

**LEARNING FROM THE RADICAL CHANGE
INITIATIVE IN BRITISH AEROSPACE, MILITARY
AIRCRAFT**

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Dedicated to:
my late father Khawaja Muhammad Sadique

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List of Abbreviations

AR	Action Research
BADL	British Aerospace Defence Limited
BAe	British Aerospace
BNR	Business Network Redesign
BOM	Bill of Material
BPCs	Best Practice Companies
BPIM	Business Process Implementation Methodology
BPR	Business Process Re-engineering/Redesign
BSR	Business Scope Redefinition
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
CATIA	Name of a software
CCTA	Name of an organisation
CF	Conceptual Framework
CIGNA	Name of a company
CONFIT	Concurrent Fault Investigation Teams
CPC	Corporate Purchasing Card
CQI	Continuous Quality Improvement
CSC	Computer Sciences Corporation
CSD	Customer Service Division
CSFs	Critical Success Factors
DMC	Divisional Management Commitment
EDI	Electronic Data Interchange
EF2000	Euro Fighter 2000
EFQM	European Framework for Quality Management
FE	Field Experiment
FFA	Force Field Analysis
FQI	Federal Quality Institute
GE	General Electric
GRA	Name of a company
HRM	Human Resource Management
IBL	Integrated Business Logistics
IBLS	Integrated Business Logistics and Support
IBM	International Business Machine
IBS	Integrated Business Support

II	Internal Integration
IPD	Product Development Team
IPL/IPC	Initial Provisioning List/Illustrated Parts Catalogue
IRM	Information Resource Management
IS	Information Systems
ISD	Information Systems Development
ISFI	In Service Fault Investigation
IT	Information Technology
ITSG	IT Strategy Group
JV	Joint Venture
KPI	Key Performance Indicators
LE	Localised exploitation
MA	Military Aircraft
MAD	Military Aircraft Division
MBA	Master of Business Administration
MBP	Management By Performance
MIS	Management Information Systems
MLU	Mid-Life Update
MoD/MOD	Ministry of Defence
MPA	Multi Perspective Analysis
MPS	Master Production Scheduling
NACA	Notice-attitude-choose-action
NATO	North Atlantic Treaty Organisation
NCSU	North Carolina State University
NVA	Non-Value-added Activities
OEI	Operational Efficiency Improvement
OL	Open Learning/Organisational Learning
Ops	Operations
PC	Project Control
PDP	Personal Development Plans (
PIT	Process Improvement Team
PLC	Product Life Cycle
PM	Process Management
PRP	Profit Related Pay
PRT	Process Redesign Team

PSP	Preferred Supplier Process
PSS	Preferred Supplier Scheme
PTT	Process Transformation Team
PWH	Price WaterHouse
QA	Quality Assurance
R & D	Research & Development
RAF	Royal Air Force
RC	Radical Change
RMPA	Replacement Maritime Patrol Aircraft
RO	Royal Ordnance
RSAF	Royal Saudi Air Force
S&R	Spares and Repairs
SAAB	Swedish automobile company
SBAC	Society of British Aerospace Company
SS	Systems & Service
SSM	Soft System Methodology
TEC	Training and Enterprise Council
TOP	Technical Organisational Personal
TQM	Total Quality Management
UGC	University Grants Commission
USSR	Union of Soviet Socialist Republics
VA	Value Added / Value-added activities
VSTOL	Vertical Short Take Off and Landing

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Abstract

Academic researchers and practitioners are always keen to know more about organizational practices. Some experts even claim that academic researchers are ignorant about organizational knowledge. Given that the study is an attempt to provide an exemplar from real life in order to increase the organizational awareness of the academic community and practitioners. The objective of the study is to understand and learn the experience of a radical change initiative that took place within the Military Aircraft division of British Aerospace over the period 1993-98. The emphasis is on the effectiveness of the change methodology applied in the process of change.

Open-ended interviews and documents were the major sources of the data used in the case study. The interviews reflected the actual experiences of those who were involved, while the documents provided contextual data and information on the key themes of the change. Nine change projects were examined which were introduced during five-year period. Analysis showed that there was a huge gap between the organization's practices and those of the benchmark companies. This gap is what BAe sought to lessen/remove through radical change initiative. The study postulates that the qualitative paradigm can shape the analysis of such a change initiative by contextualizing the phenomenon. Pettigrew et al's (1989) framework has been applied to assess the change, which consists of the context, the content and the process.

The change programme was a successful attempt to increase internal efficiency, developing business partnerships and strengthening customer satisfaction. The study concludes that there is a strong relationship between the extent of management sponsorship, employees involvement, a flatter organizational structure, efficient use of technology, an effective change methodology and the success of such radical change initiatives. The experience of this company can be used in other organizations provided that their drivers for change are similar to those of the company investigated.

Chapter 1

THE AREA OF RESEARCH

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Chapter 1

The Area of Research

1. Introduction

This research project examines both the meaning and process of a radical change initiative within an organisation through a qualitative case study. Radical change refers to the fundamental rethinking and redesign of organisational processes that is necessary to bring about dramatic changes in performance. The minimum improvement required to qualify for a radical change initiative is 20%. A defence organisation was chosen in order to examine the process of change. This organisation had a traditional 'engineering culture' made up of a hierarchical structure and bureaucratic traditions that were the binding forces among the different sectors of the 'aerospace economy'. Dwindling market share and international competition had motivated the company leadership to rethink the future of this prestigious export-led entity. The company sought refuge under a banner of business re-engineering that offered effectiveness, consolidation and redesign of its fundamental operations. The response of the initiative was a mixed message of hope and success, in that some basic issues were addressed and resolved amicably but there were a number of questions that were still awaiting answers.

The organisation has been investigated by means of a qualitative case study. The researcher was not confident that a positivistic route to research would unveil the organisational realities in question. The qualitative approach was deemed to be helpful in achieving the research objectives and in addressing the research questions. An interpretive stance further refined the way of looking at the shape of the findings, in a different manner from that of using positivistic assumptions. In-depth interviews and document analysis were the major data collection techniques. Phenomenology and hermeneutics were then used as the basis for the analysis of the interviews, whereas content analysis was reserved for the analysis of the documents. Thus dual data collection and analysis techniques provided a sound basis for the technical aspects of the research methodology such as triangulation and corroboration.

The researcher has been trained in the social sciences, with special reference to the areas of business and management. His background has thus been a blend of both quantitative and qualitative professional experience. The Hull and Salford experiences have, however, sharpened his social side and as a consequence he has chosen a qualitative approach to address the social phenomenon under investigation.

The researcher investigated the implementation of a change initiative within an organisation. In so doing, he focused on both the relevance and the effectiveness of a change methodology. He attempted to discover the way in which this experience could be re-used in order to implement similar change programmes in the future. The objectives were to understand and to learn the way in which the initiative had been designed and implemented. The audiences of the research were to include change agents, researchers and practitioners. It would be of importance to them in that it would shed light on the methodological guidance required and establish the measures of effectiveness relevant to a change methodology. These groups could then re-use the methodology in order to improve the effectiveness of any change endeavour that might be undertaken within their organisations. Finally, the theoretical base of radical change would be strengthened by the outcome, since the research would contribute to the theory and knowledge of the discipline.

The thesis focuses on three areas of the organisation in order to define its boundaries: a series of radical change initiatives that took place between 1993 and 1998; interviews with the existing employees of the organisation; and the historical and social background of the company in order to provide the context within which the current situation emerged. The discussion, therefore, revolves around the change initiative itself as a general and strategic approach to achieve the organisation's objectives. Although the research is concerned with a complex process of radical change, it is in fact the change methodology as such that is the focus of the thesis; this, in turn, includes recommendations on both effectiveness and methodological guidance.

The researcher confronted a number of limitations during the course of data collection, analysis and reporting. For instance, the use of observation and participation as data collection techniques were not feasible. Financial data could not be reported because of

security reasons, and not all of the radical change projects started during the relevant period could be included in the analysis, due to a lack of information.

The overall outcome of this research project is a set of guidelines to implement a change initiative within an organisation that may refine the existing way of introducing radical change projects. The research has also contributed positively to the personal and professional development of the researcher.

A number of questions indicate those areas where concentration is most required. What is it like to change an organisation radically? What are the expectations and concerns of those involved in the management of radical change? How does the re-engineering formula fit into the context of an aerospace business? Where has the company been and where should it be? What benefits does radical change offer to the 'common people' within an organisation? Is re-engineering an appropriate choice for a healthy defence giant?

The thesis is divided into two parts and seven chapters. Part One (Chapters 1-3) deals with the technical or theoretical issues, and Part Two (Chapters 4-7) focuses on the empirical issues. The concern of the theoretical issues is to fulfil the technical requirements of the research, including the justification of the research method employed. The empirical issues are concerned with the pragmatic (business and strategic) aspects of radical change in the company and their application in the future. The final chapter is reserved for conclusions drawn from the study.

2. The Researcher's Professional Background

"Necessity is the mother of invention" is a local proverb that proved to fit the circumstances of the researcher in that he was asked to teach *management* to a group of final year students. He had never taught a subjective or theoretical subject in the course of his education career, rather he was used to applying formulae and numerical analysis. It was a totally new experience for him to deliver a lecture on a non-quantitative topic. However, he accepted it as a challenge and later on grew to enjoy it. Students are very efficient 'score-keepers' and they liked this particular way of coping with a new subject.

Although the researcher gained confidence from this experience, there was no opportunity to continue the job permanently as there were other colleagues available to teach this type of course. Nonetheless the involvement encouraged the researcher to think about the non-quantitative and social aspects of business and administration.

During this same period an opportunity arose, within the department, to undertake foreign research training and the Department of Education selected the researcher for such a scholarship. In 1993, therefore, the researcher joined the University of Hull in order to participate in an MBA in Information Management. At the end of this prescribed course he was equipped, amongst other things, with systems development ideas and an awareness of an emerging role of IT in modern organisations. There remained, however, a dilemma between business administration and IS. The attraction of business was due to his involvement in learning and teaching business administration since 1978 and the charm of Information Systems (IS) was due to the acquisition of new knowledge. His overall learning at this time was towards IS since it was a relatively new area and represented a challenge to me.

The doctoral programme offered within the then TIME Research Institute at the University of Salford greatly helped the researcher gaining an understanding of the social aspects of both Information Systems and business. It brought together the diverse backgrounds of participants from both technical and non-technical areas. Technical participants broadened their view by becoming involved in the soft dimensions of the 'electronic machine', whereas non-technical participants were able to diversify their particular social perspectives.

Initially the researcher worked for six months on the topic of Information Systems Failure, given that this was a striking theme for research that had stemmed from the seminars held as part of the doctoral school. The researcher had wanted to conduct a survey on the causes of various system failures, but organisational constraints prevented him from continuing because people in organisations were simply not willing to expose their weaknesses to the public. Business Process Re-engineering, then emerged as an alternative.

Although the Information Systems community discovered this topic, it proved to be equally applicable in both business and management. The researcher's business background could therefore be synthesised with newly acquired knowledge about social issues and Information Systems. He therefore decided to work on the topic of Business Process Re-engineering in order to combine his classical business experience with the 'radical' training he had received at Hull and Salford. This also provided him with an opportunity to engage with the business community once again. The next decision that had to be taken was to select an appropriate research approach. Although a number of alternatives were available, a case study approach seemed to be an appropriate method through which to explore an organisational environment. On top of this the researcher was fortunate enough to be introduced to Mr Tony Ward, the Head of BPR in British Aerospace, who allowed him to conduct a study into the organisation itself.

3. The Topic

The aim of the study is to understand the reality of change in a particular organisation over a specified period of time. The researcher examined the changes that occurred in the legal, economic and social aspects around the change situation. Internally, the researcher assessed the impact of these changes on resources, processes, management systems and structures. Although there are some commonalities amongst companies (for example, premises, people and plant), each individual organisation has its own characteristics (for example, culture, image and goodwill). So, researchers need to investigate many different aspects of organisational life in order to improve the effectiveness of such change initiatives. However, the majority of the existing studies of change concentrate on the process and product of that change as the legitimate aspect of research. The role and effectiveness of the change methodology itself has been rarely addressed in the literature. It is important to be concerned about the role of methodology in the process of change because such a process wholly or partially depends upon the effectiveness and timing of the various steps involved in a transformation initiative. Similarly, the outcome or product of a change is also associated with the quality of the methodology chosen by the change agents. In addition, any change methodology must be commensurate with the organisational resources and the culture. The methodology should be tailored to them (i.e. resources and culture) in order to co-ordinate the different actions required as part of the

change process. Hence it is possible to say that the success of a change initiative is directly associated with the quality of the methodology applied. Two examples will seek to clarify this point. The first is chosen from the service sector and the second from the manufacturing sector.

The researcher worked as a lecturer at the University of Azad Jammu and Kashmir (AJ&K) for seven years, where teaching was his principal responsibility. A number of piecemeal change initiatives were introduced during his time there in an attempt to improve the standards of education and to raise the effectiveness of the management. Many of these change initiatives were unsuccessful and others were only partially successful.

One of the reasons behind the failure of these initiatives was the absence of a structured change methodology. A change usually started when the head of the institute used to set up a committee to accomplish a particular change programme such as the design of a curriculum for a certain speciality. Different actions or steps in the process of change would then be taken as and when required, and these would be formulated in various committee meetings. Committee members were thus using their own experience as an implied or tacit methodology. The personnel involved, however, were not trained either in a structured change methodology, or in managing change and this fact jeopardised the success of the change efforts. It also showed up a lack of planning and co-ordination between the various actions. This is not meant to degrade the value of a tacit methodology, but it does suggest the need for a more structured methodology, which can be tailored to the organisation's own resources and its unique tacit approach or method.

The researcher also enjoyed an opportunity to observe and analyse a number of radical change projects that had taken place within BAe. The organisation itself had made use of a formal change methodology, which had been imported from some consultants and tailored to the organisation's particular requirements and resources. Although most of the projects were considered to have been successful, neither the effectiveness nor the relevance of the methodology had been analysed and measured in order to judge the outcome of the overall initiative. These two different organisational situations suggested two interrelated issues that required further study.

- The use of tacit methodologies for change;
- The effectiveness of using structured methodologies for bringing about change, and their measurement in terms of their effectiveness in achieving given outcomes.

Both these examples support the view that a methodology is necessary in order to implement a managed change programme, although the notion of using a methodology is questioned by various researchers. For instance, Hirschheim argues that the social sciences may not require a method because science is viewed as problem solving which does not require a methodology (Hirschheim, 1992) and methodologies can be unduly constraining (Simsion, 1994). Simsion, in turn, supports a contingency approach to problem solving rather than a structured methodology since for him "it bears repeating that the alternative to using a methodology is not anarchy, but a contingency approach tailored to suit the particular project... a contingency approach is attractive insofar as it allows the project planner to select from the "best of breed" or more specifically, "most appropriate of breed". (Simsion, 1994).

These experiences compelled the researcher to reflect upon the relevance and effectiveness of a business process re-engineering methodology as used within an organisation. He believed that the issues of relevance and effectiveness could be investigated in order to arrive at a better methodology and to understand the nature of the change process.

In order to address these two issues the shape of the research problem could be formulated as follows:

What is the role of methodology in implementing a radical change initiative and what other factors can be helpful in introducing process based change in a large organisation in order to enhance competitiveness through improvement in operational efficiency?

This implies an examination of the way in which a radical change initiative has been designed and implemented in an organisation, the relevance and effectiveness of the approach used, the lessons learned, and how such learning could be re-used to introduce a

similar change programme in the future. Thus the research question contained four key themes:

- The radical change initiative itself,
- The relevance and effectiveness of the approach used,
- The learning that took place within the initiative together with its reusability, and
- The organisation within which the change took place.

Thus it can be said that the change initiative is the phenomenon under investigation, the methodology is the process of change, the organisation is the context of the phenomenon and the learning is the outcome or the product of the change. However the change initiative has been divided into the context, content and the process in compliance with Pettigrew et al's strategic change model (Pettigrew et al, 1989). These themes will be discussed in chapters 4-6 and Table 1.1. sets out the relationship of the themes to the rest of the thesis.

Table 1.1. The relationship of the research question, the previous literature and the study itself

<i>Themes in the research question (Chapter 1)</i>	<i>Referred to in the literature (Chapter 2)</i>	<i>Investigated in the field (Chapters 4-6)</i>
The context of the organisation in which the change happened	Context	Chapter 4 Context, the background and pre-radical change initiatives
The content of radical change initiative	Contents	Chapter 5 Content of radical
The process and the effectiveness of the approach used	Process	Chapter 6 Process of the radical change including business process implementation methodology
Conclusion drawn, the learning from the initiative and its reusability		Chapter 7 Outcome of the change

The given statement/question of the problem raises a number of questions concerning the topic. Is a methodology a requirement for the success of a change project? What are the major functions of a methodology in the process of change? How is the effectiveness of a methodology measured? What are the measures of performance for effectiveness? What considerations must be kept in mind in choosing a relevant methodology? How can the effectiveness of BPR performance be linked to the relevance or effectiveness of a methodology? What is meant by radical change in today's dynamic business environment? What did re-engineering mean in the context of British Aerospace (BAe). Why did BAe choose business process re-engineering as a major change initiative? How did BAe synchronise the implementation of new processes while keeping the business running? What was the relationship between BPR and other change programmes within the organisation? What was the role of IT in the management of change? What lessons have BAe learned during the change exercise? How can the learning experience be re-used to implement large-scale changes in the future?

These can be summarised in the following three questions:

- (1) How and why is a Business Process Re-engineering methodology relevant to and effective in the implementation of radical change projects within an organisation?
- (2) How can a BPR initiative be designed and implemented to achieve quantum leaps in performance whilst an organisation is already performing well in an industry?
- (3) How can the current change be reshaped in order to introduce it into different organisations, or for it to be reused to implement similar changes in the future?

4. Research Context

The government of Pakistan sponsors this research on behalf of a number of competent students from local universities. The purpose of the training is to develop the human resources of the country, and to encourage young and intelligent people to come forward to take an active part in the social and economic development of the country. A number of schemes have thus been started to train capable persons both within the country and abroad. The Quad-e-Azam merit scholarship programme was one of these schemes, and under this award three students who earned a distinction in the terminal examinations of a

university (MA/MSc and BSc Honours (four year programmes)) were offered higher education opportunities. The Department of Education, through the University Grants Commission (UGC), nominates three such persons for higher studies abroad, if they held the first three positions each year in each of the state universities. The UGC evaluates a candidate's whole academic career from matriculation through to MA/MSc and BSc Honours for this nomination.

The researcher graduated in 1987 and was placed in first position in the University of Azad Jammu & Kashmir from the department of Business Administration. The UGC then evaluated his academic career and placed him in second position for the nomination of the Quad-e-Azam Merit scholarship, together with two other students from the session in 1986, in 1992. The researcher subsequently joined the University of Hull in September 1993 on an academic programme leading to the award of an MBA (MIS). He successfully completed his MBA and then joined the University of Salford on a PhD programme in September 1994.

5. Research Objectives

Mason suggests a number of goals for MIS research, for instance, gaining understanding, yielding new products, constructing better systems, contributing to science and gaining tenure. (Mason, 1984) From a philosophical perspective "qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live." (Mayers, 1999). In addition, Bryman characterises qualitative research as "understanding actions and meanings in their social context" (Bryman, 1988 quoted by Silverman, 1993). A second objective (learning) is the result of understanding or gaining knowledge of a phenomenon. It involves making sense of the information at hand (Guba, 1990), because understanding leads to learning and learning leads to change. These examples suggest that understanding is a legitimate research objective both theoretically and philosophically. This research, therefore, is concerned with the understanding of a change initiative within an organisation. In order to gain such an understanding, the research project puts forward the following objectives:

- To understand a radical change initiative within an organisation from design through to implementation. This includes its effectiveness and the relevance of the radical change methodology used.
- To learn from the experience of the company in order to use this for the introduction of a similar change in the future.
- To contribute to the theoretical and practical knowledge and theory of the discipline concerned. For instance, this research has modified a strategic change implementation model.

The first objective is concerned with understanding a change initiative in a medium size organisation. The second concentrates on the learning gained from the change and its possible application in the future. The final focuses on the theoretical contribution of the study in the discipline. Change occurs through the quantity and the quality of the resources employed and the methods used to produce a product or service. What role such a change initiative played in the production of high-tech products in the organisation concerned and why the researcher studied this change initiative are the subjects of the next section.

6. Importance of the Study

The main concern of this research is the question of the effectiveness of a radical change methodology, a subject that has so far received little attention from scholars and practitioners. Previous research has revolved around the importance of re-engineering as a management tool, its success stories, its enablers (e.g. human, material, change strategy and software) and the need for a methodology to make the change happen. For example, Van Meel *et al* (1994) found that re-engineering methods, new organisational forms, organisational design and information systems design, were the main areas of research. Although a number of methodologies have been developed, either by academics or consultants/practitioners, little effort has so far been devoted to the testing of the effectiveness or the quality of the methodologies being applied to the process of change. This research project, however, will explore the effectiveness of the methodology used to

learn about radical change in a given organisation. In addition, the research could be important for the design and implementation of effective radical change ventures, either in private or public sector organisations, because it provides evidence of a successful change event. The research is important, therefore, to both the Information Systems and the business communities in the following areas:

- The qualitative evidence acquired from the project will strengthen the theoretical basis for radical change. This will help in understanding the concept of re-engineering, the nature of methodology and its effectiveness in a wider perspective, since this affects the whole organisation rather than just a part of it.
- Little research has been done so far, either on the subject of a change methodology or its effectiveness. Thus the study attempts to reveal the pragmatic issues concerning a change methodology.
- Organisations whose change agents have little methodological guidance for such a radical change approach could adopt the outcomes positively in order to enhance their productivity. In this way it is a source of learning for both present and potential change agents, researchers and managers.

The study reveals the social reality of the change carried out, rather than simply reflecting the technological or scientific paradigm that has been the object of most of the research on this subject, because "interest has shifted to organisational rather than technical issues." (Benbasat *et al.*, 1987). Modification of Pettigrew *et al.*'s work in light of the findings is a visible theoretical achievement of the study.

7. Rationale for the Research

This work is based on a qualitative case study carried out within a multinational organisation. Although the researcher used to read and talk about organisations, he did not have enough empirical institutional knowledge due to a lack of connection with the industry. He had a limited opportunity to work in a business enterprise for eight weeks whilst he was on internship training during his Master's degree. Gummesson (1988) holds a similar view about academic researchers since for him, "the academic researcher generally lacks institutional knowledge" (i.e. knowledge of conditions in a specific

company, industry, market etc.) This lack of institutional knowledge inspired the researcher to find a way to work in a business organisation, and entry into such an organisation became possible through his role as a research student. The researcher contacted various companies and found the present one. The next task was to shape an academic problem in such a way that the researcher could work on it. This took the shape of an apparently simple question: How does an organisation implement a radical change initiative?

This was a research problem in that, as a researcher, the researcher did not know much about either the organisation or its change programme. The researcher further supposed that other members of our academic community, together with practitioners, did not know much about this particular initiative in this particular company. Therefore, if we as an academic community do not know much about a certain phenomenon, one of us should take steps to explore it. In this case, therefore, the researcher set out to resolve the main issue – the lack of institutional knowledge - because research is by nature a problem solving activity or procedure.

The second reason that this is a research problem is related to the nature of my research project itself, in that the main objectives of my project are to gain both understanding and learning. Gaining understanding as a research objective is recommended by leading researchers (Mason, 1984), and understanding is synonymous with knowledge (Hirschhiem, 1992). Understanding leads to learning, and the purpose of learning is to use it again and again to improve certain situations or to resolve a problem. Smart *et al* (1996) support the notion of learning for change, since for them the purpose of learning is to facilitate continual improvements.

As a qualitative approach, the case study offers an in-depth analysis of organisational life. The rationale for the selection of the case study has been outlined elsewhere in the thesis, but the case study is commensurate with the nature of the problem and the objectives of the research described above. In a nutshell, the researcher claims lack of institutional knowledge as a fundamental problem. This lack of institutional knowledge therefore requires an understanding of the unknown phenomenon, and a series of attempts to understand this situation or event results in learning taking place. In turn, such learning

helps to design a change initiative that should be (and ought to be) better than the earlier version. Table 1.2 summarises key parameters of the research.

