives, levels, approaches and models have been developed on the subject of organisational change. It can range from small incremental change to planned rapid radical change on a grand scale. It can be at corporate level or shopfloor level. It can involve thousands of people world-wide or a handful of people in one department. It can involve technology, products, people and systems or a combination of these. It can be viewed from sociological and behavioural aspects and from cultural perspectives. The academic literature on this is vast and a full review is not attempted here. This study is interested in looking at a corporate led global planned change program, which is cascaded down to plants throughout the world, in particular Europe and USA. Much of the literature on organisational change will therefore not be relevant to this study.

A number of key questions are addressed and (as far as possible) the most prominent lines of thought on each are introduced. There are a number of specific questions, which will be of interest to the Gates study.

- What is organisational change and how are the views and approaches to it described in the literature?
- What causes an organisation to consider changing?
- How do views on implementing change vary?
- What has been the experience of change with regard to success and failures?
- What are the main areas of influence on change programs?

The end purpose is to provide a selective appraisal of ideas, with the intention to choose a conceptual framework, which will provide a context for the empirical study, which follows. The chapter starts by discussing change in general, attempting to define change, the levels of change and nature of change issues and how people have attempted to study change. It also considers what drives organisations to change. This is followed by some discussion on the implementation of change from a practitioner perspective, including reasons why change fails, and how to achieve effective change. Finally, it discusses some of the main areas of influence on change programmes with a view to developing a conceptual framework for empirical analysis.

Definition of Change

Organisational change takes many forms, with a wealth of differing views and approaches to the subject. Firstly, the pace of change can vary considerably. At one extreme there are the radical approaches, which can entail complete upheaval of existing patterns and systems. According to Dobson and Starkey (1993) radical change can result from the developing of concern regarding an organisation's current situation by individuals within the company. This might be caused by 'precipitating critical events'. The individuals with their new vision of the company require to gain the upper hand to get acceptance of their understanding of the issues facing the company. A consequence of this process is that the 'old guard' of senior managers stands aside or are removed. The new strategy comprising new objectives and plans is then implemented and the changes stabilised. Change by this approach tends to be dramatic, involving quantum leaps. Dobson and Starkey (1993) suggest that radical change if managed correctly can be more effective than a 'piecemeal approach' where change follows an incremental process. Dobson and Starkey (1993:123) state;

The radical approach leads to quantum leaps in strategy, which means that organisations make clean, clear breaks with the past and move from one strategy to another without a long transition through a variety of interim stages where future direction is not clear. Customers and employees thus know exactly where they stand.

At the other extreme, there is the incremental approach that involves usually smaller steps over a period of time and is described by Quinn (1982:617);

as muddling through with a purpose through a continuous evolving and consensus building approach. Change takes place through successive limited and negotiated shifts.

Quinn (1980), a leading proponent of incrementalism, suggests that the processes used to arrive at a strategy are 'typically fragmented, evolutionary and largely intuitive'. Their rationality is difficult to assess since their origins lie deep in top managers' minds. While pieces of formal strategic analysis do contribute to the final strategy, they are only pieces. In

the final analysis strategy tends to evolve as internal decisions and external events come together in the minds of managers, whose task is then to create a new, widely shared consensus for action. The basis of this model is that the strategy development process is founded upon the 'synthesis and interaction of behavioural, power/dynamic and formal analytical approaches'.

Another variation which tends to contradict Quinn (1980) is a model described by Mintzberg (1978) which suggests that change tends to come in brief spasms, interspersed with long periods of continuity. Mintzberg's (1978) approach distinguished between intended and realised strategy and pinpointed strategies contributed after the fact, or as he puts it 'realised despite intentions'. This was an important observation which challenged the previous orthodoxy that strategies are and should be plans conceived in advance of making specific decisions.

This view is supported by Pettigrew (1985) whose study of strategic change at ICI confirmed periods of incremental movement, interspersed with periodic revolutionary change. Pettigrew suggests that change evolves through time and cannot exist separately from other types of 'temporal measurement. The degree, nature and extent of temporal measurement are however an issue of some debate'.

Pettigrew (1985) argues that organisational change can be understood only in the context of large blocks of historical time. Other authors however have different views such as Wilk (1990) who suggests that change is non processual and therefore cannot be 'charted through various phases of historical time'. From this perspective change appears relatively instantaneous. As Wilk (1990:15) says:

Change is not a process, nor is it even a task, operation, performance or activity... the mythical view of change as taking time to occur can give us part of the traditional picture in which change, however revolutionary and even dizzyingly swift, is seen as actually happening gradually, step by logical step, rather than occurring by means of an all-or-none leap.

Levels of Change

Change and strategies to cope with it can also operate at different levels. Johnston and Scholes (1988) identify three different levels. First, there is the corporate level: this defines the scope of the firm in terms of the industries and markets in which it competes. Corporate strategy decisions include investment in diversification, vertical integration, acquisitions and new ventures, and the allocation of resources between the different businesses of the firm.

The second level is business strategy that concerns how the organisations compete in a particular industry or market. Where corporate strategy deals with the organisation as a whole, business strategy relates to a division within the organisation. In order to survive within an industry an organisation needs to develop a competitive advantage over its rivals, and this level of strategy is sometimes referred to as competitive strategy.

The third level of strategy is at the operations area of the company. Operational strategies are generally dictated by business strategies, however the functional departments are responsible for their planning and implementation. These operational strategies are concerned with how the different functions of the organisation contribute to the other levels of strategy. Johnson and Scholes (1988) highlight that such contributions will be important in terms of how an organisation seeks to be competitive. Competitive strategy may depend to a large extent on decisions about market entry, pricing, plant investment and although they are decisions of strategic importance they can be strongly influenced at operational levels.

At corporate level a company board of directors may plan organisational changes, but the implementation of change at lower levels would be classed as operational and would entail more detailed re-organisation. The links between corporate/strategic change and operational change are also crucial if the intended changes are to reach the core areas of the organisation. This aspect is of particular interest to our study with regard to how TQM programs are cascaded from corporate level to shopfloor level.

Our study has the added dimension of a multinational corporation attempting to cascade a common change program across the globe. It will be interesting to see how plants in the

various countries involved in our study, have received the corporate driven initiative and how the final local programs compare with the original corporate plan.

The Nature of Change

Another important aspect is whether the change situation is viewed as 'hard' change or 'soft' change. This area will be of interest in studying the implementation of planned TQM programs into the plants, which comprise both technology and people related issues. A typical hard change would involve technical change such as equipment improvements and this would involve applying existing systems based knowledge in a mechanistic way to implement the change. Systems based technical problems based on knowledge of a fairly structured and mechanistic sort seldom create major problems for management and problem solving approaches to these types of problem are usually found in the systems school of managerial decision making and analysis. McCalman and Paton (1992) define a system as; 'An organised assembly of components, which are related in such a way that the behaviour of any individual component will influence the overall status of the system'.

In contrast soft change situations would involve a high level of people orientation in which objectives and time-scales will be less clear, and the problem environment will be more dynamic and difficult to specify, while performance measures will also be more subjective. Problems with personal relationships would be an example of the kind found towards the soft end of the spectrum.

Reference is made to a model developed by McCalman and Paton (1992) which demonstrates the extent of the change spectrum. A technical problem would be placed at the extreme 'hard' end of the change spectrum in figure 10.

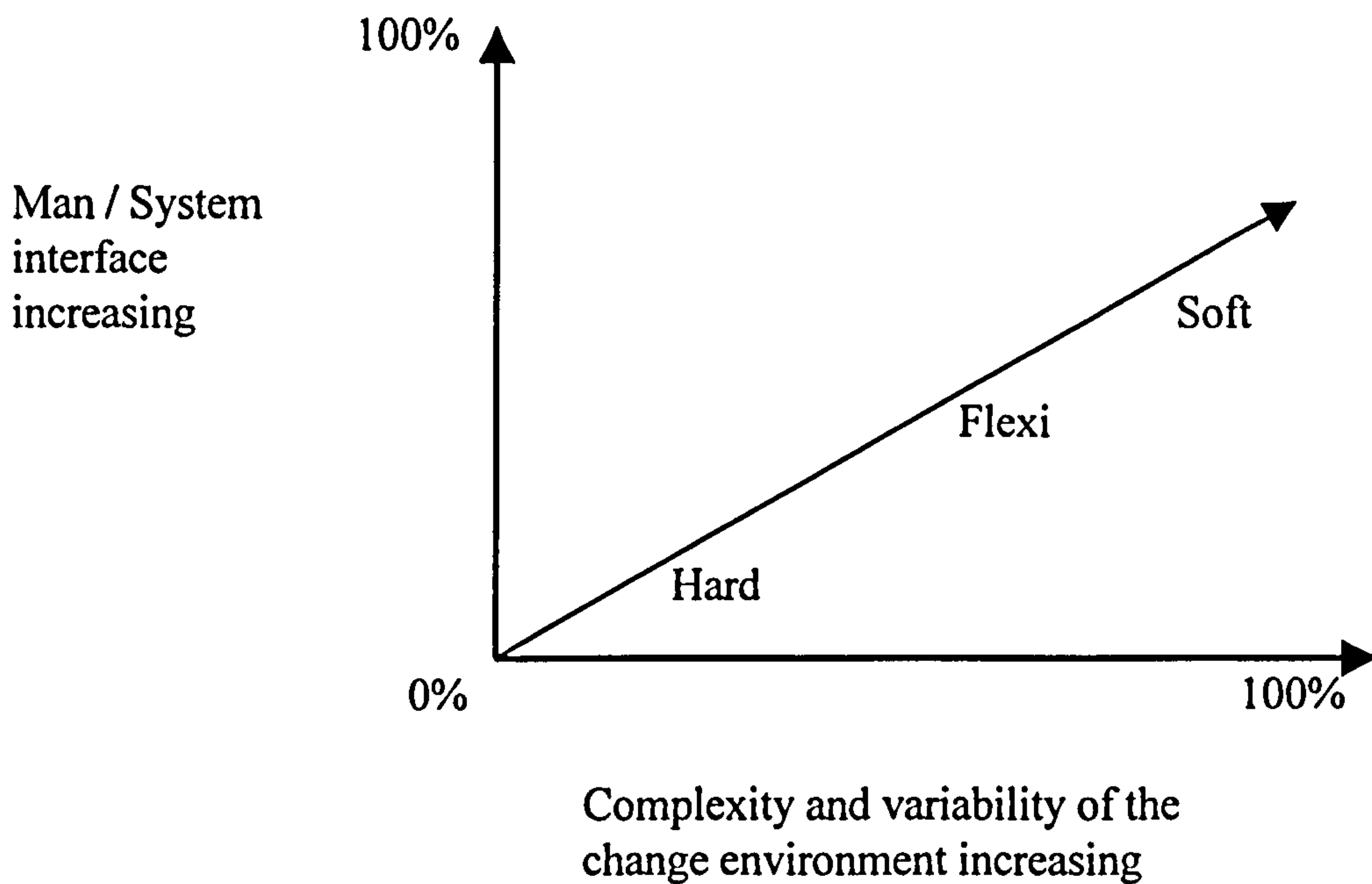


Figure 10: The change spectrum (Source: McCalman and Paton, 1992)

Technical 'hard' or mechanistic change, will be found at the left hand side of the range, which McCalman and Paton (1992:14) suggest;

Its features will include a fairly static change environment, clear, quantifiable objectives and constraints, immediate implications, short time-scales and minimal man-machine interfaces: in short, a purely scientific or engineering problem.

Change applied to the 'softer' end of the spectrum will reflect the more volatile and dynamic nature of the change environment; they will tend to originate in the organisational development school of thought. Organisational Development (OD) is one of the major approaches to implementing organisational change through individuals, and involves the following steps; Identify a need for change: Select an intervention technique: Gain top management support: Plan the change process: Overcome resistance to change: Evaluate the change programme (Aldag & Stearns, 1991).

Organisational Development may improve an organisation's strategic capability by providing a source of knowledge and techniques. This is achieved by improving its problem-solving and renewal processes, and gaining 'a more effective and collaborative management of

organisation culture' based on the development of work teams, and assisted by both internal and or external change agents. Dobson and Starkey (1993) suggest that the development of OD can be seen as a 'reaction against topdown approaches to change' whose effectiveness can be significantly reduced due to resistance and/or lack of interest.

The main problem with the OD approach is that it assumes that there is one best way to manage change that will increase both organisational effectiveness and employee well being. According to Ledford et al (1990:4-6)

The professional consultants engaged in OD are generally not concerned with the development of theory or with the design of systematic programmes of research but, rather with a set of normative prescriptions which guide their practice in managing change

McCalman and Paton (1992) argue that the planned and mechanistic approaches to change associated with scientific management will not provide answers to soft change situations. They are more likely to increase instability if implemented. McCalman and Paton also suggest that the majority of changes that managers experience usually lie within the 'flexi' region of the spectrum described in figure 10, while a tendency towards either end of the spectrum indicates the appropriate hard or soft approach. Table 2 below highlights the attributes associated with change situations from both ends of the spectrum. Consideration of the implications for the introduction of TQM will be discussed later.

'Hard' problems	'Soft' problems
Quantifiable objectives, constraints and performance indicators. Systems/ technical orientation. Limited number of potential solutions Clear problem definition. Clear resource requirements. Structural solution methodology. Reasonable static environment. Known timescales. Bounded problem with minimal external interactions.	Subjective and at best semi-quantifiable objectives, constraints and performance indicators. People orientated. Wide range of potential solutions. Unclear problem definition. Unclear resource requirements. Variable solution methodology. Dynamic environment. Fuzzy timescales. Unbounded problem with many complex external interactions.

Table 2: 'Hard' and 'Soft' problem attributes (Source: McCalman and Paton, 1992)

Areas of change which can also be considered along a spectrum similar to the hard / soft approach are the views of change following a planned route or alternatively emerging over time. These contrasting views of change are of particular interest with regard to the implementation and development of TQM across the plants in our study. It will be interesting to know which view of change TQM has followed and how successful it has been, since TQM is generally seen as a planned step by step approach, but on the other hand can develop over time. This discussion will be referred to, as the planned / emergent debate.

The Planned / Emergent Debate

Another important aspect is whether the change is deliberate, i.e. planned or emergent, i.e. emerges over time. According to Grant (1995) deliberate strategy also known as the 'rational, top-down down strategy approach' makes implicit assumptions about the strategy-making process. Here, the strategy forming process is the sole territory of top management - the senior managers having analysed the current situation, determine the appropriate direction for the organisation. The final strategy is then cascaded to the lower level managers, to be implemented. Grant (1995) suggests that this view is far from the reality experienced by most organisations, where the actual process is 'less structured, more diffused, and the dichotomisation of formulation and implementation is less apparent'.

This model of strategy is criticised by Mintzberg (1985) who states that there are several necessary conditions for deliberate strategy, these are; clear intentions; full understanding throughout the organisation; predictability with no interference from the external environment; and implementation following formulation.

Mintzberg (1985) argues that, as it is unlikely that these conditions will be met, there are serious doubts about the idea of deliberate strategy of an organisation. Mintzberg (1985) and (1987b) developed an argument from the premise that 'strategies can form as well as be formulated'. Mintzberg's research has shown that intended strategy is not the same as realised strategy. This has enabled him to compare intended strategy with realised strategy, and to distinguish deliberate strategies from emergent strategies. People develop strategy by looking back and making sense out of what they see in history, rather than looking forward.

Mintzberg (1985) defines emergent strategies as 'patterns or consistencies realised despite, or in the absence of intentions', Mintzberg develops this distinction between deliberate and emergent strategies to highlight a variety of strategies along a 'strategic spectrum', running from deliberate to emergent, as in figure 11

DELIBERATE

Planned

Entrepreneurial

Ideological

Umbrella

Process

Unconnected

Consensus

Imposed

EMERGENT

Figure 11 Mintzberg's Strategic Spectrum (Mintzberg 1985)

Grant (1995) highlights that a key feature of the rational approach to strategy analysis is the view that the formulation of business strategies can be achieved through application of the knowledge gained from systematically analysing the reasons for the success and failure of organisations. However, this approach is regarded by some, Mintzberg (1985) as having too narrow an analysis of change, is over-formalised and places more emphasis on quantitative as opposed to qualitative data. Grant (1995:21) however, suggests that;

The danger of the Mintzberg approach is that by downplaying the role of systematic analysis and emphasising the role of intuition and vision, we move into a Shirley MacLaine world of new age mysticism in which reality is devalued.

Another author, Wilson, (1992:24) describes the difference between deliberate and emergent change as the Voluntarist v Determinist debate.

Do we begin to understand change better through the cognitive actions of managers, (voluntarism) or through the forces of economics, environment and context, (determinism)?

Wilson (1992) suggests that Determinism is at the core of many 'economic theories' on organisations, in particular the ones which give priority to the strength of the business cycle over the 'entrepreneurial manager'. Wilson (1992) suggests that change processes are largely a function of 'deterministic forces' and this is widespread in both theory and empirical evidence. However, the literature e.g. (Burrell and Morgan 1979) on empowering managers to plan for change, does not take account of the broader and more 'deterministic forces', which are external to the organisation and outwith the individual manager's spheres of strategic choice. This issue will be addressed further below in the context of some alternative approaches to change. (see figure 12 below).

Some Alternative Approaches to Change

Wilson (1992) highlighted the issue of forces external to the organisation influencing changes. One approach which can address this issue is the *Open systems* approach to change which allows the variance which occurs within a firm to be explained by factors which lie outside it. According to Wilson (1992:42);

The Open systems approach views any one organisation as an independent piece of a much larger whole. Its actions and characteristics are no longer determined by the operations of its managers and founders, but by characteristics of the wider organisation-environment linkages.

Systems theory is a set of concepts and relationships describing the properties and behaviours of systems, for example, organisations, groups and people. Systems are viewed as unitary wholes composed of parts or sub-systems; the system serves to integrate the parts into a functioning unit. For example, organisations are composed of departments such as accounting, sales, manufacturing and research. The organisation serves to co-ordinate the behaviour of its departments so that they function together.

Systems can vary in how open they are to their outside environment. *Open systems*, such as organisations and people, exchange information and resources with their environment. They cannot completely control their own behaviour and are influenced in part by external forces. Organisations, for example, are affected by such environmental conditions as the availability of raw materials, customer demands, and government regulations. Understanding how these external forces affect the organisation can help to explain some of its internal behaviour.

The spread of change throughout an organisation can take many forms depending whether it is a planned approach or emerges over time. One such planned approach is the *Diffusion model*, whereby the change process diffuses throughout the organisation's networks. This model relies on an effective diffusion network for success. Diffusion research tailed off in the 1980's as the focus switched to topdown restructuring which placed the emphasis on senior management leading the change process. One criticism of the diffusion perspective was its

assumption of relatively stable environmental and organisational conditions. (Renshaw et al, 1990)

Research also suggests that change processes which rely on diffusion through pilot sites or experiments or alternative types of diffusion strategy rarely spread throughout an organisation. (Walton, 1975, 1980; Goodman and Dean, 1982).

Other forms of strategy which fall between the two extremes of deliberate and emergent and combine deliberation and control with flexibility and organisational learning are *Umbrella strategy*, whereby senior management may set out some broad guidelines, leaving specifics to others lower down the organisation, fig 11 p61. Alternatively there is *Process strategy*, where management may control the process of strategy formation, concerning itself with the design of the structure, while leaving the contents to others. Most significant organisational changes originate with higher management and are pushed through in one way or another. Resistance from the lower levels is usually expected and plans are made to overcome it. The phrase 'selling the change' is commonly used to describe a process in which management attempts either to convince those affected that they are likely to gain as a result or promises them that they will be compensated for any loss of job, pay or status.

Wilson (1992) suggests that any analysis requires a framework to position and view the various perspectives. He developed a framework to enable the various theories and models of change to be allocated along two broad dimensions which themselves originate from very different approaches to the 'sociology of organisation'.

	The Process of Change	The Implementation of Change
Planned Change	1 Logical incrementalism and various need, commitment and shared vision models	2 Reducing resistance to Change e.g. force field analysis
Emergent Change	3 Characteristic of strategic decisions: political process models	4 Contextualism: implementation is a function of antecedent factors and processes

Figure 12: A characterisation of approaches to organisational change (Wilson 1992)

Different issues will appear important to the understanding and management of strategic change, depending on the perspectives that are taken, and each perspective will vary along the dimensions shown in fig 12, and also by the levels of analysis adopted e.g. individuals, groups, organisations, business sectors, economics, nations.

Wilson (1992) suggests there has been a steady shift from emergent to planned models of change in recent years, with managers being encouraged to take more control in order to achieve the organisation's vision. There has also been more emphasis on human resource management which has confirmed the importance attached to management persuading employees that they have the correct vision of change. Wilson highlights two issues with this approach, first, the political and economic context of the organisational setting is ignored, second, the approach still assumes a traditional management / employee relationship in which management's wishes are imposed on the workforce, only the wishes of management are now referred to as change visions.

Western organisations tend to adopt the theory that by furnishing managers with the necessary skills, they will be able to ensure that planned change programs are implemented successfully. However, research suggests that the analysis of change is better understood in terms of its context and political process in organisations. (Hickson et al, 1986; Pettigrew and Whipp, 1991). Attempting to program change from a set of instructions will not work. Change initiatives need to take account of factors inside the organisation, which will influence the implementation and ultimate success of the program. This point will be of particular interest in looking at the implementation of TQM in each of the study plants.

This completes our initial selective review of organisational change in general, which attempted to orientate the reader and provide a theoretical base in which to address our area of study. The review has revealed that change is a complex subject and comprises many elements, which was evident in the change continuum in figure 11, which ran from planned to emergent change. The review also considered radical change in contrast to incremental change and found that the type of change can vary depending on whether technology is involved (hard) or people (soft) and in most areas a combination of both. Levels of change were also considered from the perspective of the flow from corporate levels, through business to operational level. A wealth of views exists on both the nature of change and how it should be addressed, and the study will use these theories to assist the understanding of the change process in the Gates plants involved in the study. Consideration is now given to the reasons why organisations want to change.

Drivers of Change

In order to understand the reasons for implementing a TQM program it is necessary to know what makes an organisation want to change. There are a number of specific, even obvious, factors, which will necessitate movement from the status quo.

The complexity and predictability of the environment may change. Dobson and Starkey (1993) suggest a few e.g. consumer demand for new products and services may render obsolete the existing ones and force market change. Some good examples of this kind of change can be found where consumer demands, in particular automobile, motorcycle and audio visual products were affected by Japanese products. Radical innovations in technology by competitors may also require an organisation to rethink its technological base, both in terms of new product technologies and new production processes. The organisation's politics may also change when there is lack of consensus on the organisations or its structure, or about best methods of manufacture. Change can also result where the balance of power over decision making may shift with the arrival of new top management. The arrival of the new management can create a political problem whereby the organisation has to determine who has the power to decide on what course of action. This can result in major changes in the organisations culture and significant changes to its 'core beliefs and values'. The management team requires to determine 'what values need to be held by which people'.

Pettigrew (1985) argues that the most obvious reasons for changes relate to changes in the external environment which drive alteration. A recent example of this, is the move by automobile manufacturers and petrochemical companies towards the provision of more environmentally friendly form of product. Pettigrew's (1985) analysis of change at ICI attempted to identify what causes change. He pointed out that there was no clear start or finish to strategic change and highlighted environmental disturbances as being the main causal factor, though these were not the only causes of change. Pettigrew (1985) suggests that to consider the environment as the only influence on change is wrong and would indicate that companies were 'merely bobbing about on a turbulent sea of change' without any real control over their direction. Pettigrew suggests that this is not so and that changes within an organisation tend to reflect and respond to developments in the business and economic world and also to 'processes of management perception, choice and action'.

Consideration is now given to the factors that need to be taken into account when looking for the causal effects that run throughout an organisation. The review has already highlighted external, environmental trigger mechanisms, which mean that the organisation has to reposition itself to remain effective. Others external drivers of change may include;

Changes in the level of technology

Changes in the customer expectations or tastes

Changes as a result of competitors' activities

Changes as a result of government legislation

Changes as a result of alterations in the economy

(Huczynski and Buchanan, 1991)

Huczynski and Buchanan (1991) also regard internal changes as triggers, due to the fact that they can be caused by reactions to the external environment, for example the redesign of an organisation to accommodate a new product or market strategy. Others may occur where an organisation has restructured and requires changes to job roles and responsibilities. Another cause of change is where the organisation attempts to be proactive and stay ahead of potential problems, like downturns in specific market segments, or economic recessions.

What then are the reasons for an organisation to consider an organisational change programme? Pettigrew's work with ICI suggests that the onset of crisis in an organisation will reduce the resistance to change, arguing that the common perception among individuals that the organisation may be closed, will act as an incentive to change the institutionalised context of the organisation and reduce the forces against the change. Poor business performance may also be a driver to organisations to adopt change programmes. This was the case with Xerox, who in 1982, concluded that Xerox needed to implement a Total Quality Process if the company was to remain competitive in the global market-place Xerox (1990). Customer influence may also affect incentive, for example, customers who have already

implemented a TQM program often look towards transferring the philosophy to their suppliers. The rationale for this is that where an organisation has developed confidence in its own management control systems, focus of work organisation, and quality control, it will feel more secure in its dealing with suppliers, if their systems are harmonised to the customers.

Senior management may also exert pressure through strategy and goal directives, and the development of measures and reporting systems which force a plant to adhere to the directives. This can be backed up by corporate audits and rewarding plants which have been successful in adopting the new strategies. The strength of the signals sent out by corporate may determine how readily plants adopt the directives. This senior management pressure can result from different perspectives; firstly, *New people at the top* -- new appointments made at senior level can result in new initiatives or programs being pursued. People who have experience from organisations which have successfully implemented an innovation may be keen to implement the same system in their new organisation; secondly, the *Felt Need* theory proposed by Lewin (1951) whereby business results may be good, but management may feel that in order to remain competitive they need to advance their knowledge, systems, and products. The information they require can be accessed from research material or benchmarking competition, known as competitive benchmarking. Finally, Abrahamson and Rosenkopf (1993) advanced the theory of bandwagon effect influencing organisations to change. They suggest that these bandwagons are attributable to two main reasons,

- (i) institutional pressure, whereby non adopters fear appearing different from adopters,
- (ii) competitive pressure, whereby non adopters fear below average performance if their competitors are gaining from the adoption of such programmes.

Overall the incentive to implement change is fairly well understood and attributed to a few key factors. This contrasts with the implementation of change, where there appears to be a vast array of sometimes, interrelated factors of influence which vary among organisations. Having discussed why organisations want to change, attention is now turned to the issues

they face in trying to implement change. This will be of interest to the study of how each of the plants has experienced the implementation of their TQM programs.

The Implementation of Change

This section considers the implementation of change, and this discussion adopts the practitioner of change perspective focusing on how to introduce organisational change. The discussion will aim to assist the development of a conceptual framework for the empirical data collection. The intention is to highlight some of the main views and models of implementing change relevant to the selected area of study. It will also require understanding of some of the main areas of influence on change and how these can affect the implementation. What factors increase the chances of successful change? What factors result in change failing?

One of the earliest approaches to change is described by Lewin (1951) who produced the force field model, which describes change as a state of imbalance between driving forces (pressures for change), and restraining forces (pressures against change). Balancing these forces means that change cannot happen because the forces are in equilibrium. This theory which set the scene for much of what we know as OD today is referred to as the Kert Lewin three phase model of change. The key point of Lewin's theory is that the success of change management can be greatly increased through an understanding of the critical steps involved in the change process. Lewin (1951) identifies three main steps, unfreezing, changing and refreezing. Unfreezing is the change stage where management are aware of the need to change and attempt to unfreeze the existing culture within the organisation, which comprises the perception and behaviour of the employees towards management and each other. Lewin's (1947) force field analysis identifies two opposing forces at work within a social system, forces that push for change and forces which resist change. A state of equilibrium is maintained if the two opposing forces are of equal strength. Change is achieved by either strengthening the driving forces for change or alternatively reducing the restraining forces against change, or a combination of both.

Figure 13: Lewin's equilibrium: driving and restraining forces for organisational change

<i>Driving forces</i>	<i>Restraining forces</i>
<p><i>(forces for change)</i></p> <p>New personnel Changing markets Shorter product life cycles Changing attitudes towards work Internationalisation Global markets Increased competition New technology</p>	<p><i>(forces against change)</i></p> <p><i>From individuals</i></p> <p>Fear of failure Loss of status Fear of the unknown Loss of friends</p> <p><i>From organisations</i></p> <p>Strength of culture Structure rigidity Sunk costs. Lack of Resource. Contractual Agreements. Strongly held beliefs and recipes for evaluating corporate activities.</p>

(Source: A strategy for change, Wilson, 1992:29)

One strength of Lewin's model is its simplicity, which facilitates its understanding and use, however, this is also seen by others Dawson (1994) as a significant drawback, since it presents a 'unidirectional' change model. Dawson feels that because the model refreezes the new setting it tends to treat the dynamic change process as a single event and may also create 'cultures' which could hinder the continuous improvement process.

An alternative view to the planned approach to change, which is seen as a formal structural move from one condition to another, is one described by Dawson (1994) as a processual approach, which is viewed over set periods of time. Dawson suggests that while there is much discussion and many models available to explain the multitude of views on organisational change, the major models and views echo the work of Lewin (1951).

The management literature in the main follows Lewin's three phase model of change (unfreezing, changing, refreezing) which Dawson (1994) suggests may have facilitated understanding of change programs in less dynamic situations. However, the dynamics of modern business is not suited to refreezing changes made during a planned program. As Dawson (1994:3) puts it;

Implementing stability and reinforcing behaviour which conform to a rigid set of procedures for new work arrangements does not meet the growing requirements for employee flexibility and structural adaptation to the unfolding and complex nature of organisational change processes.

Dawson (1994) argues that an alternative to Lewin's model is required to deal with the dynamics of today's businesses, which have changing requirements. Such an alternative would focus less on following a pre-planned format, concentrate more on analysing the processes of change and embrace, a wider perspective on the issues and methods of managing change. He suggests that a processual approach model can facilitate understanding of the processes involved in moving from the initial requirement to change to the final implementation of the new program. The framework developed by Dawson (1994) views the change process as complex and dynamic and stresses that it should not be addressed as a logical string of planned events. He identifies three general phases associated with the transition process; first, the concept of a requirement to change, second, the process of organisational transition, third, the operation of new work methods and procedures. He identifies three main groups of 'determinants' to help understand the change process.

The first of these determinants is *the substance of change* which describes the type and scale of organisational change. Dawson's work focuses on the organisational processes linked with the implementation and operation of new ideas and systems (such as JIT and TQM). In each case, understanding the components of the change is an important prerequisite to understand the process and outcomes of that change. In Dawson's (1994:42) words;

what are the characteristics of the changes being introduced and how do they enable or constrain the options open to management during the introduction of a major change programme?

The second determinant is *the context in which change takes place* and refers to the previous and present external and internal conditions as well as the potential effects of future proposals on current systems of operation. Thus, the context of change can be separated into the internal and external context. External contextual factors might include competitor changes at both national and international level, legislative changes, both sociological and technological changes, and business level changes. The internal contextual factors include: human resources, the organisation employees and departments; administrative structures, including job design and task allocation; technology, the equipment and tools and the manner in which they are organised to support the provision of product or services; and history and culture, regarding views, perceptions and attitudes held by the workforce.

The third determinant is *the politics of managing change* and Dawson (1994:42) describes this as;

the political activity of consultation, negotiation, conflict and resistance, which occurs at various levels within and outside an organisation during the process of managing change.

External political activity might include Government pressure or competitor alliances. Internal political activity might include union/management negotiation or managerial, supervisory and employee negotiations. The change process can be influenced by the interactive decisions and outcomes of these various groups of individuals, particularly if the interaction is of significance and coincides with a critical or sensitive phase in the change process.

The processual framework differs from the contingency models (a view that organisations and management processes vary with purpose, environment, technology and a whole range of other situational variables) in that it does not advise the use of a particular uniform structure for a specific change situation. Rather change is seen as ongoing, not always following a planned structure, not always moving forward and sometimes yielding unintended results as one progresses from the initial requirement to change to the establishment of the new set-up. Dawson (1994) adds that the contingency approaches utilise 'snapshot models' and treat the context from a singular and uncomplex viewpoint, while the processual viewpoint highlights

to both the academics and practitioners, the importance of what Dawson (1994:173) describes as;

the interplay between organisation governance and politics and the history and culture of organisations and change programmes.

Dawson suggests that a key learning point from the processual approach is that major change is complex and dynamic and must not be viewed as a logical string of activities.

Another author, Pettigrew (1992) suggests that research on change should consider the content of change, the context of change and the process of change, combined with the capability to adjust the links between the three (Pettigrew, 1990).

Content refers to the specific areas of change being reviewed, 'the what of change'. The content of change may also embrace more abstract criteria which may influence the decision to adopt change. The nature of the changes may vary considerably, with some being more radical than others, some technological and some focusing on changes to individuals roles, where this has been identified as a block on the change process.

Context refers to the 'why of change'. Pettigrew feels that any analysis requires to distinguish between inner and outer context. The outer context includes areas such as the 'national economic, political and social' context. The inner context includes the ongoing 'strategy, structure, culture, management and political processes'. Pettigrew suggests that one weakness of the literature on organisational change is a concentration on the inner context which can result in some of the wider issues being left out.

Process of change refers to the interactions of the variety of interested individuals and groups, as they manoeuvre and discuss proposals for change. According to Pettigrew (1992:9);

the analytical challenge, is to connect up the content, contexts and processes of change over time to explain the differential achievement of change objectives.

A key connection is the way individuals in the change process use the contexts around them to provide justification for change. Changes in the outer context can also be utilised to create change. Thus in the late 1970's John Harvey Jones utilised the changing economic climate at ICI to assist in the support of his new company strategy (Pettigrew, 1985a).

The literature highlights both successes and failures of change programs. One of the successes researched by Pettigrew (1985) was the changes at ICI in the 1970's. Pettigrew's research on continuity and change at ICI began in 1975 after ICI had been using specialist OD resources at a variety of different levels and divisions in the company, and were questioning why and how these specialists seemed to be more effective in some parts of the company than others. This echoed some of the questions raised by the author regarding Gates, e.g. why had some plants in Gates implemented TQM more successfully than others, which in turn highlighted the need to carry out inter plant comparisons.

Pettigrew (1985) suggests that the ICI case study echoes the findings of Quinn (1982) that change does not follow the 'rational-analytical schemes' found in the literature. The ICI data does not yield any information to suggest that change follows a linear process resulting from a formal strategy and that it is implemented in a controlled and sequential manner. According to Pettigrew (1985:457);

Forming and implementing strategic changes is not a steady, undisturbed progression from one routine to another, but rather a slow and incomplete process of breaking down old marriages between strategic context and content, and in an additive, intuitive, and occasionally opportunistic fashion building up a climate of acceptance for change.

Pettigrew draws upon Johnston's (1975) four stage model to suggest key parts of this process : Phases of developing concern with the status quo, then getting acknowledgement and understanding of the problems that need to be tackled and why, a planning and acting phase, and then a period of stabilisation. These phases of course, do not occur over similar time periods, neither do they necessarily follow the sequence indicated.

Another important aspect of implementing change is whether it should be managed from the top by senior management and cascaded down to lower levels (topdown) or alternatively starting at the lower end of the organisation i.e. shopfloor level, and spreading throughout the company (bottom up). It will be interesting to see whether the topdown approach, which is prescribed for TQM, is an effective way of implementing this type of change or whether the bottom up approach is more appropriate and consideration is now given to this area in some detail.

The Topdown / Bottom up Debate

The review now considers two contrasting views on the implementation of change, the topdown / bottom up debate. According to Lupton (1971) the majority of change programs are managed from top down. Some of the justifications are; Management will be held responsible, thus they need to guarantee success. Second, organisations are hierarchical in form, and tend to award higher pay and status to established skills, since those at the top are considered more competent, more accountable and more responsible. The combination of competence and responsibility is sufficient on this argument to confer upon management its right to manage the so-called managerial prerogative.

In contrast to the Topdown approach is the Bottom up approach, which involves targeting small isolated peripheral operations instead of the large central core operations. It normally involves the use of cross-functional teams working on a multidisciplinary change program. In favour of the Bottom up approach Lupton (1971) argues that to-days company's require to fully utilise the workforces skills, and also be 'flexible and adaptable' to handle the pace of change and the growing intricacy of advanced technology.

Lupton (1971) suggests that management need to start at the bottom level using a multifunction change approach, if they intend to design this type of organisation. Lupton sees bottom up management as a practical approach aimed at improving the use of people's skills within the organisation, increasing co-operation, reducing conflict and increasing organisational adaptability. He argues that top down management is deficient and the practice based upon it unsuitable to the modern organisational setting.

Views on the problems of change and suggested approaches are plentiful and varied. One source suggests that the *model* used to implement change is of critical importance. Michael Beer (1990) echoes the words of Lupton (1971) by suggesting that the conventional literature on organisational change tends to emphasise the importance of a top down, senior management led process and the Lewin three stage approach to an organisation-wide introduction of change (i.e. unfreezing, change, refreezing).

Another author, MacDonald (1993:30) states that;

The top down route is sometimes castigated by its opponents as motherhood, a process which starts by making executives and management feel good about quality, but really effects little change.

MacDonald (1993) states that the technique relies on the diffusion of education and training throughout all levels of the organisation, starting from the top. The objective is to create an awareness of the need for change at all levels in the organisation and to provide everyone with the tools and skills to make improvements. One drawback with the topdown approach is that each level in the organisation waits until the training process is fully complete before attempting to improve the process. This can result in managers, who have not been able to utilise their new skills, not taking the process seriously enough and retaining their original behaviour patterns. MacDonald (1993:31) likens this to;

attending a fire prevention course without any practical exercises of the actions they have to take. When the fire eventually arrives, they remain sitting at their desk while the east wing burns down.

In recent years, however, there have emerged calls for more 'bottom up' emphasis in introducing and carrying through the processes of organisation change. For example, Michael Beer (1990) and his colleagues have argued that top down initiated change is a change strategy which is risky and seldom adopted by top organisations. Beer's view contrasts with that presented by Wilson (1992) on page 62 which suggested that the planned topdown models of change are receiving more attention. Beer (1990) suggests that focusing on smaller less central areas of the business is a more successful strategy. He argues that while management understand the need for change in order to keep their organisations competitive, there is less understanding on how to make the change happen. Two assumptions are made. First, the various programs and new initiatives e.g. quality circles, reward systems, will transform the company. Second, changes to the organisation's formal structure and systems will result in changes to people's behaviour. Beer's four year study of organisational change at six large American corporations revealed that this is not the case. According to Beer (1990:158-9);

the greatest obstacle to revitalisation is the idea that it comes about through company wide change programs, particularly when a corporate staff group such as human resource sponsors them. He calls this the fallacy of programmatic change.

Of equal importance is the point that a corporate change program cannot be initiated and sustained by reliance on traditional structures and systems. Beer (1990:159) suggests that;

An approach to change based on task alignment, starting at the periphery and moving steadily towards the corporate core, is the most effective way to achieve enduring organisational change.

Task alignment involves reorganising employees roles, responsibilities and relationships to solve specific business problems, figure 14. Beer (1990) argues that most change programs don't work because the theory they are based on is incomplete. A popular view is that organisational change is the result of changing a significant number of individuals attitudes and behaviours, a form of conversion process. Beer (1990) however, argues that this view is the wrong way round, that the roles individuals adopt have a major impact on behaviour and that behaviour is best changed by placing individuals into new organisation set-ups, which demand new ways of working, thus creating new attitudes and behaviour amongst the workforce.

Figure 14: Contrasting Assumptions About Change

<i>Programmatic Change</i>	<i>Task Alignment</i>
Problems in behaviour are a function of individual knowledge, attitudes, and beliefs.	Individual knowledge, attitudes, and beliefs are shaped by recurring patterns of behavioural interactions.
The primary target of renewal should be the content of attitudes and ideas; actual behaviour should be secondary.	The primary target of renewal should be behaviour; attitudes and ideas should be secondary.
Behaviour can be isolated and changed individually.	Problems in behaviour come from a circular pattern, but the effects of the organisational system on the individual are greater than those of the individual on the system.
The target for renewal should be at the individual level.	The target for renewal should be at the level of roles, responsibilities, and relationships.

(Source: Why change programs don't produce change, Beer et Al, Harvard Business Review, Nov/Dec 1990)

Irrespective of whether change should be managed topdown or bottom up, there still appears to be little evidence of clear successful change in the literature. Kotter (1995) maintains that while change efforts have their share of successes and failures, most lie between the two, but towards the lower end of the range. According to Kotter the more successful cases highlight that the change process is phased, requires a significant period of time to complete. Jumping steps may appear to be faster but never produces a satisfying result. Major errors in any of the phases can result in disaster, slowing progress and cancelling out any gains.

Before looking at the experience of change and the issues of measuring success, the review briefly summarises the findings from the incentive to introduce change to the views on how implementation should take place (p67-81). It found that the drivers for change can come from many different areas. They can be external as in the case of consumer demand, Government legislation and customer influence or they can be from within the organisation as in the case of senior management pressure or felt need. The drivers of change are fairly well understood, however the implementation of change is subject to much debate and the three phase model of (Lewin, 1951) was reviewed, which is considered the fore bearer of many of the planned approaches to change we recognise today. More recent views on change by Dawson (1994) and Pettigrew (1992) revealed some similarities in the key factors of influence on change. These were;

- The content or substance of change.
- The context in which change takes place.
- The process (interaction) and politics of managing change.

The work of Pettigrew 1985 at ICI also suggested that change does not follow a planned linear approach, but is a much slower and less structured process. This led us into the debate on whether change should be managed from the top by senior management and cascaded down to lower levels (topdown) or alternatively started at the lower end of the organisation and spread throughout the company (bottom up). Again evidence was found which supports both views. (see Wilson p62 and Beer p79).

The review has cast some question marks over the planned topdown approach to change, of which TQM is one and this brings us to the question of how to measure whether a particular approach to change has been successful or not. One of the difficulties in deciding on success is what criteria to select for evaluation and what perspective is being adopted to evaluate. This area is now considered in more detail.

Measurement of Change

How do you measure whether a change program has been successful or not? How do you know if you have been successful? The analysis and measurement of success requires the selection of appropriate criteria and a measurement scale to enable success to be adequately defined. Success can be described in many ways; the Oxford dictionary describes it as 'accomplishment of what was aimed at'. The decision of what to aim at therefore determines the area or criteria with which to describe success. Success for whom, and at what level in the organisation, internal i.e. management or external i.e. shareholders. The criteria chosen to evaluate success will affect the view of success.

Success factors can be wide ranging, reflecting the different views of interested parties or stakeholders, e.g. shareholders, managers, employees, customers. For example;

- Shareholders - maximum dividends and profit levels.
- Managers - improved methods of running the business and controlling costs.
- Employees - improved working conditions and opportunities for development.
- Customers - improved product quality, pricing and availability.

Another important point is whether organisational change should be measured from a success/failure viewpoint or alternatively from a more institutionalisation perspective i.e. gradually becoming part of the new organisational arrangements and structure. Most organisations are complex entities that have developed over many years, and attempting to make a snap shot decision on whether a change program has been successful or not, may not be the best form of evaluation. In contrast to the snap shot model, where change is viewed as instantaneous Wilk (1990) see page 53 above, some literature, Pettigrew (1985) suggests that change evolves through time and cannot exist separately from other types of 'temporal measurement'. Pettigrew (1985) argues that organisational change can be understood only in

the context of 'large blocks of historical time'. An institutionalisation perspective on measurement may be more appropriate to this view of organisational change.

Another aspect of measuring change relates to the period of time over which the measures are taken. Some measures may be short term where the effects of the change are immediately obvious, for example the radical approaches involving quantum leaps in strategy described by Dobson and Starkey (1993) on page 52 above. Other measures may take longer to reveal a change e.g. where the incremental approach is adopted, involving smaller steps over a period of time described by Quinn (1982) on page 52 above. The time period perspective may be of particular importance to our study, since it will be necessary to ensure we capture both the longer-term measures in addition to short-term measures. To concentrate only on short term measures may give a false picture of how the effects of the change initiatives have impacted on the individual study plants.

Another consideration in measuring change will involve distinguishing between objective measures in the form of facts and figures as opposed to perceptual measures that are more subjective in nature. While objectives measures are the main forms of business reporting i.e. performance ratios, stock turns sales/employee, perceptual measures will be important to gauge the softer issues – the perceived impact of TQM on the business, for each of the study plants.

It will also be interesting to understand why organisations have not measured results, and where they have, what measures have been selected and why? This may give us some guidance on selecting measures and data that is available or at least reasonably accessible, since the study plants may have difficulty accessing or configuring special data.

It should be easy. You make the changes and you measure the effect, but people often don't measure the effect for a variety of reasons and when they do measure they use either existing criteria or inappropriate measures which are not linked to the actual strategies or goals. It is therefore important to identify the scope and goals of the change program, as this will enable relevant measures to be used. Yet this is one of the issues raised by Russell (1997). He suggests that many companies focus on strategic planning and change but do not take the next critical step of measuring processes and outcomes to determine whether they have

reached their goals. He suggests this is a common issue across many corporations and adds that those who do actually measure performance tend to cover too many areas, including some that are not linked to the established goals. He suggests that organisations should determine the gaps between their goals and existing measures, establish new measures to accurately reflect the changes or goals they have established. Russell (1997) suggests that most organisations can continue with 50 to 75% of their existing measures with only minor modifications required to their other measures. He stresses that accountability to the goals and measures outcomes must be a part of the process if it is to have any effect on the organisation. Lingle and Schiemann (1997) echo the words of Russell (1997) suggesting that 'until recently, with the exception of financial results, measurement has not been a burning issue in the boardroom'. They identify seven myths that reduce management's effective use of measurement. Two of these myths may be of particular importance to our study.

- Measure the hard results and the soft stuff will follow - while many organisations set financial and operational goals, few set goals for the soft issues relating to managing people, suppliers, customers and innovation.

This distinction between hard and soft attributes to change was discussed earlier McCalman and Paton (1992) on page 57-59 above, which highlighted the differences and types of problem which fall into the two categories i.e. hard /soft. It will be necessary to take account of this distinction in looking at measuring some of the softer issues relating to TQM's introduction i.e. the effects on people and the way people in turn affect the outcomes.

- Measurement is for Bean counters - senior management makes the mistake of leaving measurement of the organisation to the accountants, which tends to be financial.

As discussed earlier financial measures may not be appropriate for all aspects of a quality related change program and the study will be looking for measures that reflect the introduction of TQM and also cater for perceptual perspectives on change.

Some literature suggests that perhaps the wrong criteria may be selected to measure change. Salami (1993) suggests that the currency and language used to measure progress encourages

failure. A single or sometimes only a few criteria judge success or failure, which gives a false picture of the true performance or situation. He suggests that most organisations tend not to measure the things that are really important to them, which results in using outdated language and terms used to discuss success and failure among employees and customers alike. They represent a significant hurdle to progress and to change initiatives. He advocates the use of new measurement tools suitable for new initiatives.

This theme is echoed by Tarr (1995:1) who suggests that many change initiatives fail because of a lack of change in the performance measurement system as the needs for measurement change.

The recommended solution is often to establish new measures appropriate to the new techniques employed and append them to the existing measurement system without regard for the contradictory nature of the old and new measures and without any understanding of which measures are more important. At worst, the organisation continues to emphasise and use old 'hard' measures, ignoring their negative effect on the new organisation initiatives.

Tarr (1995) suggests that there is a lack of understanding of what measurement is, what it is designed to accomplish, and what its effect is on the behaviour and culture of organisations. He maintains that there are three characteristics of performance measurement that are important to the understanding of a performance measurement system.

- Precision versus Accuracy – Some measurement systems focus on the precision of the measurement, calculating to two or three decimal places, giving the illusion of accuracy when in fact they may have an accuracy of +/-20%. This level of precision adds no value to the measurement and can be misleading and costly. More valuable is an understanding of what accuracy and the degree of accuracy associated with a standard or actual measurement.

- Positional measurement versus directional measurement – Positional or static measures locate the position of an attribute or variable at a specific point in time or over a defined period. They provide only limited information about a process operating in an organisation.

If the static measure of customer service for a period of time is 95%, this measure provides limited information unless it is framed in a series of measurements that indicate whether the customer service trend is improving, staying the same, or deteriorating.(Tarr 1995:3).

Directional or vector measures provide the additional information of direction and velocity of change occurring in the attribute or variable measured. Vector measures overcome some of the problems inherent in traditional static measurements.

- Intended versus unintended consequences of measurement – Measurement can affect behaviour and this is why we measure people, to encourage them to perform to certain standards and goals. This is referred to as the intended consequences of performance measurement. However, because performance measures are usually only indirectly related to the goals they pursue and because people will modify their behaviour to maximise their performance against the measure, performance measures often lead to unintended consequences as well.

This has been a short review of measurement aimed at assisting our definition and selection of measures for the empirical work. This study will need to confirm how success will be measured, what are the main criteria to be used to measure against and how relevant are they to our study? It will be necessary to consider both short and long-term measures and objectives (facts and figures) as well as perceptual measures. This should provide a more rounded view of progress. It will be necessary to select measures that, as well as being relevant to our study, are accessible and if possible form the normal business reporting measures, since these will be available and more likely to be consistent across the study plants. The issues of measuring change will be covered in more detail in chapter six. The review now looks at the experience of change.

Why Change Fails

Kotter (1995) identifies eight reasons for the failure of change efforts and develops this further to an eight stage process model for change (Kotter, 1996).

The first error involves '*not establishing a great enough sense of urgency.*' This first step kicks off the program and requires co-operation from everyone involved. Unless the individuals are motivated to escape from their 'comfort zones' the program will fail. Kotter suggests this is a key point which managers fail to fully appreciate.

Change initiatives can start with just a few people, and where the change is successful the leadership coalition develops over time. However, if the development is hindered at the early stages or fails to gain sufficient support, then the change program can lose momentum and very little changes. This second error of '*not creating a powerful enough guiding coalition*' highlights the need for a steering committee early on in the program.