Table 1.2 Research model

<i>Area</i>	<i>Description</i>
Problem	Investigation of a radical change initiative in an organisation
Objectives	<ul style="list-style-type: none"> • Understanding • Learning • Contribution to knowledge
Application	Re-usability of outcomes and experiences
Methodology	Qualitative case study

8. Scope and focus

Although this research is limited to the study of radical change initiatives within a single organisation, certain general areas remain as the framework and the backdrop:

- The history of the organisation as a changing entity;
- The predecessor to radical change or the history of change as a strategy within the company;
- Aspects of the change such as the content of change, process of change, the impacts of the change and the external participants in the change;
- The methodology of change and its effectiveness. The radical change methodology and its effectiveness, since this is the primary focus of the study.

The context of this study is the military aircraft division (MA) of BAe, and this is referred to as the organisation in this thesis. Existing employees of BAe have been included in the interviewing process, although the study excludes past and future employees of the organisation. The researcher has drawn these boundaries in order to keep the study within permissible limits, but overlaps can be expected and may communicate something of importance.

9. Potential Outcomes

Theoretically, the project contributes to the process of inquiry in the following ways:

- It enables the client of the research to understand the process of business re-engineering and the methodology employed, in an organisational, technical and social perspective.
- It proposes a modified framework for a radical change implementation. The framework consists of a methodology and a strategy to implement it in an organisation based on the learning gained from the research.
- It helps to shape the sequence and structure of the various steps required in making the change happen. Similarly, the study explores the process of change and the way in which the change has been synchronised with the existing and potential business.

Practically the research contributes to the following areas:

- A conceptual framework has been developed that can be used by practitioners or change agents to introduce radical change into organisations. The framework provides an insight into why a methodology is a prerequisite for a radical change initiative, and how it can be implemented. It throws light on the possible obstacles to the way in which to make the desired changes. Managers can evaluate their change methodology, and the present work can be used as a complementary guideline to judge the value of their particular change approach.
- The re-engineering methodology can be used as a learning tool for both managers and change agents. It enables them to improve the effectiveness of their change endeavours and consequently to contribute towards the objectives of their organisation in a re-engineering context.

Methodologically, it develops a framework for investigating re-engineering within the organisation. It provides clues to the conduct of further studies on the effectiveness of a

change methodology that will be useful in developing change models, guidelines, tools and techniques. Other organisations can learn from the experience of a particular enterprise in order to introduce a meaningful and (virtually) foolproof change initiative.

Personally the project can contribute towards the personal and professional development of the researcher in the following ways:

- The research will positively contribute to the learning of the researcher. After completion of this research project, the researcher will be a recognised researcher. The door of further research will be open to him in order that he might contribute to the enhancement of knowledge in general and to business/IS theory in particular.
- The career prospects of the researcher will expand in that he will be equipped with the essential tools and techniques to impart education at a higher level more effectively and efficiently.

10. Conceptual Framework

Kettinger et al. view radical change or BPR "as a form of organisational change characterised by the strategic transformation of inter-related organisational subsystems producing a varied level of impact" (Kettinger et al., 1997). A strategic approach identifies those processes that are critical to the high level objectives of an organisation and creates a linkage between the change initiative and corporate strategy (Teng *et al.*, 1994b). Each process is therefore evaluated as to its strategic relevance (Porter and Miller, 1985).

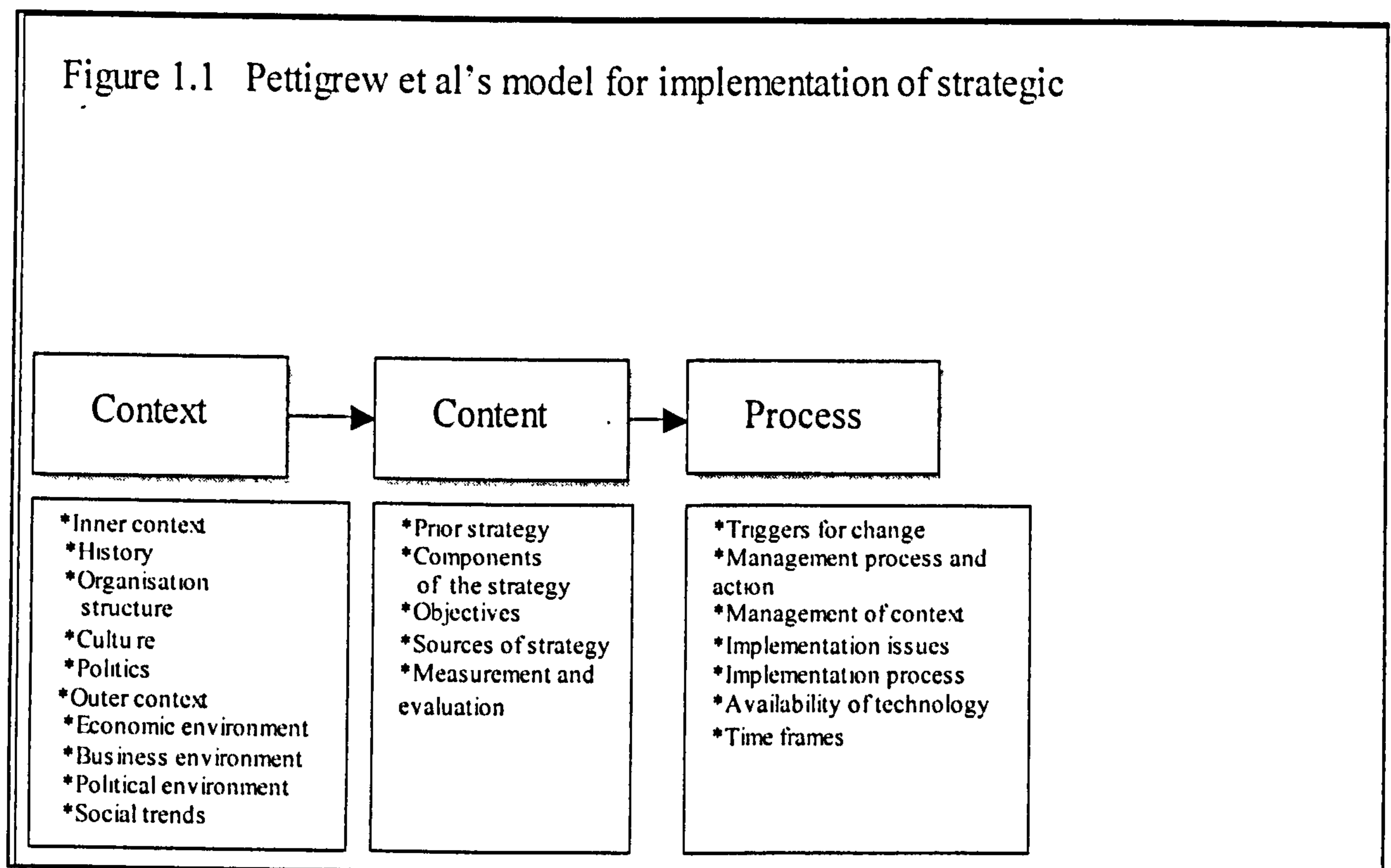
Pettigrew et al suggest a research model to examine a strategic change initiative in an organisation (Pettigrew et al, 1989). The purpose of the conceptual framework is to understand change through strategic perspective because strategic change is initiated at the top level. Management can assess changing economic, business and political conditions and implement new strategies in order to improve the firm's competitive performance. The model contains three interrelated but distinctive parts: context, content and process. There are two types of *context*: inner and outer. The inner context includes strategic history, structure, culture and the politics within which the proposed strategy is to work. The

history encompasses the historical development of the organisation over time. The structure shows the formal arrangement of authority and responsibility within the hierarchy. The culture is a web of norms, values and beliefs such as BPR destabilises jobs. The politics deals with the distribution of power within the organisation. The outer context comprises the external elements such as business environment, economic environment, political environments and both social and economic trends. The business environment is the general conditions within the industry to which the company belongs. The economic environment covers the national and international economic condition e.g. recession, boom, depression. The political environment discusses the international relations among the nations of the world especially the relations of the country with the rest of the world. The social and economic trends are the prevalent enabling or constraining conditions within the country. Awareness of organisational context helps managers to decide the contents of the strategy to be implemented.

The second element in the model is content, which comprises prior competitive strategy, contribution of functions, strategy objectives, sources of the strategy and measurements and evaluation strategy. The prior competitive strategy is the change initiatives tried or still in progress such as TQM. Contribution of functions deals with the participation of various functional departments e.g. IT, marketing, Personnel and manufacturing. Objectives are those targets the strategy will achieve. The sources of the strategy are the geographical origin of the main ideas i.e. local, national or international. The measurement and evaluation include the performance measurement indicators at organisational and process levels e.g. cost, cycle time and speed. It also includes comparison of targets with actual results.

The third element in the framework is concerned with methodological issues such as triggers for change, management process and action, implementation process, availability of technology and time frames involved in the change. Triggers for change are those causes which compel management to initiate change. Management process and action include kinds of change agents participated, their decision pattern, theoretical models they use and the way they manage the context. Implementation process involves the phases and enablers of change. Availability of technology refers to the technological support required and on hand to implement the proposed changes. The time frame implies the time period

for the initiative as a whole and sub processes involved. Figure 1.1 shows these elements in a sequential manner for the sake of simplicity although Pettigrew et al's (1989) believe that it is a non-linear framework.



Pettigrew et al's model is well established in academic circles and is a useful approach for research. They argue that the model is applicable where management wants to assess changing the economic, business and political conditions and identify and seeks to implement new strategies in order to improve the firm's competitive performance (Petigrew et al, 1989). Secondly it is a contextual framework for change. Newton praises the contextual approach as a research model and says, "in my own case, 'contextualist analysis succeeded in providing a basis upon which, as a researcher, manager, and reflective practitioner, I could understand and manage the change process and the underlying tensions. My research has validated the contextualists' view that managers are neither 'change heroes' nor 'passive victims'" (Newton, 2002). He also refers to Williams who emphasises the model and notes: 'Contextualist analysis aims to provide managers with an understanding of the iterative relationship between context, process and outcomes' (Williams, 1988). It implies important guidelines for the implementation of strategic decisions (Lau, 2002).

A common limitation of such models is that they place constraints on pluralistic thinking and put researchers on an 'engraved' path to arrive at their destinations. Hirschheim questions the existence of any model in formal research (Hirschheim, 1992). Levy et al are concerned for the strategic stance of the model in an ICI perspective, and they argue that, 'Pettigrew neglects the historically distinctive, politico-economic organization and contradictions of the production and consumption processes that have shaped the development and direction of strategic management at ICI' (Levy et al, 2002).

Despite these limitations, the researcher however did not find any actual (radical change) case study based on Pettigrew's foundation, and therefore it seems worthwhile to examine a BPR initiative through Pettigrew's approach since it emphasises strategic change, and because re-engineering is considered a form of strategic change.

11. Relationship between TQM, BPR, IT-enabled change and the Conceptual Framework (CF)

TQM is the predecessor of BPR and share many concepts with it. For instance both focus on a common unit for improvement in performance i.e. processes. BPR is more successful in those organisations where TQM was experienced or was in progress since BPR is considered a progression from TQM. However TQM emphasises continuous improvements and BPR discontinuous improvements. IT is an enabler in BPR projects through either an extensive or innovative application of it. BPR is an IT-enabled transformation approach to bring about fundamental changes in the organisational culture and performance.

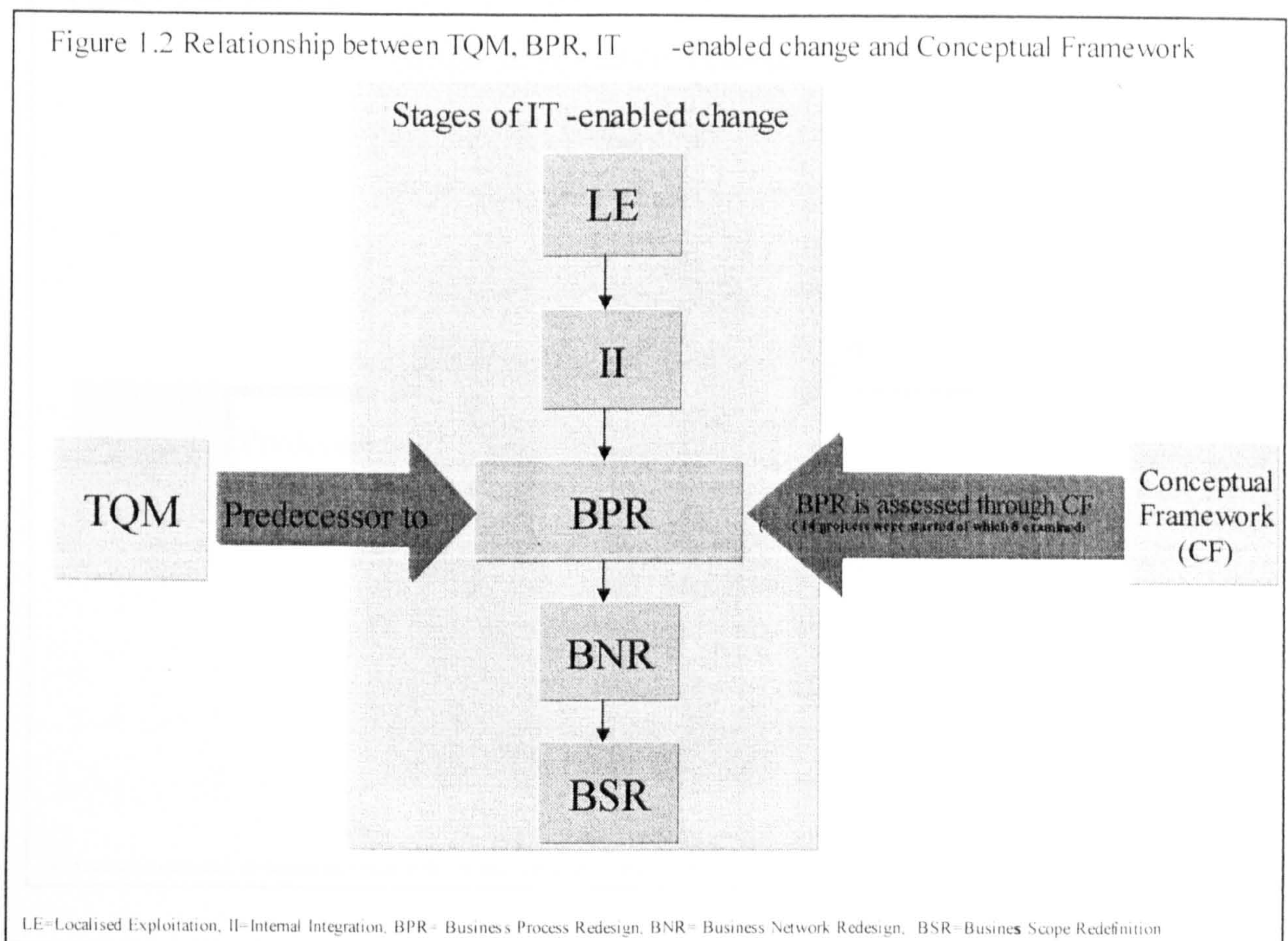
Pettigrew et al's conceptual framework (CF) is a strategic change model to bring about changes in the organisational performance. It assumes a functional orientation within which changes can be made. It asks for availability of technology to support change. The focus is on the whole organisation or functional departments. The outcome is not determined – incremental or radical. The change process has been divided into three episodes: context, content and process.

BPR is also a strategic approach to bring about step changes in performance. It assumes that technology is there to be exploited. The focus is on the processes rather than functions

since it emphasises team-based flat structure. The outcome is determined i.e. the progress must be quantum leaps. The minimum improvement to be 20% in order to be a BPR initiative.

MIT's research programme for the role of IT in the 1990s spells out the nature of IT – enabled change. For example, Venkatraman identified five stages of IT-induced changes: localised exploitation (LE), internal integration (II), business process redesign (BPR), business network redesign (BNR) and business scope redefinition (BSR) (Venkatraman, 1991). The first two are evolutionary and the remaining three are called revolutionary transformation. At the BPR level “IT is a lever for designing processes and that it should not be simply overlaid on the existing organisational context ... a business process that maximally exploits the available IT capabilities is developed ... to see an evolving alignment between technology and organisation” (Ibid., p. 137). It suggests that BPR is a part of IT-induced stages of transformation where maximum IT capabilities are applied in business processes.

Given the above arguments about TQM, BPR, IT-enabled change and CF, the relationship between them is shown in Figure 1.2. TQM is considered a predecessor to BPR and shares some characteristics such as process orientation. BPR is a part of IT-enabled transformation, which exploits maximum technological capabilities since LE and II use technology on a smaller scale than BPR. BNR used technology to include suppliers, customers or anyone else who contributes to the firm's competitiveness. And BSR is to exploit technology in the marketplace or in products. BPR is assessed in BAe by examining 9 projects out of 14 started through the Pettigrew et al's conceptual framework adopted for the research.

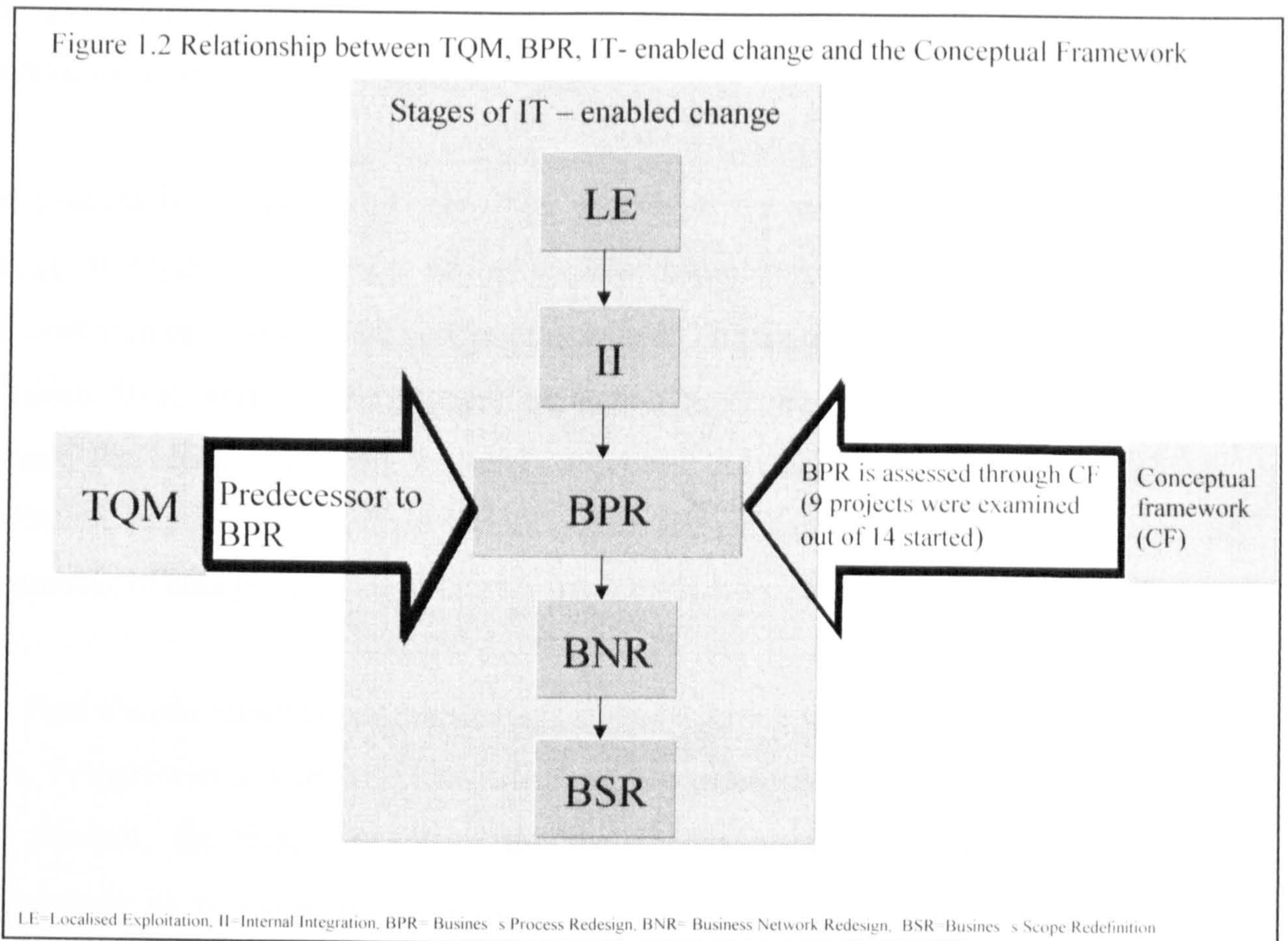


It suggests that BPR which is an IT-enabled change has been assessed through application of CF while TQM is its predecessor.

12. Structure of the thesis

The thesis has been divided into seven chapters. The first three chapters deal with the theoretical aspects of the research and the next three with the pragmatic dimension of the study. The final is reserved for conclusions drawn from the findings.

The first chapter contains research questions, research objectives, scope of the study, importance of the research and the outcome. It describes the conceptual framework that will be applied to conduct the study. The professional background of the researcher has been linked with the study as a context. The purpose of the chapter is to create the need for the study from a particular angle. For example, the researcher did not find any study based on Pettigrew et al's model on Business Process Reengineering. The study is important to uncover the institutional practices of a particular organisation in order to



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strategy and measurement and evaluation of outcome. The contents are based on the context, the issues identified and the targets to be achieved as a result of the initiative.

The process is the subject of the final chapter in the second block. The triggers for change, management process & action, implementation process, availability of technology and time frames involved will be the core issues. The triggers for change are the reasons to initiate BPR. Management process and action concentrates on the change agents who manage the change. The implementation process has been spread over four phases: evaluation, envision, empowerment and excel. The availability of technology to control the process of change and time frame for implementation are also part of the process.

The final chapter summarises the findings spread over the last three chapters and analyse them. Pettigrew et al's model is revisited and two extensions have been suggested in it. The product, the final element of the model, has been discussed and analysed to demonstrate its practical significance. Key lessons learned are discussed and the way forward has been suggested. Some technical issues of the thesis are discussed in the miscellaneous section. Finally, an over all conclusion is arrived at.

Chapter 2

Previous Research

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Chapter 2

Previous Research

1. Introduction

Kettinger *et al.* conclude that “rather than a “quick fix,” BPR is increasingly recognised as a form of organisational change characterised by strategic transformation of interrelated organisational subsystems producing varied level of impact” (Kettinger *et al.*, 1997).

This perspective reflects the reality of business re-engineering after a decade from the inception of the process centred model. The researcher is convinced of the usefulness of the change perspective and wanted to structure the present piece of work on similar lines. In addition to radical change (RC) as a newer model of change the present work examines it from the qualitative perspective. The qualitative paradigm is concerned with the contextual understanding of a phenomenon. This chapter refers to a number of change approaches including the contextual way of looking into a change effort. A number of researchers suggest the constituents of a contextual approach which includes context, contents and process (Wood-Harper, 1995; Peppard and Preece, 1995). Walsham suggests content/process linkage in his renowned model (Walsham, 1993). The fourth part is also essential to measure the outcome of an initiative, i.e. the product. Therefore researcher renamed it as product in the overall discussion of the phenomenon because the interplay of contents with the process produces the outcome which, for example, provides co-ordination and control.

It should also be made clear at this stage what these four ingredients mean for the researcher. Context in RC terms means the historical developments that lead the change agents to think about it, called triggers. Contents refer to the ‘curriculum’ that is to be imparted to the social setting. Process is the procedure involved in imparting the curriculum, alternatively the method of transformation. Finally the product is the outcome of the change programme in financial or non-financial terms.