In most successful change efforts the steering committee develops a view of the future that is communicable and acceptable to all stakeholders. The vision extends beyond the normal five year plans adopted by the majority of organisations, and it clarifies the direction the organisation is moving in. Kotter (1996) suggests that '*lacking a vision*', error three, means that a change effort can result in an organisation drifting down the wrong route, due to poor co-ordination and incompatibility of projects.

Error four involves '*under communicating the vision by a factor of ten*'. Kotter identifies three patterns to communication change. The first is the initial short internal communication on the change initiative, which usually leaves the steering committee, surprised that few people comprehend the new initiative. The second involves the MD's direct communication to all employees, which achieves little more than the first communication. The third approach involves greater effort e.g. briefs and handouts, however, senior manager's behaviour fails to match that required by the new vision. This results in increased employee cynicism, coupled with reduced belief in the communications.

Kotter describes the fifth error as '*not removing obstacles to the new vision*', suggesting that the organisation structure itself can be an obstacle. He also suggests that obstacles in the form of incentive schemes and performance appraisal systems force employees along the self interest route instead of embracing the new vision. Kotter (1995:64) states that;

Too often an employee understands the new vision and want to help make it happen, but an elephant appears to be blocking the path. In some cases the elephant is in the person's head, and the challenge is to convince the individual that no external obstacles exist.

But according to Kotter in most cases the blocks are very real.

The change process takes time, and renewal efforts can lose momentum if there are no short term goals to meet and celebrate. Error six is '*not systematically planning for and creating short term wins*'. Most people will lose heart unless they see evidence, within a reasonable time-scale (1-2 years) that the change initiative is achieving some of the expected results. Kotter suggests that without short term wins, too many people give up or actively join the ranks of those people who have been resisting change.

After a few successes with a change initiative managers may feel they have completed their task. Kotter suggests that while celebrating a success is fine, declaring that the goals or tasks are complete can jeopardise the overall change program. Unless changes sink deeply into a company's culture, which according to Kotter, for an entire company can take three to ten years, new approaches are fragile and subject to regression. Error seven is '*declaring victory too soon*'.

The eighth and final error is '*not anchoring changes in the corporations culture*'. Kotter argues that until new behaviours become part of the organisation's norms and shared values, they are subject to degradation as soon as the pressure for change is removed. Kotter highlights two areas of importance in institutionalising change in corporate cultures. The first is a conscious attempt to show people how the new approaches, behaviour and attitudes have helped improve performance. Employees sometimes need help to understand the links between their efforts and the success of a new initiative. The second is allowing enough time

to ensure the next generation of senior managers personifies the new approach. If the criteria for promotion remain the same, then it will be difficult to sustain the change process. In addition to the eight errors common to organisational change efforts Kotter (1996) identifies consequences, which may follow, these are;

- * New strategies aren't implemented well
- * Acquisitions don't achieve expected synergies
- * Re-engineering takes too long and costs too much
- * Downsizing doesn't get costs under control
- * Quality programs don't deliver hoped for results

Kotter (1996) suggests that the eight errors are not inevitable. They can be avoided or greatly reduced if management are aware of them and apply the relevant skills. The key lies in understanding why organisations resist needed change. What is the process to overcome the so commonly found inertia in organisations and what type of leadership over and above the normal good management practice is required to drive the process? Appendix 3 outlines Kotter's eight stage process for creating major change. The review now covers some of the views on achieving effective change.

Achieving effective Change

What are the steps necessary to improve an organisations chances of implementing an effective change program. Beer (1990) offers six steps to effective change.

- * Mobilise commitment to change through joint diagnosis of business problems
- * Develop a shared vision of how to organise and manage for competitiveness
- * Foster consensus for the new vision, competence to enact it, and cohesion to move it along
- * Spread revitalisation to all departments without pushing it from the top
- * Institutionalise revitalisation through formal policies, systems, and structures
- * Monitor and adjust strategies in response to problems in the revitalisation process

According to Beer (1990) the six step process can achieve change without forcing it. When stakeholders sign on to a vision, they are more receptive to new management styles that require changes to their behaviour, and once people realise the benefits of the new approach they tackle the change issues they would previously have resisted.

MacDonald (1993) maintains that the multilevel bottom up approach is a more useful and practical approach. This approach involves allocating teams of employees to tackle the various issues identified throughout the organisation. The teams will all have received training in the new change initiative and problem solving techniques. This bottom up approach ensures that the new philosophy and techniques are put to work immediately, as opposed to the top down approach, which relies on everyone being trained before applying the theory. The theory is that as each team sets to work, the organisation will experience a gradual culture change, which grows as more teams come on board. However, one possible drawback is that the training and education process may vary significantly from problem to problem, resulting in teams with varying degrees of knowledge, skills and experience.

Other research by Dawson (1994) on the management of change is based on longitudinal case study research of the management of innovation and change in British, American and Australian corporations. Dawson identifies 15 major practical guidelines, (appendix 4) which can be drawn from a processual analysis of managing organisational transition. Dawson (1994:179) echoes Pettigrew (1992) by suggesting that ;

the management of change does not happen overnight, it takes time and involves a range of political events, activities and action by various stakeholders and key occupational groups. There is context and substance to change which continually influences key decision makers and shapers of change at critical junctures during that process. This may change and modify directions and strategies adopted by organisations or individual plants within an organisation.

The literature, e.g. Kanter, Stein, and Jick (1992), also suggests that the process of change cannot be usefully or meaningfully viewed as a discrete, self contained process which is free from external shocks and disruption. Research in this area highlights that change in the external environment can result in significant diversions of management time, resources and attention away from the details of carrying through a change programme (Beaumont and Martin, 1997).

Achieving effective change also relies on management being able to maintain the focus on the change program and coping with the many diversions facing organisations. This ability to lead change can have a major impact on how well a change initiative is implemented and managed and the review now looks at this aspect of management ability.

Leading Change

Effective change also relies on an organisation's ability to lead change and one of the key aspects of ability is the area of leadership and the style of management exerted throughout the organisation, since this can have a significant effect on the workforce and its receptiveness towards management. Blake and Mouton (1978) developed a grid to help management and supervisors to understand their managerial style and possibly improve it. Although the work of Blake and Mouton is not recent, it is not intended to discuss leadership in detail and the managerial style grid may be a useful way of identifying the different management styles across the Gates plants which form our study.

The Leadership Grid postulates two basic assumptions about managerial behaviour: (1) *concern for production*, the emphasis on accomplishing productive tasks; and (2) *concern for people*, for those who get the work done. According to Blake and Mouton, concern for production covers a wide range of considerations, such as the number of creative ideas developed, the quality of policy decisions, the thoroughness and quality of staff services, efficiency and workload measurements, or the number of accounts processed or units of output. Concern for production is not limited to things but may also involve human accomplishment within the organisation, whatever the assigned task or activities. Concern for people encompasses a diversity of issues, including concern for the individual's personal worth, good working conditions, a degree of involvement or commitment to completing the job, security, a fair salary structure, fringe benefits, and good social and other relationships. The relationship between concern for production and concern for people is shown in figure 15. Figure 15 shows eighty-one possible variations of the two aspects of management—concern for people and concern for production. Blake and Mouton focus on the four extreme positions as well as on the middle 5,5 style.

Blake and Mouton see the 9,9 manager as an ideal that is worth striving for. They believe that this desirable fusion of concern for production and concern for people can be achieved through structured development activities.

Work by others, Hersey and Blanchard (1982) builds on the concepts implicit in the managerial grid. They identify a range of styles depending on the situation: the task, its

complexity and the staff member's competence and willingness to engage in the task. The four styles are: directing, coaching supporting and delegating. Hersey and Blanchard (1982) have designed a situational leadership questionnaire that can also be used for management development purposes. It provides feedback to individuals on their dominant style, style flexibility, areas of weakness and style effectiveness.

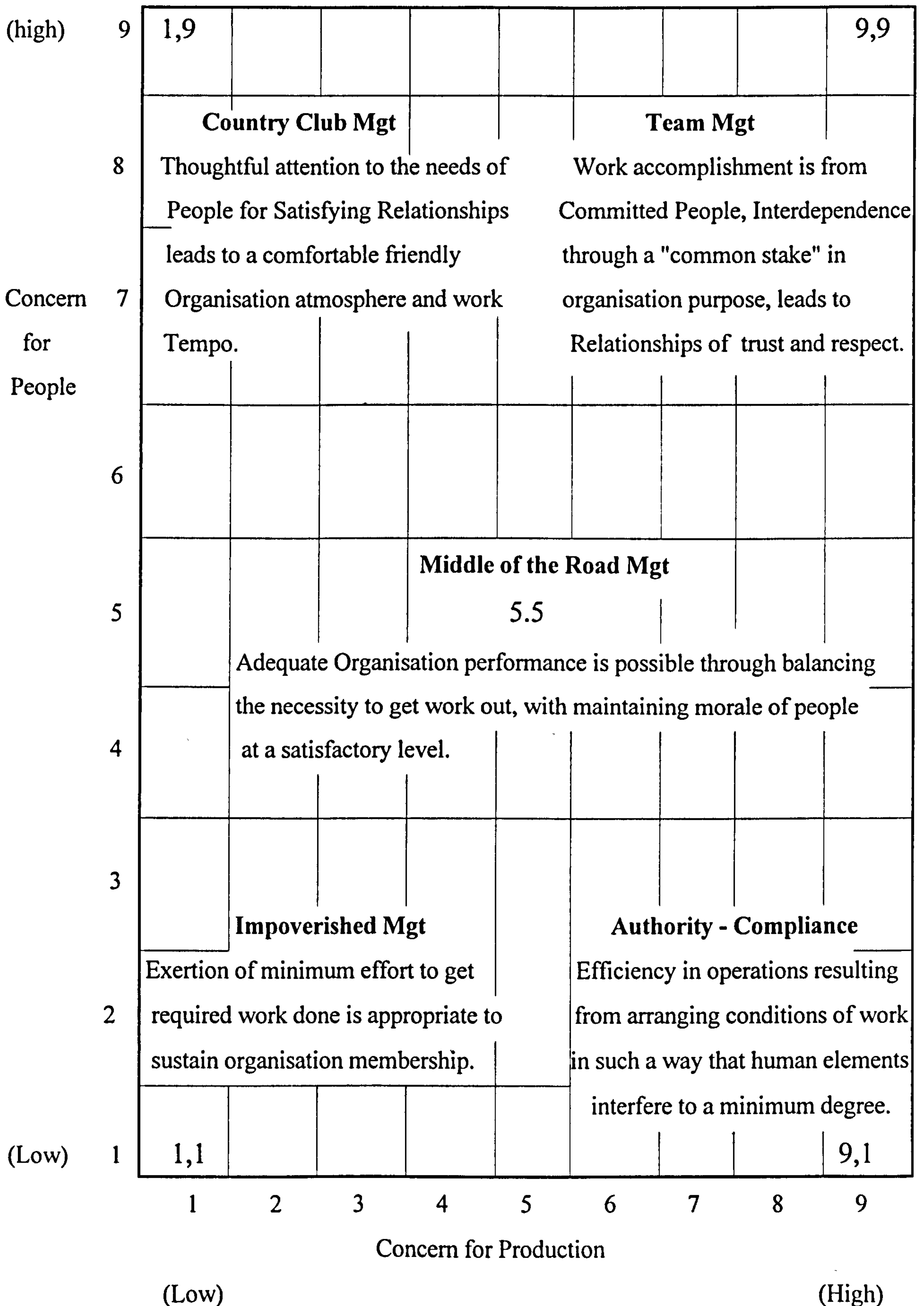
More up to date research by Beer (1990:184) identifies three attributes found in successful leaders of 'revitalisation'.

- A persistent belief that revitalisation is key to competitiveness.
- The capacity to articulate this conviction in the form of a credible and compelling vision.
- The ability to implement this vision through a consistent pattern of words and behaviour.

The style of leadership and management behaviour may be of interest to our study regarding their effects on the implementation and management of the TQM programs in each of the Gates plants. It will also be interesting to see how the styles vary across the study plants as this will also impact on how well and consistently a corporate led TQM program can be cascaded throughout an organisation.

This view of a corporate led change program now leads us to look at how a multinational corporation deals with change programs and the relationship it develops with subsidiaries.

Figure 15: Blake and Mouton Managerial Style Grid



Source: R Blake and J Mouton, *The Managerial Grid* (Houston: Gulf, 1978)

The Multinational Approach to Change

It will be interesting to see how multinational corporations handle global change programs, as this may help us to understand how the corporate led TQM program has been delivered across the Gates plants. The study will look at the level of control exerted by corporate. Is it centralised i.e. managed from headquarters or do they allow their subsidiaries some level of autonomy i.e. decentralised control?

The structure of the multinational organisation generally reflects the degree of decentralisation that the senior management of the company feel is appropriate. At the heart of this decision is the tension between, on the one hand, the need to be responsive to the various national markets, and on the other, the benefits of integrating activities and strategies across the organisation.

Bowman and Jarrett (1996) suggest decisions about what to control centrally and what to delegate will be influenced by a number of factors.

- **Size of overseas operations:** This can vary from a simple office managing the importing of the company's products, to a large scale manufacturing and marketing unit.
- **Breadth of product line:** The broader the range of products being sold in the overseas market, the greater will be the tendency to delegate more decision making power to the subsidiary.
- **Perceptions about local management:** Corporate management may have a low regard for local management, doubting their professionalism, or even integrity.

Our study covers plants in both USA and Europe, and Gates headquarters is situated in Denver USA. It will be interesting to see if corporate management's orientations towards US plants differ significantly from that towards the European plants, with regard to the level of control or autonomy given, since this may affect how the TQM program is received and implemented by the divisional management and individual plants.

The literature, Perlmutter (1969) suggests three different international orientations amongst managers.

- Ethnocentric (home country orientated) - where management only have faith in domestic employees, and therefore in their view, the strategies, structures and systems used in the domestic business should be applied across all other countries.
- Polycentric (host country orientated) – where management acknowledge the differences of the foreign operation, and recognise that there are ways of managing which are appropriate to the overseas operation.
- Geocentric (world orientated) – where management view all operations as equally important, regardless of their location. Emphasis is placed on integrating activities as far as possible across the globe.

This international perspective is of particular importance to our study since the international orientations adopted by Gates corporate management may have a significant influence on how the TQM initiative is communicated and controlled throughout the world and subsequently received and adopted by the study plants. It should however, be noted that headquarters communicate through their divisional management, who in turn are responsible for communicating strategy to the individual plants in their division (figure 2 page 28).

Firms that have become multinational face enormous problems in controlling the foreign-based operations. Differences in language, customs and laws coupled with the often, immense distances involved, add to the problem of control. The headquarters has the option of adopting a hands-off, holding company approach to the control of its subsidiaries, or it can choose to intervene directly in the decision making processes within each subsidiary.

Where a multinational sees the need to maintain its strategic direction and in particular a new change initiative it may opt for the centralised approach. Nohria and Ghoshal (1997) highlight that centralisation has been the focus of several studies of headquarters-subsidary relations. It refers to a governance mechanism whereby the decision making process is

hierarchically organised with the headquarters often making most of the crucial strategic and policy decisions. They suggest that because centralisation shifts the power base in favour of the headquarters, it can lead to 'dissonance' if the subsidiary is a powerful actor in the exchange relation. The subsidiary is likely to resent over-hierarchical control and is in a strong bargaining position due to the power that accompanies its large resource endowment. This may also be the case where the subsidiary has already introduced a change initiative that it feels is already ahead of the corporate led initiative.

Bartlett and Ghoshal 1986 suggest that the role of the foreign subsidiary manager will vary both with the size and significance of the local market and with the extent to which the subsidiary commands strategically significant resources, which can include knowledge and experience. Some subsidiaries will take an active lead in formulating strategy, others contribute resources while some will be assigned a more passive role as 'implementors'.

If corporate determine that a new initiative is to be put into effect, how this is done and how effectively may depend in part on the relationship between corporate and the divisional management. It may also perhaps depend on how corporate view the individual subsidiaries – some situations will leave considerable scope for local flexibility, others may not. But even then, why do some units take up the initiative, why do some resist or even reject? There may be some obvious reasons that include the strength of the signals from corporate and division to the individual plants, also in the opposite direction, the nature of the receptivity by the individual plants towards the new initiative, and as discussed the experience and knowledge, held by the plants. Some plants may already have experience of implementing change programs like GEM and this may influence the way they are viewed by corporate.

For this study it will be interesting to see the level of autonomy given to the Gates plants in implementing the corporate led TQM program as the range of knowledge and expertise amongst the plants vary. Will the plants be expected to implement the corporate version to the 'letter of the law' and if so, how much control will corporate exert to ensure that only one version is implemented world-wide? It will also be interesting to establish the relationship each plant adopts with divisional headquarters as it implements its change program.

Conclusions

The literature on organisational change is vast and varied and is not all relevant to our proposed area of research. This has been a selective review of some of the literature considered more relevant in explaining the change process at Gates and developing our conceptual framework for analysing the empirical data.

The review has revealed that the change can be viewed across a spectrum, (Mintzberg, 1985) ranging from deliberate planned change to change which emerges over time. It also found that change can vary from radical on the one hand to incremental on the other and that the type of change will vary depending on whether it is 'hard' in the case of technology, or 'soft' in the case of people orientated change. The review considered different levels of change throughout an organisation, running from the corporate level at the top to operational level at the lower end.

The discussion on change revealed that there is a wealth of views on the subject and an equal number of models to support these views. The subject is open to continuing debate. However, it appears that the Lewin model of change still holds a predominant position in the literature and at practitioner level. It will be interesting to see which view the change programs experienced in our study follow.

In looking at what causes an organisation to introduce change it was found that drivers for change may come from many different areas. They can be external as in the case of consumer demand, Government legislation and customer influence or they can be from within the organisation as in the case of senior management pressure or felt need.

The drivers of change are fairly well understood, however the implementation of change is subject to much debate as was found when reviewing the works of (Lewin, 1951; Dawson, 1994; Pettigrew, 1992). The work of Pettigrew 1985 at ICI also suggested that change does not follow a planned linear approach, but is a much slower and less structured process. This led us into the debate on whether change should be managed from the top by senior management and cascaded down to lower levels (topdown) or alternatively started at the

lower end of the organisation and spread throughout the company (bottom up). Again evidence was found which supports both views. (see Wilson p62 and Beer p79).

The review raised the difficulties and issues involved in attempting to measure change, which can vary significantly for the different interested parties. It also noted the tendency for organisations not to measure the effects of change and even when they did, they chose the wrong or inappropriate criteria in many cases. Some organisations even expected to append additional measures to the existing financial based criteria. The review also identified the need to carefully consider how to choose relevant and meaningful measures for our study.

The review has highlighted a few of the vast array of views and guidelines on what makes the chances of organisational change being more successful, with suggestions that organisational change fails because (i) the wrong model has been used Beer (1990) (ii) the wrong process of implementation has been adopted Kotter (1995) (iii) the politics of the change process have not been fully understood Dawson (1995). Pettigrew (1992) underlines the need for a receptive context for change to progress.

Finally, the review looked at how multinational corporations can interact with their subsidiaries when implementing change and controlling the global organisation in general. This again is variable and can range from centralised control from headquarters to a decentralised approach whereby subsidiaries are given more autonomy dependant on a number of factors.

This chapter has briefly mentioned Total Quality Management and positioned it among the planned approaches to change. TQM would be found at the planned change area of figure 11 (p61), since it is a generally pre-planned step by step model which is introduced to organisations following a rationalist approach. It will be interesting to know if it suffers from some of the problems affecting planned change already highlighted in our discussion by Grant (1995) and Mintzberg (1985). (see p60-61).

The next chapter, four, discusses TQM in some detail in order to understand the nature of this approach, how it has been received by organisations and its level of success. This will assist our understanding of its introduction into the study plants.

CHAPTER 4

TOTAL QUALITY MANAGEMENT

AN OVERVIEW OF THE APPROACH

Introduction

This chapter focuses on a specific area of organisational change, Total Quality Management, TQM. It was mentioned in chapter one, the reasons for studying TQM, which to recap were;

- To gain a greater understanding about Total Quality Management and its implementation across the Gates plants.
- To identify the factors which appear to influence Total Quality Management's implementation.
- To establish if a link existed between the level of successful Total Quality Management implementation and plant business performance.

The Total Quality Management approach is now discussed in more detail and starts by looking at the background and nature of TQM, and then reviews some interpretations of the TQM approach. This is followed by some discussion on the main principles of the TQM philosophy and the reasons why organisations introduce TQM, including the benefits expected from its implementation. The review then looks at the issues of measuring TQM and the influence of the quality awards. This leads us to the experience of TQM and covers

the successes and the reasons for failures of this approach to change. Finally, the development of the model of TQM selected for our study.

TQM: A new Approach

Total Quality Management (TQM) is a widely used strategy for enhancing organisational flexibility and increasing employee commitment to change. Dawson, (1994) suggests it started in USA and was then further developed in Japan. It is now playing a major role in organisation's quality strategies around the world. TQM differs from some of the earlier quality initiatives like Quality Circles. Quality Circles was aimed at improving participation by shop floor employees and was viewed as an operational technique.

Some, like Ishikawa (1985) suggest that QC's can improve business results however, QC's are generally not supported in the western literature, for example Hill (1995) highlights that of 13 companies introducing QC's in the early 1980's only 2 still had them at the end of 1989. While achieving some minor benefits, circles have failed to increase employee involvement, improve human relations, or change the organisation's culture. Hill suggests the main reason for quality circles 'fading away' was lack of management support. He suggests that because of TQM's changes in infrastructure it will not suffer the same fate as the QC movement of the 80's, where a lack of institutional and managerial support resulted in a very small take up and success rate. The focus on managerial support and team working is, according to Hill, believed to be the route to success for TQM.

TQM differs from Quality Circles in that it aims to unify the various individual control programs such as SPC, JIT, with the strategic management of that organisation e.g. the overall management and direction given to the company. TQM has thus developed from a number of individual techniques to the management of a system designed to improve employee participation at all levels in the organisation.

During the 90's the quality initiatives associated with manufacturing e.g. Total Quality Control, have received less attention, with more emphasis on managing the cultural aspects of the organisation and harnessing all levels of the organisation in the drive for quality (Hames, 1991). The focus is now aimed at employee involvement throughout the entire organisation, and at providing a culture of continuous improvement to the service and

delivery of products, in order to improve effectiveness and the commitment of employees (MacDonald and Piggot, 1990).

Some assume the terms TQC and TQM mean the same. However, there is a key difference. TQC has its roots in Quality Control which utilises statistical techniques to measure quality levels. This does not mean to say that TQC principles cannot be utilised in organisations that operate TQM programs. TQC has been used predominantly in the manufacturing industries e.g. SPC, and less in the service sectors.

TQM on the other hand has a wider ranging application and aims at employee involvement to help achieve the quality goals. TQM also focuses more on employee commitment and team working relationships. Culture change becomes the major component in the strategic transition, with SPC and team working arrangements being utilised to achieve the involvement of employees (Dawson and Palmer, 1994).

The Nature of TQM

The TQM approach falls under the umbrella of planned approaches to organisational change, following a regimented programme. TQM is a body of literature in popular management not underpinned by quality research and as such cannot be treated as a panacea for all organisational problems. The approach adopts implicit assumptions that there is a one best way to implement change.

TQM focuses in the main on cross-functional co-operation between an organisation's various departments and also concentrates on servicing the customer's quality needs. It is more than a quality program as viewed from the traditional manufacturing perspective, e.g. defects reduction, improved product yield. It is applied to the entire organisation and aims at continuous improvement of products and services (Wilson, 1992). The main principles of TQM consist of a management-led approach with company wide scope and everyone involved. The philosophy is prevention not detection and the standards to aim for are 'right first time'. The control measure used is the cost of quality, and the theme throughout the program is ongoing quality.

Organisations that are serious about implementing TQM require to carefully consider many aspects of their company, ranging from organisation structure through to behavioural and attitude issues for both management and workers. The change process requires people to break out of their comfort zones and any inertia or unwillingness to adopt new practices can jeopardise this change process. 'That's the way we have always done it here and it worked in the past' is a not too uncommon reaction to the call for change. People need to understand the need for change and accept ownership if they are to become part of the new initiative. This area of receptiveness towards new initiatives can have a major impact on how well a TQM program is implemented and our review will cover receptivity in more detail later.

Some suggest that the changes TQM requires are more about management, people and communications rather than technology or management tools. These areas are referred to as 'soft' subjects as opposed to the more tangible financial results organisations publish and use for controls which are termed 'hard' measures. Traditional managers and change agents alike

tend to be confused by these issues. While hard business results are what determine an organisation's success, the softer issues involving people can greatly impact on these results. This issue accounts for many of TQM's problems. (McDonald, 1993).

Hackman (1995) suggests that TQM is based on four 'interlocked' assumptions concerning quality, people, organisations and senior management roles.

- That quality has less cost attached to it than poor 'workmanship'
- That people do actually care about the quality of their work and will actively attempt to improve it, assuming they are supplied with the necessary equipment and training and management listens to their views and suggestions.
- That organisations comprise of many interrelated departments and systems and the issues they face are not restricted to single areas, but can bridge traditional boundaries.
- At the end of the day senior management are considered ultimately responsible for quality.

Hackman (1995) further suggests that the TQM gurus (Juran, 1974; Ishikawa, 1985; Deming, 1986) identify four principles that should be followed by companies hoping to enhance quality.

- Target the 'work processes'
- Understand the reasons for process variability
- Base decision making on facts utilising a 'systematic' method of data collection
- Create a culture of continuous learning and improvement

These same TQM authorities, mentioned above, outline five 'interventions' to realise the 'core values' of TQM, which focus on people, organisations and change processes.

- (i) Understanding of customers needs ensures consideration and full analysis of changes in the process.
- (ii) Supplier partnerships can help guarantee the incoming materials conform to requirements.
- (iii) Cross functional teams ensure that all angles are addressed when organisation wide issues are being discussed and evaluated.
- (iv) Scientific techniques and statistical methods ensure that team decisions are based on accurate data.
- (v) The decision making process can be greatly enhanced by the use of 'process management heuristics'.

Hackman (1995) highlights a survey report (Conference Board, 1991) which identifies five TQM practices which are in line with those of the quality gurus namely Deming, Ishikawa and Juran. They are, in order of occurrence,

- The forming of temporary 'problem solving teams' designed to review and improve methods of operation,
- Training of employees in the new techniques and philosophy.
- A topdown implementation plan.
- The development of improved supplier relations.
- Practice involves gathering information on customers in order to better meet their needs.

Hackman (1995) adds two more which he points out are not particularly mentioned by the gurus, but are never the less 'consistent' with their philosophy. These are competitive benchmarking and employee involvement, which are common elements in the US TQM programs.

This completes our initial review of the TQM approach to organisational change. The review now looks at TQM's main principles in more detail, in particular the work of Dawson (1994).

The Main Principles of TQM

There are a multitude of views and interpretations of exactly what TQM stands for and what should be the components of a TQM program. This range of views on TQM is not entirely surprising since the majority of TQM literature has been presented by consultants who have their own agendas and views. Many of them will maintain that the implementation of a successful program into an organisation relies on a specific methodology.

The issue of defining TQM is made more difficult by the fact that even though it evolved from some of the TQC principles, it covers a much wider ranging area of the management field, involving the form of strategic change and the revision of organisational policies and procedures, particularly communication and teamwork. This cultural dimension of TQM has made it very difficult to come up with a common definition. Added to this are the effects of competing consultants, the application of TQM to the service industries and the time-scales involved for change strategies. However, Dawson (1994) highlights a number of common themes and ideas found in the literature on TQM. We will use Dawson's characteristics to help explain some of the main principles of TQM, some of which we have already touched on, in more depth.

Firstly, TQM is a holistic approach to quality management, which embraces all levels of management and employees in the organisation. It also focuses on the external areas of the organisation as well as the internal, and is particularly aimed at supplier-customer relationships. This approach differs from the earlier quality approaches like quality control which was administered by QA departments for the shopfloor controls, and also the quality circles approach which aimed to increase the involvement of employees at shopfloor level. The TQM philosophy assumes that organisations, operating in a very competitive market environment will see the need for change and continuous improvement of their processes and systems if they are to survive and remain successful. The TQM approach relies heavily on the commitment and leadership of top management. Words and speeches are the easy part: management need to demonstrate to all levels in the organisation that they are fully supportive of the program and their actions must match this commitment to involve

everyone in the new team working arrangements to solving issues throughout the company.

Secondly, TQM focuses on continuous improvement which, as discussed in chapter three, is captured under the banner of incrementalism. This focus differentiates TQM from some of the conventional change initiatives, which seek to replace one set of rules with another. TQM looks to continually improve the processes and systems throughout an organisation. This change culture involves a steady conversion of how management and employees regard change and how easily they accept the need for change. Over time this culture change reduces management's, and employees' resistance to changing established working procedures, and creates a view in the workforce that change is healthy and an understanding that it is necessary to improve processes. The Japanese have developed a word to describe this system of continuous improvement, which seeks to improve standards and cope with the ever increasing needs of customers. 'Kaizen' is now a familiar term to most organisations around the world. Dawson (1994) refers to the words of Masaaki Imai (1986:3) to describe Kaizen;

The essence of *kaizen* is simple and straightforward: kaizen means improvement. Moreover, kaizen means ongoing improvement involving everyone, including both managers and workers. The kaizen philosophy assumes that our way of life - be it our working life, our social life, or our home life - deserves to be constantly improved.

The Japanese have been very successful in utilising this improvement philosophy for their manufacturing systems, JIT Kanban being an example, and the west is now realising the potential benefits of this technique, which is a key component of TQM.

Third, TQM involves the application of quality control techniques, which according to some is a necessity for ongoing quality improvement Fox (1991) however, TQM does not focus solely on quality measurement, but also utilises statistical methods to facilitate the process of continuous improvement. Traditional quality control involves the finished product being inspected by Quality inspectors and or production operators, who use

established pass/fail criteria to determine if the product is fit for purpose. In most cases any errors or quality issues have already been created further back in the process and final product inspection is merely detection rather than prevention. TQM, on the other hand, focuses on tackling the root causes of process/quality issues using cross functional and or process teams trained in the use of statistical tools. These tools can monitor the process and allow corrective action to be taken much earlier than the traditional quality control methods. These statistical tools include SPC charts, sampling plans and Pareto analysis, sometimes referred to as the 80/20 rule, i.e. 80% of defect product are attributed to 20% of the possible causes. SPC is now an accepted quality tool across the world and involves process operators measuring and recording a sample of product on a control chart, which has upper and lower control limits to tell whether the product is in control or (if outside the limits) requires action to be taken.

Fourth, TQM encourages the use of team problem solving, one example being brainstorming, which is used at the early stages of problem solving. This technique involves all team members throwing in all their ideas regarding the potential solution to a particular problem. It is particularly important at this stage that ideas are not exposed to detailed evaluation and the suggestor is not ridiculed for an idea that might initially appear difficult to comprehend. This ensures that team members creativity is not stifled. The next stage is for the group to classify their ideas into similar areas and then to prioritise the potential solutions and finally select the ones they will work on. This is the stage at which the detailed analysis of the problem begins and the use of flow charts is not uncommon to assist in understanding the problem. The next stage involves the data collection and presentation of the results on charts.

Fifth, TQM acknowledges the importance of the relationships between customers and suppliers, both inside and outside the organisation. The internal customer concept is easy to grasp for most employees, since this is the next person in the manufacturing process or service provision. Employees are encouraged to understand the needs of their internal customers, which is only possible by communicating with them on a regular basis. The external customer-supplier concept is generally well understood by most people, since this forms the basis of most business relationships.

The internal-external customer supplier is important in that unless employees can achieve a good working relationship with their internal customer through team working and regular communication, then it will be very difficult to guarantee a quality product or service and ensure a satisfactory external customer relationship. TQM places considerable emphasis on the customer, after all it is the customer who defines quality. It is therefore important to understand their exact requirements. TQM helps people to appreciate the need for strong links between supplier and customer and the importance of involving the customer in any process changes or issues which may affect them.

Sixth, TQM focuses on improving levels of trust between management and the workforce and moving the industrial relations climate away from the traditional adversarial style towards one which is more open and co-operative. This is achieved by the implementation of policies geared to empowering the workforce with more of the day to day decisions throughout the organisation. The theory is that this will result in a greater level of trust and co-operation throughout the workforce. The main tool of communication is used between all levels of the workforce in an attempt to change attitudes away from the normal 'them and us' to one of employee involvement and commitment and based on increased recognition of employee knowledge and experience.

In short, the traditional management style of imposing ideas and decisions on the workforce is superseded by one involving a team based approach visibly supported by management, in an attempt to change the culture of the organisation.

Lastly, companies implementing a TQM program require to make some changes to their organisational structure. At management level a steering committee is normally formed to oversee the program, ensure the TQM policies and goals are compatible with the overall company strategy and that the program is tracking to the planned time-scales. The steering committee also co-ordinates the various quality strategies which cascade throughout the organisation as the program is diffused.

At shopfloor levels teams would be set up to tackle some of the day to day issues, e.g. defect levels, downtime. In addition to this structure there would normally be someone

appointed as TQM co-ordinator. This function is the link between the steering committee and the various quality teams, and involves evaluating the implementation of the TQM program, providing support for training and facilitating the quality teams, as they develop the new team working culture throughout the organisation. The co-ordinator would normally be a member of the steering committee and would advise them on the progress and issues encountered on a regular basis. In the words of Dawson (1994:109)

These major characteristics of TQM programmes highlight the importance of employee involvement and teamwork to the success of this new management philosophy which places a premium on participation and continuous process improvement.

While there appears to be consensus on the elements which make up TQM and the way the approach is applied in general, there is less agreement that TQM is always going to improve the areas implied by the methodology, and this forms part of our next discussion on some views of the TQM approach

Some Views on the TQM Approach

Hackman (1995) argues that while some of the literature (Wruck and Jensen, 1994) suggests that TQM is a specific philosophy aimed at enhancing the effectiveness of organisations, it has a sound theoretical foundation and presents a strategy of performance improvement and recognises how people and organisations operate in practice. A less optimistic view is that TQM, like MBO and Job enrichment is just another initiative that has entered the management arena promising to revolutionise, only to be superseded by yet another program in the future. (A 'fad' phenomenon).

McArdle et al (1995) suggest that the increase in competition among organisations is the main driver for organisations introducing TQM, which is evident from TQM's origins. Wilkson et al (1992) argue that Britain's main proponents of TQM are found in the field of operations management. They recommend the 'hard' approach to TQM, in contrast to the 'soft' approach, which targets areas where results are less tangible i.e. people and communications. The hard approach stresses the application of quality to the fields of design and customer requirements. They suggest that while these proponents occasionally consider employee involvement, it is viewed in the main as an uncomplicated process. Where the human factor is recognised it is normally assumed that alterations to the organisation of human resources are directly linked to and follow from alterations in the systems of management and manufacturing processes. HR management and policy is secondary to the hard objectives, not a primary factor capable of making a contribution in its own right.

On the surface, TQM is a technique which aims to improve production and services on a continuous basis as opposed to the more conventional techniques which imply 'refreezing' changes. In addition, TQM brings the planning and execution of tasks together, in contrast to the traditional management approaches which separate these tasks and is blamed for extensive deskilling in many organisations. Webb (1995) suggests that TQM is subject to polarised claims. One claim by its 'management orientated proponents' is its suggestion of achieving major improvements for the less flexible organisations dogged by poor quality and an adversarial management / employee culture.

Another view held by some academics is that the 'advocates' of TQM have failed to point out that in many cases management have used the TQM technique to knowingly increase their level of control over the workforce and the workplace in general, while at the same time outwardly publicising empowerment and team working arrangements. Webb (1995) suggests there are two 'distinct' views of TQM held by the academic world. The first that TQM does have the ability to improve organisational democracy (Hill, 1991; Wilkinson et Al, 1991,1992; Wilkinson 1994) and an alternative view that the implementation of JIT and TQM techniques leads to increased management control with little signs of employee empowerment (Delbridge et Al, 1992; Sewell and Wilkinson, 1992). Webb maintains that both camps however agree that there is insufficient treatment of social factors by the TQM proponents. The outcome for many organisations is a limited perception of quality 'a quick fix model of TQM' resulting in the inability of organisations to link human resource policies with the overall TQM program.

A study by Wilkinson et Al (1992) of 25 companies also suggests that 'TQM can also be used to reinforce a management style rooted in Taylorism'. This argument is also presented by Dawson and Webb (1989:236) from a study of change in a multinational electronic company which had a mature TQM program. They state that;

The changes reported are consistent with the view that new production arrangements serve capital in the search for more efficient exploitation of labour.. the extent of discretion and autonomy introduced by the requirements to participate in incremental improvements in process and product engineering is consistent with attempts to incorporate the workforce in the projects of capital without extending to any substantive control over business strategy or the dispersal of profits.

Wilkinson and Wilmott (1995) suggest that the 'quality revolution' has resulted in the securing of return on capital by focusing on quality and speed of innovation, and not solely on price. This has meant that quality programs are implemented which can increase employee empowerment and reduce levels of frustration as they also expand and 'reinforce processes of management control'.

This completes our initial review of the TQM approach to organisational change including the main principles and a selection of views on the subject. So far it has reviewed the background and nature of TQM and found that TQM unlike Quality Circles (which had their roots in quality control) is wider ranging and focused on employee involvement, commitment and teamwork. TQM is a planned approach to change and is management led, with company wide scope and everyone involved. However, our analysis on views of the approach revealed that this view of TQM is not universally accepted. Some literature (Wruck and Jensen, 1994) suggests that TQM may be another fad phenomenon. Others (Wilkinson et al, 1992) suggest that TQM is seen as an operational technique, focusing more on systems and processes than HR. Webb (1995) suggests TQM is subject to polarised claims, one that TQM can achieve major benefits to ailing organisations and another claim that TQM can be used by management to increase control over the workforce. With this range of views on TQM it will be interesting to understand what drives a company to consider adopting TQM and our review now turns to the question of why organisations introduce TQM.

Why Do Organisations Introduce TQM

Chapter three discussed some of the drivers of change in general and these were;

- *Poor Business Performance*, where we highlighted that organisations which were experiencing difficulties in remaining competitive were driven to take action and this could be the introduction of a new initiative. We also highlighted in chapters one and three that Xerox in 1982 were forced along this route for this very reason.
- *Senior Management Pressure* driving through new strategies can also force change. This can be broken down into two main areas. One is new people at the top, the 'new broom' effect. The other is 'felt need', where management feel that in order to remain competitive they need to advance their knowledge, systems and products.
- *Customer Influence*, especially where a customer has already implemented a TQM program and they look towards cascading it down to their suppliers to ensure harmonised systems and approaches to managing the business. We highlighted an example of this in chapter three, whereby Xerox approached Gates in 1989 with a view to Gates implementing Xerox's TQM system.
- *Bandwagon Effects*, which can be broken down into two main areas. One is institutional pressure, whereby non adopter's fear appearing different from adopters of a change initiative. The second is competitive pressure, whereby non adopters fear below average performance if their competitors are gaining from the adoption of a new program.

Since TQM is regarded as a change initiative then it can also be driven by the same reasons given above, in fact research by Redman (1995) highlights this. Redman's UK based

research involved questionnaire feedback from 880 Institute of Management managers in 1992 regarding the factors which had led to recent changes in Quality Management in their Organisations. It revealed that the factors discussed above were amongst those considered the most significant. These were;

- Customer demand for quality
- Competitive pressures to reduce costs
- Competitive pressures to improve service quality
- Enthusiasm from senior managers

Other reasons included new senior management, pressure from parent company, competitive pressure to improve product design, and employees relations issues. Redman (1995) states that the research suggests that Quality management in the UK appears to be market driven as opposed to employee relations driven. He compares this with earlier research on Quality circles, Collard and Dale (1989) which highlighted 'softer' HR management issues as the drivers. Redman suggests that Quality management initiatives in the 90's by placing more emphasis on systems, data collection and measurement, may result in greater effectiveness than that achieved by Quality circles .

Although not specifically mentioned in Redman's research, one of the major drivers of TQM in the 90's has also been the publicity given by the various consultancy groups, who promise that their particular version or TQM package has the ability to transform an organisation from average to a world leader. This has undoubtedly influenced organisations and caused some to jump on the bandwagon.

Although it was indicated that the Gates TQM initiative was influenced by Xerox, it will still be interesting to know the reasons for the individual plants implementing TQM. Were they

all for the same reason or did they vary and if so, in what way? This may help us to understand the outcome of the TQM programs in each study plant.

Having reviewed the reasons why organisations introduce TQM, consideration is now given to what organisations expect to achieve by taking the time and effort to implement it.

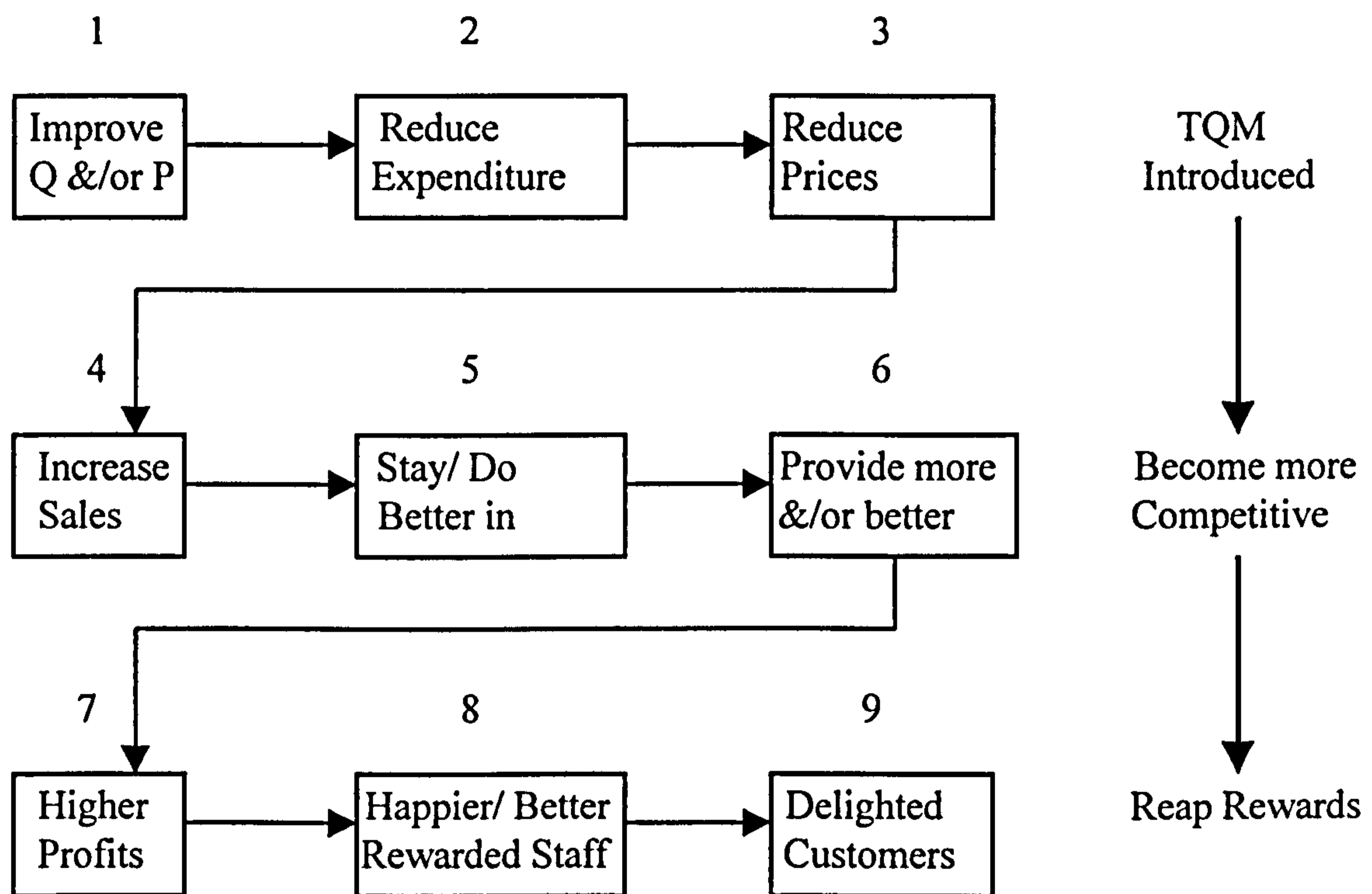
TQM - the Expected Benefits

This section reviews the generally accepted benefits that will result from an effective implementation programme, as opposed to a fully implemented programme, since there can be a world of difference between the two. Full implementation is where all the steps have been carried out 'to the letter of the law', but not necessarily resulting in the desired effect. Effective implementation results in the operation of the desired systems and has produced the expected benefits. In general terms a company would expect certain benefits to accrue from TQM, and some of these were indicated in the section on why organisations introduce TQM. These were improved quality levels and more competitive costs. Although each organisation may have different expectations, the list below gives an indication of the main areas of expectation.

- Improved Quality Levels
- Improved Performance of Processes
- Improved Service from Suppliers
- Reduced Reject Levels
- Reduced Costs
- Competitive Prices
- Increased Customer Satisfaction
- Increased Sales and Profits
- Improved Employee Morale
- Long Term Viability

Abrahami (1993) has developed a model which depicts the theory behind quality and competitiveness. He refers to it as the Quality and Productivity chain reaction.

Figure 16: The Quality and Productivity Chain Reaction



(Source: Total Quality and BS 5750, Abe Abrahami, Mgt Services, Nov 1993, p17)

In order to find out whether an organisation has actually achieved the benefits expected from TQM they need to carry out some form of measurement, a comparison of before and after. Only by doing this will they know if they have achieved any benefits or progress. With this in mind, our review now considers the difficulties in trying to measure TQM's results.

Measuring TQM's Impact

The review now considers the issues of measuring TQM's impact on a company's results. Hackman (1995) highlights some difficulties when it comes to measuring the success of TQM programs. In theory it should be easy, since TQM is claimed to improve the effectiveness of organisations, it should therefore be a matter of studying an organisation that has implemented and uses TQM and then finding corresponding improvements for the appropriate performance measures. Hackman suggests this is not the case for a number of reasons.

- (i) There are significant problems with trying to measure 'standard' business performance indices like market share, profitability and share price.
- (ii) External influences can also significantly cloud any relationship that may exist between the organisations processes and its performance results.
- (iii) The time lag between intervention and the final outcome or results can make it difficult to determine whether a relationship between the two exists.

These issues can in combination make it extremely difficult to measure the direct effects of TQM on general measurement indices of organisations. Added to these problems are the different perceptions explaining the reasons for any changes observed in organisational performance. Hackman (1995:12) reminds us that;

One simply cannot make an intervention, observe subsequent outcomes and then conclude that any changes in the outcome measures were caused by the interventions.

He suggests that many TQM reports do however make this simple error. The program is introduced, department efficiency or organisational productivity increases, and it is assumed that TQM was alone responsible (Littman, 1991; Gilbert, 1992; Raffie, 1992). However, the

improvements achieved might also be due to separate influences that just happen to occur to the same time-scales as the 'intervention'.

Hackman states that research on the effects of TQM are rarely conducted with study designs which allow hard conclusions as to the links between intervention and results. He suggests that 80% of the research literature on TQM case studies explains what happened during the intervention and while the 'findings' are usually in line with TQM's objectives, the lack of suitable research designs renders it difficult to make the direct connection with TQM.

Success in implementing TQM for the purposes of the present empirical research will be viewed from 3 main areas;

- (i) The process of introducing the change, which can be assessed against the formal stages.
- (ii) The quality of the implementation, which requires assessment against TQM indicators.
- (iii) How well TQM has contributed to specific business measures.

In order to determine how successful the implementation and quality of the TQM initiative has been, one requires some form of assessment to take place. Measurement techniques based on criteria originally developed for quality awards have been developed in both Europe and the USA. The use of such techniques to monitor the health and performance of organisations is termed self assessment. The most common frameworks for self assessment are based on the Malcolm Baldrige National Quality Awards, MBNQA, from the USA and the European Quality Award, EQA, criteria.

Hackman (1995) suggests that research on Baldrige award winning companies has a greater chance of addressing the effects of TQM on organisations since application for the award involves careful inspection of actual practices and it is therefore safe to assume that the winners actually have implemented the full TQM package.

The review will now consider how quality awards have influenced the measurement of TQM. This may assist our understanding of how to measure the study plant's progress.

The Influence of Quality Awards

The introduction of Quality Awards have helped define some of the key areas of focus to achieving TQM success. For example the Baldrige award lists;

Leadership	95 points
Information and Analysis	75
Strategic Quality Planning	60
Human Resource Utilisation	150
Leadership of Products and Services	140
Quality and Operational Results	180
Customer Focus and Satisfaction	300

Total	1000

Table 3: Baldrige Award points allocation: (source: Zairi, 1994)

Companies are assessed against these criteria, with the weightings, and their success is judged by how well they meet the detailed criteria. The European award, EQA, operates in a similar manner, but with different criteria, e.g. Leadership, Policy & Strategy, People, Processes, Customer Satisfaction, People Satisfaction, Impact on Society, Business Results. (see chapter 9 fig 17)

Zairi (1994) however observes that the MBNQA has been criticised in the last four years and that some of the Baldrige winners have experienced problems, in particular with 'bottom line results'. They also suggest that the MBNQA management may have wrongly inferred that business success automatically follows from winning the award. Three main areas of criticism are highlighted;

First, the award could be viewed as 'a purchased item' due to the levels of resource and funding required to achieve it. The 1993 winners Xerox were reported to have spent over 800k pounds and finalists Corning required 14,000 man hours to prepare for the application.

Second, the MBNQA does not guarantee top quality standards. Reference was made to Cadillac, a 1990 winner who never achieved high ranking as an automobile producer in terms of quality and reliability.

Third, winning the MBNQA does not lead to improved business results. The performance of previous winners Cadillac, Federal Express and Motorola were highlighted, whereby market shares had reduced and profit levels plummeted. Some suggest that the aim of the MBNQA was to strengthen an organisation's long term survival as opposed to enhancing profit improvement. Garvin (1991:80-93) suggests that the Baldrige award and short term business results are 'like oil and water: they don't mix and were never intended to'.