The second section looked into development of change over the years. Planned change, contingency models and contextual models are the constituents of the section. Emphasis is placed on contextual models that are qualitative in nature. The third and fourth sections looked into the predecessors of RC because they share some of its characteristics. The fifth section is reserved to survey the ingredients of RC with a critical view. The final section suggests a generic change model that may be adopted for future endeavours.

2. Evolution of organisational change

Change refers to 'a modification of the way things get done in the system' (Fossum, 1989). Change is almost as old as the human activity on the universe. However, it emerged as an organisational change and a scientific activity during the second half of the twentieth century. Burns classifies theoretical foundations of change into three categories: the individual perspective, group dynamics and open systems perspective. The individualists emphasise personal learning as the root of changing individual behaviour, which leads towards organisational change. The group dynamists advocate the existence of groups or teams in an organisation. Creation of change in a group affects other groups because they interact with each other. For them, 'the individual in isolation is constrained by group pressure to conform. The process of change must be at the group level and should concentrate on influencing and changing the group's norms, roles and values' (Burns, 1996). The open systemists view an organisation as a system made up of four sub-systems (goals and values, technical, psychological and managerial). They assume that the changes in any sub-system will impact on the other parts of that system and consequently in other sub-systems. The change can affect the performance of the sub-system concerned and the whole organisation.

Burns divides change management strategies into planned and emergent blocks. The former include Action Research, Lewin's force field analysis (1958), and Bullock & Batten's 1985 model. The emergent approach acknowledges the role of organisation structure, culture, learning and managerial behaviour in order to implement a meaningful change effort.

Collins shapes a non-traditional framework for analysis of change. His partition is based on four pillars: hero-manager reflections, gurus' works, student-oriented texts, and critical monographs and research studies. Hero-managers are those who have acquired a stock knowledge, have succeeded in business, and gained power through possession of personal attributes. The reputation of gurus came from their classical ideas and prescriptions to manage change. Their wisdom came from sound research and analytical techniques. Text-book approaches are prescriptive in nature: they represent a rational route to change, which is based on work by gurus and hero-managers' case histories or biographies. Critical monographs and research studies comprise Pettigrew's empirical work, Dawson's processual representation, technological view of Clark et al. and Scott's (HRM) cry for humans (Collins, 1998). Dawson groups his evolutionary stance into planned change (text-orthodoxy), contingent moment and contextual perspective (Dawson, 1994). This classification incorporates many features of Burns and Collins' division and contains contextual change as a subsidiary of planned change since the contextual approach is the theoretical model adopted for this research; therefore, it is being described in greater detail in the following section.

2.1 Planned change

Fossum identified nine theoretical models underpinning the modern repository of change: Force Field Analysis (FFA), Configuration Learning, Gap Analysis (Delta Analysis, Innovative Change, Leadership Intervention, Notice-attitude-choose-action (NACA) Cycle, Systems Theory, Pendulum Theory and Grief Cycle (Fossum, 1989). Table 2.1 summarises the contents of these theories.

Table 2.1 Theories of organisational change

<i>Theory</i>	<i>Brief description</i>
Force Field Analysis	It emphasises that understanding the change process increases the likelihood of success in a change initiative. The change occurs at a point where driving forces push back (or minimise their affects) restraining forces to a minimum or attain 'quasi-stationary equilibrium'
Configuration Learning	A 'process that occurs when an individual's previously determined configuration changes. The process involves rearranging, adding to, subtracting from and re-evaluating previous configurations.'**
Gap Analysis (Delta Analysis)	It assumes that there are two states in a situation: the present and the desired. A state of change occurs when the present state is converting into a desired state. Alternatively, 'change is seen as converting the things we are now to the way we want things to be'.
Innovative Change	An innovator takes an idea and develops it into a practical solution. It requires some changes in behaviour, processes or functions.
Leadership Intervention	Blake and Mouton devised five types of leadership styles each of which describes how individuals 'orient themselves with regard to concern for tasks and concern for people'. It shows how leaders intervene, and includes task leaders, impoverished leaders, country club leaders, middle of the road leaders and team leaders.
NACA Cycle	It is a cycle of decision-making that ends at a change. The process starts when a person (or organisation) <i>notices</i> that a change has or is about to occur. Then he develops an <i>attitude</i> about the change by collecting data and setting priorities. He <i>chooses</i> to support or resist the change. And finally he takes an <i>action</i> according to his choice.
Systems Theory	Systems theorists assume that change in one part of an organisation of system creates changes in other parts.
Pendulum Theory	'The pendulum swing represents the learning theory of overcompensation or over learning. Ineffective, polarised behaviour both old and new – is discarded as new behaviours are learned, practiced, and incorporated into a person's behaviour pattern.'
Grief Cycle	The cycle of grief come into being as a result of something new to the people involved. Doctors in hospital observe it at the time of death of a patient. The patient's family and friends undergo three stages of grief: denial, anger and acceptance. Dr Kubler-Ross finds it in other occasions such as divorce, redundancy, marriage and a new job.

** All quotes are from Fossum (1989).

Kurt Lewin is considered the father of change theory (Fossum, 1989), it remains an influential model and a common approach (Dawson, 1994). He introduced planned change that consists of three-phases: unfreezing, changing and re-freezing. It emphasises that understanding the change process increases the likelihood of success in a change initiative. Lewin identified the equilibrium between restraining and driving forces. For him, a change occurs at a point where driving forces push back (or minimise the affect of) restraining forces to a minimum or attain 'quasi-stationary equilibrium'. He suggests that the organisation's current state should be disrupted to achieve a new equilibrium (unfreezing phase). Unfreezing requires the transfer of a substantial amount of resources to overcome a powerful network of forces, which pull the organisation into the current state (Rouse and Watson, 1994). It aims to reduce resisting forces or increase the driving forces. The change agents then embark on moving the organisation towards the required state. It involves the actual implementation of a new social system. Finally, the change managers re-freeze or habitualise the new state (Dawson, 1994).

FFA is similar to Delta Analysis in that the objective of both is to close the gap between the existing situation and the desired situation. This was the dominant theory applied in BAe change initiative. Force field analysis is a simple model to understand and use. However, it represents a unidirectional model of change that is an oversimplification of reality. Change is a dynamic and complex process, which cannot be rendered immobile. It does not comply with the contemporary requirements of continuous change and perpetual transition culture (Dawson, 1994).

2.2 Contingency model

According to contingency theorists the best way to organise depends upon the circumstances. They 'reject the search for a universal model and aim to develop useful generalisations about appropriate strategies and structures under different typical conditions'. The researchers can focus upon a single variable, environment or a range of variables to identify the relationship between various variables (Dawson, 1994).

2.3 Contextual approaches

There is a growing tendency in a small group of academics in this country towards developing a qualitative contextual approach to change. It refers to research work which 'seeks to examine processes of change within a historical and organisational context' (Johnson, 1987). Contextual theory is a multi-disciplinary approach and is concerned with a detailed examination of the process of change. It draws on the information provided by business historians, corporate strategists and organisation theorists. Whipp *et al.* (1987) argues that agents must examine the contents of a change strategy, the process of change and the context in which the change occurs. They identified inner and outer circles of change (culture). Structures and culture are ingredients of inner culture whereas business, economic and social contexts are constituents of outer culture. Politics is involved in both of these cultures. Dawson concludes that contextual framework is based on the relationship between the contents of a change strategy, the context in which the change takes place and the process by which it occurs (Dawson, 1994). Contextualists focus on a particular type of research strategy and methodology (Pettigrew, 1990) and rely on qualitative data rather than quantitative analysis. Consequently they use corresponding data collection techniques such as semi-structured interviews, non-participative observations, work diaries, and group discussions. Clark *et al.* (1988) apply these techniques for the study of a changeover from a electro-mechanical to semi-electronic telephone exchange (Dawson, 1994). He also reports that work by Child and Smith (1987) and Pettigrew (1987) is considered contextual. The main features can be summarised as:

Contextualist moved beyond a rational model of change in attempting to explain the political arenas in which decisions are made, histories deconstructed, and results rationalised. In short, the grouping of research under what has been termed the contextualist approach includes those which seek to combine a fully historical perspective with emerging organisational dramas (Pettigrew, 1985b), and those which are concerned with more processual work. (Clark *et al.*, 1988; Dawson, 1994).

The contextualist approach does not provide the richness and complexity of a multi-level analysis; as Dawson describes, 'the research findings adequately convey the complexity of organisational change, they have also tended to mask, mystify and

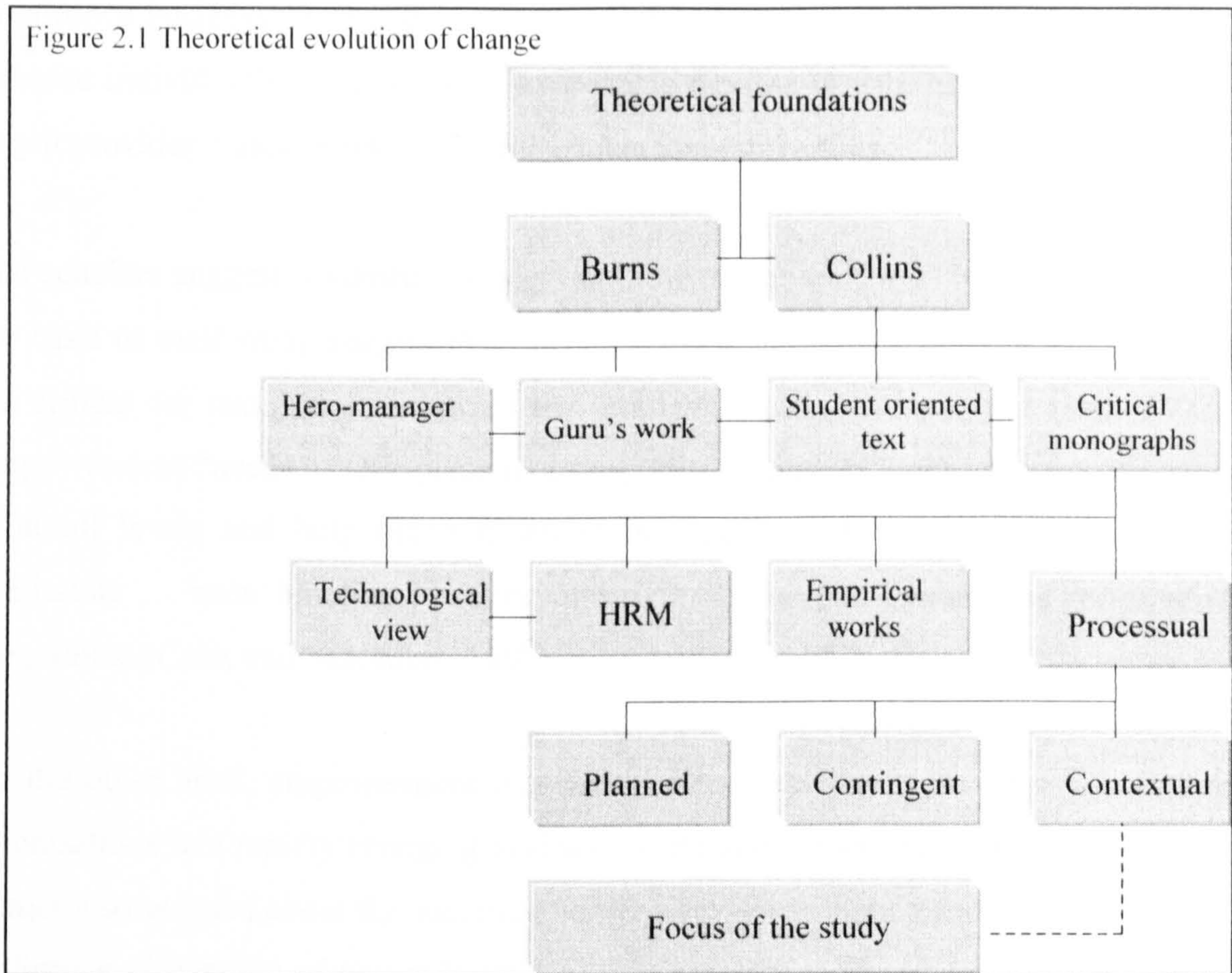
create barriers of interpretation to the non academic practitioners who seek practical tools for action' (Dawson, 1994).

The contextual approach is important from the perspective of this study because it follows a qualitative route to investigating a social phenomenon that has much to borrow from the context of the organisation for an interpretation of findings. Klein and Myers suggest a contextual rule to conduct qualitative/interpretive work, which reiterates the fact that an interpretive researcher 'requires critical reflections of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged' (Klein and Myers, 1999).

A structured change initiative always needs a procedure to implement it successfully. Hinings (1983) proposed a generic change process: a) diagnosis, b) identifying resistance, c) allocating responsibility, d) developing and implementing strategies and monitoring. This process is more or less similar to the radical change implementation process that involves evaluation of existing processes (step a), redesigning the process (step b and c above), implementation (step d above) and continuous improvement (monitoring). Pettigrew et al's (1989) model contains context, content and process. It is much easier and encapsulates internal and external context in order to evaluate a change initiative (See chapter 1 for rationale of using the model).

There are a number of options available to change agents. The choice depends upon the requirements and resources of the organisation concerned. Blair and Meadows suggest empowerment, Total Quality Management (TQM) and re-engineering (Blair and Meadows, 1996). Empowerment and TQM can also be considered to be a context for BPR because empowerment is a part of re-engineering and many concepts of TQM have been carried forward to form the present shape of BPR, e.g. the idea of business processes. It suggests that examining both of these can enhance the understanding of BPR, especially its context. The next section briefly describe the nature of empowerment and TQM as the predecessor to BPR. Figure 2.1 summarises the evolution of change and its relationship with the study.

Figure 2.1 Theoretical evolution of change



3. Predecessor to BPR - empowerment and TQM

Power and empower are complementary concepts in management literature. ‘Power resides in all the aspects of web of forces, values and beliefs, which determine human behaviour. Empowerment is the reorientation of all those factors, values and beliefs so that they support and liberate the individual rather than diminish their range of thoughts and action’ (Brown and Brown, 1994). The sociological perspective, as Rose and Black state, is a process of dialogue through which the client is continuously supported to produce the range of possibilities that he/she sees appropriate to his/her needs; that the client is the centre for all decisions that affect his/her life’ (Rose and Black, 1985). It ensures employee involvement and confidence that they work as a unified body. The strength of the workforce is harnessed and used to meet customer delight through quality products and services (Blair and Meadow, 1996). It reduces stress by assigning ownership of the job and self-control. At organisational level, it increases effectiveness, conformity, consistency and bureaucracy (Stewart, 1994). “Employee empowerment is commonly a fundamental part of the prescription, offered

to improve business performance” (Davison and Martinson, 2002). The objective is to enhance individual’s skills so that they become flexible to various employers. In this way it provides a greater sense of achievement and motivation.

The scholars suggest a number of ways on how to implement it. Nesan and Holt on the basis of their study suggest that “necessary resources and a suitable environment are critical for successful empowerment implementation” (Nesan and Holt, 2002). Empowerment “needs to take place in a supportive teamwork, with management buy-in at all levels and help being given to managers so they become coaches and facilitators ... team building, creating one right culture and reward and recognition programme (Cook and Macaulay, 1997).

On the other hand, empowerment is a less constructive way to manage people and organisations in a rapidly changing business world and labour market (Stewart, 1994). Kanter also worried about the success of empowerment without a focus, as she writes: ‘unlimited circulation of power in an organisation without focus would mean that no one would ever get anything done beyond a small range of actions that people can carry out by themselves’ (Kanter, 1994). Senior managers complained of loss of control in an empowered environment however Stewart redresses their fear, as for him, to some extent, “empowerment is a practical way to get the best from yourself and your staff ... is not about loss of control, or any kind of loss either. In fact it is about gain: gain of time, quality, commitment, ideas etc. Most of all it is about gaining access to the fullest possible range of staff skills and knowledge” (Stewart, 1994). As a change strategy empowerment brings limited gains. But it ‘can be given a stronger customer focus by linking it to TQM’ (Blair and Meadow, 1996).

TQM is ‘a management philosophy embracing all activities through which the needs and expectations of the customer and community, and the objectives of the organisation are satisfied in the most efficient and cost effective way by maximising the potential of all employees in continuing drive for improvement’ (BS.4778: Part 2, 1991). It is a ‘culture where all staff are dedicated to meeting customer needs on a “right first time” basis. They do this by measuring their team’s performance against pre-determined targets covering all processes, products and services’ (Blair and

Meadow, 1996). The emphasis is on the commitment of senior management, effective planning, using quality management tools and techniques, education and training, involvement, teamwork, measurement and feedback and working together. It offers a range of benefits to adopters of the system: customer satisfaction, employee involvement, increased productivity, opportunities for innovation, increased communication between various management levels and above all cultural change (Dale and Bunney, 1999). It offers “a platform for developing strategies that guarantee competitiveness and success” (Walsh et al, 2002). Devadasan et al argue “that the quality circle programme is one of the enablers of total quality management (TQM) projects.” (Devadasan, 1999). Despite these benefits, implementation poses a number of problems. First, most TQM projects are unsuccessful as, for instance, two thirds of the initiatives in the United States failed (Coudron, 1993). Improving too many processes at a time could cause a loss of focus which undermines the overall outcome. TQM works in a long-term perspective because behavioural change needs time to produce reasonable results. It emphasises improved communication between departments and functions which ‘may not be enough to make real improvements’ (Blair and Meadow, 1996).

Lascelles and Dale found a range of barriers to implement or exploit the full potential of the philosophy. They argue that the nature of management leadership, fear of change, inadequate skills and resources to facilitate improvement and lack of information to support the improvement process are principal barriers (Lascelles and Dale, 1994). They also identified four difficulties associated with the implementation: lack of top management support, commitment and vision; company culture and management style: the ‘flavour of month style attitude’; time pressures/constraints; work load, and resources (ibid., pp. 318–19). Brown and Weile found that “TQM takes second place in the process of shedding a significant numbers of jobs” (Brown and Weile, 1997). The next section will investigate whether re-engineering is capable of addressing these difficulties. Table 2.2 shows the main characteristics of three organisational change approaches set out above.

Table 2.2 Comparison of approaches to organisational change

<i>Distinctive factor</i>	<i>Empowerment</i>	<i>TQM</i>	<i>BPR/Process Management</i>
Objective	Piecemeal improvements in the pockets of an organisation	Holistic change in the organisation	*Holistic *Creating networked organisation
Focus	People	*Processes *Quality	*Processes *Quality *IT
Nature of change	Continuous	Continuous	Step changes
Scope	Limited	Organisation wide	*Holistic *Inter-organisation *Intra-organisation
Structure	Hierarchical/flat	Flat, team based	Flat, team based
Tools	Involvement	Involvement Empowerment	Involvement Empowerment

4. Business process re-engineering

This study assumes a qualitative framework of inquiry, which in turn assumes that a situation can be understood in its context. This section deals with context and other related topics in order to create understanding of the topic. The section is divided into four sub sections: context, contents, process, and critique of BPR. Table 2.3 summarises the list of major contributors in the theory of radical change.

Table 2.3 Evolution of BPR - Major contributor

<i>Contributors</i>	<i>Themes addressed</i>			
	<i>Context</i>	<i>Contents</i>	<i>Process</i>	<i>Critique</i>
MIT's research about IT in the 1990s	✓	✓		
Scott Morton	✓	✓		
Vankatraman		✓		
Hammer, M		✓	✓	
Hammer and Champy	✓	✓	✓	
Davenport T.H.		✓	✓	✓
Davenport and Short		✓	✓	
Champy, J		✓		
Kettinger and Grover		✓	✓	✓
Kettinger et al			✓	
Grover et al.		✓		
Teng		✓		
Markus				✓
Cooper and Markus		✓		
Stoddard, D.B. & S.L. Jarvenpaa		✓		
Kaplan, R.B. and L. Murdoch		✓	✓	
Kanter, Moss, et al.		✓		
Harrington	✓	✓	✓	
Klein		✓		
Morris, D. and Brandom, J.			✓	
Caron, J.R. et al.		✓		
Wood, J.R.G., R.T. Vidgen, A.T. Wood-Harper,	✓	✓		
Burke. G. and J. Peppard			✓	
Earl, M.J.	✓	✓		

Galliers, R.F.		✓		✓
Checkland				✓
Harvey, J.		✓		
Mumford, E.				✓
Willcocks	✓	✓		✓
Wastell			✓	
Colin-Coulson Thomas	✓	✓	✓	✓
Smart, A. et al.			✓	
Smith, G. and L. Willcocks	✓	✓	✓	✓
Blair and Meadows	✓			
Mathews, John	✓			
Towers, S.		✓		
Zairi M. and D. Sinclair		✓		
Price Waterhouse				
Francis and Southern	✓			
Walsham			✓	
Rogerson, S.		✓		
Van Meel J W et al.	✓			
Bjorn-Andersen and Turner		✓		
Landegham and Pyis	✓			
Thomson, V.J.				
Ramani, K.V. et al.		✓		
Siong, N.B.		✓		

The purpose of this section is to create a background for section five where a framework for the implementation of BPR has been suggested. A set of questions will be answered in an attempt to address the important issues in the process of design and implementation of re-engineering initiative in the future.

1. Why is change required? (Section 4.1)
2. What are the objectives of the initiative? (Section 4.2.2)

3. Which approach will managers follow to introduce it? (Section 4.2.3)
4. What is the level of change or where should it start? (Section 4.2.4)
5. What are the tools of change (elements, which facilitate change)? (Section 4.2.5)
6. Which are the conditions and assumptions of the venture? (Section 4.2.6)
7. What caution should be taken on the way to change? (Section 4.2.7)
8. What is the social responsibility of organisation as a social institution? (Section 4.2.8)
9. What is the method to make the change happen? (Section 4.3)
10. What are the views of others (critics) regarding the change? (Section 4.4)

These themes will be taken in turn to seek to answer the above questions.

4.1 Context

The context encompasses three dimensions: historical evolution of the concept; political scenario of the late 1980s and early 1990s; and the inability of the management techniques to cope with the then requirements of the business community. A brief description of these is outlined in the following paragraphs.

Business process reengineering (BPR) came into being in the early 1990s, most researchers refer to Hammer's (1990) article and Davenport and Short's work (1990) as the pioneering contribution to the concept (Jones, 1994). Some hold the view that BPR emerged as a theoretical concept in MIT's management in the 1990s research programme begun in 1984. The purpose of the programme was to examine impacts of IT on organisations in the 1990s. It commenced with two basic assumptions: turbulent business environment and the rapid evolution of IT (Scott-Morton, 1991). One of the contributors in the research programme viewed BPR as IT-enabled change because IT emerged as a core business resource in the early 1980s (Venkatraman, 1991). It was the time when the PC was launched on a large scale and it had become an integral part of modern business activity and information management. Contemporary re-engineering is built on business change, change management and system analysis, and emphasis is on IT enabled transformation of business processes (Earl, 1994). Thus

“Business Process Reengineering (BPR) was presented as the key to successful organisational transformation in the early 1990s” (King and Aisthrope, 2000).

The second aspect of the context is related to macro impacts of international changes on the organisational/management strategy. The most memorable incident of the late 1980s was the collapse of the former Soviet Union and the end of the Cold War. It created fewer opportunities than threats and intensified competition because of the ease with which information could be moved within and among organisations. The nature of competition also changed: for instance, being a low cost producer or large scale production was a competitive edge in the past but innovation, quick response to markets, customer service, quality of products and reduction in the market time became the basis of competition (Bjorn-Andersen and Turner, 1994). It opened the way to mergers of big companies, especially in the defence sector, and the emergence of new suppliers of cheap goods and services in the world markets. Francis and Southern argue that increased affluence, changing nature of competition from the Far East and technological developments and its application to IT are major context or triggers for a radical change (Francis and Southern, 1995). Flatter and leaner structures are more efficient than hierarchical arrangements, which compel management to reorganise the structure in a flatter way; they even lead to external partnerships and alliances (Bjorn-Andersen & Turner, 1994). Hammer and Champy name it ‘crisis of competitiveness’; the components of crises include superiority of customer, competition and change. They argue that a completely new approach is needed to handle the crisis. It must be process-oriented, IT-enabled and radical in nature.

The third dimension is the theoretical evolution of management techniques. TQM as a predecessor of BPR did not deliver what ought to have been delivered. Many companies who are in trouble are unable to respond to adopt the new requirements because of the high rate of change, raising customer expectations/competition and its global scope (Landeghem and Pyis, 1996). Growing complexity and greater interdependence among world economies, information explosion and world-wide communication contribute towards the inability of traditional managerial approaches

to resolve a contemporary complex web of organisational problems (Wood-Harper, 1995). He summarises leading social and economic triggers to BPR (see Table 2.4).

Table 2.4 Characteristics of markets and organisations

<i>Markets</i>		<i>Organisations</i>	
Traditional	Current	Traditional	Current
Limited product range	Short product life cycle	Simple tasks for simple people	Educated workforce, 'the knowledge workers'
Mass markets	Global economy	Complex business processes	Flexibility and speed of change attempts to improve human relations, management by objectives, decentralise authority, unique corporate strategy and culture and prevalent notion of total quality management
Little change	High quality	Large and bureaucratic	They are complex which needs a complex solution
Little competition	Customer sophistication		
	Customer service		
	Technological developments		

He reiterates that today's complicated organisational environment requires similar solutions that cannot be achieved with quick fixes. BPR offers companies the potential to reinvent themselves in order to address present complex organisational problems. 'Moreover, the changes needed are considerable, they can no longer be cosmetic. This

makes the traditional approach, which is evolutionary (such as KAIZEN. Continuous Improvement and the likes), no longer sufficient. In this view, BPR seems to offer the radical breakthrough possibility, that managers are seeking, including potential for creating a high quality image for the company, as well as saving costs in the process' (Landeghem and Pyis, 1996). BPR is sparked partly by the macro-economic conditions, partly by the political scenario and partly by competition. A shift in economies (especially the Far Eastern) means the rise of new nations as economic powers. Given that context, what should be the contents of re-engineering in order to answer the complex picture emerged so far? The next section will deal with this.

4.2 Contents

Review of literature reveals a number of themes that can be included in the content section. Some themes like relationship of BPR and information systems development (ISD) and soft system methodology (SSM) are not incorporated into the search because this thesis is concentrating on radical change. ISD and SSM are assumed independent fields of inquiry in the present context. Table 2.5 summarises the recurring themes found. The rest of the section 4.2 describes them.

Table-2.5 Recurring themes appeared in the literature

<i>Basic theme</i>	<i>Related topics</i>
Introduction, concepts and meaning	Definition, types, areas, assumptions, principles of BPR, scope
BPR as a change strategy	Change in general
As a strategic approach	Planning, BPR as a socio-technical approach and systems approach
What it offers	Objectives, empowerment
Distinctive features	Process, IT, rethinking
Methodology	Tools
BPR and IT	Other enablers, role of middle managers

Learning	How learning applies to BPR
Frameworks	Resources required, infrastructure
CSFs	Success factors
Reasons for failure	Barriers
Ethics	Relationship between ethics and BPR

4.2.1 Background - meaning, concepts and principles

As already mentioned, the MIT research programme of the 1990s commenced with two basic issues: turbulent business environment and the rapid evolution of IT. One of the researchers in the programme reported five stages of IT induced business transformation: localised exploitation, internal integration, business process redesign, business network redesign, and business scope redefinition (Venkatraman, 1991). Corporate transformation was a sixth stage added by Drew (1994). The first two levels are named as evolutionary and the last four as revolutionary. Jackson refers to seven types of BPR initiatives that can be undertaken in an organisation: intra-functional redesign, intra-functional redesign plus internal interface redesign, inter-functional redesign, external interface redesign, organisational redesign, functional redesign and network redesign (Jackson, 1995). For example, network redesign involves redesign of a process from suppliers to external customers. Selecting any of the stages or types of change determines the scope of change – the reach of change within or outside the organisational boundaries. The scope contains a single functional area: the whole organisation or a set of organisations. For example, Ford Motor Company's account payable project was limited to one functional area, IBM Credit Corporation's initiative collapsed more than one functional area and Singapore Tradenet involved a number of trade-related co-ordinating bodies (Stoddard and Jarvenpaa, 1995). Evans et al determined BPR scope in a different way, they argue that "scope paradigm is based on the classification of BPR characteristics into three dimensions. These are width (the flow dimension), the breadth (the activities dimension), and depth (the infrastructure dimension)" (Evans et al, 1999).

Hammer (1990) has launched a prototype of re-engineering in his HBR paper, 'Re-engineering Work: Don't Automate, Obliterate'. He emphasised the fact that automation is not sufficient to prosper in tomorrow's competitive business environment. He argues that 'it is time to stop paving cow paths' rather he advocated the radical change concept. He defines this radical change concept (BPR) as:

'The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical measures of performance such as cost, quality, service, and speed.' Fundamental rethinking, radical change, dramatic improvements, and critical measures of performance are fundamental to re-engineering. Many organisations define re-engineering in the similar context. For example Aetna Life defines re-engineering as:

'The radical redesign of business processes in order to achieve a significant reduction in cost, improvement in quality and or reduction in cycle time.' It sheds light on Hammer's cost, quality, and speed performance measures and is enriched with social and structural aspects that extends the boundaries of re-engineering. Re-engineering is entering into a business and organisational philosophy in this perspective. This aspect is also acknowledged by Lucas's definition, according to this definition re-engineering is:

"The fundamental analysis and radical redesign of everything in business processes and management systems, job definition, organisational structures and beliefs and behaviour to achieve dramatic performance improvements to meet contemporary requirements. Information technology is an enabler in this process' (Harvey, 1994). Chang and Powell view it as a "IT-based and customer driven approach to organisational change, undertaken to enable superior performance, such as cost reduction, short cycle time, higher product quality and increased customer satisfaction" (Chang and Powell, 1998).

Kettinger & Grover (1995) define business process change management as 'a strategy-driven organisational initiative to improve and redesign business processes to achieve competitive advantage in performance (e.g. quality, responsiveness, cost, flexibility, satisfaction, shareholder value, and other critical process measures) through changes in the relationship between management, information, technology,

organisational structure, and people.’ They suggest ten principles of business process change:

1. Business process change should be strategy-led with visionary leadership from senior management but should also recognise bottom-up participation of line workers and middle managers in design, implementation and continuous improvement.
2. Business process change should take care to ensure that resistance to change is minimised through an assessment of cultural readiness and effective change management.
3. Business process change should challenge existing assumptions concerning organisational systems and their learning capacity.
4. Business process change should leverage information technology’s process, storage and communication abilities to facilitate knowledge sharing capabilities.
5. Business process change should manage relationships both intra-and inter-organisationally. This requires deliberate design decisions related to the degree of co-operation and competition in network relationship balancing.
6. Business process change should use well-developed methods, techniques and tools of process management to steward business processes through their life-cycles. These processes may be intra-functional, but are typically cross-functional and/or inter-organisational.
7. Business process change should range on a continuum of change outcomes from radical new process design to continuous process improvement depending on the contingencies at work.
8. Business process change should empower individuals and teams and generally improve the quality of work life.

9. Business process change should be customer-driven, with value defined as satisfaction and, where possible, success.

10. Business process change should result in significant measurable performance gains with direct effects on market share and/or profitability.

Hammer quoted BPR initiatives of Ford to re-engineer its accounts receivable function. He chalked out seven principles of re-engineering. They include organising around outcomes, not tasks; making those who use the output of the process perform the process; subsuming of information processing work into the real work that produces the information; treating geographically dispersed resources as though they were centralised; linking parallel activities instead of integrating their results; making decisions where the work is performed; building control into the process; and capturing information once and at the source.

The idea of BPR was made into a scientific discipline and a managerial technique when Hammer produced the first book on the subject. The book explains the pros and cons of BPR with the help of many case studies. The concept of process, components of the process team, the role of information technology, and management have been discussed in detail. Hammer's work is considered as fundamental to the concept of re-engineering and his arguments in support of re-engineering are concerned with 'discontinuous thinking', 'starting over' rather than down sizing, restructuring, continuous improvements, enhancements or modification. It is about achieving quantum leaps in performance; fundamental rethinking, radical change, dramatic success and process oriented actions. Re-engineering obliterates obsolete, erroneous and inappropriate rules and assumptions about business. Re-engineering determines WHAT and streamlines HOW, and is not taking anything for granted but rather ignores *what is* and concentrates on *what should be*. Leadership in re-engineering is supposed to make new rules instead of following old rules. Attitude must be offensive not defensive. Its slogan reiterates, do more with less, not less with less, down sizing and restructuring. Functional walls must be demolished not plastered. Thus cross functionality must diffuse.

Hammer's guidelines for re-engineering initiatives include: the combination of several jobs into one, decisions made by the workers, performing the steps in a process in a natural order, production of multiple versions of the process, work should be performed where it makes the most sense, checks and controls must be reduced, reconciliation must be minimised. He advises changing jobs from simple tasks to multi-dimensional, changing roles from control to empowerment, job preparation changes from training to education, a focus of performance measures and compensation shift from activity to results, promotion criteria from performance to ability, changing values from protective to productive, changing managers from supervisors to coaches, changing executives from scorekeepers to leaders and changing organisational structures from hierarchical to flat.

It assumes a functionalist philosophical stance (the nature of reality is taken to be objective) which emphasises 'increasing the efficiency of the system through the logical rearrangement of processes' (Wood *et al.*, 1995). This is because the efficiency of a *machine* (BPR assumes organisation as a machine) depends upon the health and performance of its parts.

4.2.2 What BPR offers?

BPR is an organisational change technique; a modern organisation is a legal entity in the eye of the law and consists of at least four components (for the purpose of the current discussion): management, employees, organisation (as a person) and technology (all inorganic resources). BPR offers something to each of them. For example, it offers 'more with less' to organisation, learning, share in power and reward to employees, challenging work and less strain to management, and a bigger and valued role to technology. At macro level it promises to provide cheaper and better products and services to the economy.

BPR involves linking across processes and functions in order to deliver products and services to customers. It reintegrates within the business unit(s) the activities which were focused on and treated as separate in most organisations (Craig and Yetton, 1994). It is a powerful tool for implementing new strategy, figures out radically-

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Chapter 3

Research Methodology

1. Introduction

The first chapter dealt with the ‘What’ of the study; this chapter explores ‘how’. ‘How’ encompasses methods and procedures used to produce an outcome. Methodology is a synthesis of methods, techniques and procedures to conduct a study or resolve a problem situation. It is “an analysis of how research should or does proceed. It includes discussion of how theories are generated and tested – what kind of logic is used, what criteria they have to satisfy, what theories look like and how particular theoretical perspectives can be related to particular research problems” (Blaikie, 1993). Methodology focuses on how we obtain knowledge about the world (Denzin and Lincoln, 1994). However, methodological debate is preceded by the researcher’s worldview or *weltanschauung*. The researcher assumes that reality is socially constructed which, according to Blaikie, implies:

The study of social phenomenon ... requires an understanding of the social world which people have constructed and which they reproduce through their continuing activities. However people are constantly involved in interpreting their world – social; situations, other people’s behaviour, their own behaviour and natural and humanly created objects. They develop meaning for their activities together, and they have ideas about what is relevant or making sense of these activities. In short, the social world is already interpreted before the social scientist arrives (Blaikie, 1993).

Reality can be “gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artefacts” (Klein and Myers, 1999). Since the researcher believes that reality is socially constructed, he enters a social world so as to grasp the socially-constructed meaning of what people do or how their actions are given meaning. It is social construction of knowledge. Then he reconstructs these meanings into social scientific language. At the first level it is a re-description of everyday life; at the second level, the researcher may construct a theory or theories (Blaikie, 1993). He applies a series of methods, techniques and procedures that is commonly known as a methodology. This chapter is devoted to highlighting what methods, techniques and procedures are being applied for this particular study.

Walsham argues that the purpose of the interpretive methods is to produce ‘an understanding of the context of the information system, and the process whereby the information systems influences and is influenced by its context’ (Walsham, 1993). Sumsion argues that interpretive tradition “gives priority to understanding the meaning that individuals make of their experiences” (Sumsion, 2002). The purpose of the study is to understand a phenomenon in a given context. Thus the outcome ought to be a document on understanding a phenomenon rather than producing a theory or testing a hypothesis, which is more suitable for a positivistic case study.

The chapter is divided into three parts: philosophical perspective, methodological perspective, and design perspective. The researcher discussed the philosophical foundation of inquiry in the first part. The qualitative stance is the subject of this part, which guides the researcher at different stages of data selection, collection interpretation and presentation. The second part is reserved for the research methodology employed in the study; the case study approach is used to investigate a change endeavour in an organisation. The final part addresses the data collection, analysis and interpretation strategy. An in-depth interview and document analysis is the major data capturing strategies. Interviews are analysed

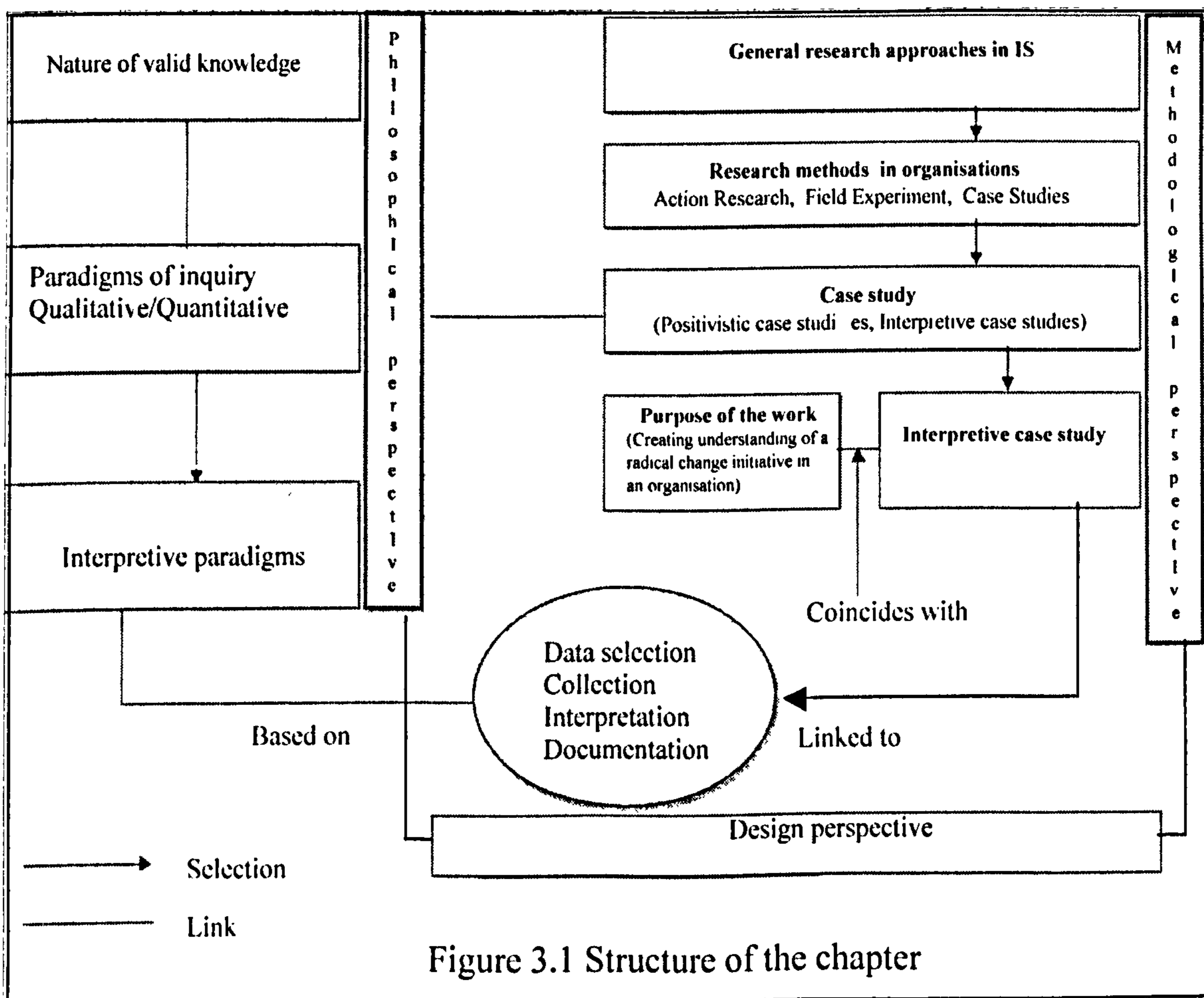


Figure 3.1 Structure of the chapter

through hermeneutics and phenomenology while documents are analysed through content analysis.

A- PHILOSOPHICAL PERSPECTIVE

This section deals with epistemological debate on inquiry. Figure 3.1 will be referred to in order to explain various aspects of the dilemma regarding the relative merits of qualitative and quantitative approaches. The researcher will try to answer such questions as:

- What is valid knowledge and how can it be acquired?
- What is the difference between qualitative and quantitative approach of acquiring knowledge? Why qualitative approach is appropriate for this project?
- What is positivist, interpretative and critical theory?
- Why the interpretative method is chosen for this inquiry?
- What are organisational methods of inquiry and how can we differentiate them?
- What is a case study approach and why has the investigator adopted it for this particular study?
- Why an interpretive case study coincides with the objectives of the study?
- How interpretive methodology is to be linked with data selection, collection, interpretation and documentation? and
- What is the rationale for proposed data collection methods for the case study?

2. Epistemology – The theory of knowledge

Our society imposes some conditions for the acceptance of knowledge claims. For example, research projects in the universities or laboratories accept a piece of work as an outcome of a research endeavour provided it contributes to the advancement of knowledge. Hirschheim (1992) argues that knowledge

is a societal convention and is relative to both time and place. Knowledge is a matter of societal (or group) acceptance. The criteria for acceptance are an agreed set of conventions which must be followed if the knowledge is to be accepted by society ... the conventions are well thought out and have historically produced knowledge claims which have withstood the test of time. In any society there are a myriad of knowledge claims; those which are accepted are those which can be supported by the forces of the better argument. They are an agreed understanding that has been produced at a particular point in time. Such knowledge claims may become unaccepted as further information is produced in the future.

Knowledge is synonymous with understanding; contribution to the knowledge refers to developing a new theory, refuting an existing theory, supporting and extending an established theory so as to refine a known theory, etc. The second consideration is how to acquire knowledge or 'search for understanding.' It is the role of endeavour (science) to acquire new knowledge since the dawn of civilisation that is related to knowledge and is based on societal agreement. Science is a convention, related to societal norms, expectations, values, etc. In its most conceptual sense, it is nothing more than the search for understanding. It would use whatever tools, techniques and approaches are considered appropriate for the particular subject matter under study ... The consequences of this conception of science is that virtually any scholarly attempt at acquiring knowledge could be constructed to be science ... for something to be considered scientific it must use the agreed set of conventions – the scientific method (Hirschheim, 1992).

In other words knowledge is an agreed understanding at a particular time. In qualitative perspective knowing is a "reciprocal relationship between researcher and the participants" (Cutcliffe and McKenna, 2002). With reference to this study, the above meaning of epistemology is significant since one of the objectives of the research is to create a shared understanding about a change initiative that took place in BAe. The understanding has been gained through a social relationship with participants in the organization. Obviously the study is limited to a given time period. It suggests that the study complies with the conditions set out for knowledge creation in the above quotation.

The second aspect is related to the method by which the knowledge is obtained. The research uses the *case study* as a method for ascribing the knowledge. The case study is one of the scientific methods suggested by Galliers (1992) for creating knowledge. Rationale for the selection of the case study as a guiding method for the research has been argued later on in this chapter.

3. The paradigm debate (quantitative versus qualitative)

Scientific method is the fundamental way to acquire knowledge or conduct research. It is essential to look at research methods to conceptualise how a research project can be completed and how the objectives of research can be attained with a certain method. These methods have been classified in various ways; one scheme divides them into quantitative and qualitative areas. This classification is preferable because the researcher's intention is to conduct a qualitative study in an organisation.

However, other classification schemes are also available to the researcher: objective versus subjective, nomothetic versus idiographic, prediction and control versus explanation and understanding, etic versus emic and so on (Myers, 1997).

Although some researchers questioned this classification (Burrell and Morgan, 1979; Gage, 1985; Shulman, 1981), however, the objective of this division is to plan an inquiry. The quantitative approach is more concerned with numerical analysis and objective findings. The qualitative method emphasises description of natural or social events and tries to develop a particular type of understanding regarding a social situation, role, group or interaction. Qualitative inquiry uses text or recorded words as a primary source of data. It is 'analytic or interpretive in that the investigator must discern and then articulate often subtle regularities within the data' (Lucke *et al.*, 1987). "Qualitative research shifts the goal of quality control from the objective truth of statements to understanding by people" (Stiles, 2002). "Qualitative research seeks to understand the procedural affairs of the targeted social phenomenon; the focus is on *how* things happen rather than the fact *that* they happen (Tetnowski, 2001).

The researcher presents a rich description of context (for instance an organisation) and seeks norms and values in that social setting. He explores what people do or say and then forms his opinion. He concentrates on inductive analysis rather than deductive analysis. Therefore, he creates a theory to explain the data captured in a particular setting. (Lucke *et al.*, 1987).

The advantage of qualitative research is to 'understand people and social and cultural context within which they live' (Mayer, 1997). The researcher studies real-world situations as they unfold naturally; the phenomenon under study is understood as a complex system that is more than the sum of its parts: a focus on complex interdependencies; qualitative data as a thick description of reality; the researcher captures the respondent's personal perspectives and experiences directly, i.e. sometimes by one-to-one interaction; he creates direct contacts with the people, situation or phenomenon and assumes changes as a constant and ongoing phenomenon. Each case is considered unique: the findings are placed in a social, historical and temporal context and the researcher does not prove, advocate or advance personal agendas. The research design is flexible, being open to adopting inquiry as understanding deepens and/or situations change; avoids getting locked into rigid designs that eliminates responsiveness; and pursues new paths of discovery as they emerge (Patton, 1990). It leads to inductive analysis that starts

with exploring genuinely open questions rather than testing the hypothesis. In the researcher's view, qualitative research increases the co-operation between academics and practitioners. This is important because research in general and social research especially depends upon industry. In the social sciences the process of knowledge creation normally begins in public life which is then acquired and reported by researchers for general use. Behavioural knowledge demonstrates the behaviour of human beings; this behaviour is expressed or shown by people, which the researchers capture and communicate. For instance, the law of supply and demand (or equilibrium) says that the forces of demand and supply determine the price of commodities. In other words, people buy more at low prices and abstain from or reduce consumption at higher prices. For instance, the price of a mobile telephone was more than a thousand pounds ten years ago, as a result few people were using them. However, twenty per cent of the UK population own a mobile today because approximately fifteen mobiles can be bought for a thousand pounds now.

Similarly, qualitative research is characterised as non-manipulative, unobtrusive and non-controlling. It does not place constraints on outcomes: the researcher or sponsors cannot expect a definite result out of their investments. The experience and academic background of the researcher plays a dominant role in the process and outcome of a research endeavour. Thus the uniqueness of a research project places limitations on generalisation of outcomes. Despite these limitations qualitative research is playing a significant role in the development and advancement of human knowledge.

On the contrary, quantitative research deals with natural phenomenon, objective analysis and numerical outcomes. The replication is easy to obtain and the researcher places desired constraints on the outcome of a research activity. The researcher attempts to completely control conditions of the study by manipulating, changing or holding constant external influences in which a very limited set of outcome variables are measured (Patton, 1990). "Qualitative research has become a more prominent style of research within the social sciences and within organization studies in recent years." (Bryman et al, 1996).

The advantages claimed by a qualitative approach are transformed to disadvantages under a quantitative paradigm. It does not mean they are mutually exclusive and rivals for scientific inquiry but rather that the researchers can combine them for their research projects. This classification facilitates the research process. Some researchers can use the quantitative method more effectively and others the qualitative

route. It depends upon their requirements and what they want to explore; the researcher will argue for a qualitative approach in the subsection below. Since the objective of this study is to understand a subjective phenomenon through qualitative instruments (that support the objective), a qualitative approach has been selected to conduct the study.