Garvin (1991) also felt that the MBNQA was designed to predict long term survival and should be viewed as such by the external observer. He suggests that its easy to find organisations with healthy profit levels, but less easy to find a 'good quality improvement approach'. Zairi (1994) suggests the MBNQA approach does not focus adequate emphasis on results and assumes that quality is adopted as an 'act of faith'. Organisations don't always gain the full benefits from quality initiatives due to concentrating too much on the processes involved and ensuring the structures and methods are in place. However, there needs to be a balance between these areas and the need to measure results. According to Zaire (1994);

one major consultancy has reported that some organisations are expressing serious concern about not seeing daylight with their TQ initiatives

(Dickson, 1992:10)

Zaire (1994) also quotes a Japanese professor, Shoji Shiba, (Dickson, 1992:10) who highlights this issue of focusing on a quality initiative without measuring results when he says 'When you consider something 'ideal' you lose the opportunity to improve it'.

So far the review has found that the drivers for introducing TQM into an organisation can be similar to change in general (see chapter three) and can range from external drivers i.e. customer demand, competitive pressures to internal drivers i.e. felt need, quality and performance levels. The review has also revealed that the emergence of consultancy groups, all eager to promise corporate transformation by introducing TQM programs, have made a significant contribution to the hype surrounding TQM and the subsequent bandwagon effect on organisations. It was suggested that organisations experience a range of benefits from TQM, which has been publicised by consultants as being directly linked to the introduction of TQM. These benefits range from improved quality, performance and employee morale to reduction in costs and reject levels (figure 16, p121). The reality is that measuring TQM is strewn with difficulty due to the influence of factors from both inside and outside the organisation. The introduction of quality awards has helped to identify some of the key areas of focus to achieving TQM success and by doing so has made it easier to make the links between organisations performance and TQM. However, the other factors of influence still need to be accounted for. These factors will be identified and discussed in detail as we proceed towards the study design.

Success at implementing TQM and receiving quality awards is all well and good, but at the end of the day companies are more concerned with what they see as the key measurements which will guarantee the continuity of the business and satisfy the key stakeholders. Companies are therefore only interested in TQM if it produces benefits in keeping with the company goals. The success of TQM therefore needs to be linked to these performance indicators, in order to prove that it is worthwhile investing in the effort. Initial attempts at this have produced varying results, and this area is now reviewed under the section on the experience of TQM programs.

The Experience of TQM

Success of TQM

How have TQM programs worked in practice? There appear to be some conflicting views of how successful TQM programs are in practice. One case study cited in *Strategic Performance Management*, Ashton (1997) and based on SGS-Thomson Microelectronics, France suggested that TQM had a beneficial effect on business results. The company were interested to find out what impact TQM had on their business results and in 1995 they conducted an analysis of both performance related elements including profitability and return on investment. The study covered the period 1991 to 1995 and came to the conclusion that without TQM the company's business results would have been 30% lower. Their Vice President of total quality and environment management, Murray Duffin (Ashton, 1997:241) was quoted as saying;

About 60% of the improvements we have experienced are demonstrably linked to TQM, while the other 40% would have been achieved without TQM. However, it stands the test of reason to state that, in less than four years, at least \$ 300 million has gone straight to the bottom line.

Wilkinson and Willmot (1995:19) report another study by Hill (1995) which supports the argument that TQM is effective, suggesting that if TQM is 'Properly implemented and resourced' it can result in notable and 'sustained' improvements in profitability and response times. Wilkinson and Willmot (1995:19) says that;

TQM like Heineken lager, is effective in reaching wider and deeper into organisations. In particular, it has the potential to overcome a number of limitations attributed to Quality Circles which seek to involve employees in making local improvements in working practices

Hill's research study of four organisations, of which three were regarded as having fully introduced TQM, suggests positive outcomes in a number of areas ranging from improved involvement and commitment to quality by employees including middle managers to more delegation of decision making. Operational efficiency was also improved thus reducing scrap and increasing yield levels. However, a number of points highlighted by Wilkinson and Wilmott (1995) are worth noting;

- (i) The fact that the firms had fully implemented TQM and were considered model organisations in this respect may render them unrepresentative of the average company. These organisations had invested significant resources implementing TQM over a period of years and it may be unwise to make comparison with organisations which have not been able to provide similar levels of resource to their TQM programs.
- (ii) As in 1 above, there is no mention as to what sort of environment, product or markets these organisations are operating in and it is possible that they are again unrepresentative of the typical organisation e.g. a 'monopoly' or a market or product with unusually high profit levels, thus allowing them to allocate huge resources to their TQM program over a long period of time.
- (iii) It appears that in some of the organisations being researched the TQM introduction did not follow the recognised route involving consensus among the various interested groups. Traditional 'instrumental and coercive' methods were employed to ensure the new initiative took root.
- (iv) The claim of greater commitment to the management of quality was based on the results of internal employee attitude surveys which cannot be viewed in isolation, since we are unaware of the employee profile with regard to views and attitudes, which themselves can be heavily influenced by the level of resource and communication given to them by management, and which can ultimately affect the results recorded.

The GAO report (1991) in the USA, reveals that TQM has had a positive impact on key results criteria, table 4

Performance Indicator	Average Annual Improvement
Employee Satisfaction	1.4%
Reliability	11.3%
Reduction in Process time	12.0%
Reduction in Errors	10.3%
Reduction in Product Lead Time	5.8%
Increase in Inventory Turnover	7.2%
Reduction in Quality Costs	9.0%
Increased Customer Satisfaction	2.5%
Decline in Complaints	11.6%
Increase in Market Share	13.7%
Increase in Sales Per Employee	8.6%
Increase in Return on Assets	1.3%

Table 4: The impact of Total Quality Management. (Source:Government Accounting Office, 1991, Washington, D.C.)

The GOA report in the USA (1991) which focused on the top 20 scorers of the MNBQA from 1988-89, was one of the first attempts to link TQM with bottom line results. The report concluded that TQM had a positive influence on major business result areas. Companies were asked to provide information via questionnaires and interviews on various performance measures, including employee related, operating, customer satisfaction and business performance. Improvement was recorded in all areas covered. (see appendix 5) A list of factors was identified, which were thought to be critical in leading to improvements in business performance. These were *a customer focused approach to quality: Strong leadership: Employee empowerment: Corporate culture: Use of hard facts.*

Research by Zairi et al (1994) also appears to show a positive link between TQM and bottom line results. However, one criticism of this particular work could be that the measurement criteria selected, (Profit levels, sales), may not be a true reflection of the benefits generated by TQM, since many other factors may have influenced the results.

A number of major organisations, some well known, have also reported success with TQM, and in some cases have also been winners of the prestigious European Quality Award (EQA). The organisations include Hewlett Packard, a well known international company active in information technology; Texas Instruments Europe, which manufactures semiconductors and software tools; Millikens Industrials Ltd, which manufactures textiles and chemicals and finally, TNT Express UK Ltd, which provides delivery, warehousing and distribution services. These companies have reported that perseverance with TQM appears to achieve results (Zink, 1997).

Other work, based on recent British TQM research, Hill and Wilkinson (1995) has tended to present a picture of less than total success, as summarised in Table 5 below. When change programmes fail there are also a variety of theories, which was explained in chapter 3, to explain the possible reasons. Some would argue that the change is probably poorly implemented (Kotter, 1995), while others would argue that the wrong model had been selected Beer (1990) and yet another view would argue that there had been a misunderstanding of the dynamics of the process (Jick et al, 1993).

Chapter 3 mentioned that Dawson (1994) adopted the view that the change process is complex and dynamic and should not be viewed as a string of linear events. Dawson advocated a processual perspective and approach which highlights to change agents the importance of the interactions between the organisational politics, history and culture and the change initiative. This approach argues that major operational change is a 'non linear dynamic process' which should not be viewed as a 'rational series' of programmed steps.

This view is also echoed by Pettigrew (1992) whose case study at ICI confirms (Quinn's, 1982) findings that change does not always follow the "rational-analytical" approaches described by the planning writers. This may be one of the flaws in the TQM approach, since

TQM falls under the umbrella of planned approaches to organisational change and adopts implicit assumptions that there is one best way to implement change. This reliance of following a step by step approach may in fact result in insufficient attention being paid to other factors of influence like receptivity.

At the end of the day, as observed, there are a multitude of factors which may influence success, however, Table 5 below shows that TQM still has some way to go before it is universally accepted as a business performance enhancer.

Source	Approach	Sample	Findings
A T Kearny (1992)	Survey	100 Organisations UK	80% failure(either had no information on performance or did not report any improvement)
London Business School(1992) (Cruise O'Brien and Voss)	Self	42	Most firms in the UK Sample would rate between 100 to 400 point out of 1000 rate against Baldrige. This is not sufficient to apply let alone win, the award
Economist Intelligence Unit (1992) Europe	Case studies	50 organisations Plus 6 stars	Report massive cynicism. We got the religion and then we lost it. TQ initiatives found to be inconsistent with TQ principles
Durham Uni'sity Business School (1992)(1993) Whyte and Whitcher, Whitcher	Survey	235(north of England) 650(Scotland)	TQM is still an innovation and there are many initiatives. Half the expected benefits have still to be delivered. But is the bottle half empty or half full?
Institute of Management (1993)	Survey plus Interviews	880 Managers UK	Only 8% claim QM is very successful

Table 5: Recent British TQM Research Findings : Summary statement

(Source: In search of excellence, Employee Relations, 17 (1), Hill and Wilkinson, 1995)

On the other hand, the international quality study conducted by American quality foundation and Ernst and Young surveyed 586 firms. The study found that many businesses waste millions of dollars a year on quality-related improvement strategies (Wall Street Journal, 1 Oct 1992 : B7) Another study by Jarrell and Easton (1993) presents favourable, but not statistically significant evidence that TQM programs increase firm value as measured by stock price. Hendricks and Singhal (1994) study of the impact of winning a quality award on the market value of firms found evidence of statistically significant positive abnormal returns.

Hackman (1995:22) provides us with an interesting quote on the problems TQM and change in general can encounter;

Although dinner may seem assured to a snake who notices a rabbit strolling nearby, there is no guarantee of nourishment. If the rabbit is extraordinarily large, it may get stuck in the snake's throat; snakes have on occasion, died when their eyes were too large for their throat. And if the rabbit is just a baby, consumption and digestion are easy, but there is little real nourishment. Eating a baby rabbit is hardly worth the trouble it takes to catch it.

Hackman suggests that change initiatives can be affected by similar problems to the snake. First, the change brought about by the new program may be so far reaching and involve such radical changes to the organisation's systems, that for all their 'potential benefits', the organisation is unable to adapt to them. Second, the changes may be more of a superficial show than a proper attempt at change, for example a change initiative that urges people to modify their attitudes and views, but expects nothing more of managers than preaching the gospel. When this happens management may be fooled into thinking that they have implemented a change program, but the reality is that the existing organisational 'structures and systems' remain intact and the organisation will exhibit the same 'behavioural' characteristics as before the change program. The review now considers in more detail the reasons why TQM programs fail.

Reasons for the failure of TQM Programs

Why do change programmes fail? There are various views available, e.g. (MacDonald, 1993), has identified eleven principal reasons for the disappointment experienced by many companies, which range from lack of management commitment, vision and planning to lack of real business measurables. (See appendix 6 for the list). Various prescriptive solutions have been offered over the years and this has led to the growth of a multitude of change management consultancy groups, all eager to diagnose the problems and to sell their solution package. However, as discussed in chapter 3, change including TQM, may not follow the sequenced simplicity that some of these consultancy groups would have us believe, and problem diagnosis is not such a clear-cut issue.

Since every organisation has its own culture and management philosophy, it can be very difficult to identify the key factors that assist or hinder the successful implementation of TQM programmes. A survey by Devlin and Partners (1989) of 250 British firms highlighted ten major problems with implementing TQM programmes. The areas of difficulty were; achieving cultural change, changing management behaviour, making time, enhancing services, obtaining tangible benefits, monitoring and measuring results, time-scale of implementation, lost momentum after initial benefits, program reverted to business as usual, and lack of interdepartmental knowledge.

Champy and Nohria (1996) suggest that TQM and re-engineering are the origins of most efforts in business process redesign and have enabled managers to improve individual processes and provide a more efficient service to customers. Re-engineering, for example, has assisted managers to focus information technology to improve process performance. However, increasing numbers of managers are realising that TQM and re-engineering have some limitations.

First, there is an assumption that process redesign can be separated from rethinking business strategy. While TQM and re-engineering apply significant focus on operational levels, e.g. scrap levels, manufacturing, Champy and Nohria suggest that they may only be improving processes and systems which are no longer adequate for organisations competing in a dynamic and changing environment.

Second, TQM and re-engineering while excellent for re-designing individual processes, sometimes fail to recognise that processes are connected. Most organisations achieve their success through managing the interaction between the various processes, and these techniques sometimes fail to address this aspect.

Third, TQM and re-engineering tend to focus more on redesigning technical or administrative processes and less on management processes, which deal with communication and decision making. However, management processes can vary significantly between on one hand a process orientated organisation to a more traditional hierarchical control organisation, and unless management processes are also addressed, the organisation may not realise the full benefits from its change initiatives. Champy and Nohria (1996:24) stress that;

TQM and re-engineering are not inherently flawed, rather they argue that they are tools for achieving operational improvements, not total solutions. But the level of disappointment among companies that have embraced TQM or re-engineering (re-engineering experts report failure rates as high as 70%) suggests that many managers see them as panaceas rather than as tools for fixing particular problems.

Zairi (1994) suggests that provided TQM is properly implemented and the focus on maintaining continuous improvement with the end customer in mind, is achieved, then an impact on bottom line results is possible. However, this does not suggest that TQM guarantees improved bottom line results, only that TQM is a means of achieving

improvements and closer links with the customer. This assumes that organisations also have the correct policies and strategies in place to support TQM. Zairi (1994:39) states that;

Increasingly, comments such as TQM failed to help business performance in the marketplace, appear in the literature, but what about the question: did business fail to introduce TQM effectively and as such failed to perform in the marketplace?

Zairi et al (1994) suggests that poor implementation of TQM is a chief reason why many organisation have suffered poor business performance. This point was also highlighted in the general literature on change in chapter 3 by Kotter (1995).

In many instances TQM implementation has lacked strategic focus and has been introduced as a bolt on to unchanged business culture. As can be seen from the discussion, success can be interpreted in many ways, depending on the viewpoint and the measurement criteria selected. The essence of how TQM can impact on bottom line results is, according to Zairi (1994:43) the focus on the customer and referring to Hudiburg (1991) he cites the Japanese who;

continually study the customer, their entire process, internal and external, is directed towards the customer. It is taken as a given that if they are better than anyone else at serving the customer, they will have strong sales and greater profits. Their ideology says, customer satisfaction first, then sales, then profit.

TQM is only one focus amongst the general literature on change however, it does have some commonalties with regard to failure in that poor commitment, poor implementation and a lack of understanding of influencing factors can jeopardise its chances of success.

The review now looks at implementation and considers a TQM implementation model, which will allow measurement against the individual plants involved in the study.

The TQM Model Selected

The TQM model used for our study was developed by J S Oakland of the Bradford Management Centre (1995) and has been supplemented by information from Paul Spenley of Pera International (1995). These models conform with the generally accepted programmed step by step approach to Organisational transformation and the philosophy pioneered by the Quality gurus, namely (Deming, 1986; Juran, 1989; Crosby, 1979 and Feigenbaum, 1983) (see appendix 7). The Quality gurus have in the main tended to adopt a general approach to TQM, viewing it as a tool to be used by any organisation in any circumstances. However, recent work in the USA has begun to critically examine these assumptions, suggesting that TQM isn't a 'one size fits all programmes' technique (Lawler, 1993). However, for the purposes of comparison and measurement, the following model has been selected, which comprises seven steps, with key objectives at each stage. The steps are;

- (i) Gain Commitment To Change By Organisation of The Top Team.
- (ii) Develop a Shared Mission and Vision of the Business.
- (iii) Define the measurable objectives which must be agreed by the top team as being quantifiable Indicators of Success in terms of the Mission.
- (iv) Develop the Mission into Critical Success Factors (CSF's).
- .
- (v) Breakdown the Critical Success Factors into the Key or Critical Processes and gain Process Ownership.
- (vi) Breakdown the Critical Processes into sub processes, activities and tasks, and form Improvement Teams.
- (vii) Monitor and Adjust Process Alignment in response to difficulties in Change Process.

The above steps will be used as a model to compare the implementation of TQM across the six plants in the study. The TQM steps listed embody all of the concepts listed as essential by previous Malcolm Baldrige winners. Research among MBNQA winners identified 8 universal lessons that are considered critical to the success of firms trying to become the best in their class (Atkinson, 1993). These are, a quality vision : top management involvement : a focus on customer needs : planning and implementation : empowerment : training : employee rewards : recognition.

It will be interesting to find out how well this model of TQM implementation meets our objective in comparing the individual plants. The model adopts a general approach which will be useful in comparing plants which are at different levels of TQM evolution.

Conclusions

This chapter has reviewed the TQM approach to organisational change. The objective was to gain a greater understanding of specific aspects of TQM which will assist our study of how the individual Gates plants have implemented it. In particular it found that TQM is not always seen as a straightforward approach to improving an organisation's communication and employee involvement. (see p114-116). It has pointed out some of the issues in measuring the TQM approach and highlighted that TQM has both successes (p 128-34) and failures (p 135-38), and cannot be viewed as a straight forward stepped approach to change, as is sometimes portrayed by the consultancy world.

The analysis on views of the TQM approach revealed that the view of TQM as a planned approach to change led by management, with company wide scope and everyone involved, is not universally accepted. Some literature (Wruck and Jensen, 1994) suggests that TQM may be another fad phenomenon. Others (Wilkinson et al, 1992) suggest that TQM is seen as an operational technique, focusing more on systems and processes than HR. Webb (1995) suggests TQM is subject to polarised claims, one that TQM can achieve major benefits to ailing organisations and another claim that TQM can be used by management to increase control over the workforce.

TQM has received mixed reports. Some claim successes and yet others claim the results are inconclusive. Part of the reason may lie in the study design (See Hackman above p123) and also the difficulty in measuring success. Questions like what criteria to select for measuring? Was the TQM program fully implemented? Need to be considered. This led us to define the TQM model selected for our study. This would ensure that each plant was being consistently measured against the same TQM format. Finally, the review has identified a TQM implementation model, which will be used for comparison across the study plants. The next chapter develops a framework for analysis, which will enable accommodation of the various issues and factors identified in chapters three and four as having a major influence on the study.

CHAPTER 5

FRAMEWORK FOR ANALYSIS

Introduction

The purpose of this chapter is to review the key issues from chapters three and four, which will have a bearing on our area of study. It will attempt to establish if the process of introducing TQM results in improved business performance and how the factors of influence identified in the review, affect the implementation and the performance results. It will attempt to explain the variance in success (performance) following the introduction of TQM across six plants – from a common corporate initiative. This variance may be due to a number of factors and the review will attempt to identify these key issues and develop a framework around them to assist our study analysis. This process may be likened to selecting building blocks to create a structure for a specific use. The discussion will attempt to determine how these building blocks should be fitted together to provide the appropriate structure or framework.

Chapter five starts by reviewing the key issues in chapters three and four that are appropriate to our area of study and will allow us to build up our framework. It then explains the elements and links involved in our framework for analysis in more detail. The framework will be used to describe the various relationships that can affect the process of implementing a TQM program and also the effectiveness of TQM on business performance.

Key Influencing Factors on the Success of Change

How do you ensure that a change program will be successful? Chapter three discussed a few of the vast array of views and guidelines on what makes the chances of organisational change being more successful. It suggested that organisational change fails because (i) the wrong model has been used Beer (1990) (ii) the wrong process of implementation has been adopted Kotter (1995) (iii) the politics of the change process have not been fully understood Dawson (1995). Pettigrew (1992) suggests the need for a receptive context for change to progress. Chapter three also mentioned the difficulties in attempting to measure change in general. Russell (1997) suggested that many organisations do not actually decide to measure the change for a variety of reasons that are expanded on by Lingle and Schiemann (1997) (see page 85). Russell (1997) adds that those who do measure change, tend to cover too many areas, including some that are not linked to the established goals. Tarr (1995) suggests the need for more understanding of what measurement is, what it is designed to accomplish, and what its effect is on the behaviour and culture of organisations.

The review suggested that any assessment of a change program requires measurement to gauge whether the program has been successful or not and again this is an area, which is also open to much debate. The review also mentioned the requirement to establish measurement criteria for the implementation of TQM and a TQM model was developed in chapter four to allow consistent measurement of each plants success in implementing its TQM program.

Chapter four discussed the issues of measuring TQM's impact on a company's results. Hackman (1995) highlights some difficulties when it comes to measuring the success of TQM programs. In theory it should be easy, since TQM is claimed to improve the effectiveness of organisations, it should therefore be a matter of studying an organisation, which has implemented and uses TQM and then finding corresponding improvements for the appropriate performance measures. Hackman suggests this is not the case for a number of reasons.

- (i) There are significant problems with trying to measure 'standard' business performance indices like market share, profitability and share price.

- (ii) External influences can also significantly cloud any relationship that may exist between the organisations processes and its performance results.
- (iii) The time lag between intervention and the final outcome or results can make it difficult to determine whether a relationship between the two exists.

These issues can in combination make it extremely difficult to measure the direct effects of TQM on general measurement indices of organisations. Added to these problems we also have different perceptions explaining the reasons for any changes observed in organisational performance. Hackman (1995:12) reminds us that;

One simply cannot make an intervention, observe subsequent outcomes and then conclude that any changes in the outcome measures were caused by the interventions.

He suggests that many TQM reports do however make this simple error. The program is introduced, department efficiency or organisational productivity increases, and it is assumed that TQM was alone responsible (Littman, 1991; Gilbert, 1992; Raffie, 1992). However, the improvements achieved might also be due to separate influences that just happen to occur to the same timescales as the 'intervention'.

Hackman states that research on the effects of TQM are rarely conducted with study designs, which allow hard conclusions as to the links between intervention and results. He suggests that 80% of the research literature on TQM case studies explains what happened during the intervention and while the 'findings' are usually in line with TQM's objectives, the lack of suitable research designs renders it difficult to make the direct connection with TQM.

In view of the difficulty in measuring success, it was decided that success in implementing TQM for the purposes of the present empirical research will be viewed from three main directions;

- (i) The process of introducing the change, which can be assessed against the formal stages detailed in chapter four.
- (ii) The quality of the implementation, which requires assessment against TQM indicators.
- (iii) How well TQM has contributed to specific business measures.

The discussion in chapters three and four also established that success will be a function of various factors and chapter three revealed the complex nature of change and the range of views on how to manage change programs. We encountered the first of our key factors of influence, which was the incentive to introduce change and found that the drivers for change can come from many different areas. They can be external, as in the case of consumer demand, Government legislation and customer influence or they can be from within the organisation as in the case of senior management pressure or felt need. The drivers of change are fairly well understood, however the implementation of change is subject to much debate and a wealth of views and models on how to manage it, as was found when reviewing the works of (Lewin, 1951; Dawson, 1994; Pettigrew, 1992). The work of Pettigrew 1985 at ICI also suggested that change does not follow a planned linear approach, but is a much slower and less structured process. This led into the debate on whether change should be managed from the top by senior management and cascaded down to lower levels (topdown) or alternatively started at the lower end of the organisation and spread throughout the company (bottom up). Again evidence was found which supports both views. (see Wilson p62 and Beer p79).

Chapter four discussed expected benefits from TQM and the Abrahami (1993) model of the quality and productivity chain reaction (figure 16) helped us form the links between the introduction of TQM, the process of implementation and the performance improvement. This allowed us to build up the central spine of our framework and also to position the incentive factor. Table 6

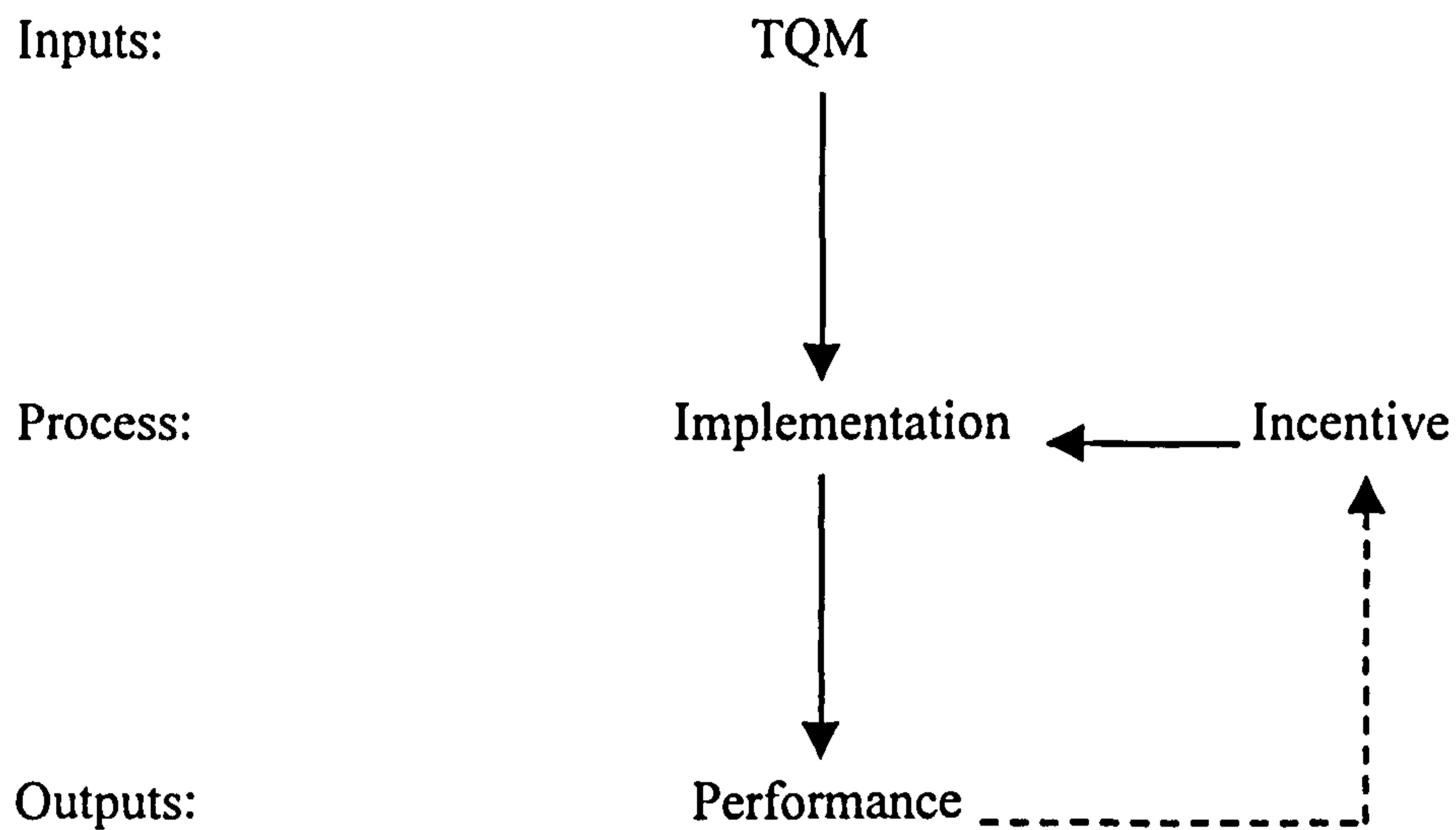


Table 6: Preliminary Framework for Analysis

The next section now considers the other key factors identified in chapters three and four and how they will influence our framework model.

Receptive context and Ability to change

The discussion on change has identified that the final change outcome can be influenced by some key factors in addition to the incentive to introduce change. Firstly, the context of the change, Pettigrew (1992), Dawson (1994), Beer (1990) (see chapter three, pages 74-77 above) and secondly, an organisation's ability to cope with the change. This ability factor formed part of our discussion in the bottom up approach on change which requires an organisation to have the ability to co-ordinate the change and cascade it to all areas, Beer (1990), Kotter (1996) (see pages 78-82 above), regarding management's time, resource and focus. Whether an initiative takes off will depend on the Receptive context and the Ability of the organisation, both are necessary for successful efforts at change.

This perspective is now discussed in more detail, in particular the work of Pettigrew (1992) and his views on the receptive context of change. Pettigrew (1992) argues that the receptive context of the change will influence the ultimate success of change. Pettigrew (1992:98) describes receptivity as;

embracing the term receptive context, i.e. there are features of context, (and also management action), that seem to be favourably associated with forward movement. On the other hand there is in non receptive context a configuration of features which may be associated with blocks on change.

He suggests that while the literature e.g. (Beckhard and Harris, 1977; Plant, 1987; Tichy, 1983) describes change as having forces that either drive change or restrict it, which helps to explain why change may happen or not, but it does not explain why the speed of change varies in different settings. Some of the literature is not only focusing on the links between aspects of content and action, to adoption and change levels, but also seeks to understand the relationship between variations in organisations' performance and capability of changing. (Smith & Grimm, 1987; Pettigrew and Whipp, 1991, 1992). Kanter (1985) feels that the environment, more than the person, has greater influence on the level of change initiative activity.

The environment here is defined as an organisation's structural and cultural features which are described as 'integrative or segmented'. Thus 'integrative' structures and cultures utilising a team based philosophy, encouraging the generation and exchange of ideas, and the ability to learn from the past and move on, will find it easier to generate innovative activity. Whereas, 'segmented' structures and cultures with their individual and sometimes isolated departments, traditional hierarchy and procedures, tend to suppress individual initiatives and innovations.

Research has also been carried out on differential rates and depths of change. Goodman and Deans (1982) research on why change persists and why to a greater extent in some organisations than others, found that most change programs experienced a loss of uniformity over time. They highlighted the main cause as the disunion between the change content and specific features of the organisation's situation, such as predominant management philosophy and structures. The change programs were also adversely affected where a key player in the change left the organisation, resulting in a loss of momentum and direction. This was also the case where external consultants had been used to start the program, but then left the rest to the organisation's management team to sort out. Implementation is also made easier where the change programme is protected from the 'energy sapping' short-term pressures experienced by most organisations.

Other factors were the external and internal labour market; the quality of the labour market in terms of skills, training, experience and attitudes and traditions can influence the success of the implementation programs; internal product champions for HR; and availability of appropriate systems, philosophies and management organisation; and external HR stimuli and support, including funding. The links between variability of organisation's performance and that of variability in learning and changing capabilities has been researched by Pettigrew & Whipp (1991, 1992) who according to Pettigrew (1992:273) concluded that ;

- (i) Common patterns emerge from key features of managing strategic and operational change.

- (ii) There is an observable difference in the way the higher performing firm manage change, from their counter parts over time.

Pettigrew's model describes five interrelated factors: Coherence, Environmental assessment, Human resources as assets and liabilities, Linking strategic and operational change, and Leading change. Each of the five factors is built upon what Pettigrew describes as a 'combination of conditioning features and secondary mechanisms', which gain their strength from combined development. This development process relies on repeated application and forms a building process which can take years to complete. The Pettigrew and Whipp (1991,1992) study points to a clear set of interrelated factors which provide both high energy around change and in turn contribute to performance.

All five factors were echoed in another study by Pettigrew (1992) on the NHS. This study of strategic service change in the NHS outlined 8 factors as providing high energy around change. These were; Environmental pressure; Quality and coherence of policy; Key people leading change; Managerial - clinical relations; Co-operative inter-organisation networks; Simplicity and clarity of goals and priorities; Change agenda and its locale; Supportive organisational structures. According to Pettigrew (1992:275-6)

The factors represent a pattern of association rather than a simple line of causation, and should be seen as a series of loops rather than a causal path between independent and dependent variables.

Pettigrew questions why some organisation contexts are more receptive to strategic change than others. His ICI work, Pettigrew (1985) highlighted the absence of certain factors. First, the absence of sufficient business and economic pressure, resulting in the lack of sufficient negative energy for change that comes from dissatisfaction with the status quo. Second, the absence of the positive energy and tension for change which can be created by a leader championing a particular strategic change. This notion of management's ability to maintain the change process can be broken down into many ability factors within an organisation, for example, the ability to allocate adequate resources, or the ability of the HR to address the

people issues affected by the change, or management commitment. This aspect of an organisation's ability to cope with change forms one of the key areas of focus on our study.

Pettigrew (1992) stresses that a key success in these kinds of change is the effective management of the links between the senior group leading the change and the operating managers carrying through the details of implementing particular changes. Pettigrew (1992:476) states that;

Even in crisis driven circumstances the operating management role is likely to involve detail and grinding on over time, and is very dependent upon the leadership role being constantly maintained. If someone in an operating management role is close to acceptance of hard targets in his sphere of negotiated influence, his work could be undermined and even destroyed by a weakening of the leadership position.

Pettigrew's work demonstrates that strategic change requires more than justification and initial action, it requires to make the changes stick. Management require to stabilise the changes and make sure that the various initiative systems, communication flows, and structures support the new initiative. Change initiatives are often associated with key people or champions who ensure the changes are maintained, however when these people leave or move on, the change initiative can lose its momentum and even revert back to the original conditions. Pettigrew emphasises that a critical part of the stabilising process requires the development of people who will maintain the change and take it forwards as new opportunities or threats affect the organisation.

Having identified the additional key influencing factors of Receptivity and Ability, attempts will now be made to build them into our framework for analysis.

The Framework Model

The basic hypothesis is that TQM experience will benefit plant performance. There will however be factors, which influence the link between TQM and performance, and how an individual plant responds to the pressure to adopt TQM, Table 7. In part this will be conditioned by its *receptivity* - a set of variables that reflect its environment and its priorities. Some plants may be more receptive than others, and our expectations would be that more receptive plants would show greater performance improvement. A further complication is that the *process* of implementation of TQM may be more or less effective.

It cannot be assumed that all plants have the same standard of implementation. Analysis suggests that the process of implementation will be conditioned by *incentive* and *ability* which may not point in the same direction. *Incentive* refers to the perceived pay-off to the plant from effective implementation, e.g. a poorly performing plant may have more incentive than one which is performing well. *Ability* reflects the preparedness of management and the workforce for the change represented by TQM. *Process* refers to the way in which the TQM programme is implemented and *Performance* considers how well the selective performance criteria respond to the injection of TQM into the plants.

The discussion has now identified some key factors of influence in change programmes, in particular an organisation's incentive to introduce change, the receptive context of change and an organisation's ability to handle change. This line of thought is now developed in the framework for analysis. These areas of discussion appear relevant to the study of the six Gates plants for a number of reasons. First, the *incentive* for each plant to implement change programmes may vary due to a number of factors, which was outlined in chapter three, namely,

- Business performance – An organisation which is struggling may look for anything which might provide salvation.
- Customer influence – If the customer is a major account representing a large percentage of sales, the influence will be stronger.

- Senior Management Pressure – This can occur where the corporate level have chosen a particular strategy.
- Bandwagon effects – Both institutional and competitive bandwagons may act as a driver of change.

Although each plant was responsible for implementing TQM under the corporate guidelines, the plants are scattered throughout different countries and may be subject to varying levels of incentive influences.

Second, the *receptive* context of each plant i.e. history, workforce, management style, could influence the way in which a change programme is received and handled by the plant, and ultimately administered by the plant management. For example a history of union / management conflict, will make it difficult to implement change, due to the lack of trust and co-operation resulting from such a culture.

Third, the *ability* of each plant could be affected by both internal factors i.e. structure, policies and external factors i.e. diversions, environmental influences. For example, the internal factors could be a complex multi tiered management structure, which is run by bureaucratic policies, finding it difficult to make the necessary changes to support a new change initiative. This might be complicated further if the management style being adopted echoed the authoritative 9.1 profile described in the Blake and Mouton Grid (chapter 3, fig 15).

The discussion has also identified that diversions and environmental factors may affect the change program and take on many forms, which may be described as ‘special factors’ and which may take an internal or external form. The internal factors might be changes in management personnel, take-overs, whereas the external factors might be, new legislation or market conditions which may deflect management’s attention away from a new change initiative, resulting in a half hearted attempt at introducing change.

Our hypothesis is that performance at plant level will be systematically influenced by receptivity, incentive and ability as three broad vectors of independent variables, each with a positive sign. However, it must be recognised that in most social science research there will be other influences on the dynamic model, which we hypothesise will have a random, non-systematic effect on performance – a form of ‘white noise’. It must also be recognised that plant performance will be subject to influence from special factors which may be entirely divorced from the TQM initiative e.g. changes in the quality of industrial relations, new investment, or changes in exchange rates affecting international markets in the products could all impact on performance measures.

It is anticipated that this combination of factors (and the related set of sub variables) will provide a comprehensive framework of analysis and understanding of the implementation of TQM and its success rate. Table 7 portrays the main components and links involved in the conceptual model. This model is an ‘analytically convenient device’ for exploring the independent variable influences on TQM. Within each of these main variables there is a range of sub variables which will need to be defined in more detail for this particular context.

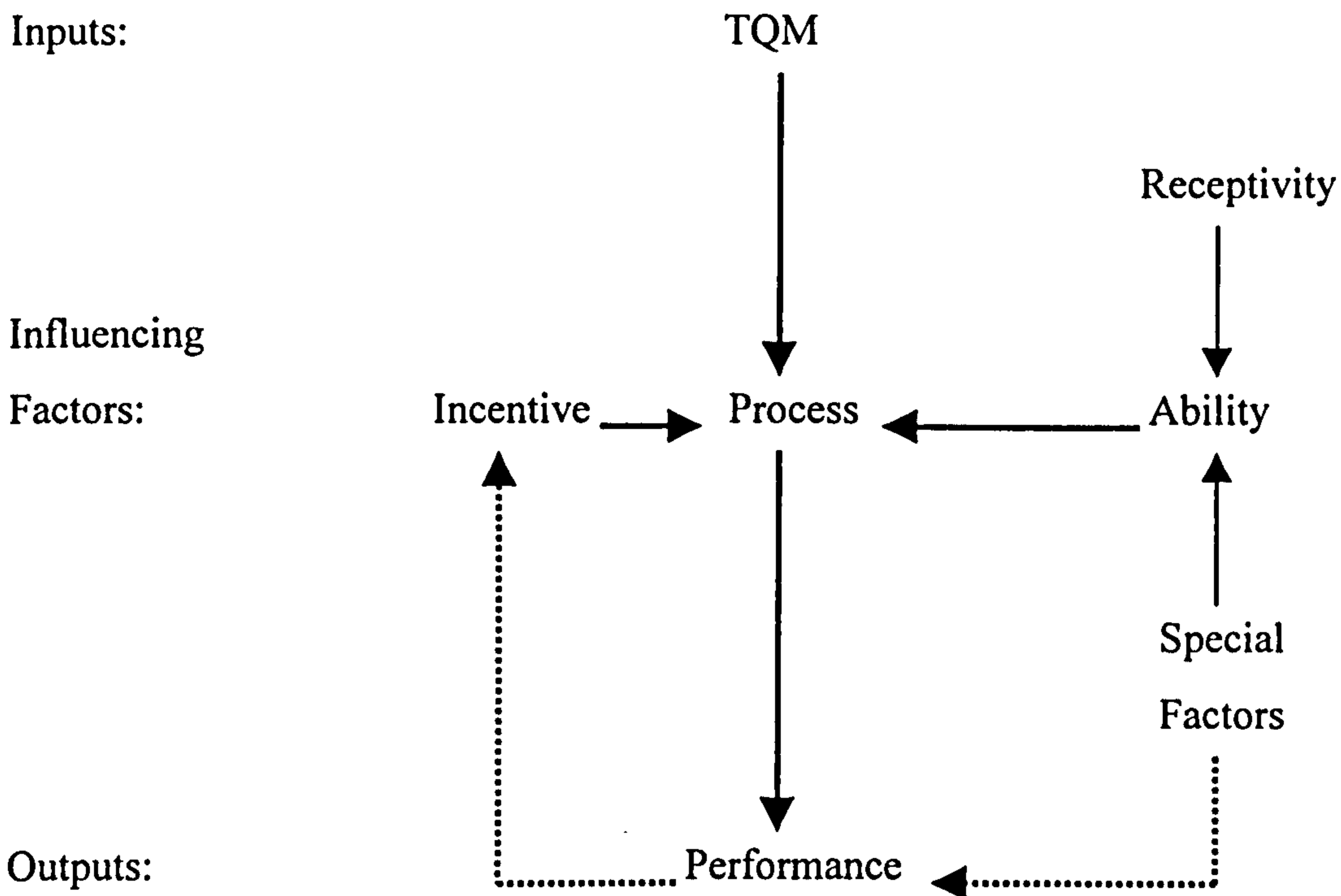


Table 7: The main components and the links involved in the model.

Table 7 shows that the process of implementing TQM is influenced by the factors described, namely *Receptivity*, *Incentive*, *Ability*. It also shows that the special factors, which can influence ability, can also influence performance. For example, changes in market conditions (expanding or contracting) may increase or reduce an organisation's performance levels, this in turn may influence an organisation's incentive to introduce TQM or if already introduced, its ability to commit to the full programme. An organisation which is experiencing market success and high profit levels may not feel it needs TQM, equally so an organisation which is losing market share and profits, may see TQM as a potential lifeline to recovery. The variability of these influencing factors will determine how the TQM implementation process operates and the impact on performance levels. These influencing factors will be discussed in more detail in chapter seven, which covers the major empirical findings.

Conclusions

In summary this review has identified from chapter three and four the key factors of influence on our study and the reasoning behind their use in our framework for analysis. A model for analysis has been constructed which outlines the direction of the influences and briefly described the factors, which will be further expanded in chapter seven

The views on change highlighted in our discussion, in particular Pettigrew's work, fits well with the receptivity and ability perspective to change which will be adopted to analyse the empirical work. The criteria relative to the incentive to introduce change are fairly clear, however ability is less clear and subject to many influencing factors, some of which have been highlighted.

In looking at the track record of change our study has been searching for an organising framework which will enable investigation of the relative success in the introduction and implementation of a common organisation strategy, TQM across a range of different plants in different locations. The Incentive, Receptivity, Ability perspective which has been identified throughout the discussion appears to be a fruitful way of analysing the change process in our study, since it can deal with both the reason for change and the inhibitions and problems experienced in attempting to introduce it. This should facilitate our attempts to study the six Gates plants.

Chapter seven develops a conceptual framework around an approach to change which adopts a view that change is influenced first, by incentive to change and second, by the receptive context of the change initiative and third the ability of the organisation/ management to carry out the change initiative and see it through to the end. The next chapter, six, will cover the methodology used to gather the empirical data.

CHAPTER 6

RESEARCH METHODOLOGY

AND PLANT DETAILS

Introduction

This chapter reviews the research methodologies with a view to identifying the most appropriate methods of capturing the information necessary for the study. It will then explain the actual methodology selected to gather the empirical data for the analysis and the reasons for adopting this approach. Finally, an outline is given of each of the plants involved in the study, regarding size, history and reasons for implementing TQM.

A number of specific questions were critical in preparing the final methodology.

- What type of data is required for the study and how will the data be accessed?
- What techniques are available to the researcher?
- How will the data be interpreted and analysed and presented?
- What factors will influence the data? e.g. design of questions, interviews.
- What are the strengths and weaknesses of the different approaches?
- What options or combinations will be best suited to the study of the Gates plants?

Section one will discuss the methodology selection and the use of surveys and interviews, section two identifies and describes the actual approach used and section three outlines the individual plants.

Chapter 3 concluded that some form of measurement criteria is required to make comparisons over time and in this study's case between plants. This will involve performance measures and quantifiable variables which will allow trends to be developed though it will be restricted by the availability of standard data. The nature of TQM as described in chapter 4 is such, that in order to discover how the change initiative has been received by the various plants and how the implementation progresses over time, it will be necessary to compliment hard data with an understanding of some of the softer issues involved, e.g. peoples reactions, views, attitudes and behaviour. This latter may help to explain the interaction and the 'politics' of the change process. These views, attitudes and perceptions however, will only represent a moment in time snap shot but never the less should give an indication of the implementation process and politics involved in each plant with regards to the TQM program.

The use of both hard and soft data is essential to understanding not only how well or badly each plant's change initiative has progressed, but also what factors have influenced the final outcome. To rely on only one form of data will not give a clear enough understanding of the change initiative implementation and progress; for example to rely solely on hard data would completely ignore the politics within each plant and how the various soft issues may have influenced the plant performance. To rely solely on soft descriptive data could run the danger of excessive subjectivity and possible bias. Comparison of results is also difficult where only soft data is used; for example, how do you quantify improvement in performance levels using only attitudinal data?

The method of data capture will also need to accommodate the anticipated time constriction imposed on visits to the various plants. It must be remembered that these plants and the people working in them are busy trying to meet deadlines and have their own priorities. This requires that the means of data capture will need to be efficient in terms of time as well as ensuring reliable and accurate information relevant to the study. There has to be a balance between the capture of 'ideal' data and the practicalities of gathering data in a pressurised work context. The aim here is to achieve that balance.

This study is dealing with a restricted population and as such requires techniques and methods of data capture suited to these selected plants. The author was aware of the Gates structure and reporting systems being used throughout the corporation and this made it easier to develop the hard data capture systems in particular. However, it was still necessary to establish that each plant had the required performance data readily available.

The facts that the study plants are spread over 2 continents and that a time limit will be placed on the plant visits, argue for the adoption of a combination of data capture methods. Written questionnaires would be sent in advance of the plant visits to save some time. Interviews would be required to capture qualitative data during the actual visits and an outline of the items found on appendix 14 was also included in the advanced postings. This data was picked up during the plant visits. In addition the information on the questionnaires could also be checked and clarified during the plant visits. The essential aim is to assemble a balance of hard and soft data across 6 plants which will enable a comparison of implementation and, if possible, the effect on plant performance. These questionnaires (appendix 10-12,14) would capture both hard and some of the soft data required for the study. The soft data on Management culture (appendix 12 section 8) utilises a likert scale to assist the respondents to grade the answers.

The next section looks at the area of surveys and interviews in more detail with a view to understanding how these techniques are applied. It will also address some key areas of concern with these techniques, i.e. bias, leading questions, and also to assist development of the methodology for the study of the Gates plants.

Surveys and Interviews

Surveys

Survey research aims to remove as much bias from the research process as possible and produce results that are replicable by following the same methods. This is achieved in a number of ways.

Standardisation refers to the conditions under which a survey is conducted, but specifically how a questionnaire is designed, administered and analysed. This covers the whole process of exactly specifying the questions to be asked, the manner of asking them, how the replies are to be scored. A standardised interview is one that has been constructed in this rigorous way, has been tried out, and is ready for use in the population to be studied. The expectation is that if all respondents are asked the same questions in the same manner and if they express a difference in opinion in reply to those questions, these variations result from a true difference of opinion rather than as a result of how the question was asked or the context of the interview.

Second, *replicability* should enable other researchers to replicate the survey using the same type of sampling, questionnaire. A survey should aim to be both reliable, whereby it obtains the same results from the same measurement on different occasions, and valid, whereby it measures what it is intended to measure.

Third, there is *representativeness*. If it is the intention to reach generalised conclusions about a population it is important not only that the sample is representative of the population, but also that the findings are capable of statistical analysis to show, for example whether observations are larger or smaller than would be expected by chance alone.

Surveys, through the use of questionnaires, typically measure some characteristic behaviour or opinion of their respondents. Depending on aims, the procedure adopted and

the number of people who are interviewed, generalisation can then take place from the sample of people interviewed to the population as a whole.

There are many types of samples but all are either probability samples (often called random samples) or non-probability samples. Probability samples are so called because it is possible to express the mathematical probability of sample characteristics being produced in the population. Probability sampling requires the existence of some sort of sampling frame, even if that sampling frame is just the n number of flats in a particular location. The size of n must be known. Where this is not the case then non-probability sampling is used.

A form of sampling often employed in market research is that of *quota sampling*. Here the general characteristics of a population are often known from data obtained from, for instance the Census. The proportion of people in particular age groups, social classes, is known beforehand and the sample will consist of a proportionate quota of people with these characteristics. This method is often used for street interviewing and while arguably representative if properly selected, often suffers from sampling bias in so far as those who are easier to interview are selected, or those that more obviously display the desired characteristics. *Purposive sampling* can be used where a selection of those to be surveyed is made according to a known characteristic. Numbers may often be small but the 'fit for purpose' defence of the method is used here.

A crucial question is whether or not a survey is the best way to approach the research. In some cases research questions will require an approach utilising more than one method, such as field research and surveys. In such cases it is necessary to identify which parts of the research can best be accomplished through a survey. Having decided a survey is the best approach to the research question and identified testable hypotheses, decisions must be made about who the population are, how will they be sampled and what type of questionnaire should be used.

Data collection through surveys is conducted mainly through three types of questionnaire: the mail or self-completion questionnaire, the telephone survey and the face to face interview schedule.

The mail questionnaire offers a relatively cheaper method of data collection than the personal interview. Second, people can take their own time to fill in the questionnaire and consider their responses, Third, as interviews are not used this could lead to less bias that results from the way in which different interviewers ask the questions. Finally, it is possible to cover a wider geographical area at a lower cost. Some of the disadvantages are firstly, that once the questionnaire is sent out the researcher has little control over the completion of the survey. Secondly, the questions need to be kept relatively simple and straightforward as the researcher has no control over how people are interpreting the question once it has been mailed. Third, the possibility of probing beyond the answer that people give is absent. Fourth, there is no control over who answers the questionnaire. Finally, the response rate may well be low and it is possible that one cannot check on the bias of the final sample, due to lack of knowledge of possible bias in the non-respondent population.

The telephone survey like the postal survey, can be convenient and relatively cheap depending on how far afield you are researching. However, telephone surveys can be problematic if using a telephone directory. First, people will for various reason opt to be ex-directory. Second, in phoning someone you may get the wrong person or the right person at the wrong time, thus causing problems in response. Third, inbuilt gender and class bias in telephone directories and the distribution of phones between classes can render simple probability sampling as unrepresentative.

In the face to face interview the researcher is able if required to record the context of the interview and the non-verbal gesture of the respondent. As a result, unlike the other methods, there is a visual-interactional component between interviewer and interviewee. According to Fowler (1988:107) this has both advantages and disadvantages.

Because of the central role they play in data collection, interviewers have a great deal of potential for influencing the quality of data they collect. The management of interviewers is a difficult task, particularly in personal interview studies. Furthermore, the role of the interviewer is a somewhat neglected topic in many survey texts.

From this Fowler considers three roles which the interviewer has to perform in the collection of data. First, to locate and secure the co-operation of the respondents. Second, to motivate and guide the respondent through the questionnaire and finally, to ask questions in a clear, standardised and concise way, to record the answers carefully in accordance with the survey instructions and maintain a rapport with the respondent.

The most important part of the actual design of questionnaires is to construct them unambiguously and to be clear in your own mind what the question is for, who it is to be answered by and how you intend them to interpret it. One might think that the meaning of a question is clear enough, but it does not follow that the people answering the question will agree with your interpretation. This is why it is useful, if possible, to conduct some initial fieldwork based either on interviews and/or observation work with the sample. This assists the researcher in understanding the concerns of the people who are being questioned and how they might interpret particular questions. According to Kidder (1981:162)

Piloting aims to see how the survey works and whether changes are necessary before the start of the full-scale study. The pretest provides a means of catching and solving unforeseen problems in the administration of the questionnaire, such as the phrasing and sequence of questions or its length. It may also indicate the need for additional questions or the elimination of others

Most surveys concern themselves with either fact or opinions. With factual questions, as opposed to opinions, more latitude can be given to the interviewer to probe, explain and possibly even vary the question wording in a way which would bias an opinion question.

These would be designed to elicit, for example, the newspapers which people read. With opinion questions, wording alterations can easily elicit different answers. According to the principle of standardisation, each respondent must reply as a result of unambiguous questions and not as the result of poor question wording, the way in which the question is asked, or as a result of the context of the interview.

There is also the decision where and when to use open and closed questions. Open questions give the respondents a greater freedom to answer the question because they answer in a way that suits their interpretation. The interviewer then records as much as possible of the answer, which is analysed after the interview. While closed questions limit the number of possible answers to be given, their analysis is quicker and cheaper and they also permit comparability between people's answers. A mixed method with open and closed questions is possible and this can sometimes allow greater flexibility of response for some studies.

Within question design attitude scales often play an important role. They consist of a set of statements, which the researcher has designed and the respondent is then asked to agree or disagree with the pre-coded answers. It is then possible to test a series of attitudes around a particular topic and not to rely upon one question as an indicator. What is known as the Likert scale places people's answers on an attitude continuum. Statements are devised to measure a particular aspect in which the researcher is interested; the respondent is normally invited to agree strongly, agree, neither agree nor disagree, disagree or disagree strongly with these statements.

Leading statements should be avoided, but where used, should be balanced by questions which point in the reverse direction. Where leading questions are used it should be clearly acknowledged that the results of the questionnaire are only representative within the confines of the format used. If a restrictive tool or technique has been adopted then the reader must be made aware of the limitations placed on the interpretation. However, this should not rule out the use of such techniques if they can contribute to the understanding of the overall study.

Having decided upon the nature and types of questions to be used, the process of actual question wording is of central importance. Appendix 9 lists some points which should be considered when designing questions.

Interviews

There are four main types of interviews used in social research. While these characterisations appear to strictly demarcate one method from another, a research project may not simply be one of the following, but a mixture of two or more types. They are the *structured interview*, the *semi-structured interview*, the *unstructured or focused interview* and the *group interview*. The structured interview involves the researcher attempting to control the interview through predetermining questions and thus oblige the respondent to reply in accordance with the interview-schedule (standardisation). The unstructured interview encourages the respondent to answer a question in her or his own terms. Interviews can be characterised from quantitative to qualitative, varying from the formal standardised example (surveys), to an unstructured situation of qualitative depth which allows the respondent to answer without feeling constrained by pre-formulated questions with a limited range of answers. The types of interview are now considered.

Structured interviews are associated with survey research. While the other techniques, particularly focused interviews, may directly involve the researcher as a subject and co-participant in the data collection process, this method relies upon the use of a questionnaire as the data collection instrument. The principle behind this method is that each person is asked the same question in the same way so that any differences between answers are held to be real ones and not the result of the interview situation itself. Given this, the role of the interviewer is to direct the respondent according to the sequence of questions on the interview schedule and its clarification is sought, then little or no variability in such elaborations should be apparent. The neutrality of the interviewer's role is emphasised in this manner. The rules for conducting such interviews are, therefore standardisation of explanations, leaving little room for deviation from the schedule; eliciting only the responses of the person with whom the interview is being conducted; not

prompting or providing a personal view; not interpreting meanings and simply repeating the questions and finally, not improvising.

In between the focused and structured methods sits one which utilises techniques from both, the *semi-structured interview*. Questions are normally specified, but the interviewer is more free to probe beyond the answers in a manner which would appear prejudicial to the aims of standardisation and comparability. Certain information can be asked in a standardised format. Qualitative information about the topic can then be recorded by the interviewer who can seek both clarification and elaboration on the answers given. This enables the interviewer to have more latitude to probe beyond the answers and thus enter into a dialogue with the interviewee. These types of interviews are said to allow people to answer more on their own terms than the standardised interview permits, but still provide a more standard structure for comparability than the focused interview. If a researcher has a specific focus for interviews within a range of other methods employed in their study, the semi-structured interview may be useful.

Unstructured or focused interviews adopt an open ended approach. This is said to provide it with an ability to challenge the preconceptions of the researcher, as well as enable the interviewee to answer questions within their own frame of reference. Some might regard this as a licence for the interviewee to simply talk about an issue in any way they chose. Nevertheless, this apparent disadvantage is turned into an advantage:

A phenomenon like rambling can be viewed as providing information because it reveals something about the interviewee's concerns. Unstructured interviewing in qualitative research, then, departs from survey interviewing not only in terms of format, but also in terms of its concern for the perspective of those being interviewed.

(Bryman 1988a:47)

Sometimes called the 'informal,' unstructured', 'unstandardised' interview, this method achieves a different focus for the following reasons. First, as mentioned it provides qualitative depth by allowing interviewees to talk about the subject in terms of their own

frames of reference i.e. drawing upon ideas and meanings with which they are familiar. This allows the meanings that individuals attribute to events and relationships to be understood in their own terms. Second, it provides a greater understanding of the subject's point of view. We are now squarely at the qualitative end of the research spectrum. Structured interviews are thought to allow very little room for people to express their own opinions in a manner of their choosing. The focused interview obviously involves the researcher having an aim in mind when conducting the interview, but the person being interviewed has more freedom to talk about the topic. This method is characterised by flexibility and the discovery of meaning, rather than standardisation, or a concern to compare through constraining replies by a set interview schedule.

Group interviews constitute a valuable tool of investigation, allowing researchers to focus upon group norms and dynamics around issues which they wish to investigate. The extent of control of the group discussion will determine the nature of the data produced by this method. A balance must be struck between the group being too small for interactive study or too large thus preventing all group members from participating in the discussion. However, as with all research guidelines, this will depend on what is possible in circumstances over which the researcher may have no control, as well as the aims of the investigation and the resources available.

A tension can exist between subjectivity and objectivity in the interview process. On the one hand, interviews are said by many to elicit knowledge free of prejudice or bias; on the other, a self-conscious awareness must be maintained in order to let the interview flow. The interviewer and interviewee therefore need to establish an inter-subjective understanding. At the same time, the pursuit of objectivity requires a distance in order to judge the situation. There appear to be two polar opposites - full engagement to detached analysis.

There are three necessary conditions for the successful completion of interviews. The first necessary condition is *accessibility*. This refers to whether or not the person answering the questions has access to the information which the interviewer seeks. The second necessary condition is *cognition*, or an understanding by the person being interviewed of what is

required of them in the role of interviewee. The third, and related to the above is the issue of *motivation*. The interviewer must make the subjects feel that their participation and answers are valued, for their co-operation is fundamental to the conduct of the research. This means maintaining interest during the interview.

Bearing in mind the questions raised on p156, this review has identified that hard and soft data will be required and accessed via a combination of techniques involving questionnaires and interviews. It is contended that there is no need to discuss the whole toolbox of non-relevant methods. Some of the issues relating to questionnaires and surveys were highlighted, in particular, bias and leading questions and it was discussed how these could be addressed. It was also suggested that a mixture of open and closed questions could be utilised provided they are interpreted within the confines of each technique and that this is made clear to the reader. The next section discusses the actual methodology adopted for the study.

Adopted Methodology

The first stage of the data gathering was to establish contacts in each of the six plants involved in the study. This was achieved by writing to each plant manager in January 1995, explaining the objective of the thesis and requesting the involvement of their plants. All plant managers agreed to participate and subsequently nominated primary contact personnel, these were;

Aachen plant, Germany :- Personnel manager

Balsareny plant, Spain:- Plant manager

Erembodegem, Belgium:- Quality manager

Moncks Corner, USA:- Materials manager

Siloam Springs, USA:- Facilitator

The Dumfries plant was co-ordinated by the author. In March 1995 a pilot questionnaire was sent to each plant, appendix 10, to gain an initial profile of the plants. It also tested each plants commitment to supplying data for the study and gauged whether future postal questionnaires would be an acceptable method of gathering data. This stage proved successful and all plant contacts showed willingness to participate. After developing a conceptual model to analyse the study area, Table 7, the author then developed the method of gathering the data. It was decided to use a combination of postal questionnaires and also to visit each plant and carry out interviews. It was felt that this method was required because some of the data involved factual measures, e.g. performance measures, and some required face to face contact and possible interpretation by the author, e.g. management ability. There was a need to probe in greater depth, developing understanding of what was a process of change. It may have been possible to generate strings of questions for these more qualitative areas, which could have eliminated the need to visit the plants. However, it was decided that a more accurate picture could be achieved by direct observation, and

discussion and the introductions would assist with future plant contact follow up. Initial data would provide a broad factual picture and this would help to identify areas for interview and discussion in the follow up visits.

The conceptual model was broken down into sections to allow the relevant questions to be developed e.g. Incentive, Ability, Receptivity, Special factors, Performance Measures. The selection of performance measures was constrained by the fact that, Gates being a privately owned company at that time, certain performance indicators were considered too sensitive to report out-with the organisation, e.g. profit levels, return on assets and other financial based ratios. The second constraint was that the chosen measures needed to be common reporting indicators across all the plants in the study, or at least reasonably accessible, since busy managers would not take kindly to laborious fact finding of obscure measures. A list of proposed performance indicators was sent to each plant prior to sending out the final draft. This was done to ensure all plants had access to the information and also to avoid delays during the plant visits. Ability to complete was confirmed by all plant contacts. The postal questionnaire was also pre-tested in the Dumfries plant by the author to ensure the information could be accessed in a reasonable time-scale and was likely to be easily understood by the respondents.

The questionnaires were sent out to each plant, one month before the plant visits along with the outline areas for interview discussion. This would allow plants enough time to digest the questions and prepare. The visits commenced in February 1996 with the two US plants. Gates has 15 plants in the US which manufacture a variety of industrial rubber goods e.g. Hose, V belts, Synchronous timing belts. Two plants were chosen, first Moncks Corner was part of the same World-wide Power Transmission division as the European plants and manufactured timing belts. Second, it had been visited by Dumfries personnel in the past, which would allow some cross checking to be carried out. The Siloam Springs plant was also part of the Power Transmission division, manufacturing V belts and was regarded as Gates top US plant for change initiatives. Both these plants manufactured similar products, with similar management structures and were considered representative of Gates US plants. Other US plants could have been selected, but it was felt that two US

plants out of six plants in total was representative and more manageable for analysis. The sample in Europe represented all the Gates Power Transmission plants at that time.

The author was aware that there could be certain limitations in studying plants from only one organisation. Gates is a privately owned American rubber company controlled in the main by the Gates family. The company has been in existence for over 80 years and is controlled from its Denver USA headquarters. The culture and systems operating within Gates may be peculiar to them and not representative of other industries even within the rubber sector.

The American influence within the organisation may also influence the way policy and strategy are dictated, for example the approach to TQM and training may differ from European and Japanese organisations. The area within Gates chosen for the study may also limit the relevance of the work to industry in general, for example The Power Transmission division is only one of 3 divisions within Gates Rubber company and again may not represent a typical environment.

The question of whether the sample of Gates plants was representative of manufacturing plants in general was partly answered by reference to some of the automotive manufacturing plants. The author had previous contact with personnel from automotive plants via customer audits e.g. Toyota, Rover, Ford and had visited automotive plants Toyota, Ford, Nissan. There was also contact with other suppliers to the automotive industry e.g. Unipart. Through these dealings it was felt that the Gates plants were broadly representative of this area of manufacturing with regard to organisation structure, operating systems and controls.

The visits to the five Gates plants lasted on average two days each. The contact personnel arranged meetings between the author and various people. These people were selected by the contact personnel, as having the necessary information and back ground relating to the pre-defined interview questions, or had shown a particular interest in the subject area, TQM. However, it should be stressed that the author, who has been located at the Dumfries plant for 18 years, had previously visited the European plants, Aachen,

Balsareny, E/gem, at least three times each and was thus familiar with the structure, management team and procedures and systems. The US plants although not previously visited by the author, had received visits from Dumfries personnel and in the case of Moncks Corner, a manager from Dumfries had been temporarily transferred for two years (91-93) and was thus able to provide the author with prior knowledge of the plant. Trip reports by the Balsareny plant HR manager on Siloam Springs were also available to the author. The level of background already known about the plants meant that the interviews could focus on updating and exploring key issues.

The author was also aware of potential bias from the respondents and used a combination of experience within Gates and checking for consistency between the individuals, to cope with this potential bias. Some respondents may feel they need to give answers which do not clash with their responsibilities. For example, if a plant manager is asked whether the TQM program in his plant has been successful or not, he may feel he has to answer yes, since he is responsible to divisional and corporate management for its successful introduction to the plant. To answer no, even if he really feels that this was the case, may reflect badly on him and his ability to implement a successful TQM program. This may also cast doubts in senior management's minds as to his overall ability to manage the plant. In order to address this potential issue it would be necessary to cross check the answers given from other personnel in the plant and also to understand why they had answered in a particular way. The author used a combination of formal questions and informal discussion throughout the plant visits to check if answers and views appeared consistent and matched observations i.e. a plant which had supposedly successfully introduced TQM would exhibit completion of the various TQM steps involved.

Questionnaire

The data gathering exercise comprised two techniques, the first being a postal questionnaire sent out to all plants, except for Dumfries, three to four weeks prior to the plant visits. The second was an interview question list. The questionnaire was structured as follows;

Postal Questionnaires

Part one (appendix 11) consisted of questions on nine business results criteria, designed to measure each plants historical performance over a period of time, ideally 1990 - 95 inc. This information would reveal year on year changes in performance, for each plant, and would also be used for inter plant comparison. The results criteria avoided specific financial data, due to confidentiality restrictions. The author was also aware of the comments in chapter four page 123 by Hackman (1995) that 80% of the research literature on TQM case studies explains what happened during the intervention, but the lack of suitable research designs renders it difficult to make the direct causal connection with TQM. The first three measures were considered more closely related to TQM, at least in the initial stages of introduction since TQM concentrates specifically on customers and quality criteria. The remaining measures were expected to take longer to show an impact and as such would be analysed separately. The criteria chosen were;

Cost of Quality which comprises first the Cost of Conformance, (prevention costs, inspection /appraisal costs), and second the Cost of Non-conformance, (internal failure costs, external failure costs, cost of exceeding requirements). The total cost is then expressed as a percentage of the total plant variable manufacturing cost.

Customer Service Level which comprises the level of orders which are within a specific target order date given to the customer expressed as a percentage.

Customer Complaints which comprises the level of customer returns and the number of parts returned per million units sold, PPM's.

Working Capital Turns which comprises the total plant manufactured sales divided by the net working capital at year end and expressed as a number of turns.

Stock Turns which comprises the cost of goods sold at variable manufacturing cost, annualised, and divided by the monthly inventory.

Yearly Product Defect value which comprises the value of defective product divided by the value of good product and expressed as a percentage.

Manufacturing Variation which comprises the percentage variation between the manufacturing budget and the actual results.

Sales / Employee which comprises sales per year divided by the average number of employees on the payroll each year.

Growth Levels which comprises the level of sales growth each year compared to the prior year, expressed as a percentage.

Part two consisted of questions relating to the framework for analysis, which identifies factors influencing a TQM programme, appendix 12, the main areas were;

1. Previous Initiatives
2. Industrial Relations climate
3. Workforce Profile
4. Organisation Structure
5. Organisation Policies
6. Resources

7. Customer Influence

8. Management Culture

9. Views of TQM progress

Part three consisted of a TQM questionnaire of 24 questions designed to check the perceived impact of TQM on the business, appendix 13, and was filled in by a range of personnel, table 8. While it may be argued that some of the questions are leading, it should be noted that this questionnaire, which was adapted from Ahmadi and Helm (1995) utilises a likert scale to aid understanding and allow a full range of answers to be achieved. It also attempts to strike a balance by adopting questions which point in opposite directions. These points were recommended in the earlier theory discussion on page 163. In addition to being useful in checking perceptions the questionnaire forms only a limited part of the overall TQM survey.

Table 8: Personnel involved in questionnaire

Plants	Personnel involved in the TQM Questionnaire	Number
A	Personnel Mgr, Quality & Prod Managers, Applications Eng.	4
B	Plant Manager, Production and Quality Managers.	3
D	Quality and Production Managers, Department Manager.	3
E	Plant Manager, Operations, Quality and Finance Managers.	4
M	Plant Manager, Materials Manager, Technical / Eng Manager.	3
S	Operations Manager, Quality Manager, Supervisor, SPC Co-ordinator.	4

Interview questions

The second technique involved a list of questions for face to face interviews with plant personnel, and attempted to gain additional insights into the why, where, who and how of the TQM initiative, appendix 14. The interview schedule was semi-structured and the same questions were asked at each plant. This method allowed the author to seek both clarification and elaboration on the responses and check for consistency in answers, in order to address potential bias from individuals.

1. Why and how was TQM implemented
2. How successful and effective was the implementation
3. Incentive factors
4. Ability factors (Receptivity, Human Resource, Mgt Ability, Diversions, National traditions, Approach adopted).

Various people were interviewed in each plant in an attempt to gain a representative view with different perspectives, to ensure the accuracy of the information and also to avoid bias from single function viewpoints. The contact personnel varied across the plants due to availability, the minimum being four contacts. Awareness of the effect of selective perceptions on the data, was tackled by using varied personnel and also ensuring some consistency and a cross functional view of the relevant managers, e.g. Plant, Quality, Personnel and Production managers and TQM facilitators were accessed in nearly all plants.

The semi-structured interviews enabled the author to check for consistency of responses from individuals and to cross check the responses with what appeared to be happening within each plant. For example, if individual responses differed on the success of the TQM program implementation, then the author was able to probe deeper to try and establish why

an individual's perceptions varied from the others. The author was also able to check these perceptions with other indicators e.g. the 7 stage implementation model of TQM. In addition to this the author was also aware of the potential bias that can exist when individuals are asked about the success of programs in which they are personally involved in e.g. suggesting failure might reflect badly on the individual. It was therefore important to understand the level of involvement and responsibilities of each individual. Awareness of the TQM development stage of each plant was also necessary, since responses, views and understanding of issues, can be affected by levels of experience and the particular stage a plant is at in the TQM implementation programme.

The questions on appendix 14 were asked at formal interview sessions by the author, who wrote out notes during the sessions. This questionnaire was semi-structured allowing the respondents to elaborate as necessary and enabled the author to clarify responses as required. In some cases notes were placed on a Dictaphone tape and analysed later. Time was allocated after each session in order to check the notes and raise further questions if required. This gave the author time to reflect on the answers and ensure there was no misinterpretation or ambiguity in the responses or descriptions. The Dumfries plant questions were covered over a longer period, since the author was based there. Further discussions with Gates personnel were also used to check and clarify answers. Dumfries personnel had visited most of the plants at some time over the last few years. In particular the spreader department manager and the technologist from Dumfries had both worked in US plants and were able to give valuable insights into the American plants systems and cultures, which will be discussed later. A formal interview session was also held with the then Vice President of Power transmission Europe which gave information on the overall TQM strategy and also further insights into the American and European Culture differences. Interviews with shopfloor employees were not carried out by the author, however, valuable insights were obtained at the Dumfries plant by the author during three day TQM training courses for shopfloor employees. In addition to this an employee attitude survey was carried out by Professors Hunter and Beaumont of Glasgow University in 1993, which also provided valuable information.

Plant Details

This section gives an outline of each plant regarding size, history and reasons for implementing TQM.

Aachen Plant - Germany

The Aachen plant is situated in Germany, close to the Belgian border. It has 312 employees and occupies a site of 10,000 square metres. The average employee age is 33 years, and the plant is unionised. The plant was built in 1981 for Uniroyal and taken over by Gates in 1986. The plant manufactures Synchronous belts for Automotive and Industrial applications.

The plant had low incentive to implement TQM in 1989, business was good, and there was no pressure from customers at that time. The decision to implement the TQM programme was taken by the Vice President, who after being approached by Rank Xerox in 1989, decided that the Aachen and Dumfries plants would participate in the TQM programme. The implementation followed the Xerox model. European senior management and the plant managers from both plants formed a steering committee and commenced working through the Xerox management orientation level. The Aachen plant started with the Xerox model in 1989 and modified it slightly to accommodate the Gates TQM model in 1992. The plant had no previous experience of quality initiatives, apart from a one year spell in 1982 with Quality Circles, in which they had 7 QC'S in operation.

The Aachen plant has a traditional organisation structure, e.g. hierarchical. The HRM manager however reported directly to the VP for Power Transmission, who is based in Erembodegem, Belgium. She has a dotted line responsibility to the Aachen plant manager. This is due to her being the European HR manager, responsible for all PT plants in Europe, however her involvement in some plants, e.g. Dumfries and Balsareny, is minimal. The HRM function, in particular the Personnel manager, played a fairly active role in the Xerox programme, organising training and participating in the initial management level orientation.

The Aachen plant also has a Workers Council which arranges quarterly meetings for all employees, and also on request.

The TQM implementation plan time-scale was as follows;

1. Phase I	Management Orientation	09/89
2. Phase II	Senior Management Training	09/89
3. Phase III	Strategic Development and Implementation planning	12/89 - 04/91
4. Phase IV	Employee Training	06/91 - 04/95

Table: 9 TQM Implementation Plan

The plant management and European Personnel manager were responsible for implementing the programme in to the plant. The TQM initiative was communicated to the workforce at in-house meetings in 1991 by plant management. The reasons for implementing TQM in a Aachen were given as;

1. Cultural change is required to meet future goals
2. Management feel that in order to remain competitive they need to advance their knowledge, systems, and products, competitive Benchmarking.
3. To increase market share, quality and service levels.
4. To decrease waste, defects, and cycle times, e.g. deliveries, inventory turnover time, order processing and resolving complaints.

Contact during the Aachen plant visit was made with the following personnel; Plant Manager, Production Manager, Applications Engineer, Personnel Assistant.

Balsareny Plant - Spain

The Balsareny plant is situated in the Catalan district of Spain, 30 miles north west of Barcelona. It has 250 employees and occupies a site of 9,000 square metres. The average employee age is 28 years, and the plant is unionised. The plant was built in 1989 by Gates, to produce V belts and between 1989 to 91 various personnel visited the US plants Siloam Springs and Elizabethtown to learn about the product, processes and quality systems.

In 1993 Synchronous Timing belts were introduced. The Personnel manager had left prior to the authors visit in march 96 however, contact was made with him during a plant visit in November 1994 and enabled the necessary personnel data to be accessed. The plant has experienced some major investment and growth in employees over the last few years. In 92/93 a new Synchronous Belt manufacturing cell was installed, and in 95 a new V belt manufacturing cell. These investments required some major reorganisation of the plant layout, and the plant is now filled to capacity. The number of shopfloor employees has increased from 60 in 1994 to 124 in 95, with a budget of 176 for 96. The increase between end 94 and end 95 was 86 employees.

The plant is situated in a fairly remote area, 30 miles from Barcelona, where there is a Gates Hose plant. The Hose plant was built in the 1950's, and has a strong union presence, and older more militant workforce, with many restrictive practices. Gates acquired this Hose plant in 1987 but intentionally distanced the new plant in Balsareny from the old plant, to avoid any influence, and also because the area was designated an enterprise zone, offering grants to investors to the area. The intention was to be different from the Barcelona plant. The GEM philosophy was used as a guide, along with the self managed cell approach.

The decision to implement TQM in Spain was that of the then Gates Vulca Vice President along with the then Personnel manager. The Gates Vulca plant in Barcelona started TQM in May 1990 and the decision was made to extend it to the newer Balsareny plant in late 1991. At that time the GQC initiative was being communicated from Divisional level in Belgium, and in 1992 the GQC and the Spanish TQM programme were blended together. The Balsareny plant implemented TQM for various reasons, namely;

- (i) The plant was newly built in 1989 and management felt they should adopt some form of quality initiative.
- (ii) The early contact with the US plants in 89/90 influenced quality awareness, e.g. GEM.
- (iii) Some Bandwagon effect, since the Gates Vulca plant had already commenced their own quality initiative in 1990.
- (iv) Pressure from Divisional level, e.g. GQC.
- (v) Customers were becoming more demanding regarding audits and quality levels.

These combined factors gave the plant high incentive to implement a TQM programme, since the management had received exposure to the Gem philosophy from the US plant visits and combined with the experience of assisting in the nearby plant in Barcelona, were made more aware of the TQM philosophy. Contact during the Balsareny plant visits was made with the following personnel; Plant Manager, Personnel Manager (1994 only), QA Manager, Production Manager, Production Facilitator.

Dumfries Plant - Scotland

The Dumfries plant is situated in south west Scotland. It has 364 employees and occupies a site of 11,500 square metres. The average employee age is 38 years, and the plant is unionised. The plant manufactures Synchronous Belt for Automotive and Industrial applications which are then exported world-wide. The plant was built in 1989 by Gates, approximately 200 metres from an existing older Gates site, which is occupied by a separate subsidiary, Consumer and Industrial Products. Prior to the plant being built, the Power Transmission department occupied part of the older plant, and was up until 1991, part of the main plant structure, in terms of management and employees. The new plant was therefore regarded as a brown field site, with respect to workforce profile and attitudes.

The Dumfries plant had low incentive to introduce a TQM programme. In 1990/1 plant management were preoccupied with setting up the new plant and introducing new technology. This major change was handled in the main by the existing management and staff and placed considerable pressure on the team. In addition to this the plant was experiencing high growth levels, e.g. 17% per year average for 1990 - 95, and profit levels were good. On the surface the plant did not need any new quality initiatives and did not have the time to introduce them anyway.

Customer influence in 1990/1 was not particularly strong as regards adopting quality initiatives, and although Rank Xerox had contacted the plant regarding it's own TQM programme, it was not a major customer and did not wield any significant pressure.

The decision was taken by the VP for Power Transmission, to introduce the TQM programme into the Dumfries and Aachen plants, and then to diffuse it to the other European PT plants over time. This approach is clearly along the lines advocated by Beer et al (1990) who favour a Bottom up approach.

When the new plant was built, due to capacity requirements, the existing PT workforce was relocated to the new plant. The new plant was therefore regarded as a 'Brown Field' site , as

opposed to a 'Green Field' site in which a new workforce is hired. This point has implications in other areas, with respect to the workforce profile and attitudes. The point being that an older workforce who may be more set in their ways, may be less flexible and less willing to embrace change initiatives, on the other hand they will hopefully have mastered the basic operations and require less on the job training and supervision.

The plant had no prior experience of quality initiatives, apart from a one year spell of Quality Circles in 1985, which had no real impact on the quality initiative. The Dumfries plant embarked on a TQM program in 1989 to the same time-scales as the Aachen plant and the roll-out plan for training commenced in 1991. At this time plant management were involved in commissioning new technology and attempting to meet increasing output demands.

In 92/93 the plant personnel were involved in supporting the Gates Spanish plant with introducing new technology, and in 1995 the French plant was given similar assistance. This involved sending personnel over to these plants to train employees and advise on manufacturing and quality systems. This tended to spread the management team thinly during a period of high change. Also in 1995 new shift patterns and 7 day working were introduced and a new Quality manager joined the plant. The new plant and the new investment in particular may have affected the progress of the TQM program and management were preoccupied with getting the capacity in place to meet increasing demands. Pressure from Divisional level for capacity added to the demand for output.

Contact in the Dumfries plant was made with the following personnel; Plant Manager, QA Manager, Production Manager, Personnel Manager, Materials Flow Manager, Coating Dept Manager, Financial Controller. The author is based at the Dumfries plant as Assistant Production manager and part time TQM facilitator, with shared responsibility for introducing change programs.

Erembodegem Plant - Belgium

The Erembodegem plant, Egem, is situated 30 miles from Brussels, in Belgium, and is the Gates European headquarters. It has 694 employees and occupies a site of 42,000 square metres. The average employee age is 36 years, and the plant is unionised. The plant was built in 1963 and was the first Gates plant in Europe. The plant manufactures V belts and Hose.

In 1991 the company reorganised by product line and the plant effectively had two factories within the same site. Business reporting and functions split into separate product lines, e.g. Power Transmission and Hose & Connectors. Each business had its own Vice President and management team. In March 1994 the decision was taken to reconsolidate some of the management team, e.g. QA, Costing.

The incentive to implement TQM in E/gem came from the Vice President for PT, who was a key figure in the early discussion to accept the offer from Rank Xerox for the Dumfries and Aachen plants. The plant approached Rank Xerox in 1988, but were not successful, due to not being a supplier. According to the QA manager the plant management had shown an interest in the Xerox programme in 1989, but the plant was still operated as one unit and they did not become involved.

The E/gem plant did not have a high incentive to implement TQM. The Vice President pushed TQM into the plant to bring it in line with the other European plants. There was some bandwagon pressure in relation to the other Gates plants who had theoretically implemented the programme, e.g. Aachen and Dumfries. The GQC programme from corporate added to this pressure. There does not appear to be any evidence of business performance or customers driving the TQM initiative.

The reorganisation in 1991 enabled the Vice President for PT to introduce the TQM programme to the PT division of the plant, and the situation existed where only half the plant were involved in the TQM initiative. The plant has two divisions on the one site, e.g. PT and H&C. The personnel manager for Hose & Connectors is located in the plant, while

the personnel manager for PT operates from the Aachen factory in Germany. Indications were that the two personnel managers did not have a particularly close working relationship. The HR function based in E/gem, e.g. the personnel manager for Hose & Connectors, did not play any role in the TQM programme, at the time of its launch in 1992, while the HR function for Power Transmission, based in the Aachen factory played a significant role in organising the Power Transmission TQM programme.

There did not appear to be any customer pressure or business pressure for change and the plant management did not appear particularly concerned about the need to implement TQM across the whole site at that time.

The E/gem plant had only one quality initiative, this was the Quality Circles in 1984. They had 10 QC's in operation at its peak. It is still in operation with one QC, however it does not play a significant role in the quality programme.

The E/gem plant had no prior experience of implementing a TQM programme. Senior management played a leading role up to the Roll-out plan for employees in 1992, thereafter input gradually reduced. The GEM philosophy was not introduced into E/gem, even though it was Gates first plant in Europe. There was no reason given for this, but the fact that the plant is unionised may have played a part, e.g. GEM was only being introduced to non union plants. This strategy however changed in 1989, with the building of the new plant in Balsareny, Spain, which was unionised and implemented GEM systems.

Even though E/gem the plant received assistance from Aachen regarding training and administering the TQM programme, the management did not appear to have a high ability to implement a TQM programme. In addition to this the organisation structure within the plant, e.g. 2 different divisions under the same roof probably did not help.

Contact during the Erembodegem plant visit was made with the following personnel; Vice President for Power Transmission, Power Transmission plant manager, QA manager, Operations Manager

Moncks Corner Plant - USA.

The Moncks Corner plant is situated near Charleston in South Carolina, USA. It has 360 employees, and occupies a site of 23,000 square metres. The average employee age is 40 years and the plant is non unionised. The plant was occupied by a textile manufacturer up until 1975, when Uniroyal bought it, retaining some of the original workforce. In 1986 Gates bought Uniroyal and the plant became Gates. The plant manufactures Synchronous belts for Automotive and Industrial applications.

The incentive to implement TQM, according to the plant manager, was customer pressure from Xerox, who while offering their TQM programme in 1989, made it quite clear that they would only be doing business with suppliers who adopted their TQM philosophy. Poor business performance did not appear to be a driver, however performance and competitive bandwagon effects were an influence, judging from the reasons for change given by the management to the workforce at the company wide briefing sessions. These were; Why Change

1. If we don't our competitors will
2. Customer expectations are changing faster that we can keep up with them
3. Standards are continually getting tighter
4. Vendors quality ratings are more stringent

At that time, 1989, there was no pressure from Corporate to implement TQM, as they were still in the process of developing their own corporate strategy for TQM. The plant experienced three quality initiatives prior to the TQM programme. The first was the Uniroyal participative management programme. This programme was developed by Jack Gorman of Uniroyal in 1973 and was designed to improve communication and encourage shopfloor participation. Moncks Corner was one of four Uniroyal plants selected to participate in the programme in 1975. The second initiative was Quality Circles,

introduced in 1980, it lasted for one year, and had no real impact on the quality initiative. The third initiative appeared when Gates took over the plant in 1986. The Gates Enriched Management philosophy, GEM, was introduced. The application of this philosophy lacks formal structure, i.e. there is no programme of events to follow, rather it advocates a policy of improved communication, motivation in all aspects of working relationships.

The plant carries out employee attitude surveys every 1.5 - 2 years, which may also help to improve the industrial relations climate. However, the plant management did admit that the absence of a union in the plant meant that it found it easier to deal with individuals who would not or could not conform to the new TQM philosophy and work practices. Gates intentionally developed non union plants due to the problems encountered with unions at their older established plants.

The Moncks Corner plant is divided into manufacturing units, termed Focus Factories. Each factory is supported by its own team e.g., sales, engineers, supervisor, planning. The rationale for this set up is that smaller focused teams will take more ownership of their area and gain from the closer working arrangements. The focus factories comprise, Automotive, Industrial, Millroom, Warehouse. There still exists some centralised functions e.g., Industrial Relations, Accounting, Customer Service, Purchasing, Engineering.

The plant, like other Gates US plants differs in certain respects from the European plants e.g. they issue a daily plant newsletter, the plant is tobacco free and employees are not required to clock on.

The decision to implement TQM was taken by the plant manager who after being approached by Xerox in 1989, felt a mixture of pressure from Xerox to accept the invitation and some competitive bandwagon effects. The implementation followed the Xerox model. Senior management formed a steering committee and formed a strategy based on the Xerox model. The HRM function did not play a particularly significant role in driving or developing the TQM programme, but never the less was an active member of the steering committee and tended to concentrate on organising training.

The Moncks Corner plant had a high incentive to implement TQM due to perceived pressure from their customer Xerox, this was supplemented by some competitive bandwagon pressure and the realisation that they needed to improve their business to remain competitive.

In 1991 Gates corporate introduced it's own version of TQM, entitled GQC, Gates Quality Commitment. It strongly resembled the Xerox programme. Corporate gave Moncks Corner nine months to implement the GQC training. Moncks Corner management felt this modification to their TQM programme temporarily slowed down progress. They made slight adjustments to the Xerox programme and called it GQC. Corporate did not audit progress sufficient enough to detect this approach, or if they did, no action was taken.

Contact during the Moncks Corner visit was made with the following personnel; Plant Manager, Materials Manager, Engineering/Technical Manager, Environmental Manager, Quality Assurance Manager, Industrial Relations Manager, SPC / TQM Facilitator.

Siloam Springs - USA

The Siloam Springs plant is situated in Benton county, north west Arkansas, USA. It has 732 employees and occupies a site of 28,000 square metres. The average employee age is 35 years, and the plant is non unionised. A large percentage of the employees, e.g. 35%, are of native American descent, Cherokee. Approximately 25% of employees have business interests outside the plant, e.g. chicken farms and ranches. The plant was built in 1974 and remained unoccupied up until 1977 when Gates took it over. The plant manufactures V belts only. It has experienced a phenomenal growth of it's workforce since it's opening in 1977. Starting with 200 employees in 1977, it reached 300 by 1983, and then 400 by 1988. The next two years saw the largest increase to 581 employees in 1990. This period coincided with the decision to close the manufacturing facility in Denver, and relocate to other Gates sites around the USA.

In the early seventies Gates management in Denver Colorado made the decision to increase the company's flexibility and manufacturing capability, by establishing satellite plants outside Denver, instead of enhancing the inefficient multi-storey manufacturing facility in Denver.

A task group was formed to look at sites that would strengthen the company's ability to meet customer needs, and another group was formed to evaluate various management systems to operate the new plants under. Uniroyals participative management system was benchmarked by Gates as part of this exercise. The results were plants that were referred to as GEM facilities, named for their participative management systems called Gates Enriched Management. The challenge in Siloam Springs was to absorb a large percentage of this production into a facility that was already regarded to be near full capacity.

Following the decision to increase capacity at Siloam, in 1987 the plant embarked on benchmarking exercises with various companies, the most notable being IBM and John Deere. The key elements of the plan were; Computer Integrated Manufacture, New Plant Layout, Cellular Manufacture, Team Development, Education and Training. Other elements included Manufacturing Resource Planning, MRP II, Just in Time, JIT, and Statistical

Process Control, SPC. This phase marked the start of their journey to Manufacturing Excellence. The goals were to increase product capacity, reduce scrap and allow shorter product runs which would enable more customer orders to be handled. A new plant manager took over in 1984, he had implemented the GEM concept in Iola, Kansas between 1976 - 82 and he won the endorsement of the Gates board to implement training programmes in other plants.

In 1992 Siloam was host site for an Association of Manufacturing Excellence, AME, conference in customer satisfaction through empowered work teams. In 1993 the plant was awarded the Shingo prize for excellence in manufacturing and also listed as one of the top 25 manufacturing plants in the USA by Industry Week magazine. In 1994 they were part of the 21st Century Organisational Excellence top 25 award.

Corporate had benchmarked Siloam during the preparation of their GQC programme. When corporate arrived with their version of TQM, Siloam management felt that the corporate initiative was old hat and that they had covered this ground already. However, at corporates insistence they embarked on the GQC programme. The HRM function did not play a particularly significant role in driving or developing the TQM programme, but never the less was an active member of the senior management committee and helped to co-ordinate training and helped benchmark other facilities.

Siloam had in effect been practising many element of the TQM philosophy prior to GQC in 1992, this meant that GQC was seen as an additional small step in their evolution, as opposed to a major change. Siloam had no contact with Xerox and had no customer pressure to implement TQM. Business results were good, hence the poor business results incentive was also absent. There was no evidence of Bandwagon effects. Senior management pressure was evident from corporate level, who insisted in 1992 that the GQC programme be implemented in a 9 months time scale.

Siloam Springs management had previous experience of GEM, Manufacturing Excellence programmes, and implementation of MRP II, which follows a structured programme, not dissimilar to a TQM programme. They were therefore well placed to handle a TQM

programme. In addition to this the plant had been practising many elements common to TQM, e.g. teams, training, empowerment, open plan offices with teams dedicated to specific areas of the plant, factories within a factory, and improved communications through regular briefs. Breaking down traditional barriers, e.g. supervisors became facilitators and workers became associates.

The plant had a high incentive to implement the Gates TQM programme, GQC, due to a corporate directive which gave them nine months to complete the training. However, the earlier quality initiative, Manufacturing Excellence, appears to have been driven by the plant management in order to become world class and beat competitors.

The plant is organised into four distinct factories, each with its own support staff. Each factory uses cellular manufacturing to process products from start to finish within one work area. Cells are managed by a team of self directed production associates. The traditional supervisor has been replaced by facilitators and team coaches who serve as resources for production. Their mission is to assist self directed teams in their continuous improvement activities. A small plant support staff manages functions that require some centralised control and accountability, e.g. personnel, accounting. Contact was made with the following personnel; Operations Manager, Materials Manager, QA Manager, Manufacturing Facilitator, Human Resource Manager, 4 Areas Managers, ISO/QS Co-ordinator.

Overview

Table 10 gives an overview of each plant in terms of the systems and policies in operation,

	Plants					
	A	B	D	E	M	S
1. Employee Attitude Survey	Y	Y	N	N	Y	Y
2. Unionised	Y	Y	Y	Y	N	N
3. Reward & Recognition System	Yes	Yes	No	No	Yes	Yes
4. Management Briefs	Qtly	Qtly	Qtly	Qtly	Mnly	Mnly
5. Bonus Scheme	No	Yes	No	No	No	Yes
6. Suggestion Schemes	Yes	No	Yes	Yes	No	No
7. Clocking on	Hrly	Hrly	Hrly	Hrly	No	No
8. Pension Rights	Vary	Same	Vary	Vary	Same	Same
9. Incentive Scheme	Yes	No	No	Yes	No	No

Table 10: Overview of plant systems and policies

The next chapter, seven, reviews the major empirical findings using the framework for analysis developed earlier.

CHAPTER 7

MAJOR EMPIRICAL FINDINGS

Introduction

This chapter compares a hypothetical model of the factors which influence a TQM programme, with the empirical data gathered from six plants belonging to the multinational manufacturing organisation, Gates. A number of plants in a single organisation are being observed, which have undergone a TQM programme. The study is attempting to establish which factors have influenced the TQM programme and whether the TQM experience has an observable effect on plant performance. It will consider the success of the implementation and how the factors have affected it, secondly the impact of the TQM programme on plant performance, and finally the possible links between the two areas. This chapter starts by describing the concepts used in the model, table 7, and then discusses the issues of measuring the factors involved and the approach selected to analyse these factors. This will be followed by a review of the empirical data collected from the six plants by the author, including plant performance using selected criteria considered to be influenced by TQM, and finally a summary of the conclusions derived from the theoretical and empirical comparisons.

The basic hypothesis is that TQM experience will benefit plant performance. There will however be factors which influence the link between TQM and performance, and how an individual plant responds to the pressure to adopt TQM. In part this will be conditioned by its *receptivity* - a set of variables that reflect its environment and its priorities. Some plants may be more receptive than others and our expectations would be that more receptive plants would show greater performance improvement. A further complication is that the process of implementation of TQM may be more or less effective: it cannot be assumed that all plants have the same standard of implementation. Analysis suggests that the process of implementation will be conditioned by *incentive* and *ability*, which may not

point in the same direction. *Incentive* refers to the perceived pay-off to the plant from effective implementation, e.g. a poorly performing plant may have more incentive than one which is performing well. *Ability* reflects the preparedness of management and the workforce for the change represented by TQM.

Plant performance comprises many indicators ranging from complex financial based factors to simpler units of measurement, e.g. scrap levels. Instead of comparing the change in a battery of performance measures which can be affected by many factors outwith the influence of TQM, we have selected criteria which are considered more susceptible to TQM programme improvements, and as such are considered to give a more accurate reflection of the TQM effort in each plant. In addition to this, Performance comparison will also be based on the level of improvement achieved over a period of time, as opposed to a straight comparison based on yearly results. This will enable starting points to be taken into account, since the plants implementing TQM programmes may show good improvement year on year, but still be trailing behind other plants, possibly due to evolution time-scales or technology levels. The criteria used for performance in this case are; *Cost of Quality, Customer Service Levels, Customer Complaints*. Data was captured on other performance measures during the study namely, *working capital turns, stock turns, defect levels, manufacturing levels, sales/employee, and growth levels*. However, it was felt that these measures are better considered as longer term indicators of success and less susceptible to immediate influence by TQM, and also capable of being distorted by other external and internal changes.

Finally, other random factors may also exert an influence on an organisation's willingness and ability to adopt a TQM programme, and also plant performance. As can be seen from table 7, it shows a feedback loop from the variables, performance to incentive. The rationale here is that an organisation's current performance may influence its decision to implement a TQM programme, i.e. if business is good the organisation might have less incentive to consider TQM, particularly if it perceives the chances of success as being low. This theory will be expanded on later. Second, various random factors, apart from influencing ability, may also affect performance, e.g. new legislation incurring additional costs or changes in the market place reducing sales levels.

Model and Concepts

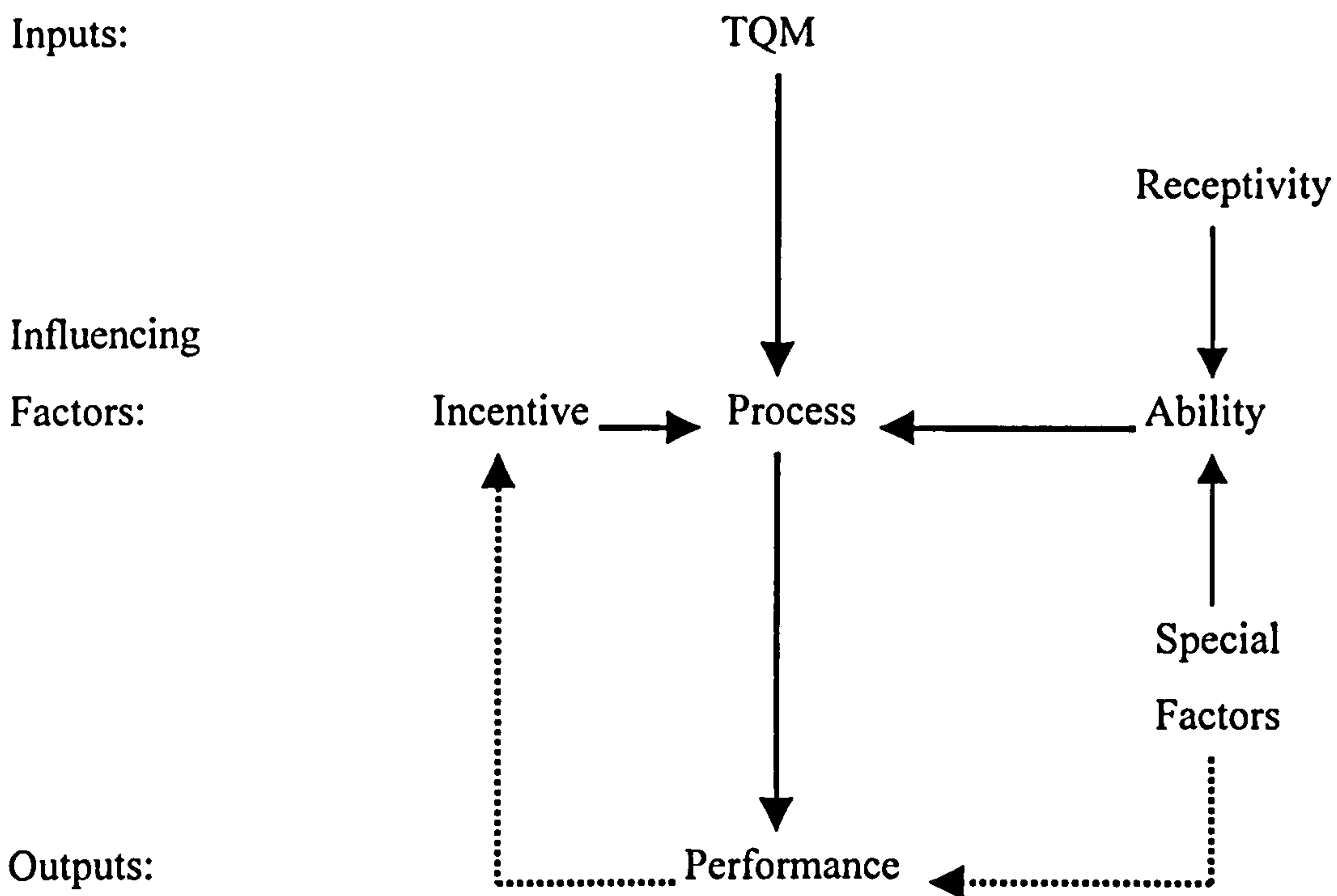


Table 7: The main components and the links involved in the model.

The model shows that implementing TQM using a specified process will influence an organisations performance. However, the process of implementation will be influenced by certain factors, namely *incentive and ability*. Ability will also be influenced by both *receptivity* and *special factors*. The special factors may take on an internal form (changes in management personnel) or an external form (new legislation, market conditions). These special factors represent more or less random events that may blow the change off course for a time. These special factors may also affect performance, for example market changes that reduce sales, and a link has been shown between the two factors. Finally, performance will influence incentive, for example an organisation which is experiencing good performance may not feel the need to implement a TQM programme, on the other hand a poor performance may encourage an organisation to implement a change programme like TQM.

Measures and approach

This section considers the variables which may influence TQM success, namely implementation, Incentive, Receptivity, Ability, Other factors, and also the criteria used to measure these variables. It should be noted that many of the concepts being used are elusive, difficult to handle and subject to debate. The approach uses proxy measures, which are suggestive and illustrative, and not an exact science. The methodology using questionnaires and interviews is also exposed to selective perceptions and as such the conclusions drawn will be limited within this scope of investigation.

Process of Implementation

This section compares the TQM implementation across the plants. The 'standard' TQM model used was developed by J S Oakland of the Bradford Management Centre (1995) and has been supplemented by information from Paul Spenley of Pera International (1995). These models conform with the generally accepted programmed step by step approach to Organisational transformation and the philosophy pioneered by the Quality gurus, namely (Deming 1986; Juran 1989; Crosby 1979; and Feigenbaum 1983). The Quality gurus have however tended to adopt a universalistic approach to TQM, seeing it as a fixed entity to be utilised by any organisation in any circumstances. However, recent work in the USA has begun to critically examine these assumptions, suggesting that TQM isn't a 'one size, fits all programmes' technique (Lawler, 1993). However, for the purposes of comparison and measurement, the following model has been selected, which comprises seven steps, with key objectives at each stage. The steps are;

1. Gain Commitment to Change By Organisation of The Top Team.
2. Develop a Shared Mission and Vision of the Business.
3. Define the measurable objectives which must be agreed by the top team as being quantifiable Indicators of Success in terms of the Mission.

4. Develop the Mission into Critical Success Factors (CSF's).
5. Breakdown the Critical Success Factors into the Key or Critical Processes and gain Process Ownership.
6. Breakdown the Critical Processes into sub processes, activities and tasks, and form Improvement Teams.
7. Monitor and Adjust the Process Alignment in response to difficulties in the Change Process.

(Appendix 14, section 3 details the questionnaire material).