According to Patton “philosophers of science and methodologists have been engaged in a long-standing epistemological debate about how best to conduct research. This debate has centred on the relative value of two fundamentally different and competing inquiry paradigms: (1) logical positivism, which uses quantitative and experimental methods to test hypothetical-deductive generalizations, versus (2) phenomenological inquiry, using qualitative and naturalistic approaches to inductively and holistically understand human experience in context-specific settings” (Patton, 1990). Orlikowski and Baroudi (1991) suggest three paradigms for qualitative inquiry: positivist, interpretive and critical theory and Guba and Lincoln (1994) state four epistemological approaches: positivism, post-positivism, critical theory and constructivism (interpretivism). However Schwandt (1994) argues for constructivism and interpretivism as two distinct epistemologies.

The positivist paradigm emphasises that objectivity is given that can be measured by quantifiable properties, the researcher and his instruments are independent entities. The aim of the researcher is to test the theory or hypothesis. Hirschheim (1992) concludes that positivism consists of five pillars: (1) the unity of the scientific method; (2) the search for the human causal relationships; (3) the belief in empiricism; (4) the value-free nature of science (and its process); (5) and the logical and mathematical foundation of science.

A positivist inquiry is based on formal propositions, quantifiable measures of variables, testing of hypothesis and deductive analysis (Orlikowski and Baroudi, 1991). The interpretive approach is different from the positivist paradigm as Schwandt (1994) argues that the goal of the former is scientific explanation whereas the goal of the latter is the grasping or understanding of the meaning of social phenomenon (Schwandt, 1994). The interpretive starts out with the assumption that access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings. According to Walsham (1993), the purpose of interpretative research is to produce ‘understanding of the context of the information system, and the process whereby the information

system influences and is influenced by the context.’ Interpretive effort ‘does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges’ (Myers, 1997). Critical theory suggests that ‘social reality is historically constituted and that it is produced and reproduced by people. Although people can consciously act to change their social and economic circumstances, critical researchers recognise that their ability to do so is constrained by various forms of social, cultural and political domination. The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light. Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination’ (Myers, 1997). The next section and the section on rationale of the research argue why interpretive paradigm is being adopted for this research.

4. The interpretive stance of inquiry

The nature of the interpretive paradigm is described above in order to gain a preliminary understanding of the concept. At this stage the researcher relates features of interpretive philosophy with the research question and objective. The creation of a relationship between characteristics of interpretive paradigm and the research question/objective will justify the choice of interpretive approach for the study. The philosophy of interpretive paradigm is also related to the professional background of the researcher.

Under the interpretive assumption the knowledge is gained through social construction. For example, language, consciousness, shared meanings, documents and tools (Klein and Myers, 1999). It represents inside understanding of the perspective and meaning of those in the setting being studied, includes propositional and tacit information (Stake, 1983), not only constitutes nomothetic models but also a holistic web of mutual and plausible influence, aims at internal consistency and coherence (Lincoln, 1990) and involves values (Smith, 1983). Interpretive data can provide contextual information and rich insight into human behaviour (Guba and Lincoln, 1994). “An interpretive approach is one that gives a feeling of how participants create meanings and create interpretations” (Urquhart, 2001). The researcher plays a significant role from design to interpreting findings.

The research question/problem suggests that the researcher wanted to know the process and product of change and the role of change methodology, and more importantly, the way in which this experience

can be used to introduce similar changes in an organisation in the future. Therefore the objectives of the study are understanding and learning of a change initiative while also seeking to contribute to the theory and knowledge of the discipline involved. In other words, the researcher wanted to gain knowledge or understanding of a change initiative through a social process/construction. Understanding of a phenomenon in interpretive terms can be gained through language, consciousness, shared meanings, documents and tools. This study employs language, shared meanings and documents as principle techniques to capture raw information. Qualitative research addresses micro features, meaning and functions of social life (Hammersley, 1990). More specifically, it studies cultures and change processes in an attempt to understand the phenomenon under investigation. The aim of investigating organisational changes is to learn the way in which to improve the status quo. It requires understanding of the existing system and how it functions. For instance, under a radical change programme the entire change is divided into fourteen processes. The researcher wants to understand different processes in order to make recommendations for further improvement or introducing new changes in the future. Understanding and learning are the common objectives in qualitative or interpretive paradigm. When the qualitative–interpretive paradigm is chosen as philosophical assumptions, then data gathering, analysis, interpreting and documenting issues are almost understood with minor deviations.

Personal background is also important to legitimise the choice of research assumptions and method. The researcher is trained in qualitative and quantitative disciplines; while concentrating on quantitative subjects, however, the first year in the doctoral school in the TIME institute enhanced his qualitative aspects. The researcher's worldview about the nature of reality was augmented by participating in various seminars delivered by learned people during the doctoral school. Qualitative methodology acknowledges the role of the researcher on one hand and concentrates on human issues on the other hand. These two features of qualitative approach motivated him to look into it in an organisational perspective.

A philosophical stance has been developed that is to be followed in the rest of the thesis as a philosophical assumption. Two competing paradigms of inquiry have been examined and this arguments were put forward about the interpretive stance to conduct a research. The researcher believes that interpretive paradigm is the suitable alternative to address the research question and to achieve research objective. The reason for developing this assumption is to decide the direction of the study and to select data collection and analysis strategy. By direction the researcher means the grand technique that is to be adopted to address the research question and to accomplish research objective(s).

Justification for the choice of case study as a research method is argued in the following part.

B- METHODOLOGICAL PERSPECTIVE

This part deals with the research methodology chosen and relates it with the purpose of the work. The objective is to justify the research method selection so as to develop a strategy for data collection and analysis. Special attention will be paid to the following questions.

- What research approaches are available for IS research projects?
- What methods are in use for investigating/studying organisations?
- How philosophical directions can be related to a case study?
- What is positivistic case study and interpretive case study?
- Which interpretive approach is followed in this thesis and why?
- How does it relate to the purpose and research question of the research?
- What type of data will be collected?
- What strategy/methods will be used to analyse and interpret empirical material?

5. Research approaches for studying organisations

Galliers (1992) suggests a range of research approaches for information systems researchers. Irrespective of his categorisation of these into scientific and interpretivist portions, I am enumerating them in an attempt to scan them for further discussion. He put laboratory experiments, field experiments, surveys, case studies, theorem proof, forecasting and simulation under scientific paradigm and subjective/argumentative, reviews, action research, descriptive/interpretive, future research and role/game playing under an interpretivist banner.

There are three methods available to conduct a study in an organisation: action research, field experiment and case study. Braa & Vidgen (1995) compared these three approaches in an IS context. Table 3.1 outlines salient features of each of them.

Table-3.1

Research methods in organisations

<i>Features</i>	<i>Action Research</i>	<i>Case Study</i>	<i>Field Experiment</i>
Duration	Long	Unspecified (any)	Short
Purpose	Intervention	Interpretation/ Description	Hypothesis testing
Change	Planned/deliberate	Accidental	Controlled variable
Direction	Building feature	Historical perspective	Real time/future

Action research is aimed at building features through intervention via a planned change initiative over a long period of time. It is restricted to a single entity, the outcomes are difficult to generalise, the researcher cannot control the variables and interpretation depends upon individual researchers. Despite its academic shortcomings, time limitation does not allow the researcher to be involved in an intervention for a relatively longer period of time than a case study. Secondly, the objective of the research is creating understanding rather than intervention. The aim of a field experiment is to test hypothesis within a relatively short time period. It is characterised with greater realism. However, it is difficult to find an organisation on which to experiment and even harder to achieve replication. The aim of the research is to create understanding of a phenomenon; hence it is not possible to conduct a field experiment to achieve the objective of the project.

In these circumstances, the case study seems a convenient way to gain understanding of a contemporary phenomenon within its real-life context and within a time constraint. Furthermore, the boundaries of the contemporary phenomenon and its context were not clearly evident at the outset of the study.

The case study approach concentrates on using historical data to interpret in an unspecified time span, although performance over a three to five year period is considered sufficient and desirable in order to arrive at a reasonable conclusion. The study investigates the nature and outcome of a BPR initiative that spreads over a period of five years.

6. Case Study as a research method

The case study is an empirical research technique, which is based on observable facts. According to Robson it is “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence” (Robson, 1993). Stern and his colleagues state that “a review of literature suggests that case study research has a prescribed set of objectives, epistemology, methodology and methods that have been developed and tested in a wide range of scholarly and problem solving situations” (Sterns et al, 1998). Yin (1994) argues that it is suitable when the phenomenon under study is not readily distinguishable from its context. In other words when investigators desire to:

- a. define a topic broadly not narrowly;
- b. cover contextual conditions and not just the phenomenon under study; and
- c. rely on multiple and not singular sources of evidence.

It should include the use of surveys, the conduct of experiments, the analysis of archives (quantitative) records and historiography or a combination of more than one of these. Robson (1993) classifies the case study into six types:

1. Individual – the detailed account of one person
2. Set of individuals – a small group of individuals with some common features
3. Community studies – one or more local communities are studied to investigate political behaviour, work patterns, leisure activities and family lifestyle
4. Social group studies – relations and activities of a family or occupational group, e.g. accountants, solicitors, doctors, etc. are described and analysed.
5. Studies of events roles and relationships – these encompass police–public encounters; doctor–patient interactions etc., studies of role conflict, adaptations, and stereotypes, etc.
6. Organisations and institutions – formal organisations are investigated through diverse aspects such as best practice, policy implementation and evaluation, industrial relations, management and organisational issues and processes of change (e.g. BPR).

Yin classifies case study on the basis of the purpose of the investigation. Table 3.2 summarises the principal features of this classification scheme. Myers (1997) argues that a case study may be positivistic or interpretive depending upon the philosophical assumptions of the researcher. For instance Yin (1994) and Benbasat (1987) are the advocates of the positivistic case study and Walsham (1993) is

an advocate of interpretive in-depth case study.

Table 3.2 Alternative classification of case study approach

		<i>Aim</i>		
<i>Focus</i>	<i>Exploratory</i>	<i>Descriptive</i>	<i>Explanatory</i>	
Single	Aimed at defining the question and hypothesis of a subsequent (not necessarily case) study or at determining the feasibility of the desired research procedure	It presents a complete description of phenomena within its context	It presents data bearing on the cause–effect relationship	
Multiple	It does all of the above for more than one case, thus generalisation is possible	It describes many cases which facilitates generalisation of findings	Multiple causality framework is defined. It justifies the quality and reliability of the outcome	

7. Rationale for the case study method

The selection of a researcher approach depends upon the research question and objectives of the study. In other words, the research question and objectives should ‘fit’ into the research method. Research question and objective (s) function as complementary to form a backdrop for a research activity. Thus the research has to achieve its objective and seek answers to the research question through a research methodology.

Alternatively the methodology works as a bridge between the objectives/research question and the outcome. The objective of the research is a detailed examination of an organisation in order to understand its change initiative. The case study is the suitable method that allows it in the ‘live’ environment. There are academic and personal reasons for the selection of the case study as a research technique. It is a desirable approach when a phenomenon is broadly defined, the researcher wanted to understand it in a greater detail and within a real world environment. Multiple sources of data

collection can be used and are desirable for the validity of the study. Secondly the researcher wanted to examine the culture of a local organisation which was possible through a case study. Field Experiment and Action Research were not viable for him.

There are many problems associated with the case study approach. For example, it is difficult to generalise findings which restrict their usefulness. Entry in to a research setting is a time consuming and sometimes monotonous job. Despite these shortcomings, it has been argued in sections five and six above that the Field Experiment (FE) and Action Research (AR) can not be undertaken due to time constraints and mismatch of the study objectives.

7.1 Parameters of the research

A lion share of human knowledge is being generated in the academic institutions and applied in the industry. Industry on its own also produces a significant amount of knowledge. Academics are always keen to know about conditions in industry and practitioners are also interested in the academic or scientific developments taking place in the academic world. The desire to know each other's developments and views about a certain phenomenon lays the foundation for industrial-academic co-operation. For example, a successful university develops healthy relations with industry that it exploits as a competitive edge to attract students. These relations are also helpful to provide students' training during studies.

In a previous section the researcher have described qualitative and quantitative research approaches; the intention has been to select the appropriate method for this study. The researcher choose qualitative approach (a case study) for this project for a number of reasons. Although the researcher used to read and talk about organisations or business institutions, as an academic researcher did not have enough institutional knowledge. The researcher could only imagine what is happening in the real world. The researcher has had an opportunity to visit a business enterprise during an eight week internship training programme during his MBA studies. Gummesson (1988) also perceives this factor and comments that the academic researcher generally lacks institutional knowledge, i.e. knowledge of conditions in a specific company, industry, market etc. This lack of institutional knowledge leads to and shapes the research problem. The research problem asks how an organisation successfully implemented a change initiative. It is a research problem because the researcher did not know much

about the organisation nor its change programme that will be used as a context. Therefore, the researcher assumes that other members of academic community or practitioners do not know much about this initiative in this particular company. If we as an academic community do not know about a certain matter, then one of us should take an initiative to explore this phenomenon because resources are available to accomplish this job and the company is willing to co-operate with us. In this way the research will be able to resolve a problem because some scholars have the view that research is a problem solving activity or procedure. The second reason is related to the nature of research project: the objective of the project is to understand a phenomenon. Gaining understanding as a research objective is recommended by leading researchers (Mason, 1984) and understanding is synonymous with knowledge (Hirschhiem, 1992). Discovering knowledge is the task of scientists and contributes to the development and welfare of mankind. To acquire 'valid knowledge', a qualitative research approach provides with sound support to achieve subjective goals such as understanding. The second objective of this research is learning. Understanding leads to learning and the purpose of learning is to use it again and again to improve certain situations or resolve a problem. Smart *et al.* (1996) support the notion of learning, for them, the purpose of learning is to facilitate continual improvements.

In a nutshell, research problem is that that the researcher does not know about a certain business entity; the facts and figures are unknown to the world. The world wishes to know/understand this phenomenon; the human and non-human resources are available to unveil the hidden realities. To understand and learn, a qualitative approach of inquiry seems suitable to address the problem. A number of qualitative research methods can be used to conduct this study however; a case study looks appropriate for this particular initiative (see table 3.3 below).

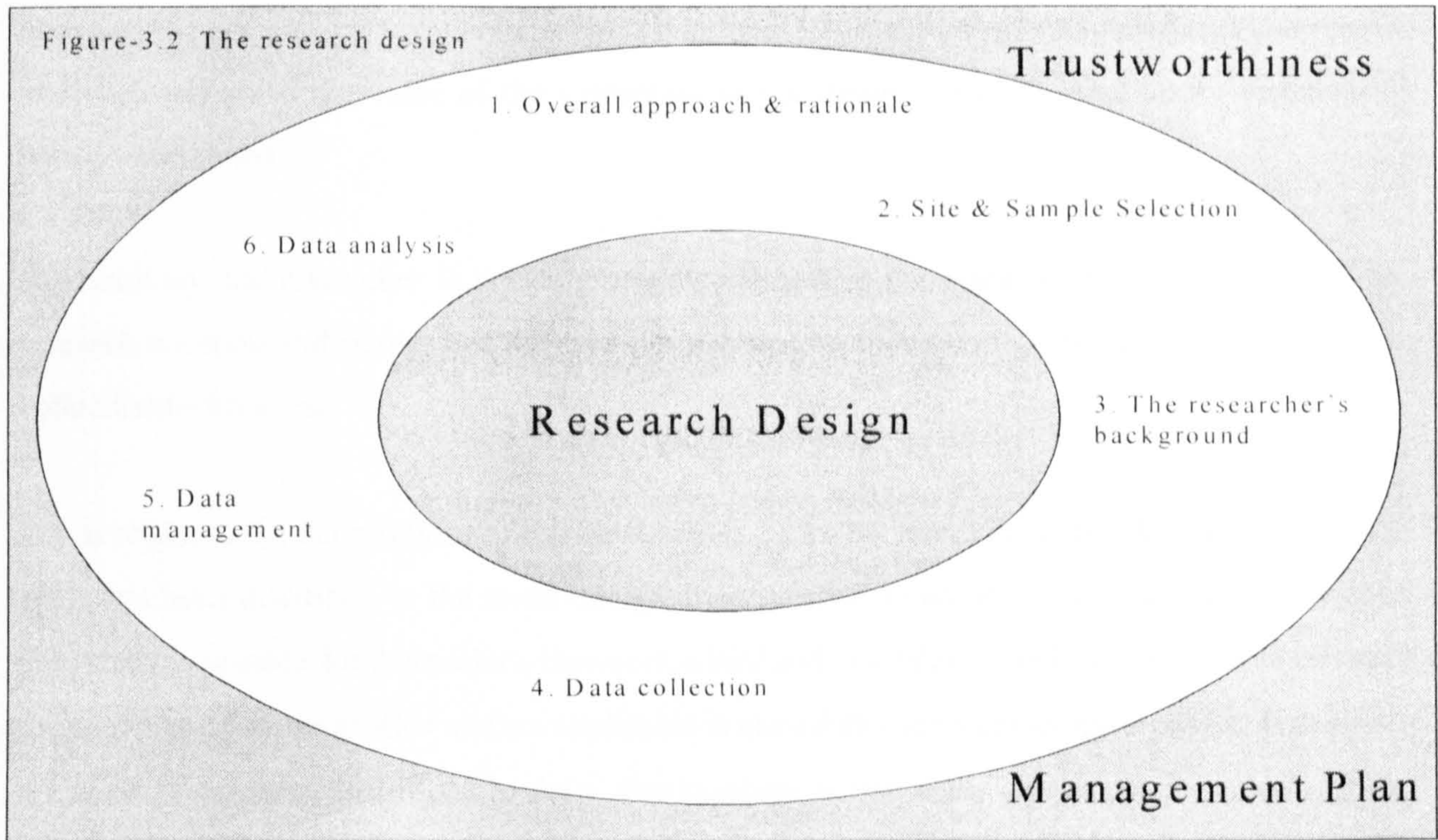
Table 3.3 Parameters of research model

<i>Area</i>	<i>Description</i>
Problem	Investigation of a radical change initiative in an organisation
Objectives	Understanding Learning Contribution to knowledge
Application	Reusability of outcomes/experience
Methodology	Qualitative–interpretive case study

8. Qualitative research design

Marshall and Rossman (1995) suggest an integrated design for qualitative researchers. The aim is to plan and monitor a study in a structured way and to demonstrate the researcher's capability to conduct the study and preserve the design flexibility. Figure 3.2 shows the steps involved in the design.

This part throws light on each of the elements diagrammed in the above figure. Trustworthiness



and time management are applicable in all parts of the design, therefore they are placed at the sides of the figure. It implies to the researcher that all steps involved must be accomplished within a time framework, and the material collected and analysed must be reliable.

8.1 Overall approach and strategy

Marshall and Rossman (1999) suggest the above framework on the basis of Yin's (1994) argument of how the purpose of the research can be matched with a research strategy. Virtually it links up data collection, analysis, interpretation and documentation. The framework tries to seek answers to the following questions.

- What is the purpose of the study?
- What is the form of the research question?
- What could be the research strategy?
- What data collection technique will be appropriate and why?

The qualitative paradigm suggests a pivotal role of the researcher's bias or background because 'value-free data cannot be obtained, since the inquirer uses his or her preconceptions in order to guide the process of inquiry, and furthermore the researcher interacts with the human subjects of the inquiry, changing the preconceptions of both parties' (Walsham, 1995). Given that view, a fifth question can be added to recognise the value of the researcher in the design. That is: What is the researcher's background (bias)?

Alternatively, the researcher is the only organic element in the research strategy; he decides the research question and purpose of the study, which in turn indicates the research method and data collection techniques.

Let us return to the main subject of this sub-section, overall research strategy. The question of case study has been discussed in the methodological perspective where it was argued that a descriptive case study is suitable for this project. However, a hard and fast rule cannot be followed because many principles overlap one another and are applicable in more than one methodological choice. That is why a line of demarcation is difficult to draw. For example, a case study can be conducted even if the research purposes are exploratory, explanatory or descriptive (Yin, 1994, Marshall and Rossman, 1999).

Marshall and Rossman's model for an overall strategy suggests four aspects of matching research question with strategy, namely, the purpose of the study, the research question, the research strategy and the data collection techniques. The researcher's background as a fifth element was included (the rationale for this is illustrated above). These elements together with the researcher's background were related to the case study in order to justify the choice. (Table 3.4) It also helps to plan and implement subsequent steps involved in the data collection and analysis.

Table-3.4 Basic elements of research design

<i>Design elements</i>	<i>Applicability to descriptive case study</i>
1. Researchers background (worldview)	Reality is a socially (constructed) emergent, subjectively created, and objectified through human actions (Ghua, 1986).
2. Research question	What is the structure, process and product of radical change in an organisation.
3. Purpose of the study	Understand, learn and document a phenomenon (Radical change in organisational perspective).
4. Research method	Qualitative case study.
5. Data collection technique(s)	In-depth interviews and document analysis.
6. Unit of analysis	Radical transformation (Business Process)

8.2 Site and sample selection

The research addresses a site-constrained (specific) question: 'By what processes was the radical change programme implemented in the British Aerospace, Military Aircraft Division?' Military Aircraft is situated at five geographical areas where radical change was implemented. The researcher selected Warton as a venue for the conduct of the study because access was provided only for this site and the head office of the BPR programme was situated here. The head office of the company is also located at this site, which facilitates access to shared resources. Training facilities for potential change teams are provided at the head office. Frequently, the internal change consultants deliver lectures and organise workshops and conferences at four other places. Sometimes they work as a member of a change team at constituent sites.

Marshall and Rossman (1995) suggest characteristics of an ideal research site: where entry is possible, resources are available, the researcher can build useful relations with the participants and data quality and credibility is reasonably assured. The researcher believes that most of the characteristics are present at the site selected. As a head office of both the company and the change initiative, the site is representative of the phenomenon under study.

The study is based on nine change projects out of fourteen undertaken during the five-year period of 1993–98. The sample represents 64 per cent of the universe that seems convincing for the credibility and the trustworthiness of the findings.

8.3 The role of the researcher

Marshall and Rossman (1999) suggest technical and interpersonal considerations as part of a researcher's contribution in a study. The technical considerations encompass the degree of participation, disclosure, intensity and focus of study. So far as the degree of participation is concerned, the researcher conducted the study as an observer except a few moments of limited participation. Disclosure refers to the fact that whether the participants or respondents were informed about the study. In other words they disclose information to the researcher despite knowing that they will be used for a research project. The intensity can be imagined from the fact that 64% of the BPR projects launched were included in the study. The company was also concerned with the research since an internal coordinator was appointed to monitor the progress and guide the researcher. The radical change initiative is the main research topic whereas change methodology is the focus of the research; it excludes other programs underway in the organisation.

The qualitative approach allows the researchers to integrate their previous knowledge and experience with the data captured. The researcher has already discussed his academic and professional background in chapter one which establishes the researcher's bias. The researcher's bias is the way a researcher see the things around him or in the data. It is more than the worldview discussed in part 'A'. For example, a hungry man was asked 'what makes two and two' he replied 'four loafs of bread'. His answer was not based on the mathematical principle but on his physical conditions at that particular moment. The same person may answer differently if he were not hungry. Similarly, a researcher interprets facts and figures in a personal perspective. It creates the variety of opinion that is the real beauty of qualitative research.

8.4 Data collection and analysis strategy

The paradigm dialogue (section 3) emphasis the basic beliefs or world view that guides an inquirer during his academic journey. A paradigm defines certain rules for the researcher. For example, 'what is it they are about, and what falls within and outside the limits of legitimate inquiry' (Guba and Lincoln, 1994). An inquiry paradigm is based upon three basic beliefs: ontology, epistemology and methodology. Ontology deals with social reality (phenomenon) and what can be known about it. Epistemology tries to seek a relationship between the researcher and what can be known about social reality. Methodology bridges the gap between a researcher and what he intends to discover (or unknown), since methodology consists of procedures, methods, techniques, plan, tactics and strategies

to obtain an objective, e.g. knowledge. Acquisition of material that could be turned into knowledge and the way by which this material is obtained is significant. For example qualitative researchers can employ in-depth interviews, observation, documents review and participation as the major techniques to gather empirical data (Marshall and Rossman, 1999). The researcher employs interviews and review of documents as a primary source of capturing data (the rationale of employing these techniques has been described below). The purpose of the dual strategy is to triangulate the data in order to improve validity and reliability.