Some of the key requirements of the implementation process include formation of a steering committee and teams, training resources, and management support and leadership. Another aspect of the implementation process is the approach adopted. Approach refers to whether the change programme is being managed from the top of the organisation to the bottom, topdown, or 'bottom up'. The literature on organisational change highlights the widespread view of a topdown, senior management led process and a three stage approach to an organisation wide introduction of change (Hunter and Beaumont 1993). This is described in the literature as unfreezing the existing set-up, changing the system, and refreezing the new conditions (Lewin 1951). Alternatively the bottom up approach is started at the periphery and moves steadily to the corporate core. At plant level a bottom up approach would involve starting with a pilot cell or department. One of the best known arguments along these lines comes from Michael Beer (1990) who has been highly critical of the notion of Organisation wide change programmes, instead favouring a decentralised, incremental process of change, characterised by the targeting of small peripheral operations, instead of the large central core operations and normally involves the use of cross functional teams working on a multi-disciplinary change programme. This view is shared by others, who argue that the theory of Topdown management is inadequate and the practice based upon it inappropriate to the organisation of industrial societies (Lupton, 1971). Some organisations may consider that the change programme should be restricted to specific areas due to resource limitations,

preferring to see the effects before they launch into a full blown programme. Other organisations may wrongly assume that the programme wrongly applies to particular departments, e.g. the production shopfloor, and that the staff and support functions can carry on as normal. The empirical analysis will look at how each plant has performed against this implementation model. Attention is now turned to *incentive*: what are the attractions or rationale for each plant embarking on the TQM journey?

Incentive

The incentive to introduce TQM is defined as comprising four elements, namely, *Business Performance, Customer Influence, Bandwagon Effects, Senior management pressure*. Consideration will be given to each of these in turn.

Business Performance

One hypothesis is that companies which have experienced poor business performance, i.e. low profits or reducing market share, have more incentive to try and do something about it, by reviewing their Organisational strategy and policies. This has been the case with many well known names, for instance (Xerox, 1990; Canon, 1988; Millikens, 1990). Conversely companies which are experiencing high levels of business performance may be less interested in changing the way they do things, since any significant change might affect their present success. The danger with this approach is that complacency can set in and the arrival of new or stronger competitors and or products/services can quickly change the situation. Rank Xerox fell into this trap, when they had a dominant position in the market and chose to ignore their competitors, e.g. Canon, which was one of the companies which captured part of Xerox's market and caused them to commence their own TQM initiative in 1983.

Senior Management Pressure

Pressure can be exerted at two levels. First, at corporate level pressure can be exerted through strategy and goal directives, and the development of measures and reporting systems which force a plant to adhere to the directives. This can be backed up by corporate audits and rewarding plants which have been successful in adopting the new strategies. The strength of the signals sent out by corporate may determine how readily plants adopt the directives. This senior management pressure can result from different perspectives; firstly, *New people at the top* -- new appointments made at senior level can result in new initiatives / programs being pursued. People who have experience from organisations which have successfully

implemented an innovation may be keen to implement the same system in their new organisation; secondly, *Felt Need* -- business results may be good, but management may feel that in order to remain competitive they need to advance their knowledge, systems, and products. The information they require can be accessed from research material or benchmarking competition, known as competitive benchmarking.

The technique of Competitive Benchmarking was pioneered by the Xerox Corporation, when their traditional supremacy in the photocopier market was challenged very successfully by Japanese manufacturers. Xerox first analysed what factors potential customers might take into account when assessing competing products: for example price, delivery, ease of use, and reliability. They then used these factors to compare their own products against the competition and drew up a theoretical benchmark product which consisted of the best rating for each of the competitive factors, making this the target for improving their own products. Benchmarking can be applied to other areas, e.g. manufacturing systems.

Second, at plant level the same principles of "*felt need*" apply. Plant managers will be keen to make sure their plants are the best in the organisation, and as such, managers will be continually comparing their performance and systems with their other plant managers. This may compel the plant managers to embark on a TQM initiative. The plant manager's commitment and leadership, consistency, and communication are some of the key areas which may have a bearing on the end result. If the signals given out are weak, then there is less chance of implementing a successful program.

Customer Influence

Customers who have already implemented a TQM program often look towards transferring the philosophy to their suppliers. The rationale for this is that where an organisation has developed confidence in its own management control systems, focus of work organisation, and quality control, it will feel more secure in its dealing with suppliers, if their systems are harmonised to those of the customer. In some cases the move by the customer may be in the way of an open offer to provide assistance if the supplier is interested, with no implied

pressure to conform. In other cases customers can exert pressure on suppliers to conform through the vehicle of supplier audits, e.g. the structure of the audit and the allocation of points for selected criteria of supplier performance can steer suppliers to change their systems. This is particularly the case when the customer is a major account for the supplier, and involves a large percentage of the suppliers market. Automotive manufacturers, Renault, Rover, are an example, e.g. if a supplier does not show signs of improvement in specific areas of the customer designed audit, then they are marked down, and the threat is that they could ultimately lose business, or will not be considered for new business if the overall supplier rating falls below a certain level. In some cases this type of situation has forced suppliers to actively pursue specific quality certification, ISO and QS 9000, in order to ensure continued business with the supplier. Customer pressure can also cause suppliers to divert their attention away from the supplier's change initiative towards the customer's version. An example of this is the Lean Production philosophy, favoured by the automotive industry. The concept of a Lean Production system has emerged from the work of the international motor vehicle program, a study in the manufacturing sector of seventy automotive assembly plants, representing 24 companies and 17 countries worldwide (MacDuffie and Krafcik, 1992). Lean Production being a system embedded in an organisational context that takes as a premise the existence of a skilled motivated and flexible workforce. This system is contrasted with the traditional mass production concept which comprises large equipment, and a low skilled less flexible workforce.

The Bandwagon Effect

The Bandwagon effect suggests that companies adopt change programs, because of a pressure caused by the number of organisations that have adopted change and not because they have evaluated their benefits,. The technique or program is viewed as fashionable, everyone is doing it and all the latest literature mentions it. These Bandwagon effects have been attributed to two main reasons; firstly, *Institutional pressure*, whereby non adopters fear appearing different from adopters. Even where many organisations have adopted a new idea and yet the idea has not been fully evaluated by any one organisation, then this appears to give the idea credibility and makes its use acceptable to organisations. Any organisation

which does not adopt the idea or change is seen as being out of step by its stakeholders, and it is this fear of what the stakeholders think, and how they may react, that drives the organisation to adopt the idea (Abrahamson and Rosenkopf, 1993). For example management or organisations may feel that failure to adopt new quality systems or philosophies may make them less of a force in the management world, and falling behind other organisations.

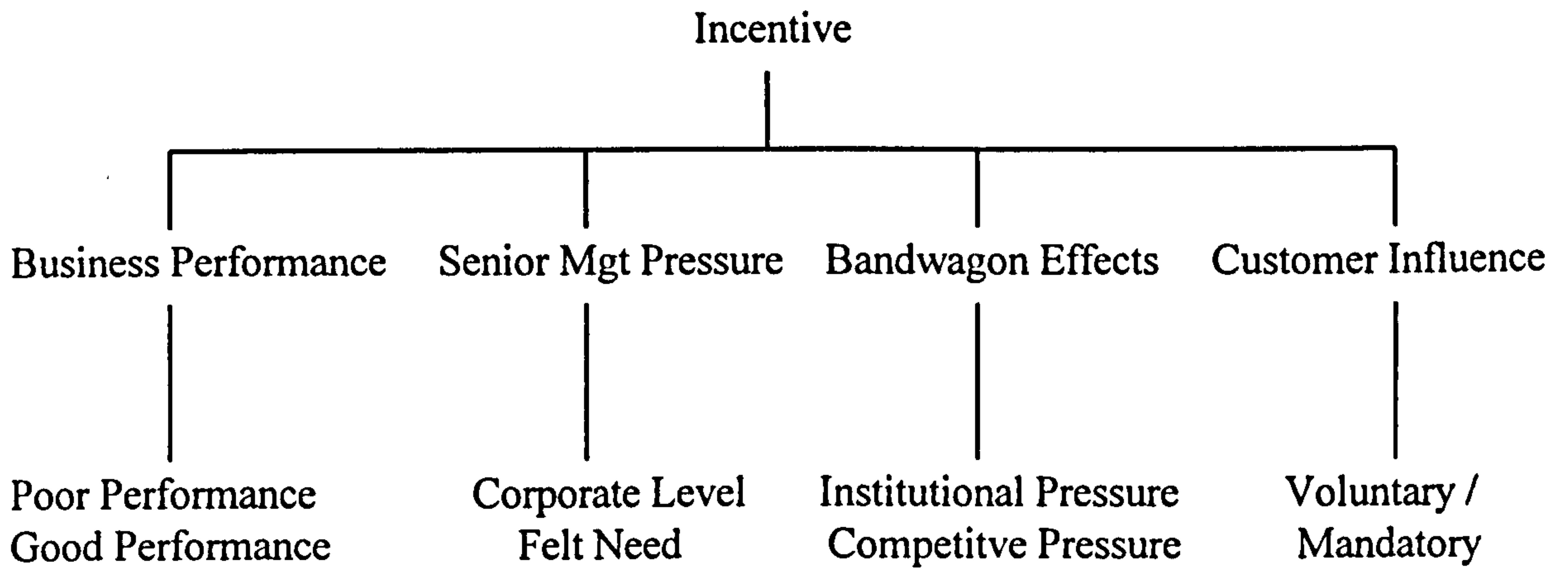
Secondly *Competitive pressure*, whereby non adopters fear below average performance if their competitors are gaining from the adoption of such programs. Abrahamson and Rosenkopf (1993:492) advanced a theory which suggests that;

bandwagons occur because of pressures on organisations arising from the threat of lost competitive advantage. The danger is that organisations hurriedly try to implement new systems without really understanding the implications or pitfalls involved, but the fear of losing out drives them to jump on the bandwagon.

The theory on Bandwagons suggests that organisations will only adopt an idea if they perceive a certain level of benefits, at least in the early days, however, those that do not adopt, may later decide to, as a result of the Bandwagon effect, created by the level of adopters. Consideration is now given to *receptivity* - a set of variables that reflect a plant's environment and its priorities.

Table 11 below summarizes the sub factors and levels contained within the Incentive element of the main broad framework. (Appendix 12, section 7 and Appendix 14, sections 1,4 and 5 detail the questionnaire material)

Table 11: Incentive Elements



Receptivity

Receptivity describes the various factors which render an organisation or plant more receptive towards the implementation of a particular change program. The literature describes receptivity as embracing the term *receptive context*, i.e. there are features of context, and management action, favourably linked with forward movement. On the other hand there is a non receptive context, a group of features linked with blocks on change (Pettigrew, 1992). The receptive factors can comprise hard and soft issues, e.g. organisation structure, (hard), and people, policies, and industrial relations, (soft). Five sub areas have been selected for discussion, these are; *Previous Initiatives, Industrial Relations climate, Workforce Profile, Organisation Structure, and Organisation Policies*. These areas were chosen as a result of personal experience in trying to implement TQM to the Dumfries plant and also after considering the general literature on TQM.

Previous Initiative considers that Organisations and plants which have had previous experience of successful change initiatives could be better placed for future change, since their experience might make them more flexible, adaptable and more inclined to accept more change, particularly if they have experienced some benefits from previous change programs. Future change programs might also be viewed as a natural extension or follow on to the original initiative, thus producing less stress and anxiety about the change. The fact that the TQM philosophy embraces teamwork, involving all employees in an organisation, highlights the need for the right industrial relations climate to exist.

Industrial Relations Climate could affect an organisation's receptivity in many ways, e.g. the relationship between management and shopfloor will have a bearing on the level of cooperation, and without good relations the introduction of change programs may be very difficult. Management/Union relations are of equal importance due to the influence the union may have over the shopfloor employees.

Other factors which can affect the IR climate include the levels, style and methods of communication between management and employees and unions, e.g. are there regular two way communication briefs? Indicators of the Industrial Relations climate comprise;

grievance/disputes, discipline cases, absence, labour turnover, workforce morale. Disputes and discipline cases should indicate the level of harmony within the plant, e.g. a high level of disputes and or discipline could signal unrest, conflict and reflect an adversarial relationship between the workforce and management, which literature suggests, could be a barrier to TQM. (Beaumont; Hunter and Phayre 1994). Likewise absence levels and labour turnover could also be a reflection of the industrial relations climate, e.g. high levels of both could result from the conflict and relations mentioned above. Workforce morale should be good if conflict and unrest are minimised, the theory therefore follows that if the above variables are adverse then morale will be low. Another indicator of workforce morale may be the level of involvement in quality teams, for although management must initiate the teams, the level of response by the workforce may reflect current levels of morale. Poor morale manifests itself in on the job withdrawal symptoms, an instrumental outlook by employees and low interest in teams.

Workforce Profile refers to the make up of the employees, e.g. age, skills, flexibility, attitude towards management. We hypothesize that a fairly young skilled workforce which is flexible and has good relations with management, will be adaptable and more receptive to change programs. The comparison will be based on average age, number of skills/ operator and level of involvement in Quality improvement teams. This measure is derived from the number of teams in operation over the three year measurement period, i.e. 1993-95.

Organisation Structure, with reference to Management levels, reporting lines, and responsibilities might be expected to have a bearing on how well the organisation is able to implement a change program, e.g. too many management levels could make communication difficult and exposed to errors and misinterpretation as it filters down through the ranks. If reporting lines are as direct as possible, this may facilitate the communication process and help to maintain the accuracy of the information. Likewise, if functional and indirect responsibilities are clearly defined, this may avoid confusion over responsibility for carrying out duties. If a steering committee is set up each member should be aware of their roles and what is required of them, e.g. responsibility for Benchmarking, Team Training. An infrastructure to support the change program can also assist, e.g. a steering committee to

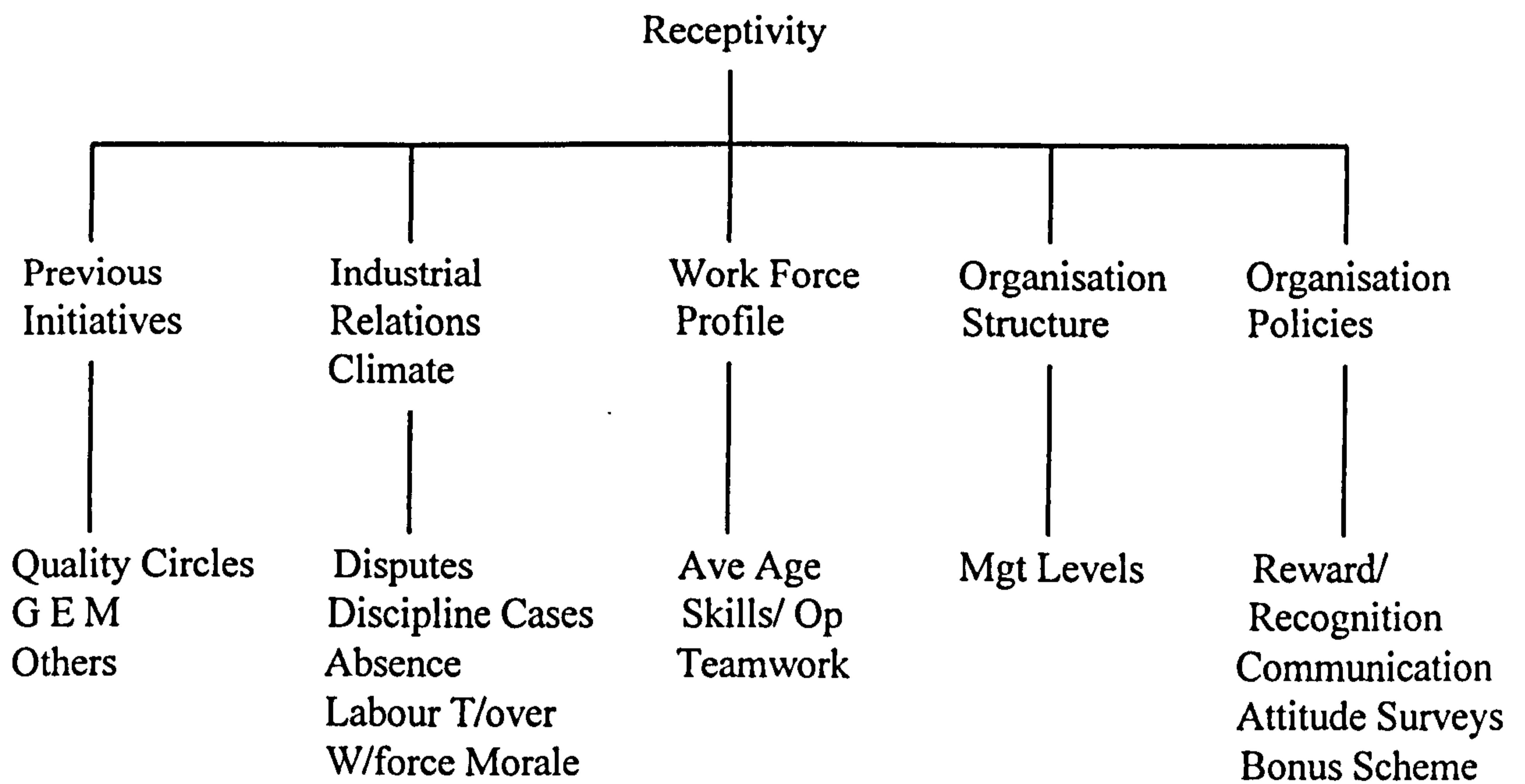
oversee the program, facilitators to advise the areas / people affected by the change and feed back issues to the steering committee for action.

Organisation Policies adopted by an organisation may influence change programs. For example, policies which encourage and support employee involvement, two way communication and cooperation, are likely to aid the transition and change in behaviour, and work practices required to successfully implement a program. Recent research also highlights profit sharing, pay for knowledge schemes and appraisal schemes, as being highly consistent with the changes that some researchers have urged to complement the operation of TQM (Beaumont; Hunter and Phayre 1994). One such checklist includes establishing channels of two way communication, all salaried workforces, training for teamwork, time management, decision making skills and joint problem solving approaches (Bowen and Lawler 1992). Some significant areas chosen for discussion include. *Reward and recognition systems, Communication briefs, Attitude surveys, and Bonus systems.* The method of comparison across the plants considers whether a system existed and how well established it appeared. This relied on both documented evidence and discussion.

Reward and recognition systems considers how individual or team achievements are recognised and rewarded. Bowen and Lawler (1992) suggests that payment systems centred on individual job descriptions, job worth and individual merit increases are inconsistent with TQM's emphasis on collective responsibility, horizontal relationships and learning. Instead, skill-based payment systems, profit sharing or group based performance pay arrangements are more appropriate. *Communication briefs* are central to any change program and can keep people more informed about the organisation and its strategies for the future, thus people feel more part of the team, and more willing to participate and contribute. *Attitude surveys* are also useful to highlight issues and areas of concern and allow actions to be taken to correct the problems. Finally *Bonus systems* can allow the employees a share in the organisation's success, and provide an additional mechanism to relate effort to reward, over and above the normal job rate. Group schemes help to unite employees and highlight the overall business performance. Other areas which may have the potential to assist or restrict a change program include, Dress codes, Canteen facilities, Pension schemes, Pay grades, Clocking on, Overtime rates, Titles. Table 12 summaries the sub factors and levels contained within the

Receptivity element of the main broad framework. (Appendix 12 details the questionnaire material).

Table 12: Receptivity Elements



Ability

Ability is referred to as - the preparedness of management and the workforce, to the change represented by TQM. Ability factors are considered under the following three sub areas, *Human Resource management, Resources, Management Ability*. These areas were chosen partly as a result of the literature, in the case of HRM and Resources, Guest (1992a) and partly as a result of personal experience in implementing TQM. Each of the factors is discussed in turn.

Human Resource Management (HRM) centres on people issues and as such should play a key role in any TQM program. The literature suggests that TQM is inextricably linked to HRM through the vehicle of training, because of the need for a quality and committed workforce; because the credibility of the initiative is partly governed by management's treatment of the workforce; and finally because quality with its emphasis on involvement and flexibility implies a high trust organisation, further suggesting that the need for total quality management linked to and integrated with HRM is increasingly recognised (Guest, 1992a). The proponents of TQM make a number of assumptions about the sort of practices that TQM requires. Most assert the importance of HR issues and refer to the need for education, training, recognition and change culture (Wilkinson, 1994). An organisation's HR function can have a significant influence on any change program, if they are actively involved and visible in the program, e.g. seen by employees, 'Walking the Talk'. Some of the changes in HRM areas considered to compliment the operation of TQM include single status or an all salaried workforce, profit sharing schemes, payment for knowledge schemes, and appraisal schemes with a development/ training needs orientation (Beaumont, Hunter and Phayre, 1994). One such checklist of recommended changes, provided by US researchers, Bowen and Lawler (1992) includes first, Training programmes which reach beyond specific job skills to cover topics such as teamwork, time management, and decision making skills. Second, career development which seeks to provide employees with a systems orientation which means greater emphasis placed on cross functional experience obtained via horizontal (rather than vertical) work assignments and moves. Third, replacement of adversarial arms-length collective bargaining by a much more joint problem solving approach. Fourth, increased

emphasis given to establishing channels of two way communication concerning strategy and performance.

Measurement of HRM for our study was based on the level of resource applied by the HRM function and their personal level of involvement in the TQM program. Developing appraisal systems which will encourage two way communication on performance and further development of the individual or team is another example of the type of systems which may facilitate change. Attitude surveys are also useful to measure the strength of current feeling amongst the workforce and also to gauge the reaction to changes. Low involvement from the HRM function could signal lack of overall management commitment to a change program and result in reducing employee participation levels. Measurement of these two areas was based on whether a system existed and to what extent.

Resources are also required to support any change program. Without them the initiative is weakened; resources may include funds, facilities, and time allocations for additional meetings and training, and trainers who have the skills and experience to train people and act as advisers / facilitators.

Management Ability considers whether the management team is able to coordinate and implement a program on their own, and whether they possess the experience, knowledge and skills to see it through and whether they are aware of their weaknesses. Four main areas are considered; *Management style, Behaviour, Commitment and Leadership, and Perceptions*. Firstly, *Management Style* can vary from Autocratic to Facilitator, literature, Jamieson (1984:24) describes autocratic as;

viewing organisations as having clear cut goals: that economic ends demand order, authority, expertise and energy and justify means: and that people require direction and control to work effectively. Facilitator organisations are described as highly complex systems with multiple goals, conflict interests. Characteristic values include, accountability and humanist: the view being that people are resourceful, creative and have development potential which needs to be well managed.

Attempting to implement TQM with an autocratic style is unlikely to succeed. A balance between attention to Technical/Engineering issues and people issues can assist. Organisations which are aware of their Management style and make the necessary adjustments to complement rather than hinder a change program may have more chances of success. Management style was also discussed in chapter 3, in particular the Blake and Mouton managerial grid, figure 15, outlined the range of managerial styles available.

Second, *Managerial Behaviour* can either support or restrict a change program. Examples of behavioural areas might include; management demonstrating the approachability and willingness to discuss issues openly and using fair and consistent approaches towards individuals and groups, coupled with the encouragement of individuals and teams to air their views without feeling threatened by repercussions. The empowerment of individuals and teams to take ownership of processes and responsibilities may also assist and help develop confidence in the workforce to tackle previously insurmountable problems. Lastly the application of Reward and Recognition systems may also highlight the type of behaviour and processes required for the change program.

Third with *Commitment and Leadership* management could demonstrate their commitment to the change process, through ensuring it is properly resourced, that ownership of issues is accepted, and that they are actually pursuing the strategy and goals communicated to the organisations employees. Formation of the steering committee and regular meetings and reviews of progress to plan are examples of the type of commitment required. Leadership is about making strategy explicit, (vision), and by using the process of strategy formulation to mobilize the organisation. Explicit strategy allows for co-ordination of activity, it provides direction to people, boosts morale, and sustains self esteem. It can provide a shield against anxiety in a period of change. Words and actions are important. Repeated attempts to inform and persuade if supported by appropriate actions, may have more chance of successfully reducing barriers to the change program.

A recent European survey, PA Consulting Group (1996) found that the major reason why TQ initiatives fail was due to poor leadership behaviour, particularly in allowing inadequate time for implementation efforts. Another survey of 60 companies, Industrial Relations Services

(1996) which had introduced quality initiatives found that over half questioned the level of senior and middle management commitment to the Quality process. Lastly *Management perceptions* of how well prepared an organisation is to receive a change program will also affect implementation, e.g. a management that feels they are well prepared, that levels of communication, commitment, and participation are high, may mistakenly under resource the new initiative, wrongly assuming that "things will take care of themselves" and all that is needed is a few training courses. Table 13 summarises the various levels of analysis contained within the Ability element of the main broad framework shown on table 7. (Appendix 12, section 6 and Appendix 14, sections 6 and 7 detail the questionnaire material).

Table 13: Ability Elements

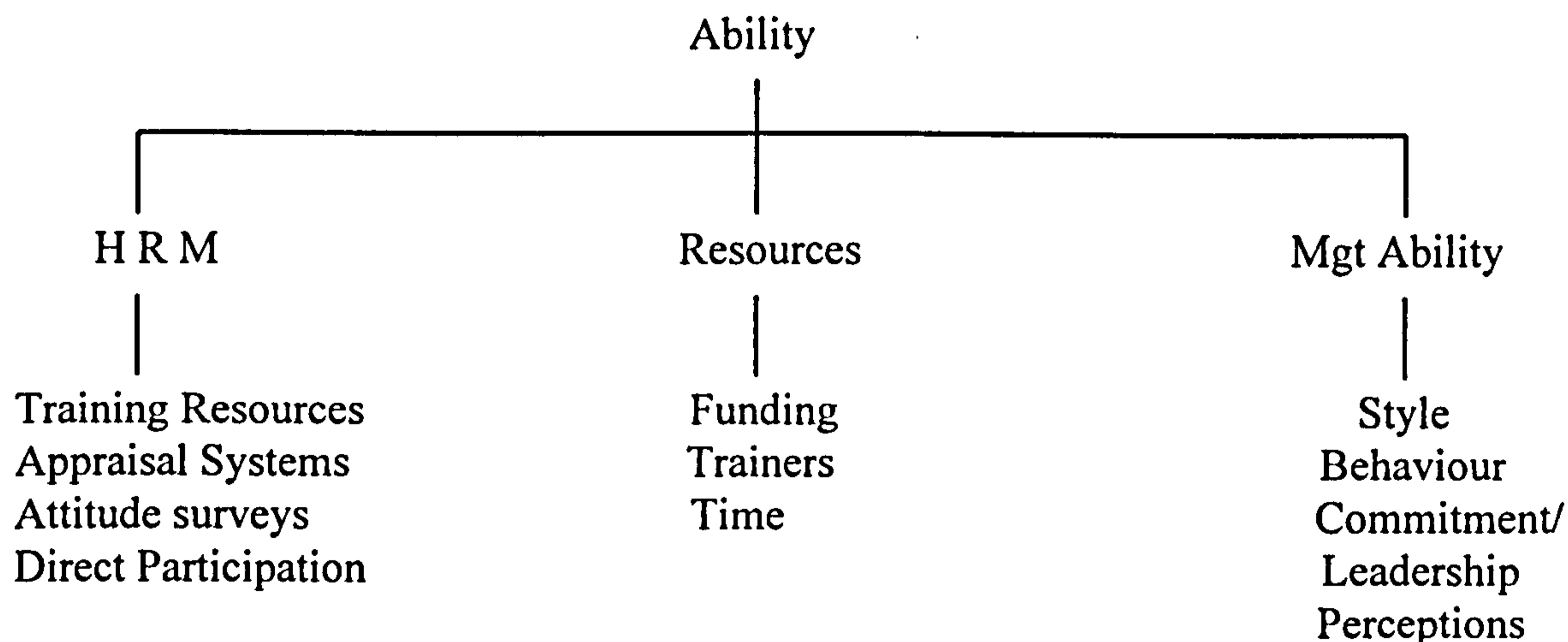


Table 14 has been developed to allow the reader to cross reference the various factors involved in the study. This table shows how the theoretical references tie up with the empirical work and the additional information found in the appendices.

Table 14: Cross Reference

Factor	Theoretical Reference	Page	Empirical Page	Appendix Page
Incentive		198	220	352
	Business Performance	198	*	371-5
	Sen Mgt Pressure	198	*	346
	Customer Influence	199	*	332
	Bandwagon Effect	200	*	347
	Summary Table/page * (see also p177-190)	11:202	16:220	-
	Detail Table 27			353
Receptivity		203/147	222	356
	Previous Initiatives	203	222	326
	Ind Relations Climate	203	223	327
	Workforce Profile	204	224	328
	Organisation Structure	204	225	329
	Organisation Policies	205	225	330
	Summary Table/page Detail Tables 28-33	12:206	17:222	- 357-64
Ability		207/147	227	365
	Human Resource	207	227	347
	Resources	208	228	331
	Mgt Ability	208	228	347
	Summary Table/page Detail Tables 34-36	13:210	18:227	- 366-9
Implementation		195	212	341-6
Performance		172-3	231	370-7
Views of Progress		-	215	336
TQM Questionnaire		-	350	338-50
Framework Model		154	194	-

Empirical Data

This section compares the data from each of the six plants using the criteria and measurements described. Plants A, B, D and E are located in Europe, while plants M and S are located in USA. Table 15 shows how each plant implemented the TQM programme against the 7 step model described on p139 and summarised as 1 - gain commitment, 2 - develop a shared mission, 3 - define the measurable objectives, 4 - develop the mission into critical success factors (CSF's), 5 - gain process ownership, 6 - breakdown the CFS's into sub- processes, 7 - monitor and adjust the process alignment. Each tick represents a completed stage. The plants are also graded from most to least successful implementation. The X's in table 15 identify the stage at which each plant ceased to fully implement the TQM programme, plant M being the only one to achieve full implementation, with plant B next due to reaching step 6, and plant S in third position due to reaching step 5. The rest of the plants reached step 4 and are thus positioned 4th equal.

Table 15: TQM Implementation across the Plants

Program Steps	A	B	D	E	M	S
1 - commitment	✓	✓	✓	✓	✓	✓
2 - mission	✓	✓	✓	✓	✓	✓
3 - objectives	✓	✓	✓	✓	✓	✓
4 - CSF's	✓	✓	✓	✓	✓	✓
5 - ownership	X	✓	X	X	✓	✓
6 - teams		✓			✓	X
7 - adjust		X			✓	
Overall	Poor	Fair	Poor	Poor	Good	Poor
Summary :- Most \longrightarrow Least Successful Implementation						
Plants	M	B	S	=A	=D	=E

Only two plants, B and M, appear to have achieved near full implementation. In Europe the plant programmes stalled at step 5 (breakdown the critical success factors into key or critical processes and gain process ownership). These plants A, D, E appeared to have no active plant steering committees to drive the TQM programme, which suggested that step one in the TQM process (gain commitment to change by organisation of the top team) was not fully completed. In addition to this, management's ability in terms of style adopted, behaviour, commitment and leadership, and low investment in post training follow up, did not achieve the necessary process ownership necessary to take the TQM programme forward. The European plants also experienced high growth in business levels, which created a distraction and may have reduced their incentive to keep the TQM momentum going. These areas will be discussed in more detail later in the chapter, in particular under ability.

Plant B had the infrastructure in place, but had also suffered from high growth levels and new technology, which has extended initial training for some employees by 1-2 years. Distractions appear to have had a major influence across the plants, the main distractions being growth levels and the introduction of new technology. It is difficult to take account of these diversion factors, and the Contingency theorists would argue that the best way to organise depends on circumstances. Contingency factors which are deemed to be of primary significance, can include technology, or the environment. The literature also highlights an issue with organisations who are simultaneously attempting to introduce advanced employee involvement programmes and advanced technology, suggesting that the two strategies may be in conflict with one another, and in doing so reduce organisational effectiveness (Goodman 1986).

In the USA, plant M worked religiously on all the steps of the programme and achieved full implementation. Also in the USA, plant S appeared to complete the GQC training requirements, but then continued with its own quality improvement programme. They still had a steering committee, but the focus was on specific projects, run mainly by staff team members, as opposed to shopfloor teams.

In all cases the topdown approach was adopted due to the design of both the Xerox and the Gates GQC programme. However, plants are now realising that due to resource limitations,

perhaps the best route is to use pilot cells to develop the TQM philosophy further, and to allow the follow on to the training courses to be introduced, e.g. a Bottom Up approach recommended by (Michael Beer, 1990). In Egem selected cells are being given additional training and dedicated facilitators, in an attempt to develop the self managed cell concept. In Aachen supervisors are being given additional training to prepare them to develop teams. In Balsareny the supervisors are now responsible for a specific area, as opposed to a shift, in an attempt to develop the cell teams. This system is also being applied in the US plants. Dumfries still operates the conventional system of one supervisor to one shift.

Change across some of the plants (B and D in particular), appears to have been incremental in nature, with large change coming from the new technology investment. Evidence from other private sector works highlights that organisations do go through periods of strategic change as well as continuity, suggesting that strategic change tends to come in brief spurts, as received paradigms change, interspersed with long periods of continuity (Mintzberg, 1978). This perspective was also broadly confirmed in a study of strategic change processes in ICI, which found periods of incremental adjustment interspersed with periodic revolutionary change (Pettigrew, 1985a).

Views / Perceptions of the TQM programme

This section discusses the views held by each plant on how TQM has impacted on their business. The objective is to identify if similarities and or divergence of views exist within a plant and also across the study plants. This may assist in cross checking the responses from the other questionnaires used in the study, regarding reliability and consistency of the study results. The views and perceptions have been gathered by utilising a combination of questionnaires and informal discussion during the plant tours and as such must be interpreted within these constraints. Each plant filled out a questionnaire, appendix 13, designed to test the views and perceptions of the plant regarding the impact of the TQM programme on their business. Appendix 15 provides the results.

In plants A and M a group consensus was taken and only one questionnaire was filled in per plant. In the rest of the plants 3-4 contact personnel filled in the questionnaire independently. Table 8 on page 174 highlights the different functions involved in the questionnaire. There was unanimous agreement by all plants on specific questions, such as Q1, the TQM effort had been beneficial in strengthening the plant's competitive position in their industry, and Q2, considering the investment made in TQM and the benefits received, they would implement the programme again if starting from scratch. They also reported that the firm's overall market share and customers Q12, had not decreased, and that information sharing Q17, had increased: all fairly positive indicators, albeit qualitative, that TQM was showing benefits.

Shopfloor employees views and perceptions were not formally tested. However, the author had some experience of shopfloor views in Dumfries via the GQC training courses, whereby groups of up to fifteen employees participated in a three day TQM awareness, team building and problem solving course. As far as Dumfries was concerned shopfloor employees' predominant view of TQM/ teamwork was seen as being involved in the decision making process and when they found that this was not matching their expectations, they viewed TQM and GQC as a failure. Although not confirmed it is strongly suspected that some of the other European plants i.e Aachen and E/gem were experiencing the same shopfloor views, since the management structures, styles and reporting lines and products were very similar.

This view was also supported during the discussion by the author with plant representatives on how each plants GQC courses operated and the type of feedback they received. A typical response from shopfloor being; " you talk about TQM and empowerment but you don't allow us to make any real decisions".

The American plant's shopfloor employees appeared more optimistic about TQM. This was evident during short discussions with employees, as the author was being given the plant tours. They were not asked a set list of systematic questions, but they appeared to suggest that their every day duties involved more teamwork and a greater level of empowerment, compared to the European plants e.g. in Siloam Springs they had access to shopfloor PC's and placed their own orders for production materials, which suggested that they had received more training than their European colleagues. This tended to convince them that TQM was 'successful'. However, this image of the American plants being further ahead than Europe with TQM and exhibiting higher levels of team work was challenged by a Dumfries employee who had temporarily transferred to a US plant. He suggested that under the surface the employees in the American plants while claiming they were operating in a TQM environment, were still demonstrating behavioural characteristics similar to the European plant employees, being critical of management behind the scenes and experiencing conflicts with work mates and supervision. The only difference was that the American employees appeared to be outwardly supporting TQM. Part of the reason may lie in subtle cultural differences between Americans and Europeans e.g. the American employees appear more confident and vocal, which could be linked to their education system and general upbringing.

Views however varied on all the other questions, due in part perhaps to selective perceptions i.e., the range of functional managers who were filling in the questionnaire, e.g. Plant, Quality, and Production managers, and their views and experience of the TQM programme. The other questions in the study questionnaire related to, Employee satisfaction - participation and turnover, Quality costs, Lead time - deliveries - customer complaints. Communication and teamwork, Sales /employee, and finally Supplier relations. (Refer to appendix 13 for full list of questions).

The variation in the plant E in particular was high. There did not appear to be a pattern to the individual variations, e.g. a particular function did not consistently lean towards a particular view, rather it appeared as if the individual experience and areas of contact with TQM, may have been the major influence.

The final question, do you consider your TQM programme successful?, had a mixed response. In all plants except for B and E, the answer was 'Yes'. Plants B and E had a mixed response. This may be explained by the fact that firstly, some functions may think TQM is working well, because the training programmes are underway, while other functions, who may be more aware of what TQM should achieve, and /or are more involved in translating the training into action plans and teams, may feel differently about progress. In plant B both the QA and the Production managers were involved in organising the TQM training and the follow up sessions, and would be in a good position to evaluate the progress of the program. They both felt that the TQM program had not been successful, however the reason for this view was in the main due to the interference caused by the rate of business growth. In plant E the QA manager felt that TQM had been successful in enabling the plant to achieve ISO 9001 and QS9000 status and to focus more on quality and communication. However, when comparing the huge amount of TQM training in the plant and the low levels of active teams it generated, he felt that TQM had not been successful. This view was also shared by the author based on his experience at plant D, where the completion of the GQC training received a lot of emphasis, since it was linked to ISO 9001 audits, but the actual follow up of GQC with shopfloor teams appeared to become lost among the competing pressures of running a plant.

The Financial controller in plant E also felt that the TQM program had not been successful. It was interesting to note that although the author was not able to have any discussions with the controller on TQM, he had access to a report sent to the VP by the controller (1994) in which he outlined some of his thoughts on the subject and highlighted an awareness of the issues e.g. how can we keep GQC alive?, how can we make the culture change? This suggested that the controller, being more aware than others of what TQM should achieve, felt that the TQM program had failed. This also comes down to perceptions of what is required of TQM and how well the individuals feel they are meeting these goals. The US plants contact personnel rightly or wrongly, adopted the perception that TQM was working for them. Secondly, some

plants may wish to portray success because they feel that they must, e.g. admitting failure would reflect badly on them, suggesting lack of capability. All plants appeared to be affected by this halo effect to some degree. Most plant managers appeared to fall into this category, although they didn't specifically state this, it was felt by the author that during the interviews they were slightly defensive about how their plants TQM progress was viewed by an outsider. Thirdly, there may be misunderstanding regarding the success of the implementation programme and the impact of TQM, e.g. a programme may fail at step 5, but the experience gained would still be useful and teamwork and communications may have improved, thus the plant management might think that they had implemented TQM as their perceptions become distorted over time. This was confirmed during a phone call with the Aachen HR manager in 1996;

"OK maybe we haven't implemented GQC to the US rule book, but we have never the less improved our awareness of TQM issues, gained ISO/QS 9000 status, have some teams in operation and are very profitable, this is success."

This suggests that the boundaries between TQM and other management techniques can become cloudy and as Hackman (1995) fears could result in TQM 'fading away' and becoming just another management technique. It also raises the question, what form a TQM program should take and how companies should tailor a program to suit their plant and environment. This point is also relevant to the earlier discussion on culture change (P216) where it was argued that American and European cultures are somewhat different and that attempting to introduce a US designed GQC program into Europe may require some thought as to the approach adopted. The plant E financial controller makes this very point in the 1994 report mentioned earlier;

Europeans are very different from Americans. It is not part of our culture to work strictly according to GQC rules. It is almost an unnatural attitude. Therefore, I have always been against copying fantastic non European concepts in a European environment. Concepts like JIT and TQM are great and have very interesting elements, but should not be copied. However,

because of the interesting elements, we should be smart enough to develop European variants of these concepts.

Lastly, there may be some wishful thinking, e.g. they would like the programme to be successful and by saying so it will also keep corporate management happy.

The questionnaire has been valuable in highlighting the range of views that can exist from a similar group of people, on a specific subject area. Also how managers appear to agree on some of the general points, e.g. that TQM benefits an organisation. One wonders if the general management literature and hype could play a part in this view being taken. Appendix 15 summarises the responses.

This section has also provided some insights into how each plant has viewed the TQM program and how they perceive its impact on their respective businesses. This will be useful in cross checking the actual business results and TQM implementation progress in each plant e.g. if there are significant differences between a plant management's perceptions and the actual results, this may point to inconsistencies in response and /or data collection. However, there may be some variation due to selective perceptions.

Incentive

Table 16 summarises, for all plants the relative importance of the 'incentive' effect (showing whether each plant had high or low incentive) and also grading the plants from highest to lowest incentive. (See Appendix 16 for an explanation of how their rankings were built up from reports and measurements of sub-factors contributing to the overall incentive measure).

Table 16: Plant Incentives to Implement TQM

Plants:	A	B	D	E	M	S
Incentive:	Low	High	Low	Low	High	Low
Summary						
High → Low	M	B	=S	=A	D	E

The incentive to implement TQM is complicated by the fact that two TQM initiatives were operational and overlapped. In 1989 the Xerox TQM programme was being adopted by some Gates plants, then in 1991, the Gates TQM programme, GQC, was introduced. Both programmes were similar in approach. Some plants, e.g. A, D, and M, started with the Xerox Programme, and the later GQC programme was blended in. Some plants, e.g. B, E used the blended version, and tailored it to suit, while one US plant, S, adopted the original GQC programme.

Through a combination of formal questions (appendices 12 and 14) and the authors unofficial discussions and observations it was revealed that Plants B and M had high incentive to adopt a TQM programme. Plant M, due to customer influence and B due to Bandwagon pressure and some senior mgt pressure. Plants A, D, and E had low incentive. Business was good, customer pressure low, and even though the senior management were pushing TQM, it was the individual plant managers who controlled the implementation programmes. Plant S also had low incentive, perhaps because they were already practising their own style of TQ, and may not really have seen the need for another programme.

However, they still considered themselves the corporation's best plant, and were not going to be seen as non-conforming. In addition to this corporate were also pushing the programme more in the US plants, possibly due to their closer proximity to the Denver headquarters

Receptivity

Receptivity is difficult to measure with hard numbers and the evaluation of the five areas *Previous Initiatives, Industrial Relations Climate, Workforce Profile, Organisation Structure, Organisation Policies*, has relied on both figures and assessment by the author, based on personal contact with the European plants, including visits, and by general observations and discussions in the US plants. Table 17 summarises receptivity and grades the plants from best to worst in each category. The overall ranking calculation is based on a simple points system, e.g. 6 points for best plant and one point for least in the case of each variable. There is no easy way to grade the plants and the points system used assumes a linear relationship between the grades, which may not be the case, however there is no evident basis for adopting an allocative weighting system. (See appendix 17 for the detailed analysis of variables ranking, and the source of information for each).

Table 17: Plant Receptivity

Variables	Best	→	Plants	→	Least
Previous Initiatives	S	M	B	E	=A =D
Industrial Relations	M	A	B	S	D E
Work Force Profile	B	S	=M	=A	D E
Organisation Structure	S	M	B	A	D E
Organisation Policies	S	=B	=M	A	=D =E
Summary Overall	S	M	B	A	D E

Previous Initiatives - three of the plants had experienced some form of prior initiative. Firstly, plant M had experienced the Uniroyal Participative Mgt programme, which was designed to improve communication and encourage shopfloor participation. When Gates took over in 1986 the plant experienced the Gates Enriched Mgt, GEM, influence. Secondly, plant S was an original Gates plant and was exposed to the GEM philosophy

from day one, and this was reinforced further by the then plant manager, who was an active participant in the development of GEM. Thirdly, plant B had some exposure to GEM when management visited USA in 1990 and 1992, and their personnel manager was also an ardent advocate of GEM. The same plant management had also some experience of assisting a nearby Gates plant, with their TQM programme in 1991. The GEM principles in particular appeared to have been a good foundation for any TQM programme, since they embody many of the key TQM elements, e.g. Communication, Involvement, Empowerment. These three plants, M, S, B, appear to have had an advantage in terms of preparation for TQM. The other plants A, D, and E, had no prior experience of quality initiatives, apart from experiencing approximately one year of Quality Circles, but this initiative did not have any significant impact, according to the plant contacts. These plants were therefore slightly disadvantaged in terms of preparation for TQM.

Industrial Relations reviews grievances/ disputes, discipline cases, absence, labour turnover and workforce morale. Information on the level of grievances / disputes was not readily available, but all plants appeared to be free of any serious disputes. Grievances were normally handled less formally and at the lowest level in the management structure if possible. The general impression given by the plant contacts was that grievances were few and far between. *Dismissals* levels varied across the plants, with the US plants M and S and one European plant D, recording the highest levels. This may be explained firstly, by the plant management's tolerance and acceptance levels of poor behaviour and performance: secondly, by the workforce's attitude to their employers: thirdly, by the strength of unions in discipline issues, and finally, by changes to the work environment, which can place additional pressures on employees, and which may then highlight employee shortcomings. *Absence levels* - the US plants, recorded the lowest levels, which may have been attributed to the strong pressure from both management and peers on employees not to be absent. The US plants had a shopfloor structure whereby specific departments or areas were allocated dedicated teams of supervisors and employees, in the hope of gaining more ownership and feeling of responsibility from employees. The US plants did not have any unions, and HR management reported that they found it easier to deal with unacceptable employee behaviour, not needing to worry about shop stewards, and only needing to ensure they were within legal guidelines, in discipline cases.

Labour turnover - one US plant, S, had a high level of turnover and yet had been quite successful at implementing TQM. This may be explained by the fact that they had low unemployment in the area (2.6%). A high percentage of the workforce, (25%) had outside business interests, and if things become unbearable had an option to take up, The plant had no union, which may have made it easier for management to 'flush out' poor performance/behaviour employees. In Europe plant B's turnover increased dramatically between 93 - 94. This coincided with a period of high sales growth and investment in new plant, which placed increased pressure on management and employees to 'produce the goods', and reduce scrap and improve quality. The low turnover levels from plant A are unexplained, but the low levels of growth in this plant may have kept the workforce numbers more stable with possibly less turnover. *Workforce morale* is difficult to gauge, however the assessment has been based on the previous four variables and also the level of involvement in quality teams, detailed in the next section.

Workforce Profile varied with average ages ranging from 28 years in plant B, to 40 years in plant M, with the rest of the plants hovering around 35 years. Average skills varied between one and three per shopfloor operator, however in plant B's case the average had dropped from three in 1994 to one in 1996, due to a dramatic increase in new recruits. The other plants had three skills apart from plant E at 2.2. Work force cultures varied considerably across the plants with 35% of native American descent in plant S, 50% coloured in plant M, and in plant B the majority were Catalan, as opposed to Spanish. There was however no evidence to suggest that a particular culture or mix had an advantage over others, with regard to implementing change programmes.

The number of Quality Improvement Teams also varied across the plants, but this may be explained by; the variation in the size and content of the problems being tackled, e.g. plants M and E had many small short term teams working on small issues, which served the purpose of training the employees and obtaining small incremental improvements, whereas plants like S and D concentrated on larger long term problems, involving mainly staff employees, which appeared to reduce the level of training and development given to shopfloor employees. The workforce in plant S however had longer exposure to change programmes due to the GEM

influence and training, and this reduced levels of training would have had less of an adverse impact compared to plant D.

There appear to be two schools of thought regarding the QIT's; use technical / engineering employees to gain large benefits quickly, or alternatively spend more time and resource building up shopfloor teams to obtain incremental savings over a longer time period. The theoretical advantage with the second option is that shopfloor employees receive more training, and are better placed to evolve into self managing teams.

Organisation Structure in all Gates plants is flat, with 4 levels between Plant manager and shopfloor employees. The US plants have divided their shopfloor into distinct areas, termed Focus Factories, each factory has an area manager with their own team, e.g. facilitator, engineer, planner, customer service. The rationale for this set-up is that smaller focused teams will take more ownership of their areas, and gain from the closer working arrangements. The facilitators are responsible for all shifts in their area, but employees do have access to area facilitators, in the event of an emergency. This system encourages the self managed cell concept, since teams need to be able to handle some responsibilities, and not rely on constant supervision, and is consistent with the Bottom Up approach advocated in some of the literature, Michael Beer (1990), and Lupton (1971). This set up was introduced to the plant B in 1992, and partially in plant E in 1994. Plants A and D however still operate a conventional arrangement, whereby a supervisor is responsible for all areas on his shift, which could prove to be a barrier to diffusing the team philosophy throughout these plants.

Organisation policies varied between continents with the two US plants differing from the European plants in that, management briefs were monthly as opposed to quarterly, hourly paid operators did not clock on, all employees share the same pension scheme, dress codes were less formal, employees were all referred to as associates, and there were no individual suggestion schemes. Plant B is the one European plant which shares some of the US policies, with no individual suggestion scheme, the same pension rights for all, and employee bonus schemes. This link may be due to the shared GEM influence. The US plants however have had a longer and possibly stronger exposure to the GEM principles, which advocate these types of policy. It is also interesting to note that these same three plants had steering

committees and appeared to have high ability with reference to implementing a TQM programme. Reward and recognition systems are practised in four of the six plants, while plants D and E had no system.

Ability

Summarised below are the ability factors across the plants. The upper section describes whether each plant has high or low ability, and the lower section grades the plants from highest to least able. (See Appendix 18 for the detailed analysis of variables ranking, and the source of information for each).

Table 18: Plant Ability Factors

Variables	Plants : Highest \longrightarrow Least					
H.R.M.	S	=B	=M	A	D	E
Resources:	S	B	M	A	D	E
Mgt Ability:	=S	=M	B	=D	=E	A
Overall Ability:	Highest \longrightarrow Least					
Plants	S	M	B	=A	=D	E

Human Resource Management involvement varied considerably across the plants in Europe. Involvement was medium in plant A in organising training and participating in the Xerox programme management exercises, however there was less evidence of ability to develop the TQM programme to the shopfloor, e.g. low number of shopfloor Quality Improvement Teams. Involvement was high in plant B, with the personnel manager very active in progressing the GEM and TQM philosophy. In contrast plants D and E had low involvement from the HR function, with lower levels of interest recorded. The situation in plant E was more complex, in that the personnel manager on site was responsible for the Hose and Connector division, and was reportedly not particularly involved in the initial TQM initiative. The PT division HR function for plant E is provided from the plant A, and although they supported plant E with training material and a facilitator, the general HR support for the plant was low.

In both the US plants, the HR function did not appear to play a particularly significant role in driving or developing the TQM programme, but never the less were active members of the steering committee and tended to concentrate on organising training. The US plants appeared to suggest that leadership by the plant manager and the existence of a steering committee were particularly important in implementing a TQM programme, and continuing the momentum.

Resources also varied, with the US plants investing a significantly higher level of funds into training, but in the case of plant S, it had not necessarily yielded the expected returns, with respect to savings and team development. The management at plant S were aware of this and were arranging specific training for their facilitators, regarding team development skills. In Europe plants A, D, and E tended to concentrate on completing the 3 day GQC training courses, and then considered the follow up. In plant B, they limited the number of training courses and included more follow up training for each group of employees, on how to use the problem solving skills taught on their 4 day training course. Plant B's progress had been severely affected by business growth and the installation of new technology. The general consensus from all Plant managers was that all TQM training courses require an immediate follow up to consolidate the skills taught on the course, and that in most cases this had not happened, due mainly to the day to day business demands.

Management Ability considered four sub areas of management *style, behaviour, commitment and leadership and perceptions*. These areas are perhaps among the most subjective areas of study measurements. The author utilised a combination of experience, previous plant visits, observations and informal discussions, to arrive at the following conclusions. First, *Style* for each plant has been arrived at through a combination of feedback from contact personnel and some personal experience. Style among the plants varied; A and D had a style leaning towards authority-compliance (see fig 15 chapter three), with strong control being exerted by the plant managers. Plant M also had a strong plant manager, but this appeared to be diluted slightly, due to the influence of their steering committee. The manager in plant E had, over the last few years reportedly changed more towards facilitator, while plants B and S appeared to use a facilitator style.

Behaviour - three plants, B, M and S, demonstrated management behaviour with respect to high management involvement, empowerment, consistent approaches and management approachability. The other three plants A, D and E, had experienced less success and had plant managers who appear to exert a strong level of control over the management team. The only exception to this view is that plant M manager did exert some measure of strong control, but, to some extent behaviour has been modified by the commitment to carry out the TQM philosophy; and secondly that the plant E manager was gradually changing towards a more facilitator style of management, as a result of the TQM initiative.

Commitment and Leadership - appeared to be low in European plants A, D and E. No plant steering committees were established to monitor progress and the level of resource given to follow up after the initial TQM training was low. The general impression given in these plants was that management were preoccupied with output and other distractions. In contrast commitment and Leadership were more evident in plants B, M, and S. Steering committees were in operation and the level of follow up was higher, although it did vary according to the level of distractions, e.g. in plant B the rate of growth severely reduced the plants ability to resource the programme from 1993 onwards. In plant S, their own previous quality initiatives were well established, and this reduced the GQC follow up programme. They felt they were already practising the philosophy.

Perceptions - In the three European plants A, D and E, management perceptions of preparation levels appeared to be clouded by the level of business growth and profit levels. This may have given management the impression that because the organisation was in good shape, it could easily accommodate a TQM programme, when in fact they required to review their levels of preparation. Secondly, the TQM programme was treated as a training exercise and employees were expected to form teams. The TQM training programme became the main focus, and follow up was sidelined due to levels of business activity, poor perceptions by management and lack of a steering committee to monitor progress. Plant B appeared to have more understanding of the importance of communication, commitment and participation, shown by their higher levels of follow up and the formation of a plant steering committee to review requirements and progress. This may have been in part due to their exposure to GEM, and the focus and experience provided by their personnel manager. Plant


B also had a small workforce in the early 90's, and output volumes were low, whereas the other European plants were busy, with many more employees, and less management resource time available for the TQM programme.

The US plants also had experience of GEM and being closer to corporate HQ were under more pressure to review their organisation for a TQM programme. The US plants applied a significant level of financial resource, double the European plants, to training and preparing the plants for the TQM journey.

Performance

Table 19 summarises the performance measures for the six plants, from best to least, based on a three year average, 93 - 95. Again the overall grading calculation is based on a simple points system, e.g. 6 points for best and one for least. (See Appendix 19 for ranking detail and detail of construction).

Table 19: Plant Performance Measures


Measures	Best  Least					
Cost of Quality	B	E	S	M	A	D
Customer Service	S	M	D	B	A	E
Customer Complaints	B	A	D	E	M	S
Summary						
Overall	B	S	M	=D	=A	=E

The trend showing plants B,S,M in the upper half of the best, appears consistent with the previous tables, on receptivity and ability. The next section, table 20, will review all the plant factors and the links between them.

Linking the Factors

This section compares all the factors in the hypothesis with the addition of a category for improvement in performance over the analysis period, as opposed to the best results data. This is included to highlight the plants which have achieved more progress in performance improvement, while implementing TQM. (See Appendix 20 for performance improvement ranking detail).

Table 20: Review of Influencing Factors and Performance (Summary of Tables 15-19)

Plants:	Best  Least					
Incentive	M	B	=S	=A	D	E
Receptivity	S	M	B	A	D	E
Ability	S	M	B	=A	=D	E
Implementation	M	B	S	=A	=D	=E
Performance I	B	S	M	=D	=A	=E
Improvement	D	S	M	B	=A	=E

Summary

There is a clear pattern of plants B,M,S consistently in the top 3 in all categories, with the only exception being the performance improvement comparison, in which Dumfries has fared better than Balsareny. The results tend to confirm an apparent link between the factors which influence TQM and the level of TQM adoption and the criteria used for performance measurement. Table 20 shows that plants B,M,S, who have experienced more success with implementing TQM are also more successful performers, which would support the hypothesis that quality performance is linked to TQM. Table 20 also reveals that plants B, M, S, which have consistently fared better with the TQM influence factors, have also been more successful with implementing their TQM programmes. In addition to this they have achieved better business performance results, which would tend to support the view that TQM does in fact improve business results, albeit specific measures in this case, and that successful TQM implementation is dependent on the influencing factors.

The comparison in table 20 using improvement in performance, reveals some interesting results specifically the change in position between the plant D and plant B. Plant D has moved to first position from previous fourth equal and plant B has moved to fourth position from previous first. What has caused this dramatic shift between the two plants? One possibility could be that because plant D was 4th equal in the performance results, it had more scope for improvement, and that a plant which had better results to start with would find it more difficult to achieve improvement - a variation of the law of diminishing returns. However, if this were the case, then plants A and E should also fare better using the performance improvement criteria, and plants M and S would drop further back. It would seem that plants B and D have been affected by other factors which we will consider in the next chapter. One of the reasons for the inconsistent results in the Gates example may lie with the influence of unknown random factors, which can disrupt business, e.g. new investment in technology or uneven allocation of business between plants by corporate management. However, it should be noted that the limited scope of the investigation as outlined in the model / concept section, i.e. the use of proxy measures and the limits of the methodology, i.e. selective perceptions, is not expected to yield a concrete relationship between TQM and performance, and as such the results should be viewed as possible indicators only.

Finally, although it was mentioned earlier that the performance criteria used were chosen because they were considered more susceptible to TQM programme improvements, the study also looked at alternative performance measures, which are considered representative of normal business reporting, but which are less influenced by TQM, at least in the short term. These measures are; *Manufacturing Variation*, *Sales / Employee*, *Growth Levels*, *Defect levels*, *Working Capital turns*, *Stock turns*. The use of these measures for plant comparisons, apart from being less susceptible to TQM influence, and taking longer to show a link with TQM, has not yielded any clear trends or relationships and as such has not been used in the comparisons (Appendix 21). Similar research has been carried out on 29 companies that were known to have implemented TQM over at least a five year period, using seven externally reported performance measures, including profit levels and assets (Zairi et Al, 1994). The results indicated that most of the 29 companies showed a performance above the median of their relevant industry, which suggests that there is an association between TQM introduction and bottom line results. The questions here are how relevant are the performance criteria used to measure the quality initiative, and whether random factors could have played a part in the business results. The next chapter explores the reasons why plants B and D do not appear to fit our hypothesis model for the performance improvement category.

CHAPTER 8

TWO EXCEPTIONAL CASES

Introduction

The previous chapter described how four out of the six plants were consistent with the hypothesis that a plant which implements TQM well should achieve an improvement in business results and that a plant which does not implement TQM well will have less success with improved results. The analysis found that two plants (Balsareny and Dumfries) did not fit this hypothesis. The Balsareny plant appears to have high incentive and ability to implement TQM and has achieved a good measure of implementation success, however it has not been able to translate this success into an ongoing improvement in business results. Second, the Dumfries plant appears to have had low incentive and ability, and has experienced low success with implementing TQM, and yet has demonstrated apparent success, with ongoing improvement in business results. The study is interested in discovering the factors which appear to have caused this non compliance with the hypothesis.

The chapter starts by reviewing the factors which made Balsareny's incentive and ability to implement a TQM program high and why their implementation was more successful than in Dumfries. This is followed by an analysis of the possible reasons for Balsareny's lack of improvement in performance, and then an analysis of why Dumfries had low incentive and ability to implement a TQM program, and their apparent lower success at implementation. The study then considers the possible reasons for Dumfries' apparent performance success and finally, draws conclusions from the investigation.

Balsareny

The Balsareny plant commenced operation, with the manufacture of V belts, in 1989 as a greenfield site. The plant is situated in a fairly remote area, 30 miles from Barcelona, where there is a Gates Hose plant. The Hose plant was built in the 1950's, and has a strong union presence and older more militant workforce, with many restrictive practices. Gates acquired this plant in 1987. Gates intentionally distanced the new plant in Balsareny from the old plant, to avoid any influence, and also because the area was designated an enterprise zone, offering grants to investors to the area. The intention was to be different from the older Barcelona plant.

The TQM initiative in Spain started at the Barcelona Hose plant in 1991. It was driven by the VP for Gates Vulca. He contacted a consultant, at Management Consulting Group, in Spain, who helped to develop a package with elements similar to the later GQC program. They also included an element of leadership training designed to improve management levels. This consisted of 5 modules from Gates 'Front-line Leadership' program, designed by Zenger Miller Consultants in USA. Four people from Balsareny including the current QA manager, assisted with the Vulca plant training. At the same time the GQC initiative was being communicated from Divisional level in Belgium, and in 1992 the GQC and the Spanish TQM program were blended together.

Balsareny's TQM program was a blend of mainly the Vulca program and some of the GQC program. They also dropped the leadership element and substituted Interactive skills, which was a one day course presented by a Rank Xerox consultant. Although Rank was not a customer of Gates Balsareny, they decided to contact Rank and request assistance, since Rank had already been heavily involved with the other Gate's plants TQM program in 1989, namely Aachen and Dumfries.

The GEM philosophy was used as a guide to develop the new workforce, along with the self managed cell approach. In May 1989 the QA manager and the Technical manager, along with 8 operators, visited the Gates Elizabethtown plant in Kentucky, USA, to learn about manufacturing V belts, teamwork and cell concepts. In 1990 the plant manager visited Gates

Siloam Springs, and in 1991 the Production manager and the Operations manager from the Belgian plant visited Siloam to learn about the GEM philosophy.

Initial production volume was low, and the plant was only partially equipped, with a significant amount of space available for expansion. The plant has experienced some major investment and growth in employees over the last few years. In 1992/3 a new Synchronous belt manufacturing cell was installed, and in 1995 a new V belt manufacturing unit. These investments required some major reorganization of the plant layout, and the plant is now filled to capacity.

The TQM Program

The Balsareny plant implemented TQM for various reasons, firstly the plant was newly built in 1989 and management felt they should adopt some form of modern quality initiatives, described as 'felt need' in chapter 3. Second, the early contact with the US plants in 89/90 influenced quality awareness, e.g. GEM, gem had been running in the US plants since 1975, and in Siloam Springs since 1977. These plants were therefore very familiar with the philosophy and able to assist and train other groups in their systems and techniques. This apparent successful diffusion of the GEM philosophy throughout the US plants however contrasts with some theories which suggest that diffusion strategies rarely work (Walton, 1975, 1980; Goodman and Dean, 1982). Third, customers were becoming more demanding regarding audits and quality levels, in particular the automotive customers, who were themselves going through rapid change in order to remain competitive. The customer pressure was in fact being exerted on all European plants and reflected the general change in the automotive industry, which was demanding more from its suppliers. The development of the QS 9000 quality system developed by Chrysler, General Motors and Ford, was an example of how the major car manufacturers were co-operating on standardizing quality system requirements for their suppliers. Fourth, pressure from Divisional level, e.g. GQC, the TQM program in Europe and the GQC format were well established by 1992 and European headquarters were keen to see it implemented in all the European plants. Lastly, some Bandwagon effect, since the Gates Vulca plant had already commenced their own quality

initiative in 1990, and Balsareny being a new plant, were not going to be left behind; perhaps a variation of Competitive bandwagon pressure (Abrahamson and Rosenkopf, 1993). These combined factors gave the plant high incentive to implement a TQM program, since the management had received exposure to the Gem philosophy and combined with the experience of assisting in Vulca, were made more aware of the TQM philosophy.

The Balsareny plant also had high ability, with much of the infrastructure to support a TQM program in place, e.g. the plant had operated an informal recognition system since 1993, for both individuals and teams. Recognition varied from small gifts, letters to employees home from the plant manager, a buffet and speech, dinners and presentations. There was no formal structure or policy and the plant manager and his team decide where, when and what to award.

Plant wide communication briefs were carried out Quarterly during working hours. A half hour brief is given out within working hours, it was not compulsory, but according to the plant manager, there is a high level of attendance. A minute of the meeting was also issued. Coordinators had a half hour weekly meeting with management to discuss issues.

The plant operates a bonus scheme, which excludes management levels, a component which literature suggests could complement the operation of TQM (Beaumont et al, 1994). It is based on five criteria; *Absence levels, Accident Rates, severity and frequency, Marginal Contribution, Scrap levels, Labour Utilization.*

The recruitment system used followed the GEM philosophy and consisted of 3 stages; first, interviews with Personnel and use of Psychometric tests, second, interviews with the Production Manager and Coordinators and finally interviews with operators of the relevant cell team. This ensured that everyone was given the chance to vet the prospective employee.

In April 92 the shopfloor organization structure was changed. Instead of covering all areas of the plant on shift, the coordinators were made responsible for specific areas of the plant and were on call 24 hours/ day. If a coordinator's operators had a problem and the coordinator was off shift, then the operators would approach the coordinator of another area who was on shift, and try and resolve the problem before calling out their own coordinator. The objective

of this change, according to the plant manager was to gain more ownership by the coordinators, and allow them to concentrate on specific areas, and develop their teams.

Balsareny utilized the Catalan state's TQM program material, and in doing so received grant aid with their program. Resource for the TQM training was supplied by the QA manager, who is a part time facilitator. He was assisted by the Rank Xerox consultant, who presents the interactive skills part of the GQC course. The Personnel manager in particular, had significant input to the TQM initiative, organizing material and developing a strategy, including the recruitment program, which he felt was a key element in order to have the correct caliber of employees. This HRM involvement is recognized in the literature as a key requirement in developing TQM (Guest, 1992).

Lastly, a steering committee was formed at the start of 1992, recognized as an essential stage in the TQM program (Oakland, 1995). The training was carried out by the Personnel management and the QA manager, from internal resource, and externally from Rank Xerox and MCG consultants. Follow up after the 4 day basic training involved a period of 6 months, where the group of 16 employees were split up into 4 teams of 4 and allocated a problem to work on, using the GQC 6 step problem solving approach. The team met with management each month to present a step of the approach. The idea was to give them some follow up practical experience, in order to develop their problem solving skills. This level of follow up resulted in only one course per year between Nov 1992 - June 1995. This approach contrasted with Dumfries and Aachen, who had many courses each year, but little follow up afterwards.

Influencing Factors

From the information presented thus far, it appears that Balsareny had made a good start with their TQM program, and had many of the systems in place to support the quality initiative, yet apart from all these positive points which favour TQM implementation success, Balsareny did not experience the expected improvements in business results, why? Part of the reason may be explained by the considerable change the plant has experienced over the last 3/4 years.

In June 1992 a new plant manager was appointed. He came from the E/gem plant, and his background was in sales and applications, as opposed to production management. In the same year the coordinators were made responsible for specific areas of the plant, as opposed to the whole shift. This was done to increase the focus on teams and their development. In 1996, discussion with one of the new coordinators highlighted that some of the older supervisors preferred the original system of a coordinator covering the whole plant for a shift. This suggests possible resistance to the new system even after four years, and may also have cast some doubt over the older coordinators commitment to the change program and team development.

In 1993 a new product line, Timing Belts, was introduced. This was part of a strategic decision to expand the Timing belt manufacturing plants throughout Europe, to cope with forecast growth levels, and to be closer to the automotive manufacturing plants. This required the installation of a new manufacturing cell and reorganization of the plant layout. The plant had no experience of timing belt manufacture, and therefore had to experience a learning curve. A considerable amount of management time was required in commissioning the new plant, training operators, and learning about the new products. The Dumfries plant personnel assisted with visits to Balsareny, and a group of Balsareny operators were sent to Dumfries for two weeks in 1993, to learn about the new product and processes.

In 1995 two new V belt manufacturing cells were installed, and the timing belt cell was expanded to cope with the additional growth. One of the V belt cells had been transferred from a plant in France, newly acquired by Gates. This plant was part of Kleber Industries. This was a strategic decision by Gates to gain a foothold in France and be closer to the large French automotive and industrial markets. This change required a significant reorganization of the plant layout and the incoming goods warehouse was temporarily relocated out-with the plant building, and was still there in march 1996. This expansion called for additional operators, and the number of shopfloor operators increased from 60 in 1994 to 124 in 1995, with a budget of 176 for 1996. This was a phenomenal growth by any standards.

These changes placed significant pressure on Balsareny, and their TQM program undoubtedly suffered. The author visited the plant in November 1994, as part of an internal benchmarking study, and found a relatively quiet plant, in terms of output, with only 60 shopfloor operators and considerable resource being applied to the TQM initiative. Discussion with the then Personnel Manager, highlighted his intention to send two supervisors to Siloam Springs in the USA, to experience the GEM philosophy. This highlighted the level of management commitment being applied to the TQM initiative.

This situation contrasted with the visit in March 1996, which revealed a plant filled to capacity, with many new operators being trained, and management heavily involved in organizing the new cells. Average skills /operator had dropped from 3 in 1994 to 1 in 1996, due to level of new recruits with no prior experience. New employee induction training was reduced from 200 to 24 hours between 1994 and July 1995, also due to the level of new recruits, although part of the reason was that the qualifications of the new operators was higher than the earlier recruits. The Production manager was visibly stressed and had very little time to spare, as compared to the 1994 visit. He felt that the TQM program had been delayed by at least one year and possibly two, due to the changes, and level of business growth; factors deemed of primary significance to change programs, by the contingency theorists.

It was also interesting to note that both the Production manager and the QA manager felt that the TQM program to date had not been successful, due to the growth levels and disruption caused. The plant had only organized one GQC training course in 1995, and none were planned for 1996. Another visible change to the plant between November 1994 and March 1996 was the apparent deterioration in the levels of housekeeping. The plant no longer gave the same bright clean impression, presumably due to the level of activity.

The level of labour turnover increased significantly from 1% in 1993 to 9.8% in 1995, which may have reflected the increasing pressure the plant was under to produce more output. One of the coordinators felt that changes in the standards of acceptable performance and behavior may also have affected the turnover level, i.e. less tolerant management.

The same coordinator visited the Dumfries plant in June 1996, as part of an internal benchmarking exercise, and highlighted to the author that while the new recruits in Balsareny had higher levels of technical qualifications, they did not appear to have the same level of hands on skills and flexibility, as the previously hired employees, and were generally less motivated by typical factory jobs. They had much higher expectation levels and were looking for careers. He felt that there was a balance to be struck between qualifications and experience. This point may also partially explain the increase in labour turnover, e.g. people who do not feel their talents are being utilized to the full and who are bored with the routine tasks assigned to them will eventually become frustrated and look elsewhere for satisfying work.

The general impression was that the Balsareny plant had tried to achieve results from their TQM initiative and had made a good attempt at implementing the changes required to make TQM successful, but were basically overwhelmed by the level of change in the form of new technology, products and growth levels. Some suggest that this diversion or preoccupation with technology and high growth may drive organizations down a route which could be in conflict with TQM, e.g. low focus on people issues, and in doing so reduce the organizations effectiveness (Goodman, 1986). In addition to this the management team had the least experience of all the plants in working together on power

transmission products and processes, and unlike Dumfries, they were a greenfield site in 1989, starting from scratch, and not transferring existing skills and knowledge across to a new plant.

The study now considers possible reasons for Dumfries having a higher level of success with performance improvement, even though they were less successful with the TQM initiative. Table 21 below, details the differences between the plants.

Table 21: Comparison between Balsareny and Dumfries Plants

<i>Factor</i>	<i>Balsareny</i>	<i>Dumfries</i>
Incentive	High	Low
Previous Initiatives	Yes	No
W/Force Age	28	38
Skills/Employee	1	3
Supv/Employee Ratio	1/36	1/60
Steering Committee	Yes	No
Reward & Recognition	Yes	No
Attitude Surveys	Yes	No
Bonus Scheme	Yes	No
Mgt Ability	High	Low
Distractions	High	High
Growth 90 - 95	388%	123%
HRM Involvement	High	Low
Results Improvement	Poor	Good

Dumfries

The Dumfries plant also opened in 1989 but as a brownfield site, and transferred its existing workforce over from the older Gates plant at Dumfries. Prior to 1989 the workforce occupied part of the old plant, along with three other business units, but had grown too large, and were also restricted due to the aging technology which reduced their ability to compete with other Timing belt manufacturers, e.g. Continental, Pirelli / Dayco.

The Power Transmission business had been transferred down to Dumfries from a plant in Edinburgh in 1969, during the Uniroyal era, and the business had grown steadily with the introduction of new products and processes. The workforce had been recruited from the local area and also from the other business units in the plant, i.e. internal transfers. These employees also transferred a history of views and culture to the new plant, which may have influenced their receptiveness towards new change initiatives. Although the new Dumfries and Balsareny plants were similar in size, that's where the similarity ends. The headcount at Dumfries numbered 305 in 1990, nearly four times that of Balsareny, and sales in 1990 were 5 times Balsareny's, which meant that Dumfries was a much busier plant. The Dumfries PT business had a well established business in 1989 with high order loads. This made it more difficult when transferring into a new plant while maintaining business as usual, added to which they had the pressure of commissioning new manufacturing technology and dismantling some existing equipment, all without disappointing customers. The transfer was therefore phased over a year, which meant that at one point, they effectively had two plants to manage.

The TQM Program

The Dumfries plant had low incentive to implement a TQM program. The main driver came from the Vice President for Power Transmission Europe, who after being contacted by Rank Xerox, decided to participate in their Total Quality initiative in 1988, selecting the Dumfries and Aachen plants. Like the Balsareny plant Dumfries blended the Xerox TQM program with the later GQC initiative in 1991, although it was still predominantly the

Xerox format, but renamed GQC. The Dumfries plant had been very successful with high growth and good cost reduction programs, so it would have been understandable that they did not feel the need for a new initiative at that time. However, they had been chosen by senior management to participate.

The plant also had low ability to handle a TQM program. They had no prior experience to act as a foundation on which to build the latest program, e.g. GEM. The infrastructure, unlike Balsareny, was not in place to support TQM, for example, there was no reward and recognition system to facilitate team development, no group bonus scheme to encourage group participation and awareness of performance factors, no internal attitude surveys to gauge the views of the workforce, and address the issues of concern. These are the factors considered by the literature as necessary to support TQM (Beaumont, Hunter and Phayre, 1994; Bowen and Lawler, 1992). There had been an external attitude survey carried out by Professors Hunter and Beaumont of Glasgow University in 1991 and 1993, which highlighted some areas of concern regarding employees perceptions of the management style being adopted, in which the employees suggested that Dumfries management appeared very production orientated and did not communicate with the employees enough (see appendix 22). This survey however, may have been overlooked or dismissed, possible due to the management's focus on setting up the new plant. The absence of a plant steering committee, apart from confirming the low incentive, also made it difficult to coordinate the TQM program, and the low involvement from the Human Resource function compounded this problem.

The Management saw most of the plants future success as being related to quantum leaps in technology and material improvements and less emphasis required from teams, at least in the initial stages. They did not appear to have the time to develop teams to give the results and change the culture. This issue of time is a common feature for companies attempting to implement TQM. In a recent survey, making time for a TQM program ranked as the third highest problem after culture change and management behaviour (Develin & Partners, 1989).

Once the management and staff had been on the three day TQM course, the remaining participants consisted mainly of shopfloor employees. This appeared to create the view that

the TQM program was only for production and this further reduced management and staff interest in TQM, especially when the managers did not appear to give out any positive TQM signals. The two internal trainers were also becoming weary and wanted others to get involved. Added to this, the shopfloor employees reactions and feelings were being vented at the 3 day course and the two trainers were not accustomed or prepared for this. Some of the points raised by the employees were that; management were not willing to listen to employees; output takes priority over everything; no follow up after the courses; no sign of any change by management regarding attitude and behaviour, and also the poor suggestion scheme regarding response and perceived interest by management. They also felt that the general management view of the 3 day training course was, 'lets get them out of the way'. The completion of the TQM program appeared to be seen as the last 3 day course in some management members eyes.

The drive for output and productivity also appeared to give the shopfloor operators the impression that management were adopting tougher controls and did not care about their problems, that issues were falling on deaf ears. This did not help with creating the desired TQM culture regarding communication and trust. There was an absence of a sense of team spirit and an associated sense of low morale. This situation may also have tended to reinforce management's view that employees were only interested in money and needed to be controlled by technology.

Dumfries, like Balsareny suffered from the high levels of growth and the introduction of new technology. The design of the new plant, layouts, and commissioning of equipment, were all carried out in the main by the plant management and engineering functions, which placed a considerable workload on this small team. This tended to soak up management resource and reduce their ability to cope with the TQM program.

Influence Factors

In spite of the problems experienced by Dumfries they have achieved improvements in the selected performance criteria, e.g. *Cost of Quality, Customer Service Levels, Customer Complaints*. This improvement however is not consistent with the hypothesis prediction that only plants, which have implemented TQM successfully, will experience improved performance results. What has caused this wrong prediction at Dumfries? Possible reasons are now considered.

Firstly, Dumfries maintains close customer focus and contact through the customer audits of Gates, mainly major automotive accounts. These audits allow Dumfries to understand the customers requirements and with their assistance, how to get there. Most major accounts visit the plant and comment on various aspects of the business, ranging from service levels to product quality and new developments. The major automotive customers in particular are very stringent as regards their tolerance of defect levels, and they stipulate acceptable defect levels in parts per million, which means that even one defect in say ten thousand is still unacceptable, and could jeopardize business. Dumfries looks to developing strong partnership links based on trust and open discussion as a means of retaining and growing it's business. Dumfries have received many customer awards, e.g. Ford Q1, Renault, and also ISO 9001 accredited in 1994 and QS 9000 in 1995. This close contact enables rapid feedback on any complaints and service levels and enables Dumfries to reduce complaints and optimize service levels. Returning to the point made about customer pressure on page 237, it could be argued that the impetus for this change was driven by the automotive customers rather than by Dumfries itself.

Second, Dumfries focuses on new product development and has developed many improvements over the years. Material development has resulted in stronger, quieter and longer lasting Timing belts, which may result in less product failures and customer returns. They also work closely with automotive suppliers at the development stage of new engines, to help determine the optimum product specification regarding, purpose, quality and cost. Gates also manufacture pulleys and tensioners for the automotive industry and they advise on the complete package, ensuring compatibility between individual products. These projects

can last 2/3 years and involve close co-operation and confidentiality. In addition to this, Dumfries has a strong applications team who keep close contact with the customers and are always available to lend their expertise to solve problems and improve customer understanding of the product and correct applications, thus reducing unnecessary belt failures and complaints.

Third, Dumfries are strong in Engineering and Technology related areas. This is evident in the level of new automated processes which have been installed over the years to cope with the volume demand, although some of the technology was designed by the Aachen plant. These automated processes have improved product quality and capability, CpK, and helped reduce defects. The increased confidence in the manufactured product has enabled the introduction of sample inspection techniques, thus reducing inspection costs and the cost of quality. They have enabled greater control over manufacturing processes and coupled with supervision, who have a strong mechanistic approach, have resulted in highly controlled processes. The emphasis has been on control to achieve output and reduced costs, and improved delivery to customers, resulting in improved service levels. However, the drawback with this level of control is that employees may feel like slaves to the technology, unable to have any real influence on the day to day operation, with the result that team participation and the implementation of TQM may be more difficult.

Finally, Dumfries have been able to remain competitive and hold prices year on year through a strong emphasis on cost reduction programs. These programs have been driven by senior management and implemented in the main by technical / engineering groups, and include, *Material Supplier sourcing*, which has enabled the best prices to be obtained. *Labour productivity* through automation and a strong Industrial Engineering presence and finally, *Control over fixed costs* by maintaining a flat management structure has maintained low overhead costs. This, in conjunction with quality has enabled Dumfries to retain their major customers.

The Dumfries plant have also more product and process experience compared to Balsareny, and have worked on improvement programs and the management of the business longer, which may explain part of the reason for the better results. Dumfries have not however had

great success in the area of human resource management, regarding shopfloor involvement and shopfloor teams. This may be partly due to the level of automation, but also due to a lack of follow up after TQM training, and low involvement in driving the initiative. Dumfries also have a plant manager with an Industrial Engineering background, who appeared more prominent in driving improvements quickly and successfully, albeit in a less facilitative style. This view may have contributed to the absence of a plant steering committee at Dumfries, since there are clear 'trade offs' to be made between the increased cross functional communications and the involvement in decision making, which a steering group approach can give, versus the danger of descent into waffle, avoidance of decision making, and removal of personal accountability.

The influence of the automotive suppliers has also resulted in their philosophies being utilised, e.g. Just in Time, Kanban, and more notably Lean Production, a concept which has emerged from the work of the international motor vehicle programme (MacDuffie and Krafcik, 1992). It could be argued that Dumfries were heading in the route of Lean Production rather than the TQM model, partly due to the strong influence of the automotive customers who audit them. One of the principles of Lean Production is the reduction in buffers, i.e. inventory levels, this is consistent with the Just in Time philosophy being adopted by Dumfries and actively encouraged by their major automotive accounts. This was evident in the setting up of new finishing cells in which the work in progress was significantly reduced, and the Kanban principles were adopted, i.e. small job lots being processed through equipment which was now sited closer together, and where operators were encouraged to learn multiple tasks. This new approach involving the expansion of cells and smaller work groups, was probably more akin to the bottom up approach to organisation change, described by Beer (1990) on page 79.

The TQM model and Rank's model advocate a topdown approach to implementing TQM whereby the initiative / programme is cascaded down from senior levels to the shopfloor. There is however a view that a bottom up approach is more appropriate; this view argues that the greatest obstacle to corporate revitalisation is the idea that it can be accomplished through a company wide change programme formulated at the centre, rather than an approach to change based on task alignment, (the wedding of behavioural and business concerns), started

at the periphery and moving steadily to the corporate core. Organisations should start corporate revitalisation by targeting small isolated peripheral operations (Beer, 1990).

This perspective has been derived from an empirical investigation of a number of major US organisations undergoing corporate restructuring and revealed that effective renewal occurs not when managers choose one alternative or the other, instead effective revitalisation occurs when managers follow a critical path that obtains the benefits of topdown as well as bottom up change efforts while minimising their disadvantages. This point highlights that TQM can be implemented in different ways as long as the basic principles are adhered to and at the very least there is a mixture of topdown versus bottom up approaches and organisation wide versus partial organisation approaches.

Some literature suggests that organisations should also determine the level of readiness prior to starting a TQM implementation (Devlin and Partners, 1989). If your organisation is not ready for TQM, it will not work. Therefore rather than jumping in with some initiatives, a little up front diagnosis might suggest that the first phase of a TQ programme is preparedness. Dumfries may have benefited from this advice.

Conclusions

This comparison has shown that a planned topdown and seriously implemented TQM programme approach, criticised by Beer (1990) does not always guarantee success, in this case due in the main to influencing factors of high growth and investment in technological innovation. The comparison has also revealed that business performance success can be achieved by following alternative routes to organisational change.

Dumfries have shown however that the basic elements of TQM i.e. improved communication, continuous improvement, and customer focus, are still recognised as worthwhile, but the programmed approach, also criticised by Lawler (1993) may not be suitable in all circumstances, and also incompatible with some management styles. Dumfries have employed some of the TQM principles, i.e. customer focus, understanding the process, but not the commitment of all employees. The drive from a strong leader has ensured success of this strategy, but one wonders what might happen if this one key individual leaves, and more reliance is placed on the infrastructure and management teams, and also if the market was less stable, or even more competitive. Have Dumfries 'all their eggs in one basket', in terms of relying on key individuals to run the business?

If Dumfries had invested more time and resource in TQM, would this have produced better results than they achieved, or would it have jeopardised the areas of improvement. A plant manager who has seen success achieved by following a particular approach, will not readily change to an untested approach, particularly during a period of rapid change. This raises the question of whether TQM is suited to an organisation experiencing rapid change, or whether it is more appropriate to an organisation which is going through a more stable period in its evolution

Given the type of business Gates are in e.g. at the forefront of technology in timing belts, which is driven by technical and engineering development on a large scale, sometimes quantum leaps regarding materials development, what is the best strategy to adopt in the short term, given the resource restriction. Is the conventional TQM model appropriate as a general model or does it need to be viewed against other variables, particularly when there is

not a clear line between TQM and bottom line results. This line of thought is consistent with a contingency approach to organisational change which argues that the best way to organise depends on circumstances. Investigators try to understand the relationships among variables so they can recommend which strategies and structures are appropriate for each situation. Contingency theory studies seek to establish general associations between characteristics of organisations, in particular the propensity to innovate their structures and the environment in which they operate.

The Dumfries, Balsareny plant comparison has shown that there is a link between business results and TQM, however the link can be significantly affected by the variables described in the hypothesis model, and in particular, diversions caused by technology and growth levels. In addition the improvement in business performance is phased, with the performance criteria most susceptible to TQM, being the first to yield results, and the other performance measures taking longer to show improvement.

The Dumfries plant however appears unique in that they have achieved improvements in TQM related performance measures, yet have not achieved full success with implementing TQM. The next chapter takes a closer look at Dumfries in an attempt to explain this anomaly.

CHAPTER 9

FOLLOWING THROUGH AN EXCEPTIONAL CASE

Introduction

So far the study has analysed the introduction and success rate of TQM between the various international plants. At one level it compared the six plants in the study. It then focused on and compared two plants, Dumfries and Balsareny, which did not comply with the hypothesis. It found that Balsareny could be explained by the adverse influence of growth levels on their TQM program. This left the Dumfries plant, which was also affected by growth levels and high investment in new technology, but achieved improvement in TQM related performance measures, without fully implementing their TQM program. This chapter now considers the reasons why the Dumfries plant appears less consistent with the literature on TQM. The literature and our hypothesis suggests that plants like Dumfries, which have not implemented TQM well will not experience the same level of improvement in selected performance measures as plants which have implemented TQM well. In this case the performance measures are Cost of quality, Customer service level, Customer complaints. As a reminder, the measures were defined as follows;

Cost of Quality which comprises first the Cost of Conformance (prevention costs, inspection/appraisal costs) and second the Cost of Non-conformance (internal failure costs, external failure costs, cost of exceeding requirements). The total cost is then expressed as a percentage of the total plant variable manufacturing cost.

Customer Service Level which comprises the level of orders which are within a specific target order date given to the customer expressed as a percentage.

Customer Complaints which comprises the level of customer returns and the number of parts returned per million units sold, PPM's.

The comparison of the actual results between the plants reflects the Dumfries plants low success rate with the standard TQM implementation model. Dumfries are placed 4th overall, table 22, row (A) however, when looking at the improvement over the period 1993-95, row (B) it appears that Dumfries have faired better than the other plants. This result shows a lack of fit with the model used and presents a number of questions. First, has Dumfries opted out of TQM or has it adopted an alternative route to change. Second, what influences have caused Dumfries to opt for an alternative route. Third, is the hypothesis incomplete due to its inability to explain the Dumfries result.

To refresh the reader on Dumfries' performance, requires a return to the table first presented in chapter 7, which shows the performance success levels for each plant in the study using TQM related performance measures. The table highlights that Dumfries has been the most successful plant regarding improvement in performance, plant D. However, Dumfries did not appear to achieve this success by TQM alone, in fact Dumfries failed to fully implement the TQM program.

Table 22: Plant Performance results 1993 - 95

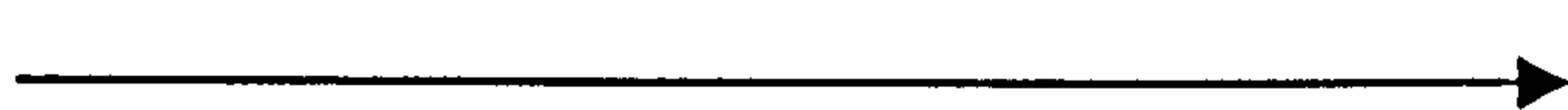
Measures	Best  Least					
Cost of Quality	B	E	S	M	A	D
Customer Service	S	M	D	B	A	E
Customer Complaints	B	A	D	E	M	S
<i>Summary</i>						
Overall (A)	B	S	M	=D	=A	=E
Improvement (B)	D	S	M	B	=A	=E

Table 22 summarises the TQM related performance measures for the six plants, from best to least successful, based on a three year average, 93 - 95. The overall grading calculation, (A), is based on a simple points system, e.g. 6 points for best and one for least. The improvement, (B), is based on the best year on year improvement, even though the *actual* results for the best improvement plant may be lower than other plants in the study.

Dumfries appears to have focused on some of the criteria common to TQM, e.g. customer focus and quality, with some measure of success. Table 22 shows that Dumfries is placed in third position for customer service and customer complaints. TQM however, may be only one tool in an array of techniques which can improve performance measures and quality and as highlighted in the previous chapter Dumfries appear to have opted for systems and controls which have had a similar effect to applying TQM but without the focus on people. Could Dumfries have selected a TQM hybrid? or have they merely selected a different route, choosing alternative techniques to achieve a similar result to TQM. The change from being positioned 4th in row A of table 22 to 1st in row B may be explained by the focus on these alternative systems. The problem being faced with now is that the current model, table 7, does not adequately acknowledge the existence of alternative or complementary systems to change. There is a need to understand the factors which have caused the Dumfries plants' mismatch with the hypothesis and whether it can be explained within the framework of the existing model.

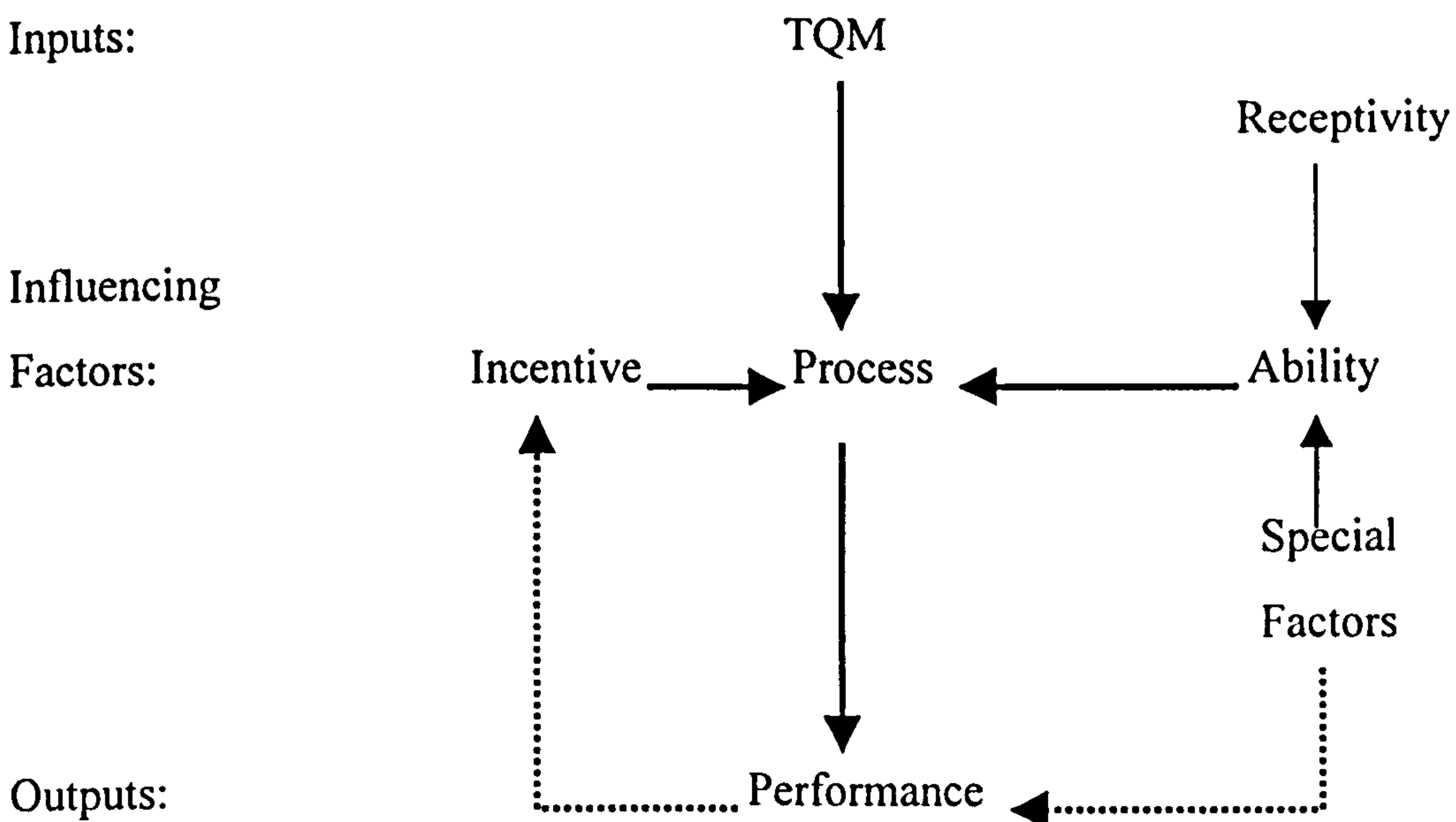


Table 7: The main components and the links involved in the model.

In the previous chapter it was mentioned that the complaints improvement could have been influenced by manufacturing process improvements and service level improvement by industrial engineering efficiency studies. Assuming the Dumfries improvement is accurate, then where does it fit into the model. Dumfries, appear to have achieved results by adopting a slightly different route to change, which is not explained by the hypothesis.

It was explained in the previous chapter the route that Dumfries followed with the concentration on technology and materials. The study is attempting to understand what has driven the Dumfries plant along their adopted route. The previous chapter explored some of the reasons why Dumfries did not follow the normal TQM route, with some of the reasons attributed to diversion caused by growth and new technology. It also found that Dumfries did not highlight a formal alternative strategy. It appears that the direction taken by Dumfries may have been a combination of other factors. The study will now explore two main areas which appear to have had a major influence on the direction taken and the performance results achieved. These are *Customer influence* and *Management style*.

Customer influence

Customer influence is most notable from the automotive market as opposed the industrial markets, and this appears to be the case throughout all the plants in the study, table 23, shows that the major customers are in the main automotive manufacturers. The most notable industrial customer influence comes from Xerox, who approached Gates with their TQM programme after having apparently successfully implemented it throughout their own organisation, and were looking to convert their major suppliers. This example echoes the work of Hunter; Beaumont and Sinclair (1996) regarding supplier development, which suggests that customers do seek to harmonise their management control systems with suppliers. A typical example is where customers update their own internal control systems, perhaps as a result of adopting a TQM programme, and then to encourage suppliers to go down a similar route. For some it may be argued 'this has worked for us we think you should have it too'. This appears to be the view held by the automotive manufacturers, based on personal experience through their plant audits.

In other cases the move may be more in the way of an open offer to provide assistance if the supplier is interested (with no implied pressure to conform). This appeared to be the case with Rank Xerox in Europe although Xerox in the US appears to have applied more pressure with the Moncks Corner plant. Xerox had won the prestigious Baldrige award in 1989 after implementing a TQM strategy which required recipients to cascade the philosophy to customers.

The work on supplier development also suggests that where an organisation developed confidence in its own management control systems, focus of work organisation, quality control, it will feel more secure in its dealings with their suppliers if *their* systems are harmonised to those of the customer. It is at this point that the customers interest begins to extend beyond the audit of outputs of supplier control systems, into the selection of systems themselves, and the inputs to the systems, e.g. the quality of management, labour training schedules and content. The RG 2000 audit carried out by Rover is an example, which covers a multitude of areas, for example under HR they look at; *Management Style and Company Culture : Management of Change : Development and Training : Skills and*

Skills Retention : Motivation Contribution and Recognition. Under Total Quality they look at; *Philosophy and TQ Strategy : Application of TQ Principles in Manufacturing and Administration : Total Quality Development Status* (appendix 23). The automotive customers are also actively pursuing EDI, electronic data interchange, whereby ordering and invoicing are carried out by direct computer link between the customer and supplier. This reduces paperwork and the delays and errors which can accompany the conventional systems.

The automotive customers approach to organisation change at their suppliers was less direct than Xerox and involved the use of supplier audits to convey the messages. The automotive customers had improved their quality standards and systems due to market competition and were focusing on suppliers to ensure quality and consistency of product. In addition to this they were also interested in HR issues and manufacturing systems. The use of flexible manufacturing systems, JIT manufacturing, Lean production principles and Kanban had all been implemented by the automotive customers and they now appeared keen to see their suppliers adopt them and were willing to offer assistance, e.g. the Dumfries plant took advice from Toyota in developing its cellular manufacturing systems.

In addition to this, customers were keen to move to a more open book policy by their suppliers. This was particularly noticeable with some of the new Japanese automotive customers, Honda, Toyota, who required detailed information on a plants capacity levels and product costing structure and more recently from Ford, who are looking for significant cost downs and require to understand their suppliers systems and processes. This is a particularly sensitive area since suppliers are required to reveal their product cost breakdowns and identify potential areas of improvement.

The interest in HR issues was approached by asking specific questions during audits. Organisations most commonly focus on;

Recruitment/ selection procedures: length of time that supplier takes to recruit, use of psychometric tests.

Training: induction training, selection for training and identification of training needs, and extent of training in technical matters, most commonly, SPC.

Mechanism for employee involvement, communication and development : team briefing, suggestion schemes (suggestion rate per employee), and appraisal systems, as well as policies and practices on the introduction of change and remuneration policy.

Table 23: Major Customers

<i>Plant</i>	<i>Customer</i>	<i>Audit length/ days</i>	<i>Yrs with Customer</i>	<i>Relationship</i>
Dumfries	Renault	2/3	15	Good
	Rover	2/3	20	Ave
	Ford	2/3	20	Good
	Honda	2/3	3	V/Good
	Toyota	2/3	1	V/Good
Aachen	Renault	2	15	V/Good
	V.W.	2	20	Good
	Ford	2	25	Good
	Opel	2	20	V/Good
	Xerox	2	15	V/Good
Balsareny	Fasa- Renault	3	5	V/Good
	Ford	3	3	Good
	Seat	3	5	Fair
	Fiat	2	4	Good
	G.M.	2	5	Ave
E/gem	Peugeot	4	13	Ave
	Renault	3	8	Ave
	Ford	4	14	Good
	Audi/ V.W.	2	21	Ave
	Claas	2	33	Fair
M/ Corner	Honda	1	2	Ave
	Ford	1	20	Good
	Xerox	1	15	Good
	Canon	1	2	Ave
	Storagetek	1	5	Fair
S/ Springs	J. Deere	1/3	19	V/Good
	J.I. Case	1/3	19	V/Good
	G.M.	1/3	5	V/Good
	Paccar	1/3	19	V/Good
	Ford	1/3	19	V/Good

Some of the forms which this focus on suppliers HRM has taken include;

More people orientated audits are becoming increasingly common. No longer do visits to suppliers by customers take the form of managers sitting in conference rooms. The growing interest in their suppliers shopfloor is perhaps best demonstrated by visits to suppliers customers in which the latter walk around the plant and talk to hourly paid employees, checking their use and understanding of procedures and quality requirements.

Encouragement of customer culture, throughout the supplier's workforce i.e. an appreciation among employees of the importance to both internal and external customers. There has been an increasing interest among customer organisations in ensuring that the supplier's shopfloor understand fully the customer's requirements. For example, visits by hourly paid staff from suppliers to customers plant to enable workers to see the difficulties caused to the customer by quality problems in supply. In one case the Dumfries plant warehouse team leader visited a major automotive replacement customer's warehouse facility to gain a greater understanding of the customers facilities and requirements. It also served the purpose of strengthening working relationships with counterparts. This has also been used by Dumfries suppliers, when quality problems with a material supplier were identified, the supplier brought his employees 200 miles to Dumfries to show them the effects on their customers process.

Training is an important area to suppliers and monitoring of suppliers training records is a common practice when customers carry out their supplier audits. Customers are looking for evidence of progress with operator flexibility training which not only gives employees more interesting opportunities but increases their understanding of the complete process and hopefully improves their overall quality levels. TQM training is also considered essential by accreditation bodies, e.g. ISO 9000.

Teamworking arrangements : major automotive customers encourage the use of teams and selected problem solving systems, e.g. Ford 8D system which guides the supplier through a specific approach and checklist. There is also the use of joint problem solving teams who work on agreed problem areas in an attempt to improve quality and service provided, e.g.

Uniparts ten to zero programme, which initially grades a problem area, ten for worst and zero for best. The joint programme then attempts to improve the area and ultimately achieve a zero grade.