8.4.1. In-depth interview

Interview is a conversation with a purpose (Robson, 1993). The purpose of interview as a data capturing technique is to 'allow researchers to understand the meanings people hold for their everyday activities' (Marshall and Rossman, 1995). Each of the interviewees has a social history and an individual or unique perspective on the world (Fantana and Frey, 1994). An interview is a flexible and adaptable way of finding things out (Robson, 1993). It is useful "because of the ability of interview techniques to obtain the richest data within the prescribed limits of the research" (Harris, 1999).

The objective of this study is to understand an organisational event, which is commensurate with the objective of an interview since it is one of the most common and powerful ways to understand human beings (Fantana and Frey, 1994). The researcher is trying to understand an organisational event through human beings: the employees. Therefore, it seems appropriate to employ interview as a data collection techniques.

There are many reasons for the application of interview. For example, many facets of recent change cannot be identified unless consulting those who were involved in the process of change. The documents were standard inorganic in nature but the people were interactive and different. They have different amount of experience, knowledge and approach to see the change.

Interview does have its limitations. It involves personal interaction and co-operation and interviewees may be unwilling to disclose the sort of information which the researcher wants to explore. Interviewing is a time-consuming strategy: preparation before the meeting and the availability and schedule of the respondent always generate problems for researchers (Table 3.5). The table is based on the work of Marshall and Rosman (1993) and Robson (1993). Combining interviews with other

sources of data gathering techniques can produce reliable outcomes. The researcher's role as a non-participant observer limited his choice of data collection techniques. The interview was a viable and sound strategy to corroborate data obtained through review of documents.

Table 3.5 Strengths and weaknesses of interview as a data collection technique

<i>Strengths</i>	<i>Weaknesses</i>
Face-to-face interaction with respondents	Misinterpretation of data is possible due to cultural differences
Detailed and extensive data is obtained Quickly	Dependent upon a small number of respondents
Facilitates co-operation between researcher and informants	Replication is difficult because individual researchers are different.
Researcher can access to clarify and amend data captured	Quality of data is subject to observer's effects, thus are obtrusive and reactive
Complex interactions in social relations can be discovered	Truthfulness of data depends upon the respondents
Data is grasped in natural setting	Also dependent upon ability of the researcher
Useful to obtain data on non-verbal behaviour and communication	Time consuming; preparation, e.g. arrangements to visit, security matters, etc.
Triangulation, validity checks and analysis are easy to accomplish	
Helpful for investigation and discovery of Nuances in culture	
Flexible strategy for formulation of hypothesis	
Contextualize activities, behaviour and events	
Flexible approach to gather detailed material	
Useful to uncover the subjective side, especially organisational processes	

8.4.2 Review of documents

There were two factors for the selection of documents. Information about companies can be found in public media and scholarly published work. This information is available to everyone but there is certain information to which the public has no right of access. Organisations maintain this information in the form of various documents such as business plans, reports, memos, electronic databases, etc., that are their assets and a business secret. They allow certain people (researchers, auditors and consultants) to consult these documents. The researcher supposes that he can know about an organisation if he analyses these documents. It can tell him the history of the company, business strategy, previous change programmes, assets, employees, norms and values, and most important the recent change initiative, i.e. business process re-engineering. The researcher consulted the documents of the company in order to develop an understanding of organisation, its history, policies, strategies, previous change programs and business structure. The objective was to develop a context and understanding of the setting. Contextualisation helps to know about the past so as to understand present or future of the context/phenomenon (Klein and Myers, 1999). He enjoyed an opportunity to review business plans (1992-97) in the organisation. They outlined the annual review of business activity, policies and strategies and future plans. They also threw light on the economic environment and major events in the industry worldwide, thus pointing out the opportunities and threats to the company in the short-term and long term. Furthermore, they show how the company is reacting against internal and external forces to remain competitive in the industry so as to pursue its mission. Business reports narrated the procedures involved in the change initiative and the role of different factors such as information technology. They explained the contents of change, the process and potential product of change.

Reviewing documents is an unobtrusive approach, “one rich in portraying the values and beliefs of participants in the setting” (Marshall and Rossman, 1995). Documents analysis helps to contextualize the phenomenon and is an unobtrusive and non-reactive method. It helps the researcher to determine the emphasis of important themes within the data. So it shows the road that can lead to reliable findings. Marshall and Rossman put forward a number of strengths and weaknesses of documents (see Table 3.6).

Table 3.6 Strengths and weaknesses of documents review as a data collection technique

<i>Strengths</i>	<i>Weaknesses</i>
Researcher can manipulate or categorise data for analysis	The researcher can 'miss the forest while observing the trees'
Follow-up is possible in order to correct and clarify data	Misinterpretation of data is possible due to cultural differences
Management and administration is easy	Dependent on the goodness of the initial research question
Statistical analysis can be made as data are quantifiable and amenable	
Generalisation is possible	
Work done by other researchers is helpful, e.g. measuring devices	
Triangulation, validity checks and analysis are easy to accomplish	
Helpful for investigation and discovery of nuances in culture	

8.4.3 Sources of data

There were seven types of document available for consultation:

1. Annual business plans: BAe Military Aircraft division publishes a document known as the business plan which outlines the objectives, targets, products, management intentions and performance of the division.
2. BPR reports: these were the heart of the change programme dealing with each project. Each project was divided into four phases, the reports were compiled for the first two phases and the third was summarized in the report of the second phase.
3. There were reports and presentations on the general procedure or method of introducing change.
4. Presentation material (slides) for the training of BPR teams and other people involved.
5. External consultants' research reports about the organization and its radical change initiative.
6. BAe's in-house magazine, Military Aircraft magazine (the Fastrack) and related publications.
7. Mini-library of the BPR section (books, magazines and journals, to which the BPR section was subscribing).

Items 2, 3 and 4 from the above list were the core sources of data. The reports contain an actual account of the change process over five years of transformation. The programme was split up into four major stages: evaluation, envision, empowerment and excel. The existing processes were studied in the evaluation, processes were redesigned in the envision, implemented in the empowerment stage and a programme of post- implementation and monitoring was the subject of the excel stage. Reports and

transcripts of interviews provide the basis for the analysis and, eventually, conclusion the conclusion. Items 5-7 are supplementary to the inquiry.

Transcripts of the phenomenological interviews were the second source of data captured. These documents were the 'passive informants' and were to be considered as an official written source of information. The authors of these documents cannot, however, express their personal views freely in such formal reports. Interviewees therefore were used to allow individuals to comment about events. So the interview become an alternative to BAe's documents. The objective of the interviews was to obtain the views of those who were actually involved in the change process, e.g. the heads of the project teams, the internal consultants and the members of the process improvement team (PIT). Information obtained through interviews was used to corroborate the information obtained through paper sources. Dual sources of data increase the validity of the research and strengthen the conclusion arrived at.

All the interviews were conducted within the premises of BPR section. Mr Dave Edmondson, who functioned as a coordinator, arranged the times and venues. The standard duration of each interview was one hour. The research prepared a list of indicative questions to be asked. However, changes could be made according to the situation, time and depth of the issue. He took notes during and after an interview.

Interviewees told the story of change. They described the change methodology, difficulties, learning involved, indicated the significant issues involved in the change and the role of key actors. Eleven interviews were held with eight persons: four interviews were with the Head of the BPR section. His interviews contained the main story of the change. These four were fully transcribed whereas important points were noted from the other interviews.

8.5 Data analysis and management strategy

Data analysis is “a process of resolving data into its constituent components to reveal its characteristics elements and structure” (Dey, 1993). It involves description, classification and connection of raw data. A researcher’s job is to concentrate on the following questions:

- What is relevant data?
- How can the data be grouped?
- What is the relationship between data?

- How is data meaningful to users?

They are taken in turn.

8.5.1 Analysis procedure

Qualitative analysis can positively begin with description of the situation, as the researcher perceives it. It is concerned with how a social actor defines different situations and explains the motives that govern his action. The researcher makes sure that this relates to the intention of the actor involved (Dey, 1993). Description makes complex ideas simple and understandable by reducing them to constituent elements (Bernard, 1988). It is an instrument to describe local actors, events, and settings. The purpose is to tell or construct a story (Rien and Schon, 1977).

Description refers to recitation of characteristics of a person, object or event and is the basis of scientific theories because it permeates a theory. A researcher develops thorough description or 'thick description' of the phenomenon (Dey, 1993). It encompasses information about context, intentions and meanings of organised actions, its evolution and process in which action is embedded (Denzin, 1978 quoted by Dey, 1993). Context aims at situating action and grasping wider social and historical import. Dey (1993) notes, it requires description of the social setting within which action occurs; the relevant social context may be a group, organisation, institution, culture or society; the time frame within which action takes place; the spatial context; the network of social relationships, and so on. (p. 32)

However, researchers have their own bias regarding the research topic, accumulating it during their lives in the past, together with knowledge, social background, experience and personal motives. The researcher needs to seek a middle way in order to respect the subject's intentions and his own interpretation of the phenomenon. His job is to make meaning negotiable because it can evolve over time. Dey (1993) summarises it as: data analysis process involves analysing changes over time. Social changes are analysed through phases, key incidents or the complex interplay of factors because material and social factors affect change.

Explanation and interpretation requires classification in a way that helps to achieve research objective. An analyst breaks up data into meaningful pieces “which correspond to the separate facets of social reality we are investigating, but which also allow us to put them together again to produce an overall picture” (Dey, 1993). He argues that classification lays the conceptual foundation for analysis and is a familiar process of reasoning and comparison. An analyst can redefine categories in order to produce more rigorous conceptualisation.

Classification provides the basis for making *connections*; it separates the pieces of data, which share similarities (and of course differences). Identifying substantive connections demands identification of associations between different variables. Associations can be examined through regularities, variations and singularities in the data (Dey, 1993).

An *account* can be arrived at the end of making logical connections in the data. This is a general approach to analysis and is considered in the following pages.

8.5.2 Theoretical framework for analysis

Huberman and Miles (1994) suggest two frameworks for analysis: inductive and deductive. The inductive approach is useful when the terrain is unfamiliar or excessively complex, a single case is under study and approach is exploratory or descriptive. It involves finding regularities in the physical and social worlds. The deductive framework is good when “the researcher has prior acquaintance with the setting, has a good bank of applicable, well-delineated concepts, and takes a more explanatory and/or confirmatory stance involving multiple, comparable cases” (Huberman and Miles, 1994).

They suggest a number of tactics to tackle qualitative data:

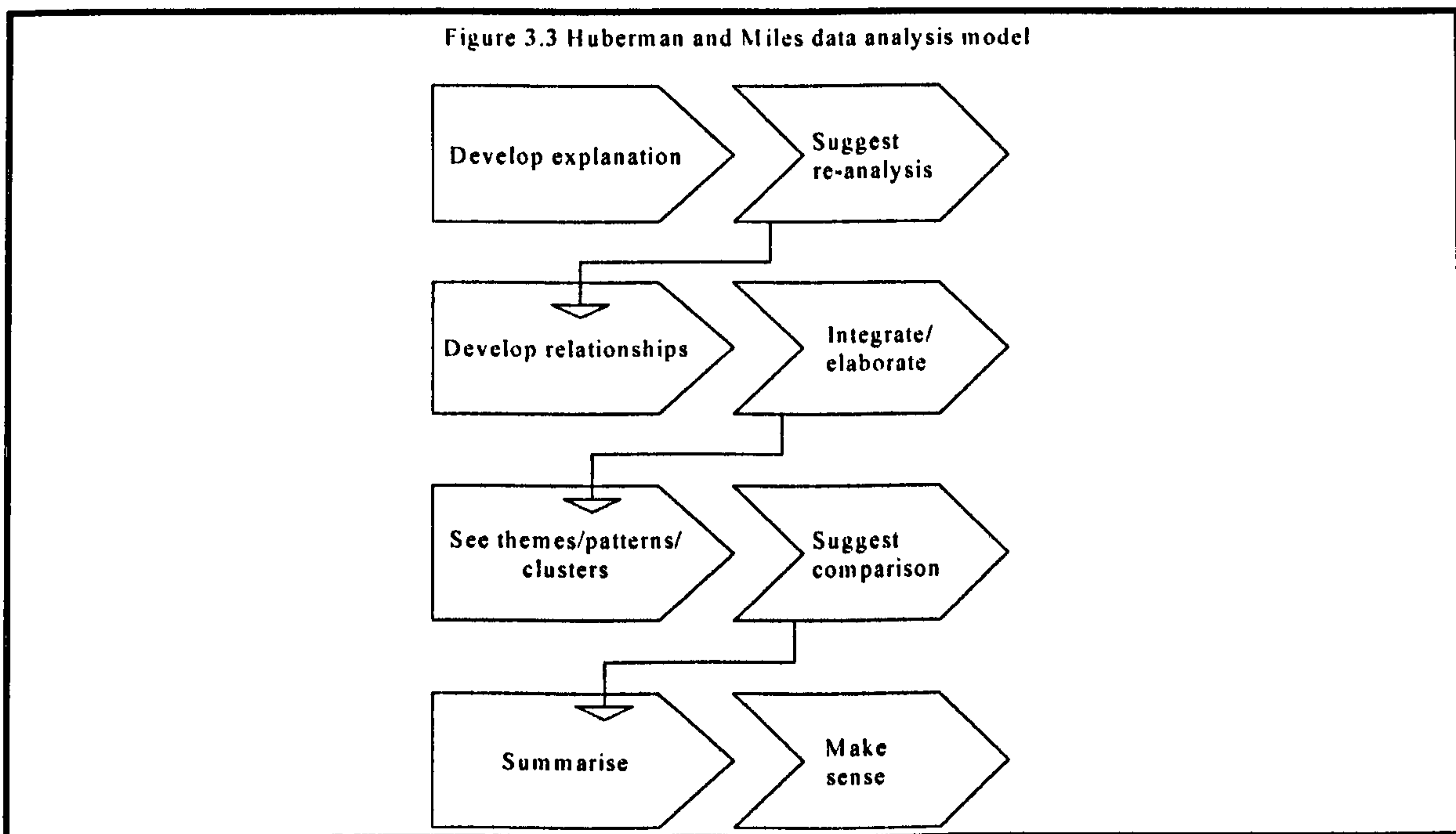
1. Noting patterns and themes
2. Seeing plausibility – making initial, intuitive sense
3. Clustering by conceptual grouping
4. Help one to see connections, making metaphors
5. Counting
6. Making contrast and comparisons
7. Partitioning variables
8. Subsuming particulars into the general, shuttling back and forth between first level data and more general categories.
9. Factoring

10. Noting relations between variables
11. Finding intervening variables
12. Building a logical chain of evidence
13. Making conceptual/theoretical coherence

They also suggest a general framework to analyse qualitative material: description and explanation, data display, the role of theory and importance of causality. Description is discussed in the beginning of this section, other issues are explained below.

Explaining addresses the 'why' question in the analysis process (Huberman and Miles, 1994): providing required information, supporting claims or making causal statements (Draper, 1988), is a concatenated description. Explanations are condition and context dependent, partial, inconclusive and indterminately applicable (Kaplan, 1964).

Data display allows to permits analysis, make comparison easy and heightens credibility because display usually accompanies conclusions. The purpose is to answer the research question. "Displays beget analysis, which then beget more powerful, suggestive displays" (Huberman and Miles, 1994). The display sequence is shown in figure 3.3 below.



Another relevant dimension is the application of theory in the study. A *theory* helps to explain, predict and interpret a phenomenon. It fits the data, modifiable and is relevant to the core of the topic. A theory in view influences the amount of data collection, reduction and display. Huberman and Miles (1994) summarise five facets of a theoretical construct:

- A congeries of well-articulated constructs
- A map so as to generalise the stories told about a case
- A predicted pattern of events that is to be compared with what is actually observed
- A model, with a series of connected propositions that specify relations, often hierarchical, among components
- A network of non-hierarchical relationships, expressed through statements defining linkage among concepts.

These concepts are valuable for the establishment of a conclusion at the end. They guide the researcher to build theories out of his work. The researcher will co-ordinate them with his work in the final chapter.

8.5.3 A model for analysis

A case study can be positivist, interpretive or critical. Yin (1994) and Benbasat *et al* (1987) are advocates of a positivist emphasis and Walsham (1993) advocates interpretative case study research (see Myers, 1999). The goal of the positivist approach is scientific explanation whereas the goal of the interpretive approach is the grasping or understanding of the meaning of social phenomena (Schwandt, 1994). An interpretative approach starts out 'with the assumption that access to reality (given or socially constructed) is only through, social constructions such as language, consciousness and shared meanings'. (Myers, 1999) According to Walsham the purpose of interpretive research is to produce an 'understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context'. (Walsham, 1993) Interpretive effort 'does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges' (Myers, 1999). Table 3.7 sets out the salient features of qualitative data and their analysis.

Table 3.7 Relationship between philosophical assumptions and goal of analysis in qualitative data

Characteristics of qualitative data	Philosophical assumption	Goal of analysis
<p>*Qualitative data relate to questions of meaning that are being researched</p> <p>*Meaning is expressed through text, images and actions</p> <p>*Text or recorded words is the most common form of data</p> <p>*Data are obtained without any deliberate intervention</p>	<p>*It starts out with the assumption that access to reality (given or socially constructed) is only through social constructions such as language e, consciousness and shared meanings (Myers, 1999). The participants 'make sense out of their experiences and in doing so they create their own reality' (Lucke et al, 1987)</p>	<p>*Describe and develop understanding of the meaning of social phenomena.</p> <p>*To produce understanding of the context of the change.</p> <p>*It 'does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerge'.</p> <p>* Descriptive in nature and interpretative 'in that the investigator must discern and then articulate often subtle regularities within the data' (Lucke, et al, 1987)</p> <p>*Qualitative study involves detailed description of the social context and what people say or do form the basis for inductive analysis</p> <p>*Theory is created, not tested to explain the data</p> <p>*The focus of attention is on the experiences and perception of the participants</p> <p>*Feelings, explanations and</p>

		<p>expressions of participants are treated as realities (the relativistic view of the world)</p> <p>*The researcher does not seek verifiable truth or apply a cause and effect model of reality</p> <p>*The researcher begins with a preliminary question(s) in order to direct the focus of attention. Alternatively, he attempts to bring as few assumptions and preconceived structures to the study as possible.</p>
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In summary, the researcher has to produce an understanding (in the form of an account) of the qualitative data with the assumption that reality is socially constructed. Data analysis is 'the process of bringing order, structure, and meaning to the mass of collected data' (Marshall and Rossman, 1995). Data analysis includes data reduction, data display and conclusions (drawing and verifying) (Miles and Huberman, 1994). Similarly, data description, classification and making connections are parts of the qualitative analysis (Dey, 1993). Marshall and Rossman (1995) suggest five analytical procedures: organizing the data; generating categories, themes and patterns; testing the emergent hypotheses against the data; searching for alternative explanations; and writing the report.

Given the suggestions of Miles and Huberman, Marshall and Rossman, and Dey, the plan of the analysis may resemble what is shown in tables 3.8 and 3.9.

Table 3.8 Plan of data analysis (the Miles and Huberman model)

<i>Macro level</i>		<i>Micro level</i>	
<i>Analysis element</i>	<i>Application to the study</i>	<i>Analysis element</i>	<i>Application to the study</i>
Data reduction	Number of projects reduced from 14 to 10 and then to 9	Display	Actual tables
Display	Actual tables	Data reduction	Reducing the characteristics of each project and transferring them to a table
Conclusion	Chapter 7	Conclusion	Chapter 7

Table 3.9 Plan of data analysis (the Dey model)

Analysis element	Application to the study
Description	Description of all the projects (Appendix A)
Classification	Classification of project characteristics
Connections	All of the themes are connected to three themes context; content and process

The content of the three data chapters has been established after application of the above model in a cyclical manner. For instance, from the original documents and interview data, analytical descriptions have been made. Extracts have been placed at appropriate chapters or sections. It follows by a logical arrangement of the themes found in literature review and theoretical framework; e.g. important themes have been placed under three headings – context, content and process. This classification was the basis of key findings in the final chapter. Analysis has been made in the body of a chapter, at the end of each section in many instances and in the final chapter.

9. Access and procedure of the study

At the end of the first year in the doctoral school a number of topics were under consideration for research. Information systems failure, systems development methodologies and business process re-engineering were short-listed. In consultation with the supervisor the researcher chose business process re-engineering (BPR) as a general research topic focusing on the effectiveness of methodology

employed. There were many options for investigating BPR, including survey, action research, field experiment and case study. Meanwhile the researcher came to know that British Aerospace (BAe) had initiated a BPR programme recently. He approached Professor Wood-Harper, his advisor for the research and then Director of the TIME Institute in order to contact BAe. He wrote a letter to Mr T. Ward, the head of BPR in BAe's Military Aircraft division in Preston. Mr. Ward, a Salford graduate and a senior engineer, responded positively and allowed the researcher to investigate the BAe BPR initiative. Time and venue for the first meeting with him were agreed upon.

Mr. Ward familiarized the researcher with the BAe BPR initiative and its procedure. The researcher proposed use of documents and unstructured interviews as the primary methods for data collection. Mr. Ward explained the kind of data available to him and the limitations of classified documents, which could be consulted in the office.

The researcher started to read *annual business plans* going back to 1993 when the change initiative was officially inaugurated. The plan highlighted the business environment, the range of company customers, collaboration with external parties, technological advancements, targets for the next period, personnel policies and strategies, critical success factors, values and performance. It gave him a high level vision of the context of the company. The qualitative philosophy emphasizes the need for knowledge of the context in a qualitative inquiry in order to understand the phenomena. Business plans offer a rich picture of the context within which the change has happened.

Consultation of documents and meetings with Mr Ward and his colleagues provided the basis for designing the interviews. Fourteen projects were examined, ten of them were short-listed for further analysis. Nine of the ten were selected for final analysis. BPR (evaluation and envision phases) reports on these projects offered an understanding of them. Nevertheless, it was felt that the people actually involved in the processes should be consulted. The researcher decided to interview them in order to enhance the level of understanding he had derived from BAe documents and meetings with BPR personnel.

The organisation is a defence enterprise that is sensitive in terms of information disclosure. Therefore, the researcher worked as an observer who was considered a visitor and was escorted from the reception to the BPR department, the venue for reading the archives and conducting in-depth interviews. A fortnightly visit of a whole day was agreed with the company so that the researcher can

continue my data collection campaign. The researcher and the head of the Business Process Re-engineering (BPR) chalked out a procedure to conduct the work. The head of the BPR co-ordinated with the researcher for the first three months and then an internal consultant of the BPR team worked with the researcher as a co-ordinator. The researcher identified the potential interviewees and the co-ordinator arranged the timing and dates of all interviews.

The change initiative was started in 1993 as part of a total business and operational strategy. Most of the radical change projects were in the process of implementation during 1998. The researcher wanted to study the programme from 1993 to 1998; hence termination date for data collection was January 1998. The annual business plan of the company was a document published yearly to outline key actions undertaken in the previous year and what to do in the following year. Each project was divided into four phases: evaluation, envision, implementation and continuous improvement. The researcher consulted thirty reports concerning fifteen projects undertaken during the five years period.

10. Trustworthiness

Marshall and Rossman (1999) summarise validity criteria for a qualitative inquiry; four constructs reflect the basic assumptions of a qualitative inquiry. *Credibility* refers to the notion that the inquiry should demonstrate identification and description of subject under study. The purpose 'is to explore a problem or describe a setting, a process, a social group, or a pattern of interaction' (1985, p. 141). *Transferability* suggests application of original findings to another context. Suppose findings of study 'A' are drawn from population 'P' and are applicable to the population 'P'. A valid inquiry must be capable to apply the findings of study 'A' to the population of sample 'B'. *Dependability* requires a researcher to account for changing conditions in the phenomenon or research design as a result of refined understanding gained in the end. *Confirmability* requires a researcher to produce findings in a way that can be confirmed by another researcher. Data collection and analysis procedure and contents help to arrive at similar general findings to the original investigator.