Employee attitude surveys are welcomed by customers to encourage their suppliers to take more account of employee views and attitudes when making changes. Accreditation systems, ISO 9000, also demand this type of employee feedback.

Accreditation of BS5750 and more recently the investors in people awards by suppliers is also of increasing interest to many customers. Some customers are insisting on specific accreditation if continued business is planned, e.g. General motors regarding QS 9000 accreditation.

Most of the areas described above were implemented by Dumfries to some degree and they fit in with and complement the TQM philosophy. This may explain the partial success of the Dumfries approach, e.g. an alternative TQM approach, and may also have given the initial impression that Dumfries were implementing a full TQM programme. However, it also appeared that the level of introduction of these areas may initially have been aimed more at satisfying audit requirements, than a conscious internal strategy for change. This was evident by the low levels of follow up after the initial audit requirements had been met. A situation which existed in many of the other plants, and may be typical throughout manufacturing industry. This view is based on discussions with personnel from a Rover audit and was echoed in national seminar presentations. The focus on meeting the audit requirement was driven by the need to retain customer business, there was too much at stake in terms of future business, not to comply.

The question is, how much was the lack of follow up on TQM attributable to the diversion caused by growth and new technology described in the previous chapter and how much due to the customer audit influence diverting the Dumfries plant away from the standard TQM programme, to areas more in line with the automotive manufacturers requirements. In saying this, there were however elements of the automotive customers approach which were compatible with the TQM philosophy as we have described above, i.e. customer

focus, service levels, and this is where part of the Dumfries improvement in performance may lie, driven by customer end results. There were also elements, which were part of the TQM philosophy and customer audit areas, but were not fully addressed at Dumfries, this was the people focus, which did not receive the same level of attention as the other areas mentioned. The reason for this may have been due to the diversion, i.e. growth and technology. Management style may also have played a part in the form of only concentrating on their areas of strength, i.e. engineering and financial, and also being selective in what they adopted, e.g. selecting the elements which were felt more appropriate to Dumfries in that period of their evolution, i.e. 1990-95.

The strength of the customer drive is also a point worth discussing, reference to table 23 shows that although all plants had automotive customers, there was some variation in the actual customers. All plants had Ford as a customer.

Some customers however only appeared at Dumfries, Toyota and Rover. It may be that different automotive customers exert varying degrees of pressure on suppliers to conform to their systems and as such this may be one explanation as to why the Dumfries plant achieved more business success improvement than the other plants.

One of the performance measures, the Cost of Quality, may in some cases have been prepared more with customer audits in mind, since corporate did not appear to be using this measure as a reporting document, and still used the traditional performance measures, which in itself did not appear to reinforce the commitment to TQM. The Dumfries improvement may also have been influenced by automotive techniques, i.e. SPC sample inspection. Customers insisted that if suppliers had 100% inspection in production at the end of the line, then they had little confidence in their manufacturing process, to produce good quality products. Dumfries was therefore encouraged to install up-line inspection routines to enable sample inspection to be introduced downstream. This exercise in turn reduced the Cost of Quality.

Other plants also experienced this automotive customer driven change. So what has made Dumfries different? Could Dumfries have applied these techniques more rigorously than

other plants and as mentioned above been the result of some automotive customers applying more pressure for change than others. Taking another viewpoint, could the fact that Dumfries appeared to be behind some of the other plants performance on these criteria, table 22 (A), mean that Dumfries had more scope for improvement and thus show more improvement in performance over the selected analysis period.

There is no concrete answer, but the customer influence is clearly a major element in both diverting Dumfries from its programmed TQM approach, while at the same time enabling Dumfries to achieve TQM related benefits.

Management Style

Consideration is now given to the second influence factor, management style, which may not only have affected the drive for customer initiated improvements, but also influenced the direction of change in the Dumfries plant. In chapter 7 it was highlighted that management style can vary from autocratic to facilitator. Jamieson (1984:24) describes autocratic as;

viewing organisations as having clear cut goals whose economic ends demand order and authority, expertise and that people require direction and control to work effectively. Facilitator organizations are described as highly complex systems with multiple goals and conflicting interests. Characteristic values include, accountability and a humanist approach, with the view that people are resourceful, creative and have development potential which needs to be well managed.

Attempting to implement TQM with an autocratic style is unlikely to succeed because TQM is a people orientated philosophy, advocating a facilitator style of management. A balance between attention to Technical/Engineering issues and people issues is a requirement of TQM. Organizations which are aware of their Management style and make the necessary adjustments to complement rather than hinder a change program may therefore have more chances of implementing a successful change program (see also fig 15 chapter 3). Models are available to assist organisations to focus on the right areas of their business. Figure 17 shows the European model for business excellence. Each of the elements has a percentage weighing. This is used for the purpose of scoring the UK and European annual awards, however, it also indicates the level of priority that an organisation should give to each of its elements. These weightings are useful when it comes to prioritising improvement activity within an organisation. It appears that management style plays an important role in the framework for change, with a focus on *leadership, people management, policy strategy and resources*.

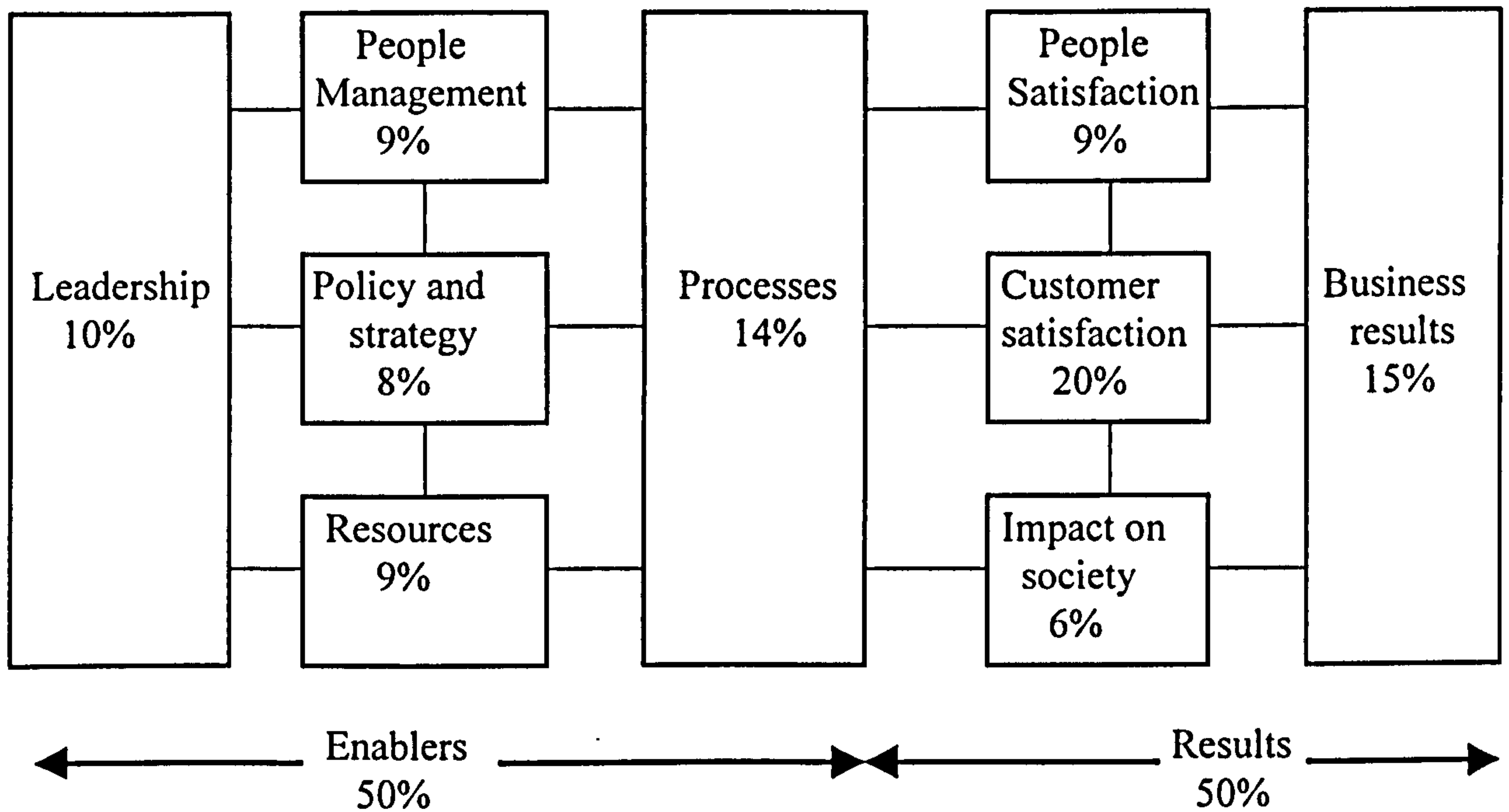


Figure 17: European Quality Model (source: Organisational Excellence, Oct 1996:5)

The model shows an organisation as having 9 key elements and, although not listed here, each of these elements has a number of sub groups, 33 in all. The model categorises the 9 elements into enablers and results. The results are concerned with what the organisation has achieved or is achieving. The enablers are concerned with how results are being achieved.

Essentially the model tells us that:

Customer Satisfaction, People Satisfaction, and Impact on society are achieved through Leadership which drives Policy and Strategy, People Management, Resources and Processes, leading ultimately to excellence in Business Results.

The study now considers how management style may have affected the Dumfries change programme and its results and why a particular style may have been adopted. The style adopted may be a combination of the effect of individuals, historical influences and events and conditions. It was highlighted in the previous chapter that the style adopted at

Dumfries was less facilitative than some of the other plants, possibly due in part to a management team with a strong engineering and financial background which tended to concentrate on technology and material related issues and less on the people issues. Part of the reason for this may have been that the product being manufactured comprised high material cost and low labour. Material therefore had more potential to reduce costs. It was also highlighted that the pressure for capacity at that time and the requirement for new developments played a major role in this approach being adopted. However, the absence of a people programme is worth discussing. Research suggests that managers feel that facilitating and coaching is a lower priority than a doing role. Studies in a major US chemical company showed that more than half the managers work time was spent on people management, the manager's attitude was that their time was being wasted. They didn't think they were being productive unless they were primarily in a doing role rather than in a coaching, facilitating and co-ordinating role (Roeber, 1973).

This would suggest that Task orientation is more prevalent in industry than relationship orientation. *Task orientation* being the extent to which a manager directs his own and his subordinates efforts and is characterised by initiating organising and directing. *Relationship orientation* is the extent to which a manager has personal job relationship and is characterised by listening, trusting and encouraging. The fact that relationship orientation and coaching takes more time to produce results and has not received the same level of attention in traditional management styles, may reflect its lack of use. The Dumfries plant, along with most of British industry, has a history of a mechanistic approach to shopfloor control, relying on the use of authority and control systems to achieve results, which has produced performance improvement. If quality can be improved through tight controls and strong levels of supervision, how long can it be sustained, will management become weary of continually having to keep a tight reign over things and find slippage if they relax for a minute. This can create a vicious circle whereby management are afraid to relax and empower the workforce. The workforce in turn become so used to the tight control that they are unable and unwilling to accept responsibility for anything out-with their normal duties. Unless management take the initiative to break the cycle then nothing really changes.

Another factor of influence may be the profile of the workforce with regard to their receptivity towards change. In the Dumfries case the new plant was a brown field site with an existing workforce, who had been subjected to a traditional management style for many years and would require a lot of management time to change their style. This point was also echoed by Gates suppliers who claimed to have the same problems with their workforce, customers however appeared less willing to admit this, perhaps due to the fact that they audited Dumfries and were expected to more advanced in their HR systems.

The emphasis on control to achieve results at Dumfries and the focus on technology may have made employees feel like slaves to the technology, unable to have any real influence on events, and this may have explained the low levels of team participation. The combined effect of management style and workforce profile may also have limited potential TQM progress, e.g. low success at forming self managed teams, and in turn influencing the route adopted at Dumfries.

During the research period the author was involved in setting up teams at Dumfries and attempting to focus them on tackling the issues and problems identified as reducing the efficiency and effectiveness of the business. Discussions with the plant manager highlighted the awareness by management of a 'knowledge gap', which made it difficult to empower the workforce to accept more responsibility and involvement in the running of the business. This knowledge gap was not limited to shopfloor employees, but also involved technicians, technologists and engineers. The plant management identified the need to increase the level of product and process knowledge in addition to the team based training, however this was not a short term project and would probably take one to two years to implement. This created a dilemma whereby, the plant which was already running at high capacity levels, was racing ahead with technical and engineering improvements, which required specialist knowledge, held by a small group of individuals and management and staff functions, were not resourced to train up teams and involve the shopfloor employees in the improvement process to any great extent at that particular time. The result was that employees felt 'left out' of the decision making process and involvement in the change process. This situation undoubtedly adversely affected the evolution of the team working arrangements at Dumfries and the general progress of the

GQC initiative. However, having recognised this, the plant management are now actively attempting to increase training and devote more time to team working. This will undoubtedly provide small incremental improvements, but at the end of the day, one questions the level of improvement that can be achieved from the teams, taking into account that the plant produces a high tech product, designed by polymer and material scientists and chemists, who are continually trying to keep ahead of the competition and are looking for substantial leaps in product and process improvement. Then again perhaps there is a place for both forms of progress operating at different levels and timescales, after all, this is how the Japanese made their comeback with Kaizen.

Dumfries management were faced with the choice of a full blown TQM programme or a partial customer influenced strategy, backed by tight control. It is difficult to say which route may have been the best option under the specific circumstances, but Dumfries appear to have implemented a partial version of TQM, retaining the TQM focus on customers and quality, and by doing so achieved TQM related performance success. The question is how long is this approach sustainable. In theory as long as results are produced, but the lack of a people orientated supportive structure may eventually prove a problem when management turn their focus to developing self managed teams.

Summary

This chapter has reviewed the hypothesis to accommodate the results of the Dumfries plant. It has also explored the influence of customers and management style on both the TQM programme and the selected performance results. The Dumfries plant is not unique in having strong influence from the automotive customers, nor is their management style and workforce, which can be found in other Gates European plants, however Dumfries appear to have had more success in performance improvement, which has outpaced the plants heavily involved in TQM.

Dumfries appear to have been affected by a combination of customer influence via audits and requirements for accreditation combined with a management style driven by a strong financial and engineering presence which has resulted in selected elements of TQM being adopted, e.g. customer and quality focus, along with other techniques favoured by the automotive industry, i.e. JIT, Kanban, LP, Cellular manufacture. The requirement for growth may also have influenced the choice of system, e.g. JIT and Kanban, helps to process products faster and more efficiently. Dumfries has implemented systems and controls which have had a similar effect to applying TQM, but without the people focus. It has demonstrated that different routes to change are available and appear to work. Time will tell whether they can ultimately match TQM's predicted longevity. The next chapter, ten, will review the lessons learned from this study.

CHAPTER 10

CONCLUSIONS

Introduction

This final chapter reviews the main objectives of the research and summarises the findings. It discusses the implications of the research for organisational change and then reviews the limitations of the research and opportunities to further the research. Finally, it discusses the future for TQM. Section one will cover the main objectives. Section two will summarise the findings including the TQM implementation process and the conclusions on performance in the context of the model used. Section three will cover the implications of the research for Organisational change. Section four will review the limitations of the research and provide suggestions for further research. Finally, section five will discuss the future for TQM.

Main objectives of the research

The first objective was to understand more about TQM and the issues involved in its implementation. In chapter one it was mentioned that contact with shopfloor employees at Gates highlighted a general lack of understanding and acceptance of the TQM initiative. In order to try and understand this it was necessary to look at how TQM had been implemented across the six plants selected for the study. How had the implementation differed, were some plants more successful at implementation than others and what were the key factors at work? It was hoped that the information would give some insight into the pitfalls and successes of implementation and act as a guide for future use.

The second objective was to find out if there was a link between the level and success of TQM implementation and the business performance of the plants. Again it was mentioned in chapter one that there was a distinct lack of research into how TQM impacted on plant performance levels. In chapter four it was suggested that what little research has been done appears to give conflicting views on success. This lack of definite proof has left managers concerned about the real worth of investing time and resources in TQM and may be a barrier to acceptance of TQM in organisations. The study was also interested to find out what factors appear to influence any relationship between TQM and plant performance. These factors may also help to explain the varying results reported across the current literature. As a reminder, performance criteria were chosen which were considered more closely influenced by TQM, rather than other performance measures which may take longer to reveal a link, or which may be more subject to other sources of influence.

Findings

The Implementation Process

The implementation of TQM across the plants was assessed against a standard model, and as a reminder the model chosen for the research is reviewed. This seven step implementation model allowed us to compare each plant and to gauge the level of success in implementing TQM. Table 15 shows how each plant implemented the TQM programme against the 7 step model described on p139 and summarised as 1 - gain commitment, 2 - develop a shared mission, 3 - define the measurable objectives, 4 - develop the mission into critical success factors (CSF's), 5 - gain process ownership, 6 - breakdown the CFS's into sub- processes, 7 - monitor and adjust the process alignment. Each tick represents a completed stage. The plants are also graded from most to least successful implementation. The X's in table 15 identify the stage at which each plant ceased to fully implement the TQM programme, plant M being the only one to achieve full implementation.

Table 15: TQM Implementation across the Plants

Program Steps	A	B	D	E	M	S
1 - commitment	✓	✓	✓	✓	✓	✓
2 - mission	✓	✓	✓	✓	✓	✓
3 - objectives	✓	✓	✓	✓	✓	✓
4 - CSF's	✓	✓	✓	✓	✓	✓
5 - ownership	X	✓	X	X	✓	✓
6 - teams		✓			✓	X
7 - adjust		X			✓	
Overall	Poor	Fair	Poor	Poor	Good	Poor
Summary :- Most \longrightarrow Least Successful Implementation						
Plants	M	B	S	=A	=D	=E

The study found that only two plants, Balsareny and Moncks Corner, appeared to have achieved full implementation. In Europe the plant programs stalled at step five (breakdown the critical success factors into key processes and gain process ownership), due to a combination of factors. The first was what Kotter (1995) refers to as a lack of guiding coalitions, otherwise known as steering committees. The steering committees are responsible for developing the TQM strategy at plant level and providing guidance and drive to ensure the programme progresses. The failures in this area were a direct result of not completing step one of the implementation process at plant level i.e. gaining commitment to change by the top management team. This required the senior management team to develop a steering committee, which would oversee the implementation of the TQM programme. The European Division management team had developed a steering committee to oversee the development of the TQM programme, and the individual plant managers were responsible for implementing TQM to their respective plants. However, the plant managers in Aachen, Dumfries and Erembodegem did not appear to develop plant level steering committees, due to either being preoccupied with business growth and technology or finding it difficult to gain commitment at lower management levels. This was evident at Dumfries by the low response of managers willing to take part in presenting the TQM training programme. There may also have been a view by plant managers that steering committees were not required at plant level, although this was not openly admitted.

The lack of a steering committee resulted in disjointed programmes, which lacked leadership and drive; Leadership for example, due to insufficient monitoring of progress and lack of follow-up to ensure the programme was working to plan, and why progress was not being made. This lack of involvement in the implementation stage failed to amplify any of the positive signals given out at the start of the programmes, with the result that the programmes eventually ran out of steam. Plant management's inability to cope with a major change initiative contributed to the lack of implementation success. The low level of post-training follow up e.g. the use of and development of problem solving teams, made it very difficult to diffuse the TQM concept throughout the plants. In terms of the earlier analysis (chapter seven) low commitment to the TQM programme may be explained by the influence of three main factors.

First, with respect to the incentive to implement a programme, most plants were already very successful in terms of profit and financial ratios, and management may have questioned the *need* for or benefits of implementing a major change initiative of this kind.

Second, the style of management in individual plants and the management's perception of TQM and what was required differed. In chapter seven we observed that the US plants Moncks Corner and Siloam Springs demonstrated a facilitator style of management with higher levels of empowerment and team activity than the European plants in general. The US plants had also more prior experience of change initiatives, in particular GEM. This experience gave them a good grounding and understanding of the requirements of TQM. In contrast, the European plants, with the exception of Balsareny which utilised the GEM concept, appeared to operate what Blake and Mouton (1978) described as a more authority-compliance style of management, where technology and engineering received higher focus, with less emphasis on empowerment and team development. (see fig 15 chapter three). The plant managers were responsible for implementation in their respective plants and their influence played a significant part in shaping the TQM programmes. Management perception of TQM in the European plants appeared to view the programme as another management technique, as opposed to an all embracing programme. This was evident from the lower levels of post training follow up, which was noted in chapter seven. The TQM training programme became the main focus, and follow up was sidelined due to levels of business activity, poor perception of what TQM required of management, and lack of a steering committee to monitor progress. The Balsareny plant was the only exception in Europe and tended to follow the GEM approach.

Third, a factor which influenced both the incentive to implement TQM and management's ability was the growth rate of business and the scope for business opportunity being experienced during the TQM implementation. This caused a major diversion for management, since their main priority was to ensure orders were processed and to capitalise on future growth potential. The fact that two new plants were built in Europe in 1989 highlighted the growth opportunity factor. This growth and investment in new technology soaked up plant management's resource and may explain the low levels of ability and commitment to the TQM programme.

Influencing Factors

The model used to analyse the implementation process recognised three main factors of influence. It incorporated the incentive to implement and observed how it could be affected by existing business success. The other factors were receptivity and ability.

The study found that the Balsareny, Moncks Corner, and Siloam Springs plants, consistently fared better with the TQM influence factors, and were also more successful in implementing their TQM programmes (see Table 20 chapter seven). This evidence is consistent with the hypothesis that successful TQM implementation is dependent on the influencing factors, receptivity, incentive and ability. There was a clear pattern of the two US plants and the Balsareny plant in Europe, being consistently in the top three places in all categories. Chapter seven highlighted that the receptivity and ability factors were capable of being decomposed into a range of sub-factors which may influence events by enhancing or moderating the effects of the main factors. The sub-factors themselves were influenced by another level of variables, which highlighted the different levels and complexity involved in trying to understand influences on organisational change. Due to the nature of the factors, our measurement approach included both qualitative and quantitative measures. These measures tended to confirm the existence of a link between these factors and the overall receptivity and ability shown by the plants in the study (chapter seven). The US plants invested heavily in training and resource and had prior experience of change initiatives; these plants demonstrated higher levels of receptivity and ability than the European plants at Aachen, Dumfries and Egem. For example, the US plants had experienced the GEM philosophy and team working arrangements were already well developed and part of the culture, whereas the TQM philosophy was fairly new to the European plants.

TQM Success and Plant Performance

Plant performance comprises many indicators ranging from complex financial based factors to simpler units of measurement, e.g. scrap levels. Instead of comparing the change in a battery of performance measures which can be affected by many factors outwith the influence of TQM, criteria were selected which were considered likely to be more susceptible to TQM programme improvements, and as such are considered to give a more accurate reflection of the TQM effort in each plant (chapter six). In addition to this, performance comparison was also based on the level of improvement achieved over a period of time, as opposed to a straight comparison based on yearly results. This enabled starting points to be taken into account, since the plants implementing TQM programmes may show good improvement year on year, but still be trailing behind other plants, possibly due to different evolution time-scales or technology levels. The criteria used for performance in this case are; *Cost of Quality*, *Customer Service Levels*, *Customer Complaints*. Table 24 summarises the measures for the six plants, from best to least, based on a three year average, 1993 - 1995. The overall grading calculation is based on a simple rank order points system, e.g. 6 points for best and one for least. The improvement grading is based on the level of performance improvement over the same time period (1993-1995). The TQM implementation results from Table 24 are also shown for comparison against the performance results.

Table 24: Performance and Implementation Success comparisons

(Performance)	Best	—————→					Least
Overall (3 items)	B	S	M	=D	=A	=E	
Improvement	D	S	M	B	=A	=E	
Implementation Success	M	B	S	=A	=D	=E	

The study found that the Balsareny, Moncks Corner, and Siloam Springs plants, who have experienced more success in implementing TQM are also more successful performers, (overall), which would support the hypothesis that quality performance is linked to TQM, and would tend to support the view that TQM does in fact improve a relevant sub set of business results, as measured in the context of this study. Data was captured on other performance measures during the study, as described in chapter six. However, there was no clear pattern developing from this data, and in addition, these measures are better considered as longer term indicators of success and less susceptible to immediate influence by TQM, and also capable of being distorted by other external and internal changes (see appendix 21).

The comparison using *improvement* in performance reveals an interesting result in terms of the change in position between Dumfries and Balsareny. Dumfries has moved to first position from previous fourth and Balsareny has moved to fourth position from previous first. The study questioned what had caused this dramatic shift between the two plants. One possibility was that because Dumfries was fourth in the performance results, it had more scope for improvement, and that a plant which had better results to start with, would find it more difficult to achieve improvement - a variation of the law of diminishing returns. However, if this were the case, then Aachen and Egem should also fare better using the performance improvement criteria, and Moncks Corner and Siloam Springs would drop further back. It seems likely that Balsareny and Dumfries have been affected by other factors.

More detailed analysis suggested that Balsareny had tried to achieve results from their TQM initiative and had made a good attempt at implementing the changes required to make TQM successful, but were basically overwhelmed by the rate of change in the form of new technology, products and growth levels. Some suggest that this diversion or preoccupation with technology and high growth may drive organisations down a route which could be in conflict with TQM e.g. low focus on people issues, and in doing so reduce the organisation's effectiveness (Goodman, 1986). In addition to this the management team had the least experience of all the plants in working together on power transmission products and processes, and unlike plant Dumfries, Balsareny were a greenfield site in 1989, starting from scratch, rather than transferring existing skills and knowledge across to a new plant.

The detailed examination of the Dumfries case revealed that it had been affected by a combination of customer influence via audits and requirements for accreditation combined with a management style driven by a strong financial and engineering presence. This, it was argued, had resulted in selected elements of TQM being adopted, for example customer and quality focus, along with other techniques favoured by the automotive industry, such as JIT, Kanban, LP, and Cellular manufacture. The requirement for growth may also have influenced the choice of system. JIT and Kanban for example help to process products faster and more efficiently. Dumfries had implemented systems and controls, which had a similar effect to applying TQM, but without the people focus. It had demonstrated that different routes to change are available and appear to work. Time will tell whether this selective approach to change can ultimately match TQM 's predicted longevity.

Implications of the research for Organisational Change

The results have highlighted that the change process can be complex, with many interrelated factors of influence which, can vary from plant to plant and over time. Failure to address the key factors of incentive, receptivity and ability will reduce the chances of success. In essence we are arguing that unless you pay attention to these factors, follow up through the recipes for change on TQM will not produce the desired results except by chance. Organisations and managers considering TQM or wondering why their TQM efforts have not produced the expected results will gain from an understanding of this research and be more aware of the potential pitfalls involved.

In the area of general change in the wider organisational context it was found that management style influenced how a change programme is implemented, in particular the authority-compliance approach, identified in figure 15 chapter three, which was adopted in most of the European plants. There was also a significant finding in chapter seven that the European plant styles were more geared to handling hard problems as opposed to soft (Table 2 chapter three) and more inclined to adopt a mechanistic approach to change. This approach was not compatible with the TQM change philosophy, which requires a more people orientated approach, normally found with soft problems (see McCalman and Paton, chapter three page 57/8).

The research confirms Pettigrew's (1985) (chapter three), view that change does not occur along the lines of the 'rational-analytical schemes' elaborated in the planning literature, as was the case at Dumfries. This view was also confirmed by Kotter (1995) who maintains that skipping steps creates only the illusion of speed and never produces a satisfying result. This view was confirmed in our study by the failure to gain the full commitment of the top team, (step one of the TQM process) in most of the European plants, and this contributed to failure at step five in the process.

This research challenges the conventional top down literature on organisational change, namely that of Lewin (1951), whose three phase model of planned change was initially adopted uncritically by contemporary management texts. Like Dawson (1994) we find that

the inability of Lewin's model to deal with the continuing dynamics of change demonstrates the need for an alternative framework. An approach which, is less prescriptive and more analytical, would further our understanding of the processes involved and enable practitioners to adopt a broader perspective on the problems and practice of managing change. The research does concur with the view of Pettigrew (1992) who argues that the receptive context of change will influence the ultimate success of change. It was found that the receptivity factors, in particular, previous exposure to initiatives, had a positive effect on the US plants ability to cope with a TQM programme.

The implications of this research may be of interest to management consultants, even though it tends to challenge the view of a prescriptive packaged approach to change. Consultants have tended to package change concepts like, TQM and BPR, and sell them as a virtually guaranteed step by step process to success. However, this research suggests that this neat and tidy prescription for change is not so simple and subject to a multitude of variables, interacting with the organisation and the change process. This implies that change agents require some detailed analysis of an organisation prior to attempting to change it, and that before a major change is introduced some remedial steps may be necessary to fill gaps or build improved foundations.

Organisations and managers should also be aware that attempting to implement a major change programme, no matter how well it is packaged or hailed as a panacea, requires a large commitment from management in terms of time, organisation and resources and needs to be carefully considered prior to starting. If an organisation is experiencing changing environmental conditions, for example markets, legislative change or fiercer competition, then attempting to add to this variability may result in a half hearted attempt at change, due to management's attention being focused elsewhere on too many competing diversions. This point was highlighted in the literature in chapter three (Beaumont and Martin, 1997).

The research has suggested that a selective approach to change programmes like TQM is capable of producing improved performance results. This would imply that TQM does not need to be applied in a step by step manner. Organisations can decide which elements they

feel are most useful depending on their individual circumstances, for example some organisations may not have the time and resource to apply to setting up committees and steering groups, preferring to cherry pick from a modular change programme or adapting it to suit their requirements. As has been stressed, however, it is probable that in the longer term this partial and selective approach may not yield the full benefits claimed for TQM - for example in the Dumfries case, will the long term results be reduced because of the lack of a strong HR dimension ?

The study identified the influence of market conditions on change programmes. Business levels figured heavily in the outcomes at Balsareny and to some extent Dumfries. The importance and stability of an organisation's market may be one of the reasons why TQM was superseded in some cases by Business Process Engineering. BPR evolved to produce a fast and more dramatic form of change in keeping with the needs of fast changing market conditions, whereas TQM is more relevant to stable market conditions and a longer time frame for implementing and achieving results.

Researchers may also find the selective theory of interest when studying the success and failure of TQM. For instance, has an organisation's success or failure with TQM been due to the faulty or incomplete implementation of a planned approach or has it been the result of being selective to suit a particular organisation's position? In other words, have they failed to implement a planned approach or have they selected the wrong elements from the full TQM programme. Take for example an organisation which, is implementing a planned TQM programme and adhering to all the recommended steps. This organisation may be successful or not depending on a number of influencing factors, which have been discussed. However, as far as the TQM programme goes, it will have succeeded or failed in its attempt to implement a complete TQM package. On the other hand, if the organisation has been selective and only used parts of the recommended TQM programme, it will still be subject to the same influencing factors, but there will be additional variables in the selectivity of the TQM programme. In other words, what selection of variables will ensure success? There may well be many combinations to choose from, and the selection criteria themselves will influence the final outcome regarding success or failure. The question is, how does an organisation know which elements to select to suit its particular

circumstances, and is it a conscious selection or does it emerge over time as a result of the influence of key players in the organisation and specific circumstances or events? This point echoes the deliberate v emergent strategy debate in chapter three page 60. There is also a danger that an organisation's selection may result in a non-complementary fit with existing strengths. This may reduce the organisation's ability to compete in its specific market sector, for example, if it invests large amounts of resource into areas which do not produce the expected results or which set up conflicts with existing strategies. In the case of selectivity there may be key factors and links which, would enable some new theories of change and how to handle it in a dynamic environment, to be assessed.

Research Limitations and Suggestions for further Research

This section reflects on the model used for the research. Did it 'work' and what were the limitations and weaknesses in the methodology? Firstly, many of the concepts used in the model are elusive, difficult to handle, and subject to debate. The approach uses proxy measures, which are suggestive and illustrative and do not constitute an exact science; for example, workforce morale and levels of teamwork, levels of communication throughout the organisation, and participation and time allocated to the implementation of the TQM program. However, with so many 'soft' factors at work, it is impossible to accurately measure them all in a quantitative way. Some reliance needs to be placed on qualitative data and views, as long as their limitations are made clear. The methodology using questionnaires and interviews was also subject to selective perceptions and as such the conclusions drawn will be limited within this scope of investigation. The time-scales in each plant averaged two days of planned and focused information gathering except for Dumfries, where much deeper knowledge was available. Advance data was obtained from the other plants and prior knowledge of the plants (as highlighted in chapter six p170/1) was also brought to bear. This was a relatively short time in which to capture the data and form conclusions on each plant, though it would compare not unfavourably with many other case-related studies.

In defence of the methodology, a range of managers in different functional areas were interviewed in each plant in an attempt to gain a representative view drawn from different perspectives, to ensure the accuracy of the information and also to avoid bias from single function viewpoints. The contact personnel varied across the plants due to availability, the average being four contacts. The effect of selective perceptions on the data was tackled by using varied personnel and also ensuring some consistency and a cross functional view of the relevant managers: thus Plant, Quality, Personnel and Production managers and TQM facilitators were accessed in nearly all plants. Awareness of the TQM context and development stage of each plant was also necessary, since responses, views and understanding of issues can be affected by environment, levels of experience and the particular stage a plant is at in the TQM implementation programme.

The model used for the analysis adequately explained four of the six plant results, A,E,M,S, which were consistent with the hypothesis that a plant which implements TQM well should achieve an improvement in germane business results: conversely a plant which does not implement TQM well will have less success with improved results. However, the model was less able to explain the Balsareny and Dumfries plants which did not fit the hypothesis. The 'special factors' in the conceptual model, developed in chapter 5 were argued to provide a reasonable explanation in terms of the diversions or strategic decisions, experienced by Balsareny, and to some extent Dumfries, where the rate of change in the form of new technology, products and growth levels emerged as significant contributors to explaining the result. This diversion overwhelmed Balsareny and explained their limited success with business performance, even though their TQM implementation was good. The Dumfries plant appeared to achieve TQM related success, except for the people development dimensions, without actually implementing the full TQM program.

Dumfries, it was argued, adopted a selective approach to TQM and their approach was heavily influenced by customer demands and management style. This result could not be fully explained by the conceptual model. The standard model assumed that the planned step by step approach to implementing TQM was applicable, however a selective approach to implementation on this evidence, may also be useful and suit an organisation's particular needs in time. This may be viewed as an 'emergent' strategy as was the case with Gates, whereby the original planned approach advocated by TQM was modified to a selective approach to suit the prevailing circumstances. Dumfries has cherry-picked to suit priorities and strengths, which has appeared to work for them in the short term at least. The big remaining question is whether the partial acceptance of TQM as in Dumfries will bear out in the long term because of its deficiency in the HR side. The HR side at Dumfries has received less attention over the years possibly due to the nature of the business i.e. a highly engineered technology environment driven by rapid advances in materials and manufacturing methods. The emphasis at Dumfries has appeared to be more on control of shopfloor employees, although this is not unique to the Dumfries plant and is a factor in the other European plants. This management style would be described as the 9,1 approach on the Blake and Mouton grid in chapter 3 figure 15.

It is uncertain whether the lack of progress with regard to people and teams development will adversely affect the business long term. This also raises questions as to the style of management most suitable for a particular environment. The team management approach described as 9,9 in the Blake and Mouton grid in chapter 3 figure 15, needs the necessary infrastructure in place. An organisation which has historically been subjected to the traditional management approach may not have the incentive, time, or inclination to apply resource to this area, particularly if the business environment is more geared to technology rather than people.

Finally, the research focused on three performance measures considered appropriate for TQM. The link between TQM success and performance results was relevant only for the selected range of measures and cannot be assumed to represent all business performance areas. In other words this research tells us that specific performance measures appear to be linked to TQM. However, this research cannot claim that TQM is a total business performance enhancer. Nevertheless, it has been argued that these measures are in areas where you would expect to see changes in performance. This would suggest that other performance measures like defect levels and working capital turns, would also be improved by TQM.

The limitations of the present research with regard to time-scales and data availability suggest that further work needs to be carried out to confirm the link between TQM and business performance success. A number of issues need to be addressed.

First, the performances measures used were selective and may not be representative of typical performance reporting. It was felt that *profit levels* and *Return on assets* may take longer to show a link with TQM and are also likely to be influenced by many other factors including internal company accounting conventions. The study therefore used measurements considered more closely related to TQM. However, future work should consider a more extensive range of performance measures over a longer time scale. This may also have more impact on organisations who are considering TQM.

Second, while this research is fairly unique in that it focuses on six plants belonging to a single organisation as opposed to the typical single plant research, a larger sample of plants or organisations would test the representativeness of the Gates results. The question is whether other industries are affected by the same range of influencing factors, or whether Gates is unique in this respect. (Personal experience of the author with automotive manufacturers through audit contact and benchmarking exercises would suggest that Gates is not unique). However, comparisons across organisations would raise a host of other comparability problems, whereas working in a single corporate framework at Gates allowed greater reliance on the outcome measures, standardising automatically for some of the variance that would arise through non-equivalent reporting conventions. This is in fact a strength of the present research.

Third, the time spent in some of the plants was limited to two days. A longer period in each plant may have helped to obtain a more developed view of variables with management style and staff behaviour, but the practicalities of such a requirement are likely to make it difficult to achieve.

Fourth, the model used for this work did not fully explain the results with regard to alternative routes to change being adopted or selective elements of TQM being combined with other approaches. The issue here is whether TQM, which is generally seen as holistic needs to be so applied, or whether organisations can self analyse what they need from TQM and adopt a cherry-picking strategy. The implication of the Dumfries example is that this may be feasible, but further exploration and testing of this notion is needed in order to understand which elements of organisational behaviour have most influence on change and the role environment plays in determining the final outcome.

The Future of TQM

Where is TQM now? There is no doubt that organisations are more aware of TQM and some are practising it. This is evident from the wealth of seminars at which organisations outline their successes and failures. In the current competitive environment can TQM be introduced or maintained in organisations that are engaged in down sizing? One hypothesis would be that a context of rationalisation with an associated fear factor among staff is likely to provide a hostile climate in which to make radical changes. For Guest (1992a) TQM demands a high trust set of relations and in the context described a low trust dynamic is likely to be operating and hence working against TQM. On the other hand, a crisis situation is often thought to be a critical factor in overcoming organisational inertia and getting staff to see the necessity for change (Pettigrew, 1985). This indeed was the case at Xerox when it embarked on TQM in the 1980s. However, there is an issue here as to whether crisis brings compliance (or temporary co-operation) rather than real commitment.

There are various potential future scenarios for TQM. First, that TQM is losing momentum and perceived by organisations and managers as 'it hasn't worked', possibly due to internal weaknesses of its design. This results, in disillusionment by management and the conclusion that TQM has no pay off. They blame TQM rather than their method of implementing it.

Second, that TQM is losing popularity to other systems, such as Business Process Re-engineering (BPR) which promises faster and greater impact on bottom line results. Hammer (1993:32) defines re-engineering as;

A fundamental rethink and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service and speed. The approach is based on the premise that continuous *incremental* improvement is not capable of meeting the challenge of the global market place. To succeed, companies need *major* breakthroughs in performance and to leapfrog their competitors.

BPR, unlike TQM which focuses on incremental improvements over a period of time, is focused on achieving more radical improvements in a much shorter time-scale, instead of 5% or 10% improvement in areas like lead time, BPR targets 50 - 60% levels of improvement.

MacDonald (1995) describes BPR as 'discontinuous improvement' as opposed to 'continuous improvement'. In short it is a review of how the business is managed and takes place at strategic level in the organisation.

Wilkinson and Wilmott (1995) suggest that BPR's proponents are merely presenting a variation of the TQM philosophy, which is evident from the way BPR highlights the importance attached to 'cross functional approaches' and to the focus on the supply of goods and services.

There will however be a limit to how far one can take (and keep repeating) radical change of this nature. The question then, is what to do next. Possible actions may include looking for the lower level change opportunities, which although producing less dramatic and significant savings would nevertheless continue to enhance an organisation's effectiveness. Another option in the form of new theories on change might develop i.e. BPR II, or organisations might return to TQM and accept a slower less radical form of change for the lower potential areas of their business.

Hackman (1995) believes that if TQM is properly implemented it will yield significant improvements for an organisation and that it warrants spending time and resource to achieve it. However, his projections of TQM's future is rather bleak. He feels that TQM will, over time, be demoted to just another management technique, instead of providing the means to overhaul organisations. He identifies three trends of concern.

First, 'Rhetoric is winning out over substance'. The persuasive and impressive literature on change may have helped to ensure TQM's diffusion throughout the business world, however, Hackman suggests that the versions adopted by organisations can vary considerably from that of the quality gurus, with companies sidelining or ignoring some of the more challenging

aspects of TQM's implementation, but still publicizing and suggesting they are implementing the full program. As Hackman (1995) puts it; ' Science is fading, the slogans are staying'.

Second, other management / quality techniques are being introduced under the title of TQM e.g. work redesign, empowerment programs, and this makes it difficult to distinguish between them. The result could be that by being blended together TQM loses its place as a distinct and separate quality technique.

Third, the majority of research on TQM takes in aspects of continuous improvement and centres around 'anecdotal' case studies which, look at the result before and after an intervention. Hackman suggests that while these studies illuminate the advantages of TQM, they do not provide enough focus on really understanding the nature of TQM's 'processes and practices'. Hackman (1995:25) states that;

If TQM is to prosper rhetorical excesses will have to be kept in better check than they do at present and researchers will have to do a better job of illuminating the mechanisms through which TQM practices realize their effect.

There is also literature emerging which, is questioning the TQM philosophy and model of implementation. Oren Harari (1993:34) cites one of ten reasons why TQM doesn't work as;

TQM focuses people's attention on internal processes rather than on external results. The Baldrige award is actually counter-productive, when it reinforces this internal preoccupation. It does so by allocating only 250 or so possible points out of 1000 to the actual result of a firm's quality efforts, the rest being allocated to internal process improvement.

The Baldrige award has also been criticised in recent years as the fate of some Baldrige winners led them to face business difficulties which were reflected in poor bottom line results, Rank Xerox being one of these companies, which was reported to have spent in excess of £800,000 to achieve the award (Zairi, 1994).

According to Stein (1994) TQM is also evolving to a new stage. TQM II attempts to focus more on achieving profitable results for companies in shorter time-scales. The theory developed by Goldratt, (1994), provides amongst other things, new insights into how to use the traditional TQM tools to maximise profitability. The aim of TQM II which, is still being developed, is to systematically identify areas or factors in the business which, if improved, would result in an immediate increase in profit. This then develops into a longer term continuous improvement programme. It could be argued that this approach is merely selective TQM, as developed by the Gates Dumfries plant.

There is a scenario whereby TQM still exists in a diluted format and is slowed down to suit individual organisation's style of management and prevailing circumstances, a sort of 'drip feed' version of TQM.

It is difficult to predict the future of TQM, whether it will be developed further, modified or superseded. The variable literature on TQM leaves organisations unsure of its worth and while this situation exists they will tend to develop their own approaches on an adhoc basis. It must be stressed however that TQM is only one technique in an array of approaches to change and organisations should take account of their individual circumstances, particularly the key influencing factors discussed in this thesis, before embarking on a major change programme.

Finally, as this research has shown, the issues surrounding TQM are not black and white, and influences from the various areas discussed can cause a swing between priority areas for an organisation. One thing is clear from this research, no matter which version of TQM or organisational change is being implemented, it will only be successful if it is given a high priority and full commitment, by a management that understands what the change process entails.

APPENDIX 1

EXAMINATION CATEGORIES, ITEMS, AND POINT VALUES***Malcolm Baldrige National Quality Award***

1990 Examination Categories/items	Maximum Points
1.0 Leadership	100
1.1 Senior Executive Leadership	30
1.2 Quality Values	20
1.3 Management for Quality	30
1.4 Public Responsibility	20
2.0 Information and Analysis	60
2.1 Scope and Management of Quality Data and Information	35
2.2 Analysis of Quality Data and Information	25
3.0 Strategic Quality Planning	90
3.1 Strategic Quality Planning Process	40
3.2 Quality Leadership Indicators in Planning	25
3.3 Quality Priorities	25
4.0 Human Resource Utilization	150
4.1 Human Resource Management	30
4.2 Employee Involvement	40
4.3 Quality Education and Training	40
4.4 Employee Recognition and Performance Measurement	20
4.5 Employee Well-Being and Morale	20
5.0 Quality Assurance of Products and Services	150
5.1 Design and Introduction of Quality Products and Services	30
5.2 Process and Quality Control	25
5.3 Continuous Improvement of Processes, Products and Services	25
5.4 Quality Assessment	15
5.5 Documentation	10
5.6 Quality Assurance, Quality Assessment and Quality Improvement of Support Services and Business Processes	25
5.7 Quality Assurance, Quality Assessment and Quality Improvement of Suppliers	20

6.0	Quality Results		150
6.1	Quality of Products and Services	50	
6.2	Comparison of Quality Results	35	
6.3	Business Process, Operational and Support Service Quality Improvement	35	
6.4	Supplier Quality Improvement	30	
7.0	Customer Satisfaction		300
7.1	Knowledge of Customer Requirements and Expectations	50	
7.2	Customer Relationship Management	30	
7.3	Customer Service Standards	20	
7.4	Commitment to Customers	20	
7.5	Complaint Resolution for Quality Improvement	30	
7.6	Customer Satisfaction Determination	50	
7.7	Customer Satisfaction Results	50	
7.8	Customer Satisfaction Comparison	50	
	TOTAL POINTS		1000

Source: MBNQA, 1990

APPENDIX 2

Gates European Rubber Operations

1995 Objectives

Profitability

All Business Units will be profitable.

Cost Reductions of 2% minimum on VMC will be achieved on all core products through efficiency improvements.

Growth

Rapid integrate Kleber Operations and capitalize on added resources.

Introduce minimum of 5 new product versions of technical superiority.

Market shares gains of 2% minimum in all major markets.

Link all sites to Central Distribution Project, implement Central Warehouse in conjunction with rationalization in Louvres and in Saint Just.

Total sales increase over 1994 of 30% minimum.

Market Leadership

Demonstrate Technical Leadership through active product innovation.

Closely link technical and marketing efforts.

Commitment to Service Factors of 95% minimum in all markets.

Secure no1 and no 2 market position in all core markets.

Organisation-World Class

Minimum of 25% improvement in cycle times during 1995.

All manufacturing sites to be ISO-9000 approved.

A-1 rating under new corporate criteria to be attained by all plants.

Highest quality rating on all customers audits.

Active continuous improvement within GQC process in all sectors of the organization.

Environmental Corporate Responsibility

Active safety programs are in place in all operations.

Reduction of 25% minimum in lost-time accidents in each facility.

Waste reduction of 20% as a result of active scrap reduction programs and proactive recycling concepts.

Conform with all local environmental requirements and contribute innovative concepts on all environmental issues.

APPENDIX 3

The Eight-Stage Process of Creating Major Change (Kotter)

1. ESTABLISHING A SENSE OF URGENCY

Examining the market and competitive realities

Identifying and discussing crises, potential crises, or major opportunities

2. CREATING THE GUIDING COALITION

Putting together a group with enough power to lead the change

Getting the group to work together like a team

3. DEVELOPING A VISION AND STRATEGY

Creating a vision to help direct the change effort

Developing strategies for achieving that vision

4. COMMUNICATING THE CHANGE VISION

Using every vehicle possible to constantly communicate the new vision and strategies

Having the guiding coalition role model the behaviour expected of employees

Empowering Broad-Based Action Getting rid of obstacles

Changing systems or structures that undermine the change vision

Encouraging risk taking and non traditional ideas, activities, and actions

6 GENERATING SHORT-TERM WINS

Planning for visible improvements in performance, or 'wins'

Creating those wins

Visibly recognizing and rewarding people who made the wins possible

7 CONSOLIDATING GAINS AND PRODUCING MORE CHANGE

Using increased credibility to change all systems, structures, and policies that don't fit together and don't fit the transformation vision

Hiring, promoting, and developing people who can implement the change vision

Reinvigorating the process with new projects, themes, and change agents

8 ANCHORING NEW APPROACHES IN THE CULTURE

Creating better performance through customer and productivity oriented behaviour, more and better leadership, and more effective management.

Articulating the connections between new behaviours and organizational success.

Developing means to ensure leadership development and succession.

Source:- Adapted from John P. Kotter, 'Why Transformation Efforts Fail,' *Harvard Business Review* (March-April 1995):

APPENDIX 4

Dawson's 15 Major Practical Guidelines on introducing Change

1. Maintain an overview of the dynamic and long-term process of change, and appreciate that major change takes time.
2. Recognise that the transition process is unlikely to be marked by a line of continual improvement from beginning to end.
3. Be aware of and understand the context in which change takes place.
4. Ensure that change strategies are culturally sensitive and do not underestimate the strength of existing cultures.
5. Consider the value of having a champion of change.
6. Affirm that the substance of change is fully understood.
7. Train staff in the use of new equipment, techniques or procedures.
8. Ensure senior management commitment and support.
9. Develop a committee and cohesive local management team.
10. Ensure that supervisors are part of major change programmes.
11. Gain trade union support.
12. Spend time developing good employee relations.
13. Clearly communicate the intentions of change to employees.
14. Provide appropriate funding arrangements.
15. Take a total organizational approach to managing transitions.

Source: Dawson (1994:179)

APPENDIX 5

TQM- based Performance Achievement of Top 20 Companies

Type of Indicator	Number of Companies	Score (Favourable)	Score (Unfavourable)	No Change
<i>Employee-related indicators</i>				
Employee satisfaction	9	8	1	0
Attendance	11	8	0	3
Turnover	11	7	3	1
Safety/ Health	14	11	3	0
Suggestions	7	5	2	0
<i>Operating indicators</i>				
Reliability	12	12	0	0
Timeliness of delivery	9	8	1	0
Order-processing time	6	6	0	0
Errors or defects	8	7	0	1
Product lead time	7	6	0	1
Inventory turnover	9	6	1	2
Cost of quality	5	5	0	0
Cost of savings	9	9	0	0
<i>Customer satisfaction indicators</i>				
Overall customer satisfaction	14	12	0	2
Customer complaints	6	5	1	0
Customer retention	10	4	2	4
<i>Financial performance indicators</i>				
Market share	11	9	2	0
Sales per employee	12	12	0	0
Return on assets	9	7	2	0
Return on sales	8	6	2	0

Table 25: TQM- based Performance Achievement of Top 20 Companies (Highest Scorers in Malcolm Baldrige Criteria) Source: GAO (1991) [4].