Let us look at the criteria from the present study's perspective. For instance, *credibility* is established through the final three chapters of this thesis. The seventh chapter summarises the findings and learning from the study. The objective is to create an understanding of the phenomenon through description and analysis. Although *transferability* in case studies has been questioned (Marshall and Rossman, 1995), a number of findings are applicable in other settings as shown in chapter seven. In

connection with *dependability*, there was no significant changes in the research design however, the nature of the phenomenon did change. For instance, BPR and related terms have been replaced with Process Management (PM). PM emphasises business processes as the focus for change with a significant role of technology. With reference to *conformity*, interviews and documents have been used for data collection. The documents are the hard copies which can be accessed and conformity or replication can be obtained straight away, nevertheless, interviews may not be taken as it is or with the same wording. Despite these issues the basic data can be collected again and replication can be claimed. Availability of interviewees is the only problem that a new researcher can encounter.

11. Conclusion

The aim of the chapter is to justify the research method applied in the study. The research question reiterates the understanding of a social phenomenon. Creating a detailed understanding in an organization for an outsider can be done better through a case study. Other methods of studying an organization such as action research or field study are not feasible because of various personal and practical reasons.

Taking the case study as a research method and qualitative paradigm as a philosophical assumption, interviews and documents have been selected as data collection methods. The analysis tends towards understanding through the application of interpretive guidelines. These three aspects have been discussed in philosophical, methodological and design perspectives, which guide the researcher during various phases of data collection, analysis and presentation. The previous two chapters established the research problem and its significance, to be researched together with the examination of existing literature. This chapter sheds light on the research approach used in the investigation. The rest of the thesis describes the conduct of the study and its conclusions.

Chapter 4

The Context of the strategy

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Chapter 4

The Context of the strategy

1. Introduction

This is the first chapter in a series of three: context, content and process. Pettigrew et al divided the idea of context into inner and outer sections (Pettigrew et al, 1989). The inner context “helps shape processes through which ideas for change proceed” (Pettigrew et al, 1992). This refers to company history, structure, culture and politics. The outer context constitutes the economic, the business, the political environment, and both social and economic trends (Pettigrew et al, 1989). The outer context is important because if it changes (for example unpredictably such as the end of the USSR), then the inner context needs to respond concurrently (Lau, 2002). Context is important given “the intended audience can see how the current situation under investigation emerged” (Klein and Myers, 1999). Chakravarthy argues that the lack of fit between the context and the strategic plan chosen can impede corrective action (Chakravarthy, 1987) and Lau concludes that “different contexts do have different impacts on strategic implementation” (Lau, 2002). For instance, a culture of working together facilitates the introduction of teams. Pettigrew et al argue that “the neglect of context and the role of powerful groups within it has produced a situation in which myths abound about rational problem solving processes and their linear implementation” (Pettigrew et al, 1992).

The second section of this chapter deals with the inner context or characteristics of the organisation such as its antecedent conditions (recent history), structure (formal arrangement of roles and responsibilities), culture (beliefs, values, norms etc) and politics (distribution of power). The third section is reserved for the outer context, which is concerned with external factors such as the economic environment (general economic conditions), the business environment (business activity in the industry and in the country) political (national and international relations) and social environments (social trends within the country or wherever the company’s customers reside) within which the

company is operating.

This chapter provides an understanding of the company's internal characteristics such as structure, culture and political framework and the external conditions such as national economic, political and social contexts that were in place when the change started. This will guide the change agents in the selection of the components of the strategy described in the next chapter.

2. The inner context

According to Pettigrew et. al. (1989) the inner context is a combination of antecedent conditions (including company history) , structure, culture and internal politics. Each of these elements are the subject of this section.

2.1. Antecedent conditions

Antecedent conditions include: company history, pattern of crises 'transforming events', course of past successful/unsuccessful strategies and their impact, duration and ramifications (Pettigrew et.al., 1989).

Historically, British Aerospace (BAe) came into being with the statutory merger of the British Aircraft corporation, Hawker Siddeley Aviation, Hawker Siddeley Dynamics, and Scottish Aviation on 29 April 1977 as a result of the Aircraft and Shipbuilding Act 1977. It was registered on 31 December 1979 as a public limited company. BAe acquired the undertakings of the constituent companies in 1978 in order to reorganise internally. The constituent organisations were established by the earlier consolidation of the British aviation industry.

The Government denationalised the company in January 1981 by the British Aerospace Act 1980. The assets, rights, obligations and liabilities of BAe were transferred to the new owners. The status of the organisation was now that of a public limited company with 51.57% private ownership. Only 15% of foreigners were allowed to purchase its shares. The rest of the private ownership was offered to the general public and to employees. Subsequently the Government got rid of the remaining ordinary shares in BAe in the

autumn of 1985, but retained its special share i.e. according to an On-line source that,

The rights attaching to the Government's special share require that the amendment or removal of certain provisions relating to those rights in BAe's Articles of Association can only be effective with the written consent of the special shareholder, the Secretary of State for Trade and Industry. These provisions relate to the United Kingdom control of BAe, the Articles of Association stating that it is a cardinal principle that BAe should be and remains under the United Kingdom control. In particular: (a) if the aggregate number of foreign-held shares in BAe exceeds 29.5 per cent of the voting capital the excess must be disposed of within 21 days and is disenfranchised in the interim; (b) all directors of the company must be British; and (c) the special shareholder has the right to appoint a Government Director to the BAe Board. The special shareholder has no voting rights at General Meetings of the company. At 13 March 1990 the number of foreign-held shares in BAe represented 14.3 per cent of the issued ordinary share capital of the company (On-line source, 2002).

But 'the rights attaching to the government's special share did not extend to dividends or votes unless relating to certain changes to the Articles of Association. This relates primarily to the maintenance of UK control of both the board and the company' (Monopolies and Mergers Commission, 1995).

With the privatisation of the company, it offered 100 million ordinary shares of 50p for sale at £1.50 each. The subsequent issues were as follows:

- BAe issued new shares of £179.5 million to raise additional capital in 1985.
- BAe made provision of £250 million against re-organisation and rationalisation costs.

The company management was under pressure to reduce borrowings, so the company raised £432 million by rights issue; the ratio was 2:5.

- A huge sum of £1000 million provision was made against jet aircraft financing and reorganisation costs.
- Further provision of £250 million had to be made for turbo-prop aircraft financing losses.

- The banking facilities of the company were restructured by establishing a syndicate in order to finance medium-term loans of £1.5 billion.
- The second rights issue was made to raise £178 million so that Vertical/Short Take Off and Landing (VSTOL) could be acquired.

BAe has been placed as the fifth-largest aerospace (and defence) company in the West. It is one of the 75 largest organisations in the UK quoted on the London Stock Exchange and is the country's biggest exporter. It is involved in the design, development and manufacturing of civil and military aircraft, guided-weapon systems and the provision of defence support services.

BAe Military Aircraft is a producer of high-tech defence equipment; any change in the defence industry either offers it opportunities or poses threats to its business. The company was a major supplier of fighter and training aircraft to the Ministry of Defence and many allies of the Western world. These customers were spending a lot of money on defence in order to compete with the former Soviet Union. The sudden collapse of the Soviet Union forced them to cut their defence spending. Consequently, the demand for products was reduced and the company had to cut the level of production. Tony Ward described the situation within which the company was operating in the early nineties (Box 4.1).

Box 4.1 Market environment

"The company started the initiative in an environment when the international defence market shrank with the collapse of the Soviet Block and development of new markets. Central importance moved from the West to the Far East and the Pacific Rim. World defence companies merged into a bigger producer of similar products. It calls for a more efficient way of production at a lower cost and customer satisfaction at competitive prices. BAe wanted to become much more competitive than what she was through improved quality, low cost and customer focus." (Ward, interview 1997)

It suggests that the collapse of the Soviet Union was the principal cause of the company problems. As a consequence the economic importance transferred from the West to the East, aggregate demand reduced and the competitors changed their strategies i.e. they adopted mergers and acquisition as the competitive tools.

The shift of economic importance from the West to the East was due to the availability of cheaper labour and technology in other areas. Decline in the aggregate demand was the result of a reduction of military threat from the former Soviet Union. The third factor which forced the management to initiate a change was the merger of 'big names' in the defence industry. For example, General Dynamics sold its military aircraft division to Lockheed and Soviet Design Bureaux brought capable aircraft to the world market at low prices (BAe, 1993). General Dynamic Missiles has been linked up with Hughes and General Electric with Martin Marietta (BAe, 1994). In Europe the similar trends were on the way to consolidation. Almost all of the Italian aerospace industry was subsumed in a single unit – Finmeccanica.

Although BAe could have adopted the same path to become more competitive and cost effective she selected partnership as a way to consolidate resources and share responsibilities. Objectives of the partnership were 'to select our partners wisely to meet our key business goals, and commit ourselves wholeheartedly to making success of every relationship' (BAe, 1995). Tony Ward argues the need and operational goals of partnership, (Box 4.2),

Box 4.2

Rationale of partnership

"We have to start a joint venture with SAAB and Gripen to bring more heavy weight fighters into our product portfolio. The purpose was to gain effectiveness, efficiency and improve the quality of products and response to the customer. That meant we needed to focus on what we did rather than expanding in new markets. This was one of the reasons that the company wanted to concentrate on progress rather than breaking into new markets." (Ward, interview 1997)

Joint venture experiences encourage the Business Process Re-engineering (BPR) team to start joint processes with other companies. Ops 4, the predevelopment process, was the first joint process inaugurated with a French aircraft manufacturer called Dassault. Martin Kaye, the head of the process introduces him with the objective and process of the project (Box 4.3).

Box 4.3 Process and objectives of Ops 4

I am leading a joint team with Dassault, the French aircraft manufacturer. We have been working together since October 1996 to look at the BPR. Ops 4 is a predevelopment process that is a part of a large aircraft ... The purpose of this process was to meet the needs of the next generation of aircraft and the emphasis was on affordability. A new generation aircraft was needed by both the countries in terms of capability. Given the limited resources of the countries and the issues identified in the evaluation, the partnership or European way was the best alternative available to both countries. To achieve affordability, the viable way ahead was re-engineering the process jointly so that expertise and resources could be exploited together. (Kaye, interview, 1997)

It suggests that joint venture (JV) was not only a business collaboration but also a re-engineering co-operation which is a speciality of BAe radical change initiative. Establishment of a joint venture is the fourth stage in the Venkatraman's (1991) classification of scope of BPR i.e. business network redesign (BNR). It is the stage in IT-enabled change where the company involved in the transformation develops a partnership with the suppliers, customers and partners. The principal objectives of this JV were to consolidate resources in order to produce a new generation of aircraft that could serve the nations involved in the years to come. The dysfunctional aspect of the partnership was that two separate teams were engaged in the same process. So, although the process was to achieve an economy of scale, the process itself was consuming more resources than the normal required in a redesign initiative.

Let us go back to the historical developments, which taught a number of lessons to the company and seduced management to consider BPR as a panacea to address strategic and operational issues surrounding the company. The company tried a number of change strategies to address major issues of the times. But none of them were considered successful. Tony Ward summarises the strategies attempted and their reasons for failure (Box 4.4).

Box 4.4 Prior change attempts and their outcome

We felt in the beginning that we were suffering from initiality. This was due to the fact that the company had tried a number of change initiatives but none of them worked. We perceived the danger that the company or the staff would think this would be just another attempt. For example we had experience with continuous quality improvement (CQI), TQM and everyday improvement etc. A lot of training sessions were held right from the top management to the operational employees. Hundreds of training courses were delivered, hundreds of facilitators were trained and lots of ideas were generated. But nothing happened. We had also a couple of attempts at empowering the workforce (managers and employees) by a series of workshops and communication exercises. Again nothing tangible happened; instead, the action slowly drained away. We started a number of other change programmes which were assessed for headcount change such as personal appraisal and management by performance (MBP). Under MBP the manager sets his own objectives, reviews them at the end of the year and assesses how he performed. It was not introduced properly because we did not train staff well in the appraisal techniques and we did not get buy-in from the union. So we had to renounce it. Similarly, a new personnel director started a large-scale training programme with the aim to make basic changes in human resources but no encouraging results came out. Therefore, we were worried that people would say it is just another mystery (Ward, interview, 1997).

The above quotation suggests that the company was involved in some kind of performance improvements and cost reduction. It uses TQM (including empowerment), CQI and appraisal for performance improvement and MBP and personal appraisal for controlling cost through reduction in headcount (human down sizing). The former approaches are more or less predecessors of BPR. Although they were not successful on their own, they helped the company to successfully induct re-engineering. Their contribution seems to be far-reaching rather than immediate as viewed by Ward. The reasons for their failure probably seem to be similar to TQM such as “un-corrected vision: a vision statement must be closely coupled with behaviours that can be picked out, reinforced and practised by employees; poor objectives; projects are not visible and well represented; lack of involved management; the policy deployment process uses targets and indicators that are easily achievable; and those responsible for projects do not see them as important daily activities but as extra work.” (Uche, 2001). Cost reduction strategies did not achieve their objectives partially because of lack of appropriate training, buy-in of the trade unions and the threat to people’s jobs. This was a message to the company that any attempt to reduce headcount was dangerous. The company probably felt it and did not try the strategy in BPR.

Summing up this section: The company came into being in 1980 and is partially controlled by the government. The company is one of the big names in the industry and a major partner in the world defence market. The collapse of the Soviet Block was the main reason for reduction in demand and tough competition since the company is in the defence business. As a consequence the big companies in the industry were getting together in order to combine resources and strengthen competitiveness. The company reacted in almost a similar way as the other contenders were responding - by introducing change programmes and establishing partnerships or merging with rivals. The only difference in the strategy was that the company had learned a bitter lesson in initiating change in the past. Therefore, it embarked on the change carefully. The next section examines just how carefully the change was structured.

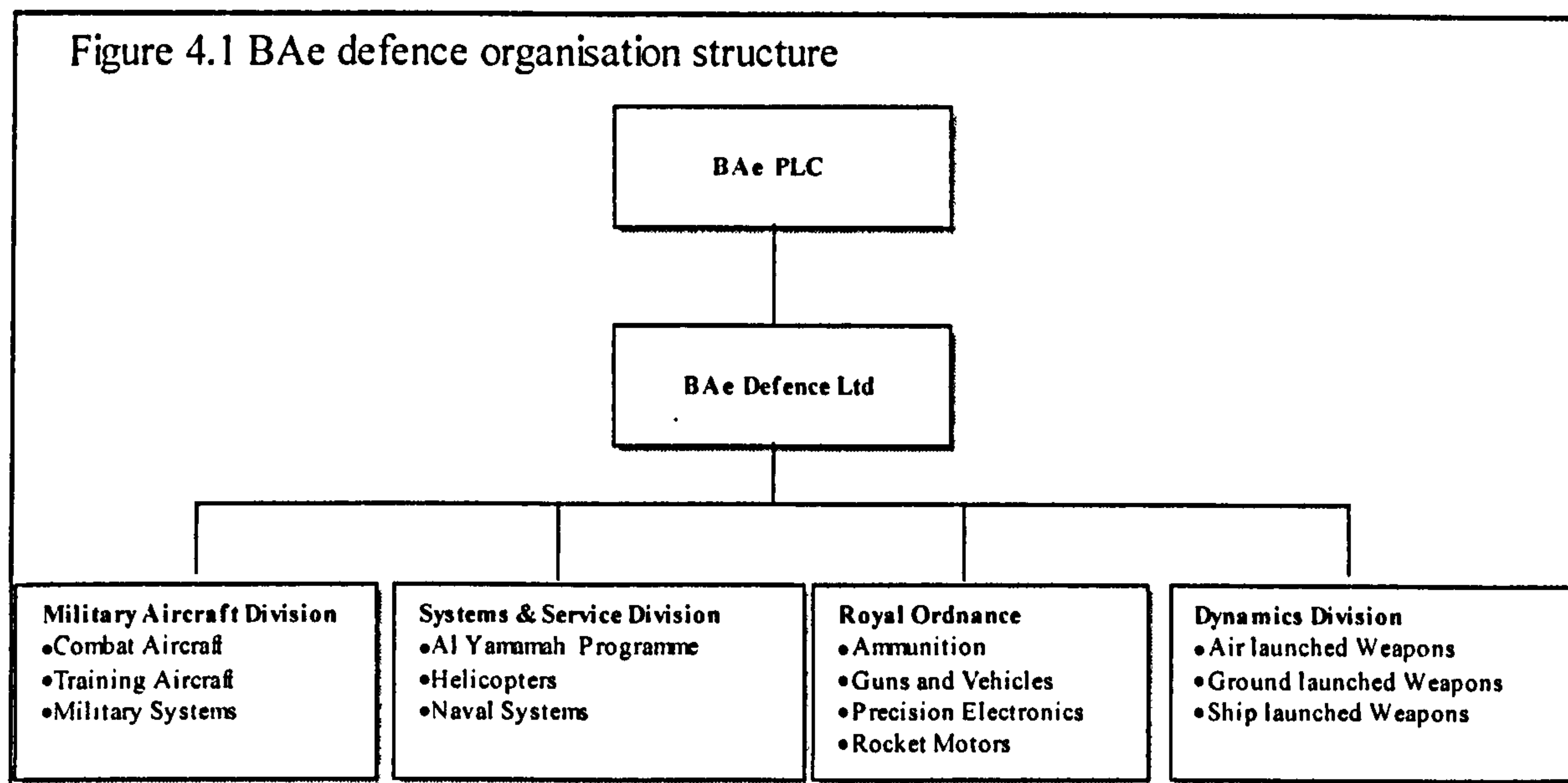
2.2 Structure

Structure is the formal framework of relationships within a company and multiple structures produced by individuals through the composite actions of individuals (Pettigrew et al, 1989). It implies two questions: (a) what is the nature of formal relationships and, (b) what are the impacts on the organisational structure (structure produced) as a result of change initiative? The organisational structure has been divided into four levels: BAe plc (BAe Defence) level, Military Aircraft (MA) level, product level within MA and BPR level. The first three levels provide an answer to the first question raised and the fourth one provides the answer to the second question. The rest of the section seeks answers to these questions.

British Aerospace plc. has been organised into four products areas: BAe Defence, Commercial aircraft (BAe Airbus, AVRO International Aerospace, Jet Stream Aircraft), Property (Arlington Securities and Arlington Property Holdings) and BAe Inc.

As this study is concerned with a division of BAe defence, a brief description of the group will be helpful in understanding the settings. BAe defence is the principal component of BAe plc, manufacturing defence products such as military aircraft, guided-weapon systems and ordnance and supply of support services. It is the most profitable part of BAe and contributes the lion's share to the company's profitability. BAe defence sold £4,258

million worth of weapons and equipment, earned £487m before interest, employing 30,800 people and owns £2,711m in assets. It had combined orders of £9,676m in 1995 (BAe, 1995b). BAe defence has been organised into four divisions as shown in Figures 4.1 (BAe, 1996a).

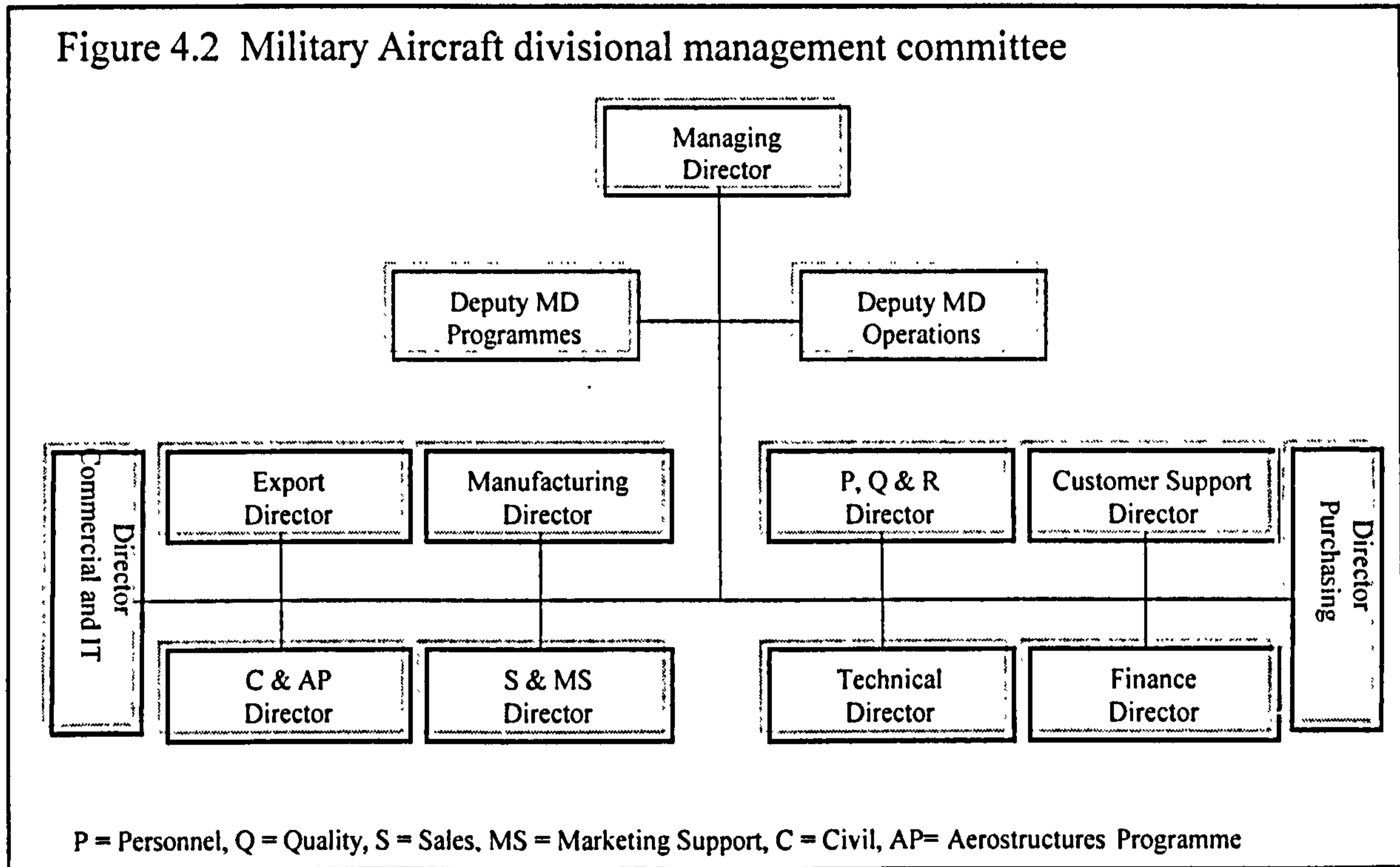


Royal Ordnance (RO) has thirteen sites all over the UK and consists of rocket motors, small arms, ammunition and guns groups. RO manufactures ammunition, fuses and explosives to small arms, rocket motors and medium and large-calibre guns for land systems. *Dynamics Limited* is involved in weapons, weapon-control systems and guided weapons. The guided weapons include surface-to-air; air-to air, air-to-surface, ship-borne missiles and anti armour systems. Dynamics provides guided weapons to the Royal Navy's warships.

Systems & Service (SS) develops naval systems, helicopters and it is the principal contractor for the Al Yamamah programme. It was established in 1991 to sustain and expand the Al Yamamah project. The SS is meant to provide after sale-services and supply of parts to the customer.

Military Aircraft division (MA) The Military Aircraft (Figure 4.2) is functionally organised under the leadership of a managing director, and its business has been divided

into ten directorates. In this sense it functions as a subsidiary of BAe (The MA will be called an organisation/firm for the purposes of this thesis). It is organised in three groups i.e. business operations, projects and business support, each of which consists of three or



more directorates. MA employs about 16,000 personnel; manufacturing and other facilities are spread over five locations in the UK (Table 4.1).