APPENDIX 6

Principle Reasons for Failure of TQM Programs (MacDonald,1993:4-5)

1. Lack of management commitment.
2. Lack of vision and planning
3. Satisfaction with the quick fix
4. The process became tool bound
5. Easy acceptance of packaged methodologies.
6. Quality became constraining
7. Culture change versus project approach
8. Creation of a quality empire
9. Management did not change
10. The people were not involved
11. Lack of real business measurable

APPENDIX 7

TQM packages available

1. Phil Crosby: fourteen steps based upon the philosophy of 'zero defects'.
2. Joe Juran: Very similar to Crosby, based upon the 'right first time' principle.
3. Richard Deming: Fourteen steps, based upon the removal of organisational quotas and controls by replacing them with leaders, and increased training for managers.
4. The Conway system: six steps, based upon 'imagineering', i.e. looking into the future and asking, 'What if?'

Major systems from the UK:

5. P A Consultants: very similar to Crosby and Deming.
6. David Hutchins Associates: based upon the extensive use of Quality Circles.

Whilst there are differences in method between the TQM packages, their overall philosophies are very similar. Deming's (1986) fourteen points for management are highly representative of the programmed step by step approach to organisational transformation which characterises these approaches. These steps in the main focus on training, leadership, and reducing barriers between staff areas and different departments within an organisation.

Source: Wilson 1992:93

(See appendix eight for details of Deming's 14 points)

APPENDIX 8

Deming's 14 Points For Management

1. Create constancy of purpose for improvement of product and services
 - * Short-term objectives must be totally consistent with long range plans.
 - * The senior management team must not become preoccupied with short-term profit.
 - * Constancy of purpose means acceptance of obligations such as; innovation, putting resources into research and education, continuous improvement of the design of both product and services, and putting resources into maintenance, and new aids in both direct and indirect areas.

2. Adopt the new Philosophy
 - * Stop learning to live with mistakes and delays.
 - * Defect prevention not defect detection and correction.
 - * Dependability of service is an important quality characteristic.

3. Cease dependence on mass inspection
 - * Routine 100% inspection is the same thing as planning for defects.
 - * Inspection is too late, ineffective, and costly.
 - * Quality comes not from inspection, but from improvement of the process.

4. End the practice of awarding business price tag alone
 - * Price has no meaning without a measure of the quality being purchased, look for signs and assurance of quality.
 - * Train the suppliers in the language of SPC.
 - * The purchasing department must understand the problems the material purchased encounters in production.
 - * Reduce the number of suppliers.
 - * Single source and develop long-term relationships

5. Constantly and forever improve the system of the production and services

- * Continual reduction of waste and continual improvement of quality in every activity.
- * Locate problems.
- * Continual improvement of quality brings a continual rise in productivity.
- * Action by management is the major cause of improvement in any process or activity.
- * Management will improve a process by active participation with experts.
- * Statistical leadership will be required in the design and analysis of tests, and to separate special causes from common causes.
- * A process that is in statistical control can be improved only by a study of the process.

6. Institute modern methods of training on the job

- * Training is a continuous exercise.
- * Use SPC in training.
- * Job rotation .
- * Ensure every worker knows who their customers are.

7. Institute modern methods of supervision

- * The supervisors should be trained in counselling techniques and must endeavour to maintain workers morale.
- * Supervisors must be empowered and directed to inform senior management concerning conditions that need correction
- * The senior management team must be prepared to act on supervisors reports.
- * Encourage team work.

8. Drive out fear

- * People should be encouraged to ask questions on any issue of which they are unsure.
- * People should be encouraged to report non-conformities in an honest fashion.

- * Employees need to feel able to solve job-related problems.
- * Open and frank two way method of communication.
- * First name terms.
- * Single status canteen.
- * No reserved car parking spaces.

9. Break down barriers between departments

- * People in research, design, purchasing, sales, etc. must learn about the problems encountered with the various materials and specifications used in production.
- * Everyone has a customer and should get acquainted with them.
- * Each department should be working for the company; eliminate departmental rivalry.
- * Encourage teamwork.
- * Encourage departments to meet inside and outside of company hours.

10. Eliminate numerical goals for the workforce.

- * Eliminate targets, slogans, pictures for the work force, urging them to increase productivity without providing the tools to achieve them.
- * Posters explaining what management are going to improve the system are acceptable.
- * Numerical goals set for other people, without provisions for a road map to reach the goal, are negative.
- * The goal should be never-ending improvement.

11. Eliminate work standards and numerical quotes

- * A work standard is a fortress against improvement of quality and productivity.
- * Work standards, rates, and piecework are manifestations of an inability to understand and provide appropriate supervision.
- * More emphasis should be placed on trusting employees to be responsible.
- * Encourage communication.

12. Remove barriers that hinder the hourly worker

- * Only management can remove these barriers and handicaps.
- * People need to have adequate equipment, machines, tooling, gauges and material to do a job they will have pride in.
- * People should know what their job is.
- * Do not rate people on numbers.
- * Management should solicit the views of operators.
- * Management need to get involved.

13. Institute a vigorous program of education and training.

- * Everybody has a new job.
- * The first step is for management to remove the barriers that rob the hourly worker of his right to do a good job.
- * Education and training will fit people into new jobs and new responsibilities.

14. Create a structure in top management that will push every day on the above 13 points.

- * All 14 points are the responsibility of management.
- * Managers from the top down must re-evaluate their belief and working practices.
- * Top management must believe in it.

Source

Deming W. E. 1982, Quality, Productivity, and Competitive Position,
Massachusetts Institute of Technology, Center for Advanced Engineering Study.

APPENDIX 9

Question Wording

1. Try to bear in mind the intended audience and use the simplest language possible to convey the meaning of the question.
2. Try to ensure that questions are not too general or insufficiently specific. 'What do you think of the President?' is vague. Instead it would be better to break the question down (perhaps) to create attitude scales on various aspects of the President's performance or personality.
3. Try to avoid using language which is prejudicial. Seemingly straightforward questions can be, unwittingly, sexist or racist in their assumptions.
4. Avoid ambiguity, that is, using words with several different meanings, double negatives, or 'two questions in one', for example, 'How long have you been unemployed and in receipt of benefit?'
5. The use of vague words should be avoided, as they tend to create vague answers.
6. Avoid leading questions such as 'You don't think that.... Do you?' People replying will either react negatively to your presumptions or answer in accordance with what they believe to be your wishes when the aim is to discover their opinions.
7. Ensure that respondents have the necessary knowledge to answer the question.
8. Do not presume the respondent follows the patterns of behaviour you wish to know about. If you are interested in how many cigarettes people smoke a day don't ask this straight away. You could begin with a filter question 'Do you smoke cigarettes?' If the answer is 'yes', you could then ask 'And how many cigarettes do you smoke per day?'

9. Avoid hypothetical questions, which elicit hypothetical answers. People may simply shrug their shoulders and say 'Who knows?'

10. Exercise some caution in the use of personal questions for both ethical and practical reasons. Insensitive use can lead to a termination of the interview or a refusal to answer the rest of the questionnaire.

Adapted from (Robson, 1993; Bryman, 1988; Fowler, 1988)

APPENDIX 10

The following questions are designed to obtain a profile of each manufacturing plant.

People

1. How many people are employed in your plant by department.
2. What is the employee age and service profile.
3. What is the employee gender split.

Plant

4. Is your plant unionised.
5. Is it single or multi union
6. What proportion of employees are in the union.
7. How long has Gates occupied the plant and how old is the plant approximately.
8. What size is the plant in square metres.
9. What is your last 5 years sales by units and value.

Reward & Recognition

10. Do you operate a suggestion scheme and if so give brief details.
11. Do you operate a bonus scheme, and if so who participates.

Training/Procedures

12. What type of training is carried out within the plant.
13. Do you have a formal flexibility training program for shopfloor employees.
14. DO you have a formal induction program for new starts.
15. Do you have a formal selection procedure for shopfloor employees and does it include psychometric testing.

Quality Planning

16. Do you have a yearly quality plan with objectives, and how is it communicated and implemented.
17. Do you measure the cost of quality.
18. Do you have a strategy for implementing TQM, if so how is it controlled and monitored, e.g. steering committee.

Participation/Appraisal

19. Do you operate problem solving teams, and if so, how many are currently operating and on what kind of problems.
20. Do you carry out annual employee surveys.
21. Do you carry out appraisals on shop floor employees, and if so is it a formal appraisal.

22. Do you organise out of work activities, eg annual barbeques, family events, social clubs.

Communication

23. What type of meetings are held in the plant, eg quarterly briefs, supervisor/ employee briefs

APPENDIX 11

Part I - Questionnaire

This section covers the factual performance data which will be used for results comparisons. If possible can you provide data from 1990 onwards, or as far back as possible.

1) Quality Factors

This involves the Single quality Factor, and if possible the Cost of Quality format. Please supply copies of the historical reports for last 3 years.

2) Working Capital Turns %

90 ____ 91 ____ 92 ____ 93 ____ 94 ____ 95 ____

3) Stock Turns

90 91 92 93 94 95

Raw Material:

W I P:

Fin Goods:

4) Yearly Defect Value %

90 ____ 91 ____ 92 ____ 93 ____ 94 ____ 95 ____

5) Manufacturing Variation %

The variation expressed as a percentage of the ideal standard, credit or debit.

90 ____ 91 ____ 92 ____ 93 ____ 94 ____ 95 ____

6) Customer Service Levels

90____ 91____ 92____ 93____ 94____ 95____

7) Customer Complaints

Number of valid complaints and Parts per million.

90____ 91____ 92____ 93____ 94____ 95____

8) Sales per Employee

I already have sales figures for 1990 - 94.

Sales

89____ 95____

Number of Employees

90____ 91____ 92____ 93____ 94____ 95____

9) Growth Levels

This will be calculated from the sales data, both units and value, and thus requires 1989 sales.

APPENDIX 12

Part II - Questionnaire

This section consists of questions relating to the framework for analysis, described in the background report.

1. Previous Initiatives

1.1 Has your plant any experience of the GEM philosophy

Yes / No

If so, when was it introduced. year _____

1.2 Has your plant had Quality Circles in operation.

Yes / No

If so, when was it introduced. year _____

Is it still Operational Yes /No

↳ How many QC's at peak _____

How many now _____

1.3 Has your plant been involved in any other Quality

Initiatives prior to adopting TQM. Yes / No

If so, when was it introduced. year _____

Program Description _____

2. Industrial Relations Climate

2.1 What percentage of your workforce have been involved in formal discipline cases, and grievance cases.

Discipline 1993 _____ 1994 _____ 1995 _____

Grievances 1993 _____ 1994 _____ 1995 _____

2.2 What are your absence levels, Staff and shopfloor.

Staff: 1993 _____ 1994 _____ 1995 _____

Hourly: 1993 _____ 1994 _____ 1995 _____

2.3 What is your labour turnover % (Standard measure)

1993 _____ 1994 _____ 1995 _____

2.4 How many QIP teams were operational from 1993 to 1995.

1993 _____ 1994 _____ 1995 _____

2.5 Do you carry out employee attitude surveys. Yes / No

If Yes, How frequently _____ Times / Year

3. Workforce Profile

3.1 What is the average age of your employees. _____ Years

3.2 How many skills on average do your hourly paid employees have. A skill is classed as one job, eg grinder, cutter.

_____ Skills / Employee

4. Organisation Structure

4.1 What is the ratio of supervisors to shopfloor employees.

4.2 Do you currently have a steering committee for overseeing the TQM strategy.

Yes / No

4.3 Who is on the committee and how often does it meet.

Title _____ Title _____

Title _____ Title _____

Title _____ Title _____

Meeting _____ Times / Year.

4.4 Do you employ facilitators to assist the implementation of TQM.

Yes / No

What facilitator training did they receive. Internal / External

How many days training _____ Days

6. Resources

6.1 What percentage of Sales is spent on TQM education and training in 1994 and 1995.

1994 _____ %

1995 _____ %

6.2 Where is TQM training carried out.

Internal / External / Both

6.3 How much annual time is allocated to TQM training.

_____ hrs / employee / year

6.4 How many TQM facilitators do you employ _____

6.5 Who prepares and presents the training material.

Internal / External / Both

6.6 Do you engage in training initiatives with other organisations, if so, who and when.

Yes / No

7. Customer Influence

7.1 What major customers audit your plant, give total number and list the top five below.

Total number _____

1

2

3

4

5

Names:

Length
of Audit

Length of
Relationship

Relationship

Value:-

Poor

Fair

Ave

Good

V.G

7.4 Do you visit these major customers out-with audits. Yes / No

If Yes, How many customers _____

7.5 Have these major customer or any other customers influenced your strategy towards TQM, either directly or indirectly.

If so, in what way.

7.6 Do you operate JIT, Kanban, Lean Production, systems in manufacturing.

JIT Yes / No Yr of Intro _____ Complete/ Partial

Kanban Yes / No Yr of Intro _____ Complete/ Partial

Lean Prod Yes / No Yr of Intro _____ Complete/ Partial

8. Management Culture

How well do these statements describe management within your plant
(Circle the appropriate answer)

8.1 Decisions on day to day operations are made with the involvement of the employees affected by them.

Not at All		Partially		Very much
1	2	3	4	5

8.2 Decisions are delegated to the people who take action.

Not at All		Partially		Very much
1	2	3	4	5

8.3 All sections of the company are guided by shared

a) Visions

Not at All		Partially		Very much
1	2	3	4	5

b) Values

Not at All		Partially		Very much
1	2	3	4	5

8.4 Senior management are involved supporting the TQM programme.

Hardly at All Occasionally Continuously

1 2 3 4 5

8.5 Employee empowerment is encouraged at all levels.

Not at All Partially Very much

1 2 3 4 5

8.6 Employee empowerment is present more as rhetoric than as reality.

Agree strongly Disagree strongly

1 2 3 4 5

8.7 Consensus is practiced throughout the management levels.

Not at All Partially Very much

1 2 3 4 5

9. Views of TQM Progress

9.1 How close is your plant to realising it's TQM goals.

20% 40% 60% 80% 100%

9.2 Which of the following factors have had the most influence on TQM progress in your plant. Rank in importance 1 = top

Culture Commitment Training Leadership Customers

9.3 What impact will TQM have on your plant over the next 2/3 years.

Little Moderate Major

1 2 3 4 5

APPENDIX 13

Total Quality Management Questionnaire

Instructions: please circle the number of the response which best represents the level of agreement that your company has with the following statements.

Since our firm began implementing a total quality management programme:		Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
1	Our TQM efforts have been beneficial in strengthening our competitive position in our industry.	1	2	3	4	5
2	Considering the investment we have made and the benefits we have received, we would not begin implementing TQM again if we had the opportunity to "start from scratch".	1	2	3	4	5
3	The number of employees participating on quality teams has increased.	1	2	3	4	5
4	Employee satisfaction has decreased	1	2	3	4	5
5	Voluntary separations of employees from the company (employee turnover) has increased.	1	2	3	4	5
6	The number of product/service defects, errors, or breakdowns have increased.	1	2	3	4	5
7	The number of product/service defects, errors, or failures found by the customer has increased.	1	2	3	4	5
8	Product/service order processing time (the time required to respond to a customer order or request) has decreased.	1	2	3	4	5
9	Product lead time has decreased.	1	2	3	4	5
10	Our cost of quality has decreased	1	2	3	4	5

Since our firm began implementing a Total quality management programme:	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
11 The number of customer complaints has decreased.	1	2	3	4	5
12 Our firm's overall market share has decreased.	1	2	3	4	5
13 Our firm's sales per employee have increased.	1	2	3	4	5
14 Our firm's return on assets have increased.	1	2	3	4	5
15 Customer focus has decreased.	1	2	3	4	5
16 Formality of communication between depts has increased.	1	2	3	4	5
17 Information sharing has increased.	1	2	3	4	5
18 Inventory turnover has decreased.	1	2	3	4	5
19 Timeliness of delivery has improved for getting products/services to the customer.	1	2	3	4	5
20 Supplier relationships have strengthened.	1	2	3	4	5
21 Increased product/service quality has not been experienced.	1	2	3	4	5
22 The "plan-do-check-act" approach is not used in our company (Deming cycle).	1	2	3	4	5
23 Teams are used heavily to develop process improvements on a continuous basis.	1	2	3	4	5
24 Do you consider your TQM programme successful?	Yes			No	

(See Appendix 15 for details of questionnaire results) (Source: Ahmadi and Helms, 1995)

APPENDIX 14

INTERVIEWS - PLANT LEVEL Plant _____ Date _____

1. Why was TQM Implemented

1.1 What were the reasons for implementing TQM.

1.2 Who decided to implement TQM.

2. How was TQM Implemented

2.1 Who was responsible for the implementation.

2.2 Was there a formal strategy.

2.3 Was there a steering committee.

2.4 Was there any external input, eg consultants.

2.5 Was it a top - down diffusion programme.

2.6 What were the steps, strategy.

2.7 How long was each stage.

2.8 What type of training took place.

2.9 Who carried out the training.

2.10 What happened after the basic TQM training.

2.11 What percentage of the workforce have been trained.

3. How successful was the Implementation

3.1 Gain Commitment To Change By Organising the Top Team.

Once the decision to adopt a TQM strategy has been taken the first step is to gain the top team commitment. An appreciation of process alignment is required by the team. Process Alignment involves a broad review of the Organisation and the changes required by the top team.

Gaining a shared diagnosis of what changes are required.

What the business problems are.

What must be improved.

The Top team working as a team, (Belbin Team Rolls).

3.2 Develop a Shared Mission and Vision of the Business.

The mission statement gives a purpose to the organisation. It should answer the questions, What are we here for, or What is our basic purpose, and therefore must define the boundaries in which the business operates. Some business analysis may be required at this stage. This may include profiling the Organisation, S W O T Analysis, Identifying Quality Costs.

Was there a Strategic Planning Workshop.

Was a Quality Policy developed.

3.3 Define the Measureable Objectives, which must be agreed by the Team as being the Quantifiable Indicators of Success in terms of the Mission.

These indicators will help to translate the directional and sometimes " loose" statement of the mission and vision into clear targets and in turn to simplify management's thinking. They can later be used as evidence of success for the team.

Were measurable objectives defined.

3.4 Develop the Mission into Critical Success Factors (CSF's).

Once the top team begin to list the CSF's they will gain some understanding of what the mission or the change requires. The first step in moving from mission to CSF's is to brainstorm all the possible impacts on the mission. In this way items ranging from politics to costs, from national cultures to regional market peculiarities may be derived. They are the minimum key factors or subgoals that the organisation must have or need, and which together will achieve the mission. It will be important to know when the CSF's have been achieved through key performance indicators, KPI's, but the more important step is to use the CSF's to enable the identification of the processes.

Were the CSF's listed. (These factors should achieve the Mission).

Were the Processes identified, eg We must have (right first time) suppliers.

3.5 Breakdown the Critical Success Factors into the Key or Critical Processes and gain Process Ownership.

The key or critical processes describe what actually is or needs to be done, so that the organisation meets its CSF's. As with the CSF's and the mission each process necessary for a given CSF must be identified and together the processes listed must be sufficient for the CSF's to be accomplished.

Each business process should have an owner who is a member of the top management team that agree the CSF's. The process owners should form a process quality team to take the next steps in quality improvement. Were the processes for a given CSF identified, i.e. what needs to be done, eg Measure supplier performance. Each process needs an owner who is a member of the Top team that agreed the CSF's.

Was the implementation action plan organised.

Were seminars arranged for the top team.

Were facilitators identified and trained

Was a TQ coordinator identified.

Was the TQ philosophy communicated to the workforce.

Was there company wide GQC training.

3.6 Breakdown the Critical Processes into sub processes, activities and tasks, and form Improvement Teams.

The Quality Improvement Teams can be broken into 2 types;

1. Corrective action teams -- imposed to solve problems.
2. Continuous Improvement Teams -- voluntary and from the same work area.

Reward and Recognition is also important, consideration for both individuals and teams. This may comprise certificates, awards, profit sharing and quality champions. Once the processes have been analysed, it should be possible to develop metrics for measuring the performance of the processes, sub processes, activities and tasks. These must be meaningful in terms of the inputs and outputs of the processes, and in terms of the customers and of suppliers to the processes.

Were QI teams formed, what type.

Were processes broken down into sub processes, activities and tasks.

Were metrics developed for measuring the performance of the processes, sub processes, activities and tasks.

3.7 Monitor and Adjust the Process Alignment in response to difficulties in the Change Process.

This stage may result in some casualties, i.e. individuals who are not capable or are not prepared to accept the changes in spite of all the direction, support and peer pressure brought about by the Process Alignment. This final step completes the cycle and starts the next continuous improvement cycle.

Was the program monitored and adjusted.

Were there any casualties or re-organisations.

4. Pressure from Senior Mgt

4.1 Where did the TQM initiative originate, corporate, divisional or plant level, and when.

4.2 How was the TQM initiative communicated to employees, eg who, where, when.

4.3 Did Corporate or Plant Mgt indicate that TQM was required to improve the plants performance.

4.4 Have there been any significant personnel changes which have affected the TQM initiative, e.g. easing out or new blood.

5. Bandwagon Effect

5.1 Did Corporate and or plant mgt feel pressurised to implement a TQM program due to;

- a) Institutional Pressure, i.e. other organisations were all adopting TQM and the pressure was to stay in tune with industry.
- b) Competitive Pressure, i.e. fear that competitors will gain an advantage over them by adopting TQM.
- c) Customer pressure.

6. Human Resource Management

6.1 What role has the HRM function played in the TQM strategy.

If a key role, what.

If not critical, why not.

7. Management Ability

7.1 What experience do the management team have of implementing TQM.

7.2 How would you describe the management style, e.g. strong control, laissez faire.

7.3 Do senior management play a leading role in the TQM program.

7.4 Does the TQM initiative appear in the strategic and dept plans.

7.5 What is management's view of progress to date on the TQM program.

7.6 What are seen as the main issues in implementing TQM in your plant.

7.7 Has senior management mapped out the next steps in the TQM journey, i.e. where to next.

7.8 Are lower levels of management and or teams empowered to make decisions, - examples.

8. Diversions

8.1 Have there been any events or conditions which have influenced or affected progress of the TQM program, e.g. new investment, market conditions, key personnel changes.

9. National Traditions / Cultures

9.1 Do you think there are any national traditions or cultural aspects which may affect the implementation of a TQM program in your plant as opposed to other plants, e.g. Germany v America.

10. Approach Adopted

10.1 How has the TQM initiative been approached in your plant, eg topdown, bottom up or both.

APPENDIX 15

Different Views on the Impact of TQM

Table 26: Results of TQM Questionnaire (See Appendix 13 for Question Details)

Question No's	Plants / Answers						
	A	B	D	E	M	S	
1	5	3-4-5	4	4	5	4-5	*
2	1	1	1	1-2	1	1-2	*
3	4	2-3-4	2-4-5	3-4-5	4	4-5	
4	1	4	1-2	2-3	2	2-3	
5	1	1-2	1-2	2-3	4	2-3	
6	1	3-4-5	1-2-4	1-2-3	2	2-3	
7	1	2-3-5	1-2	1-2-3-4	4	1	
8	4	4	1-5	3-4	4	5	
9	5	4	2-4-5	2-4	4	3-4-5	
10	4	2-4	3-4	3	5	3	
11	3	2-3	4-5	2-3-4	3	4-5	
12	1	1	1	1-2	2	2	*
13	5	1-4-5	5	3-4-5	5	4-5	
14	5	3-4	5	2-3-5	5	4-5	
15	1	1	1	1-2-3	1	1	*
16	4	2-4	4	1-2-3	2	-	
17	4	4	4	3-5	4	5	*
18	1	2-3	1-2	2-3	1	1	
19	3	4	2-4	3-4-5	4	5	
20	5	4-5	3-4	2-3-4-5	3	5	

Table 26: Results of TQM Questionnaire

Question No's	Plants / Answers					
	A	B	D	E	M	S
21	1	2-3	1-2	2-3-4	3	1
22	1	1-2-3	1-2	1-2-3-4	3	1-2
23	4	2-3	2-4	3-4-5	5	5
24	Y	Y/N	Y	Y/N	Y	Y

Notes:- Plants A and M gave group consensus : Plants B and E exhibit the largest range and variation in answer to question 24 : * Denotes common answers

Table 8: Personnel involved in questionnaire

Plants	Personnel involved in the TQM Questionnaire	Number
A	Personnel Mgr, Quality & Prod Managers, Applications Eng.	4
B	Plant Manager, Production and Quality Managers.	3
D	Quality and Production Managers, Department Manager.	3
E	Plant Manager, Operations, Quality and Finance Managers.	4
M	Plant Manager, Materials Manager, Technical / Eng Manager.	3
S	Operations Manager, Quality Manager, Supervisor, SPC Co-ordinator.	4

APPENDIX 16

Incentive

Incentive Factors	Plants					
	A	B	D	E	M	S
Business Performance	Low	Low	Low	Low	Low	Low
Customer Influence	Med	Low	Med	Low	High	Low
Bandwagon Effect	Low	Med	Low	Low	Med	Med
Senior Mgt Pressure	Med	High	Low	Low	Med	Med
Overall Points Score	6	7	5	4	8	6
<i>High → Low Plant</i>	M	B	= S	= A	D	E

Table: 27 Incentive Sub Factors

Table 27 shows each of the four sub-factors relating to Incentive. A low rating suggests that a particular factor had minimal impact on a plant's incentive to implement the TQM Program. Medium and High ratings operate similarly for moderate and strong effects respectively. In order to rank the plants overall a points system has been adopted. It assumes a linear relationship between the variables and that all factors are of equal importance. Three points are allocated for a high influence, two points for a medium and one point for a low influence. The points for each plant are then added up and the plants are ranked overall from high to low starting from the left side of the table. For example, from the table plant M with one low, one high and two medium, scores 8 points overall, whereas plant B, with two lows, one medium and one high, scores 7 overall and is thus positioned after plant M in the overall rankings. An = sign means that two or more plants have achieved the same rating score. The valuation of each influencing factor has been arrived at following discussion with each of the plant contact personnel.

1. Business Performance Influence was deemed to be of low influence across all the plants after viewing the positive growth figures. These were hard measures.
2. Customer Influence varied across the plants depending on the level of pressure being exerted by customers. This information was obtained from the contact personnel using the questionnaires. (appendix 12, section 7).
3. Bandwagon effect was determined partly from the authors interpretation and discussion with the contact personnel, supported by questionnaire returns. (appendix 14, section 5).
4. Senior Management Pressure effect was also gained as item 3 above. (appendix 14, section 4)

The feedback from the respondents in each plant confirmed the final conclusions on each of the incentive variables. There did not appear to be any clash between the information gained from questioning the respondents and the author's interpretation. Independent research would most probably reveal the same conclusions, since the responses were clear and unambiguous in most cases.

Business performance was gauged from the hard data on plant growth performance. Customer influence although more subjective, was gauged by the detailed questions in appendix 12, section 7. The author, through experience of major automotive customer audits, was also aware of the level of influence major customers can exert on their suppliers, in particular the automotive OE customers i.e. Ford,

The Bandwagon effect was the most subjective of the measures and the author had to interpret the strength of this variable by utilising some informal discussion throughout the visits, in order to gauge the overall strength. This was necessary to avoid any bias from relying only on one source. The effect of senior management pressure, while partly subjective, was easier to

interpret since all the plants belonged to one company which had a common strategy regarding TQM. The only variation was the strength of the signals from corporate and divisional levels which varied slightly from divisions and plants. The author's prior visits to the European plants assisted in determining where slight differences existed, although these were minimal. In the case of the US plants, the author also utilised informal discussion with the European Vice President who was familiar with the corporate approach. The author also had to place more reliance on the US plants responses, however, there was nothing to suggest that approaches differed in any significant way.

APPENDIX 17

Receptivity

Appendix 12 sections 1-5 detail the receptivity questions asked during the plant visits. The detail of each section is now considered.

Previous Initiatives

Factors	Plants					
	A	B	D	E	M	S
GEM	No	Yes-3	No	No	Yes-2	Yes-1
Quality Circles	Low	No	Low	Med	Low	Low
Others Initiatives	No	Yes	No	No	Yes	Yes
Overall Points Score	1	2	1	2	3	3
<i>High → Low Plant</i>	S	M	B	E	=A	=D

Table 28: Previous Initiatives

Table 28 details the sub-factors relating to Previous Initiatives. The three sub-factors have been evaluated again using a points system to achieve an overall ranking of highest to lowest receptivity towards a TQM program.

The GEM factor allocates one point if GEM existed in a particular plant and zero points if it did not. In addition to this, the three plants, which did implement GEM have been graded by the author based on the perceived level of implementation. This was obtained during discussion with plant personnel. It was felt by the author that GEM had a major impact on receptivity and where two plants received the same overall points score, as in the case of plants M and S then the GEM rating would be used to decide the final ranking.

The grading for Quality Circles is slightly different in that three points have been allocated for a high level of QC activity, two points for medium, one point for low and zero points

where no QC's operated. The low grading level of QC's was in all cases where a plant had operated a few QC's in the past for 1-2 years, but they no longer existed during the study period. The medium rating was given where some QC's still existed.

Other Initiatives relate to any type of quality or business improvement initiative which may have assisted in preparing a plant for organisational change. Points for this sub-factor are allocated purely on whether an initiative existed or not and does not consider evaluation of how effective it was or the level of effect on receptivity towards the Gates TQM program.

Industrial Relations

Factors	Plants					
	A	B	D	E	M	S
Disputes	Low	Low	Low	Low	Low	Low
Discipline - Ranking	1	2	5	4	3	6
Absence "	6	3	4	5	2	1
Labour Turn/Over	1	3	4	6	2	5
Work force morale *	2	3	=5	4	1	=5
Overall Points Score	18	17	10	9	20	11
<i>High → Low Plant</i>	M	A	B	S	D	E

Table: 29 Industrial Relations

* (See Table 30 below)

Table 29 details the sub-factors relating to Industrial Relations. The first sub-factor Disputes has been allocated a low level due to the information not being readily available, however, following discussion with plant contacts, all plants appeared to be free of any serious disputes. The sub-factors Discipline, Absence and Labour turnover have been graded by taking the average of the results for each plant for 93-95 and grading the plants from best to least, starting from the left side of the table. The points allocation is based on 6 points for best moving to 1 point for least, except where two or more plants are equal in points, in which case the equal plants receive the same points allocation i.e. if two plants are second equal, each receive 5 points and the next placed plant would receive 3 points for being in fourth position.

Absence level is based on hourly paid employees, since staff figures were not available in all plants, however, staff absence was extremely low in all plants (4) which did supply data, i.e. 1-1.5%.

Work force morale is difficult to gauge. However, the assessment has been based on a combination of the three sub-factors mentioned above and an additional factor involving the number of Quality Improvement teams in operation in each plant over the study period 93-95. Table 19 below details the calculation. The evaluation did not take account of the quality and make up of the QIT's (See discussion on p208/9 for details). The same points system has been used in table 19 i.e. 6 for best, moving to 1 for least.

The overall Industrial Relations grading is based again on the same points system and Table 29 shows from left to right the best - least plant. Again the scoring system assumes a linear relationship.

Table 30: Work Force Morale

Factors	Plants					
	A	B	D	E	M	S
Discipline - Ranking	1	2	5	4	3	6
Absence "	6	3	4	5	2	1
Labour Turn/Over	1	3	4	6	2	5
No of QIT's - Ranking	3	4	5	1	2	6
Overall Points Score	17	16	10	12	19	10
Work force morale * Ranking	2	3	=5	4	1	=5

Work Force Profile

Factors	Plants					
	A	B	D	E	M	S
Ave Age - Ranking	2	1	5	4	6	3
Teamwork - Ranking	5	2	4	6	1	3
Overall Points Score	7	11	5	4	7	8
<i>High</i> → <i>Low Plant</i>	B	S	=M	=A	D	E

Table: 31 Work Force Profile

Table 31 details the sub-factors relating to Work Force Profile. The first sub-factor average age has been graded in such a way that the plant with the youngest average age is considered best, moving from left to right across the table. The skills per operator are the same across the plants with one exception which is only slightly less. This sub-factor has therefore been excluded from the grading calculation. The teamwork ranking has been arrived at through judgement by the author, following discussions with each plant on the type of day to day teamworking and how the plants are structured, i.e. in the US plants, each department has its own team comprising many different functions, whereas most of the European plants operate with centralised functions and demonstrate lower levels of day to day teamworking. The overall ranking is again based on 6 points for best and 1 point for least, with some plants being equal, i.e. M and A.

Organisation Structure

Factors	Plants						
	A	B	D	E	M	S	
Ratio Supv/Ops - Rank	4	3	6	5	2	1	
Steering Committee	N	Y	N	N	Y	Y	
Organisation Structure	G	G	G	Ave	G	G	
Overall Points Score	5	7	3	3	8	9	
<i>High</i> → <i>Low Plant</i>	S	M	B	A	D	E	

Table: 32 Organisation Structure

Table 32 details the sub-factors relating to Organisational Structure. The first sub-factor, ratio of supervisors to shopfloor operators, is graded whereby the plant with the lowest ratio is considered the best, running from left to right across the table i.e. a 1:30 ratio being better than 1:40. Due to the potential difficulty in attempting to use two types of scoring system in the one table and the fact that the literature on TQM suggests that the existence of a steering committee is a major factor in structuring for a TQM program. It was decided to give priority to this second sub-factor. This meant that even if a plant with a steering committee had a lower supervisor: shopfloor operator ratio than a plant without a steering committee, it would still be rated better overall. As it happened there were no instances of this occurring in the study and in all cases the plants with Steering Committees had the best ratio of Supervisor / operators.

The structure for all plants with the exception of E was good and again this sub-factor has taken second place to first Steering Committees and then the ratio of Supervisors / operators for the purposes of ranking. The overall ranking for Organisational Structure has been arrived at as follows;

1. First, the plants with Steering Committees were graded using the Ratio Supervisors / operator sub-factor (since all these plants structures were good). The best to least running from left to right in the table.
2. The plants with no Steering Committee were then graded as above except that in this case plant E, which although having a higher ranking for Supervisor/ operator ratio than plant D, was still placed last due to a poor organisational structure . This structural failure in plant E is due to two plants trying to operate on one site. (see discussion on page 183).

Organisational Policies

Factors	Plants					
	A	B	D	E	M	S
Reward & Recognition	Y	Y	N	N	Y	Y
Communication	Qtly	Qtly	Qtly	Qtly	Mnly	Mnly
Attitude Surveys	Y	Y	N	N	Y	Y
Bonus Scheme	N	Y	N	N	N	Y
Overall Points Score	3	4	1	1	4	5
<i>High</i> → <i>Low Plant</i>	S	=B	=M	A	=D	=E

Table: 33 Organisation Policies

Table 33 details the sub-factors relating to Organisational Policies. Ranking has been based on allocating points based on whether the sub-factors are used in the plants, i.e. if yes, then 1 point is allocated, if no, then zero points. The only exception is communication whereby quarterly briefs have been allocated 1 point and monthly briefs 2 points. The overall ranking has been calculated by totalling the points for each plant and ranking them from best to least, again starting from the left side of the table.

APPENDIX 18

Ability

Appendices 12 and 14 detail the ability questions asked during the plant visits. The detail of each section is now considered.

Human Resource Management

Factors	Plants					
	A	B	D	E	M	S
Train Resource - Rank	=3	=3	5	6	2	1
Attitude Surveys	Y	Y	N	N	Y	Y
Direct Participation	M	H	L	L	M	M
Overall Points Score	7	8	3	2	8	9
High → Low Plant	S	=B	=M	A	D	E

Table: 34 Human Resource Management

Table 34 details the sub-factors relating to HRM. The questions relating to this area are found on appendix 14, sect 6, appendix 12, sect 2 and 6. *Training resource* is based on the value spent on training, averaged for 1994/95 and expressed as a percentage of the total plant sales. The plants are then graded with the highest percentage being considered the best and again running from left to right in the table. Six points are allocated to the best plant and one point for lowest plant. *Attitude surveys* are either present or not and one point is allocated if present and zero points if not. *Direct participation* ranking has been based on the author's evaluation of the level of HRM involvement. This was based on discussions with HR personnel and other plant personnel. Points for this sub-factor have been allocated on the basis of 3 points for high involvement, 2 for medium and 1 point for low involvement. The *overall ranking* is

based on totalling the points for each plant over the sub-factors and again showing best to worst from left to right in the table.

Resources

Factors	Plants					
	A	B	D	E	M	S
Funding - Ranking	=3	=3	5	6	2	1
Trainers -Ranking	=4	2	=4	=4	3	1
Time / Effectiveness	L	H	L	L	M	M
Overall Points Score	8	12	6	5	11	14
<i>High → Low Plant</i>	S	B	M	A	D	E

Table: 35 Resources

Table 35 details the sub-factors relating to Resources. The questions relating to this area are found on appendix 12 sect 6. *Funding* is based on the value spent on training, averaged for 1994/95 and expressed as a percentage of the total plant sales. *Trainers* is based on both the number of trainers, supplied by the plants, and the level of training perceived by the author. This is a judgement following discussions with plant personnel and is based on the perceived quality of trainers, regarding skills, training and availability to facilitate teams. *Time/Effectiveness* is also a judgement by the author on how much time is allocated to team meetings, facilitation and also how effective it appears to be regarding the number and level of problems being addressed by the teams. This sub-factor has been graded as high, medium or low, with 3 points allocated for high, 2 for medium and 1 point for low. The *overall ranking* has been based on totalling the points for each plant over the sub-factors and again showing best to worst from left to right in the table.

Management Ability

Factors	Plants					
	A	B	D	E	M	S
Style - Ranking	Low	High	Low	Low	High	High
Behaviour - Ranking	Low	Med	Low	Low	High	High
Comm / Leadership	Low	High	Low	Low	High	High
Perceptions	Low	High	Med	Med	High	High
Overall Points Score	4	11	5	5	12	12
<i>High → Low Plant</i>	=S	=M	B	=D	=E	A

Table: 36 Management Ability

Table 36 details the sub-factors relating to Management Ability. All the factors are ranked by the author following specific questioning found in Appendices 10-12 and also some informal discussion with the plant contact personnel. These sub-factors have been graded as high, medium or low, with 3 points allocated for high, 2 for medium and 1 point for low. The *overall ranking* has been based on totalling the points for each plant over the sub-factors and again showing best to worst from left to right in the table.

APPENDIX 19

Plant Performance Measures

Measures	Plants					
	A	B	D	E	M	S
Cost of Quality	24	7	29	13	19	14
Ranking	5	1	6	2	4	3
Customer Service	78	83	87	75	93	94
Ranking	5	4	3	6	2	1
Customer Complaint	93	26	101	142	274	341
Ranking	2	1	3	4	5	6
Overall Points	9	15	9	9	10	11
Overall Ranking	=4	1	=4	=4	3	2
High → Low	B	S	M	=D	=A	=E

Table 37: Detail of Plant Performance Measures

The data for each of the sub-factors has been factorised in order to maintain company confidentiality. The Cost of Quality (COQ) is ranked whereby the plant with the lowest percentage is in the highest ranked position, with the other plants following likewise. Customer Service is ranked whereby the plant with the highest percentage is in the highest ranked position. Customer Complaints is ranked whereby the plant with the lowest figure is in the highest ranked position. Points are allocated on the basis of 6 points for best moving to 1 point for lowest in each of the sub-factors, then totalled to give the overall points score and then the overall ranking.

APPENDIX 20

Performance Measure Improvement

Measures	Plants					
	A	B	D	E	M	S
Cost of Quality	2.4	7.7	2.4	26.4	10	11.6
Ranking	=5	3	=5	1	3	2
Customer Service	(1.4)	(5.8)	4.8	(23.8)	(1.1)	(2.1)
Ranking	3	5	1	6	2	4
Customer Complaint	(8.6)	(7.7)	67.9	(220)	(8.1)	11.1
Ranking	5	3	1	6	4	2
Overall Points	=8	9	14	=8	12	13
Overall Ranking	=5	4	1	=5	3	2
High → Low	D	S	M	B	=A	=E

Table 38: Detail of Plant Performance Measures Improvement

Table 38 shows the percentage improvement for each of the selected performance measures over the period 1993-95. Where a () sign appears, this means that instead of improving, the performance deteriorated. An = sign means that two or more plants have achieved the same rating score. The *overall ranking* is based on totalling the points for each plant over the sub-factors and again showing best to worst from left to right in the table.

Appendix 21

Alternative Performance Measures

Measures	Plants					
	Best	—————→				Least
1. Wk Capital Turns	M	E	A	D	B	S*
2. Manf Variation	M	S	A	D	E	B
3. Stock Turns	D	A	B	M	E	S*
4. Sales/ Employee	E	A	B	M	D	S
5. Growth (value)	B	M	D	E	S	A
Overall Performance	M	A	=D	=E	B	S

Table 39: Plant Comparisons (Three years average results: 1993-95)

* Denotes figures not available

Table 39 shows the alternative performance measures based on average results over the period 1993-95. The overall grading calculation is based on a simple points system e.g. 6 points for best and 1 point for least. Table 40 below details the actual three year average data used. However, for reasons of company confidentiality, the data has been factorised. As a reminder the measures are detailed below. Defect levels have not been used due to differences in systems used throughout some of the plants.

1. *Working Capital Turns* which comprises the total plant manufactured sales divided by the net working capital at year end and expressed as a number of turns.
2. *Manufacturing Variation* which comprises the percentage variation between the manufacturing budget and the actual results.

3. *Stock Turns* which comprises the cost of goods sold at variable manufacturing cost, annualised, and divided by the monthly inventory.
4. *Sales / Employee* which comprises sales per year divided by the average number of employees on the payroll each year.
5. *Growth Levels* which comprises the level of sales growth each year compared to the prior year, expressed as a percentage.

Alternative Performance Measures Detail

Measures	Plants					
	A	B	D	E	M	S
1. Wk Capital Turns	4.7	1.5	1.9	4.9	18.5	*
Ranking	3	5	4	2	1	6
2. Manf Variation	(1.8)	9.4	0.5	1.8	(6.1)	(3.3)
Ranking	3	6	4	5	1	2
3. Stock Turns - RM	23	18	27	6	16	*
FG	9.3	9.2	9.4	5.4	6.8	*
Ave Ranking	2	3	1	5	4	6
4. Sales/ Employee	137	126	100	141	102	75
Ranking	2	3	5	1	4	6
5. Growth (value)	2.7	45	16	26	13	4.4
Ranking	6	1	4	3	1	6
Overall Ranking	2	5	=3	=3	1	6

Table 40: Plant Comparisons Detail (Three years average results: 1993-95)

* Denotes figures not available

APPENDIX 22

Employee Survey of Gates Power Transmission Dumfries

The full report is company confidential however, presented here is a section of the 1991 survey carried out by Professors Hunter and Beaumont of Glasgow University. The Power Transmission operation had transferred to a new purpose built factory in 1990. This area focuses on the gradient effect found in the analysis of results. The interviews covered 23 employees in five areas of the business.

The Gradient Effect

In developing the analysis they sensed differences in attitudes at different stages of the operation. They also found that while some answers were clear-cut for a majority of our sample, other questions gave results which clustered at the extreme ends of the scale. It seemed possible that these 'mixed' responses reflected differences of view associated with different locations in the production process. They re-analysed the data for these questions for each of the following groups;

Supervision : Warehouse : Engineering: Manufacturing : Finishing

Since the numbers were small, there were risks of misrepresentation. The warehouse and engineering groups were merged in the presentation because of the small numbers, but the response were fairly close in these two areas.

Their questions used a five-point scale (usually 5 = very good, 1 = very poor). Mean scores for each question were calculated for each group of employees. A mean value of 3 would indicate an average or middle of the road response, over 3 would be above average, under 3 below average. The results are shown in Table 41

The results show a remarkable degree of consistency. The mean scores for supervisors and warehouse/ engineering are high, they fall somewhat for manufacturing and are consistently low for finishing workers. (The only exception is 'management toughness' where the scoring system is reversed, with 5 = 'much tougher', 1= 'much slacker': so the results shown are consistent with gradient for other questions.)

To summarise:

- (1) The 'mixed answers' are better understood when analysed by work groups
- (2) The dissatisfaction factor is low for supervisors, warehouse and engineering, rises for manufacturing and is highest for finishing workers.

Gates Survey : Analysis of Questions Showing Polarisation (Mean Scores)

Gates as an Employer	Supervision	Warehouse/ Eng	Manufacturing	Finishing
2B provision of information relevant to workplace	3.3	3.8	3.0	1.8
2D mgt. keeps promises	4.0	3.4	2.6	2.1
2E company listens/ responds to employee views	3.3	3.4	2.6	2.0
3E my job provides an interesting work experience	3.6	4.0	2.3	2.1
New Plant				
1B well informed about design of new plant and planning	3.6	3.0	3.1	2.6
6 able to Influence working arrangements in new plant	3.6	3.4	2.0	1.0
7 senior management controls tougher than before	4.3	3.4	3.8	4.2
8 job in new factory an improvement on old job	4.3	4.4	3.0	2.4
	(n = 3)	(n = 5)	(n = 10)	(n = 5)

Table: 41 Dumfries Plant Employee Survey

Source : Beaumont and Hunter (1991)

APPENDIX 23

ROVER RG 2000 Questionnaire**4.0 TOTAL QUALITY****4.1 PHILOSOPHY AND TO STRATEGY**

4.1.1 Communication of quality vision for the business to employees

4.1.2 Production and communication of company mission statement

4.1.3 Establishment of a Total Quality Performance status

4.1.4 Strategic programme for cultural change in the business

4.1.5 Key principles for improving customer relationships

4.1.6 Manufacturing and business processes improvement

4.1.7 Communication of business 'process' performance information

4.1.8 Extension of the TQ philosophy to suppliers and its influence on relationships

4.1.9 Status of the TQ training programme for all employees

Sub-Section Total

4.2 APPLICATION OF TO PRINCIPLES IN MANUFACTURING

4.2.1 Total Quality Leadership (Management Led) in manufacturing areas

4.2.2 Total Quality Scope (Company Wide) in manufacturing areas

4.2.3 Total Quality Involvement (Everyone Responsible) in manufacturing areas

- 4.2.4 Prevention Not Detection in manufacturing areas
- 4.2.5 Zero Customer Defects in manufacturing areas
- 4.2.6 Cost of Quality in manufacturing areas
- 4.2.7 Continuous Improvement in manufacturing areas

Sub-Section Total

4.3 APPLICATION OF TQ PRINCIPLES IN ADMINISTRATION

- 4.3.1 Total Quality Leadership (Management Led) in administration areas
- 4.3.2 Total Quality Scope (Company Wide) in administration areas
- 4.3.3 Total Quality Involvement (Everyone Responsible) in administration areas
- 4.3.4 Prevention Not Detection in administration areas
- 4.3.5 Zero Customer Defects in administration areas
- 4.3.6 Cost of Quality in administration areas
- 4.3.7 Continuous Improvement in administration areas

Sub-Section Total

4.4 TOTAL QUALITY DEVELOPMENT STATUS

- 4.4 Company culture: Traditional Quality Culture, TQ Realisation, Training, Learning or maturity

TOTAL QUALITY SUMMARY

- 4.1 TQ PHILOSOPHY & STRATEGY
- 4.2 APPLICATION OF TQ PRINCIPLES: MANUFACTURING
- 4.3 APPLICATION OF TQ PRINCIPLES: ADMINISTRATION
- 4.4 TOTAL QUALITY DEVELOPMENT
- 4.0 TOTAL QUALITY RATING

HUMAN RESOURCES

- 5.6.1 MANAGEMENT STYLE AND COMPANY CULTURE
 - 5.6.1.1 Statement of values and principles for human resource issues
 - 5.6.1.2 Policy for the health and welfare of all employees
 - 5.6.1.3 Policy for standards of behaviour, appearance language
 - 5.6.1.4 Removal of internal class barriers between administration and shop floor employees
 - 5.6.1.5 Physical integration of management with the workforce locations

Sub-Section Total

5.6.2 MANAGEMENT OF CHANGE**5.6.2.1 Development of coherent strategies for organisational change****5.6.2.2 Measuring the success of organisational change****5.6.2.3 Extent of employee involvement in planned changes****5.6.2.4 Mechanism for extending successful changes to all areas****Sub-Section Total****5.6.3 DEVELOPMENT AND TRAINING****5.6.3.1 Scope of induction training programmes for new employees****5.6.3.2 Definition of skills, training and qualifications for each position****5.6.3.3 Recording of skills, training and qualifications of employees****5.6.3.4 Review of employees personal development status****5.6.3.5 Resource allocated to training and development of employees****5.6.3.6 Managers accountability for training, education and development****Sub-Section Total**

5.6.4 **SKILLS AND SKILL RETENTION**

- 5.6.4.1 Identification and acquisition of new or specialist skills
- 5.6.4.2 Protecting the company from the loss of key individuals
- 5.6.4.3 Operation of a system for the minimisation of employee turnover
- 5.6.4.4 Relationship between the company and employee representatives
- 5.6.4.5 Formal procedure for the resolution of employee grievances
- 5.6.4.6 Operation of a formal disciplinary code of practice
- 5.6.4.7 Records of employee lateness and absenteeism with appropriate reaction programmes
- 5.6.4.8 Initiatives in operation for improving employee relations

Sub-Section Total**5.6.5** **MOTIVATION CONTRIBUTION AND RECOGNITION**

- 5.6.5.1 Employee involvement in planning and decision making
- 5.6.5.2 Recognition and reward of employee contributions and achievements
- 5.6.5.3 Delegation of responsibility for measurement and control
- 5.6.5.4 Scope of policy for employee communications i.e. frequency, media used, feedback

- 5.6.5.5 Communication of marketing and performance related information to employees
- 5.6.5.6 Process for the understanding of employee attitudes
- 5.6.5.7 Encouragement and operation of teamwork across functional groups

Sub-Section Total

Source: Rover Group RG2000 Audit (1993)

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