The Military Aircraft is responsible for the manufacture of Tornado, Harrier and Hawk aircraft and parts of the Eurofighter. The Eurofighter is under development in collaboration with Italy, Germany and Spain.

MA has recently manufactured 48 Tornados for Saudi Arabia. There are also orders for Hawk and Harrier aircraft from the international market.

Table 4.1 Locations and personnel of the organisation

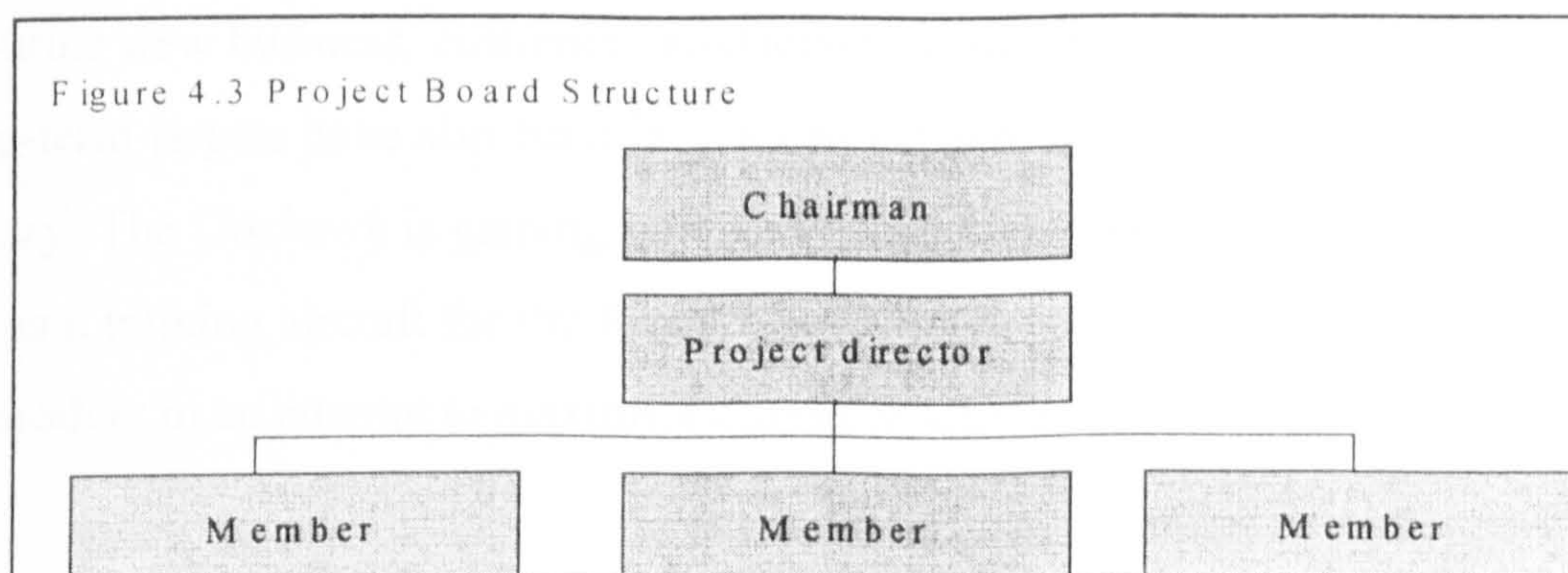
Location	Personnel
Warton	6016
Samlesbury	3641
Brough	3601
Dansford	959
Farnborough	530

Source: BAe, 1996a.

Since the company is manufacturing eight types of military aircraft at the time of writing a third set of structure is in place where each project (or aircraft) is managed by a project board (BAe, 1997). The board is responsible for designing a whole or part of an aircraft, manufacture and test it in order to gain further production orders. The boards consist of a chairman, one or more project directors and seven to fourteen members from the departments involved. Finance, personnel, customer support etc. are common participants in projects. DMC members chair the boards (including business development board) who report to the managing director. In this way the boards are high profile teams working within the organization (BAe, 1997c). Figure 4.3 demonstrates the formal relationship in the project boards (three members have been shown for simplicity). The next few paragraphs describe the company product line. The purpose of describing the product line is to understand the product range since each product is managed by a separate project board.

Product line

Military Aircraft is manufacturing combat aircraft, training aircraft and military systems. It deals with complex electro-mechanical manufacturing systems. The company products



are high-tech with a high unit value. They are made-to-order and have long lead-time. They require intensive post-delivery services over the life cycle. Sometimes mid-life updating is necessary to keep the product in line with market forces and customer demands. Profiles of principal products are given below (BAe, 1997) and photographs of some selected aircraft are in appendix D.

The *Nimrod* aircraft has been under the Ministry of Defence (MoD) usage for some considerable time, and the user is now seeking to replace its fleet with a new or upgraded aircraft. According to BAe's business plan of 1995, 'the MA Nimrod Replacement Maritime Patrol Aircraft (RMPA) project team has been formed to put the MA in a position to win the RMPA contract through an international competitive procurement process. The MoD intends to appoint a single Prime Contractor to supply a complete weapon system package to a guaranteed operational capability, inclusive of training systems and integrated logistic support' (BAe, 1996). The *Gripen* is a collaborative project between SAAB (Sweden) and BAe to develop a cost-effective modern fighting aircraft for the twenty-first century. The joint-venture is meant to develop, produce, market and support export versions of the JAS-39 Gripen. MA has agreed to provide market access, facilities, and production capacity (BAe, 1996). The *Hawk* is manufactured in three variants: Hawk 60, Hawk100 and Hawk 200. These variants diversify its usage and effectiveness. The Hawk product strategy was launched in 1995 to ensure the future needs of the market in order to remain the world leader as a training aircraft. Salient features of the strategy include: "making agreements with our major suppliers on identifying areas for cost saving and stabilising the equipment prices for the next five years; reorientation of customer support to give even closer attention to customers through nominated managers and teams dedicated to each customer, and through tooling and product investment to improve quality and reliability" (BAe, 1996). The main targets for the product include capturing new business, customer satisfaction, quality improvement and delivery on time. Long-term targets have also been in place to expand the market of the product to the next century. The *Goshawk* is gaining popularity for its low operating cost and high utilisation rate as a training aircraft for the Royal Navy. MA is trying to improve the performance of the product in an attempt to maximise customer satisfaction. Short-term targets are to

maintain schedule performance, improve quality and reduce costs so that the customer can accommodate its acquisition and maintenance budget, and make sure that the product remains profitable. Cost reduction must be made to win future orders through capitalization on OEI/BPR by the team working across sites and functions. The *Tornado* is a high-speed, low-level ground attack/reconnaissance aircraft which is in service to many European and Asian airforces and navies. It has many variants in order to fulfil different roles in the defence sector. The principal target of this project is the Al Yamamah phase II these days. Nevertheless, mid-life update (MLU) production and development are underway as well. The project board is committed to schedule adherence for all its customers at a defined budget. The *Harrier* is the best VSTOL aircraft capable of performing multiple functions in the battlefield. It has been developed in many variants in order to perform different functions. A number of European and American airforces and navies are using it. *The Eurofighter 2000* is under development with the collaboration of three other European partners. Three prototypes have made successful test flights, which have confirmed the excellent handling qualities and high performance of the product.

Each of the above product is managed by a separate project board and a similar project board is looking after business development responsibility (BAe, 1997c).

The product line includes combat aircraft for land based and sea operations, training aircraft and military systems. BAe is manufacturing the best VSTOL aircraft in the world and has a monopoly in vertical short take off and land (VSTOL) technology. EF2000 will be another distinctive piece of technology, which will fulfil the needs of the twenty first century. It seems that the product line is diversified and the company is competing with big names in the industry. For instance, Business Plan reports that the EF2000 is competing with many F (i.e. F-15E, F-22, F-18E etc.) family US aircraft and Mig-29 Russian fighter (BAe, 1995).

2.2.1 BPR management structure

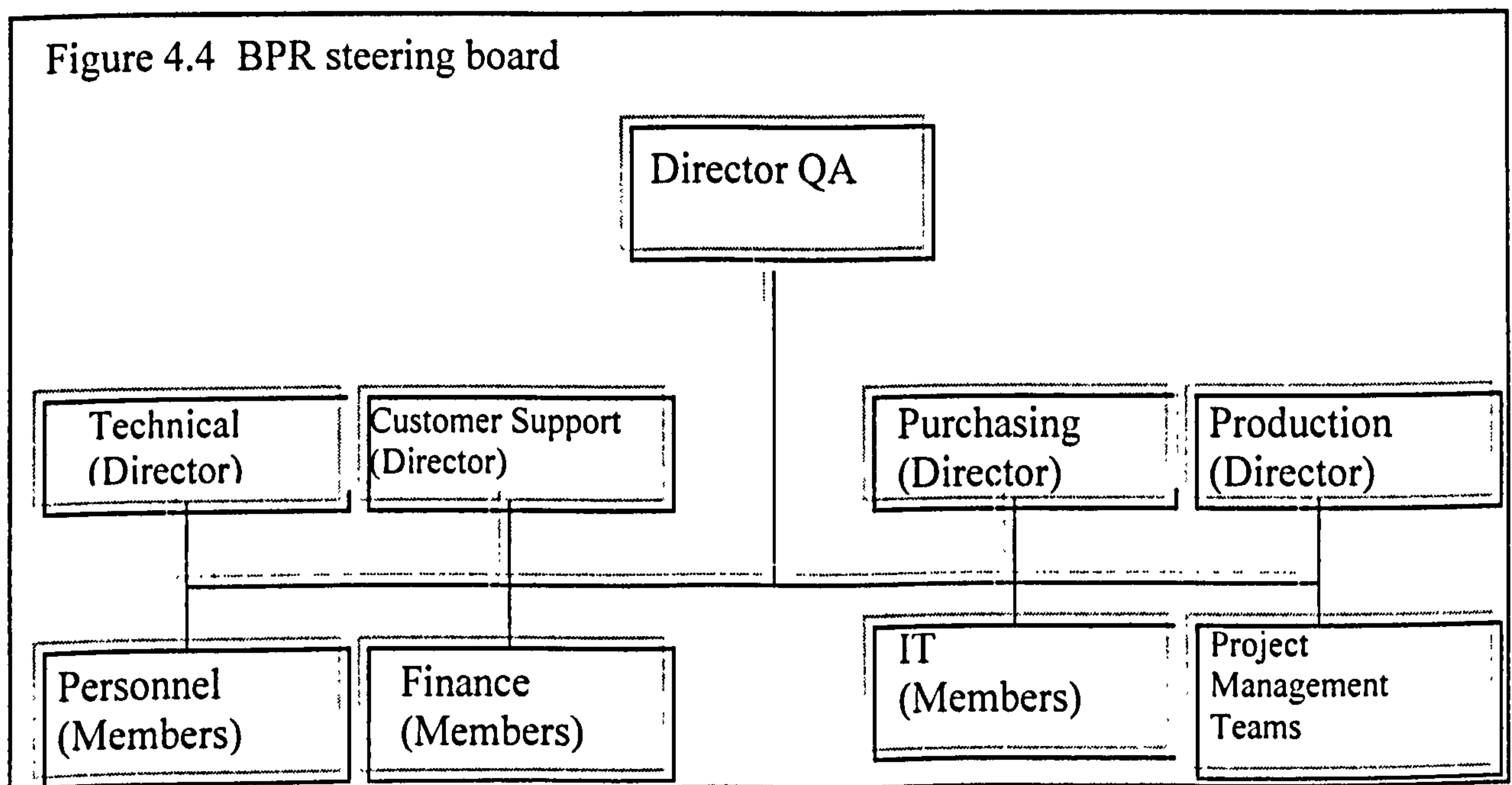
Steering board was set up for BPR. Objectives were set to emphasise the importance of initiative and solicit support from senior management. T. Ward explains the rationale, procedure involved and functions of BPR steering board. According to him (Box 4.5),

Box 4.5 BPR management structure

The director of Quality Assurance was a very experienced person with a blend of technical and personal capabilities to his credit. He ran a site in Kingston and closed it successfully and was very much experienced in change as well. He was promoted to DMC level and was given the technical responsibility to bring the BPR in during the course of 1993. He managed our relationship with the consultants and set up a BPR steering board at senior level which consisted of some DMC (Divisional Management Committee) members from IT, personnel and finance. The rationale for the inclusion of these members was that these departments were the key enablers in the process of change. It was perceived that IT would be a key enabler, personnel will need to be there to look at our training budget and help to resolve OD (Organizational Development) and communication issues that will come out of BPR. The finance can help us to resource with costing of current or new processes and estimation of process costs. Other members of the board include directors of production, technical, customer support and purchasing.

The board used to meet every three months to review the progress and discuss other issues. At the next level we had the project management teams that were chaired by a director of quality assurance. The team (s) consists of project team leaders as they grow and representations from IT, personnel and finance. The number of project team leaders vary from one to five according to the number of projects in progress. They are meeting monthly and responsible for making sure that the project is well-resourced and working according to specifications (Ward, interview, 1997).

Figure 4.4 shows the new structure created for BPR as described by Ward in the above quotation.



It suggests that BPR was managed by a high level team; four members were affiliated with DMC and others were taken from functional areas. The head of the board was a DMC member as well. Project management teams were reporting to the head of the board. So there was no one between projects and the head of the steering board/sponsor since other members were reporting to the sponsor. It seems an example of flat structure because the team has only got two layers of management i.e. the head of the board and the members.

Teams in the organisation

There were other teams working within the organisation. For instance, visits to other best practice organisations revealed that they were using multi-functional and co-located teams in day-to-day operations. BAe responded on the similar lines and introduced such teams in redesigning business processes and managing them. Teams were also introduced for evaluation of business processes at the outset of a process/BPR project. Ali Dormer, the head of IPL/IPC process describes how he started work on his process. He says (Box 4.6),

Box 4.6 Process inception at BAe

a process improvement team of nine members was formed which were taken from different departments e.g. technical, engineers, finance, personnel, customer support, commercial and purchasing. They were working in different departments hence all of them belonged to a unique culture. The first task of the team was to identify and scope the process including the number of people working in the process and the resources occupied within a three months time period' (Dormer, interview, 1997).

The Process Improvement Team (PIT) was selected from the departments involved, it was the first step to involve people in the process of change itself. The main team also formed sub-teams to divide responsibilities, as Martin Kaye team leader of Ops 4 states, *'We had set up six working groups with specialists as members e.g. my team consisted of eight people of which two were from general areas, four were from specialists and two were from each company'* (Kaye, Interview, 1997). The task of the team was to identify the process and *'to share the ideas of the new process to those stakeholders (especially those which are being effected by the change) as soon as possible. They will take time to work with the ideas so when it comes to translating the vision they will hopefully something new to say. It also helps to set up divisional teams to monitor the progress'* (Ward, Interview, 1997).

There are two types of teams in place: teams being used in day-to-day management, and teams used in the change or redesign of various processes. Some of the first types of teams have been discussed above (DMC, project boards etc.), the second type of teams worked during redesigned are considered now.

Redesign of business processes has been divided into four phases: evaluation, envision, empower and excel. Separate teams were used for each of the phases (except Ops3 where a single team performed evaluation and envision). The most important task prior to the launch of a project was to select the right team with the right people representing key stakeholders. For instance, authors of the evaluation report of a project state that ‘the selection of the team prior to launch was considered most important. The team members were selected upon the basis that they would represent key stakeholders and in effect their “agents” within the team. This has seen to be of considerable benefit during the evaluation phase’ (BAe, 1994b).

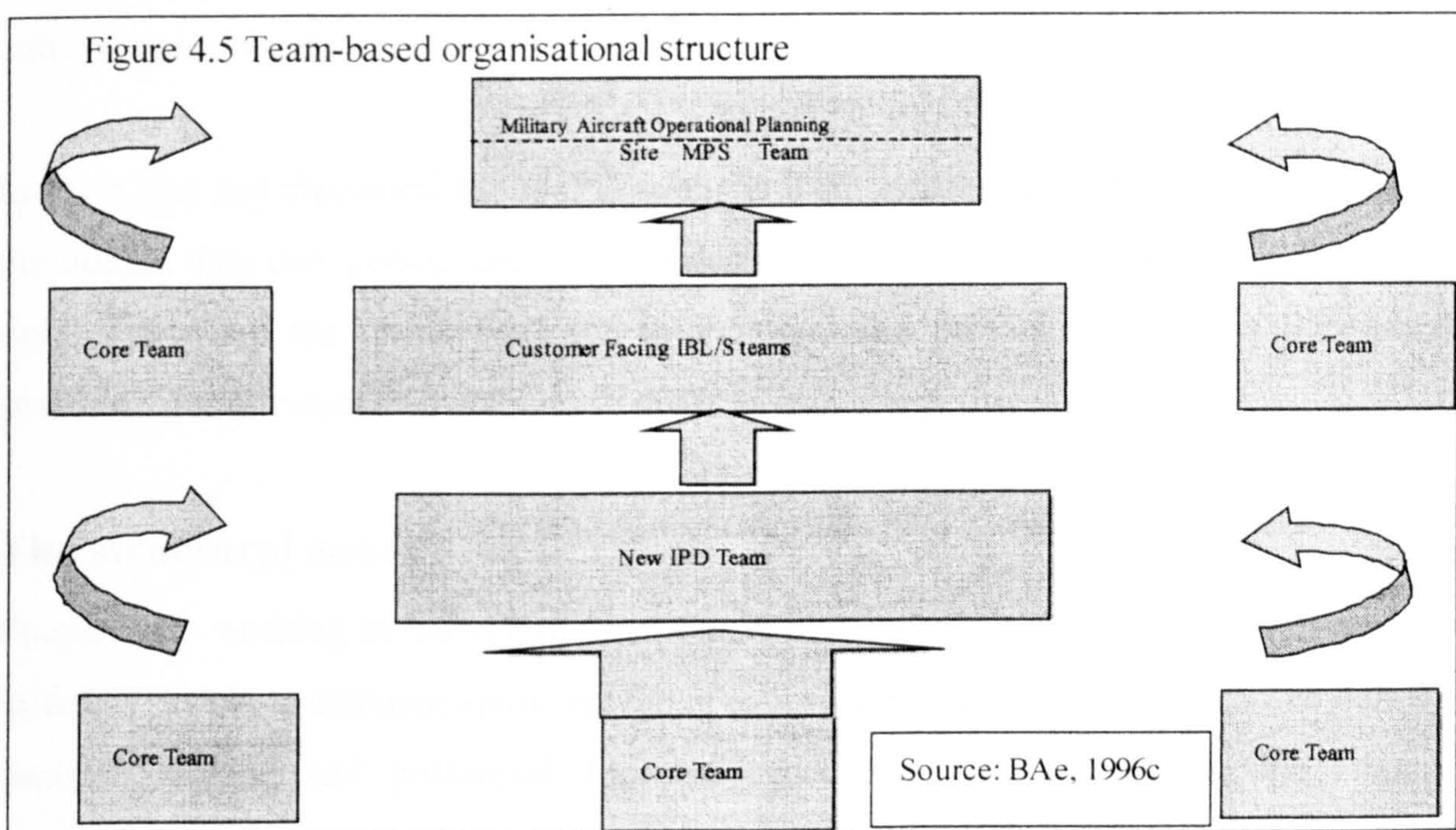
Multi-functional teams drawn from all of the process functions (BAe, 1994c) which are co-located (BAe, 1996a) have been employed to redesign the business processes. The main teams were supplemented by sub-teams, who worked on level 1 processes or principal areas identified in a process (BAe, 1994b, 1993c). Sub-teams were used to conduct interviews with stakeholders in order to understand the sequence and logic of the tasks performed (1993c). The main teams were known as Process Improvement Team (PIT) (BAe, 1993c, 1994d), Process Transformation Team (PTT) (BAe, 1993b), Concurrent Fault Investigation Teams (CONFIT) (BAe, 1996b), and Integrated Product Development Team (IPD) (BAe, 1996c).

IPD teams not only provide a unique structure to the team and its members but also to the organisation. The nature, function and importance of these teams can be realised from the following quotation from Ops 3 envision report. It reads,

Co-location is nothing new, but IPD Teams go considerably further. Instead of staff being owned by parent functions, they are owned by the IPD Team and that includes all support staff. The team owns and controls its own budget & has full signatory authority. That is to say Designers, Engineers,

Procurement & Planning staff will be able to operate in entirety, making key decisions without reference to a parent department for signature. The team is therefore fully-contained and empowered... The introduction of IPD teams removes the functional barriers and simplifies the organisational structure and with the functional bias gone, individuals can concentrate on the project or business at hand, and leave the writing of procedures and the setting of divisional standards up to core functions (BAe, 1996c).

An IPD arrangement splits the organisation into four main operational areas: Core teams, process teams, project teams and site based M.P.S. teams (Figure 4.5). IPD teams work with core teams in order to discharge day to day business in project and process areas.



Core teams co-ordinate with IPD teams through core activities e.g. provide specialist skills not in the IPD, provide back-up resources to the IPD, internal (from freed resources) and external recruiting, setting development objectives, task specific training etc. The benefits of IPD teams range from resolving functional issues to providing a new organisational structure. The compilers of the Ops 3 envision report claim many of these benefits, they say,

It is easy enough to say that IPD Teams operate better than our current methods but why should we have them...the answer is simple. Throughout the course of the Evaluate and Envision phases, a combination of the views of M.A.D. employees and evidence from best practice visits to companies

such as McLaren, Rover Cars and Aerostructures Prestwick, have all supported the theory that if you put all the people involved in the process in the same place at the same time, they work better and respond faster. Through a combination of direct communication and a greater visibility, and hence understanding, of the problems and constraints facing their colleagues, team members can work together to resolve issues rather than becoming embroiled in mass procedures and bureaucracy.

As a result of the close coupling of people, the response times within the team are cut drastically...procedures that had previously taken weeks were reduced to hours or even minutes (BAe, 1996c).

In addition to that, IPD teams address the issues raised during the redesign process e.g. complex organisation, fragmented communication, lack of divisional standardisation, cultural concerns etc.

In short, the key characteristic of IPD teams is their independence from functions such as the budget they use, getting approval for decisions from a higher authority and control of staff. These are the teams who are autonomous and provide a flat, less bureaucratic structure to implement step changes in order to gain competitiveness.

The structural issues

People were working in individual functions, which means things were done bit-by-bit by different people at different spots, maybe in different buildings or sites. It caused delays in decision making and prolonged approval procedures. In contrast, the best practice companies were organized in multi-functional co-located (physically or virtually) teams thus the people were working collectively as a consolidated group. T. Ward indicates the bottlenecks in the functional arena, (Box 4.7),

Box 4.7 **Functional and structural issues**

in connection with the S & R process the company came to know that best practice companies (B.P.Cs) have got a single process owner whereas we were doing it in individual functions such as purchasing, finance and technical. The process owner had the responsibility to order the goods and sent them out. So, rather than lots of functional involvement in a process, a single person was controlling the whole process. Secondly we had mainly people operating things in a single function. The B.P.C.s have multi-functional teams sat together e.g. finance, supply, contract etc. In addition, there was a lot of paper work involved in processing a customer order and it used to take days. (Ward, interview, 1997).

It shows that people were working in single individual functions and a lot of paper work was involved. The BPCs had a single process owner for various functions and they were using multi-functional teams. BAe had responded positively to address these issues. Business processes were redesigned to minimize paper work. As a result 50,000 invoices were eliminated from the system and multi-functional teams were introduced to replace function-based work.

Analysis

The issues indicated are common in a functional structure where a small part of the total job is done by an individual (or a group) who may not be aware of the whole process involved. On the contrary, team members know what is involved in their process and what each of them is supposed to do. The functional structure generates 'red tape' characterised with delays and inefficiencies. For instance, Ford was employing 400 people in its account receivable department whereas Mazda had only 5. Ford was ineffective because three departments were involved in the process and the order was checked at 14 different places. Structural barriers were removed by limiting the process into two departments with three activities to perform and the company saved 75% jobs (Hammer, 1990). CIGNA Corporation consolidated six functions into two processes in order to flatten the functional hierarchy by pushing decision making to self-managing teams. It delivered an end-to-end service to the customer and allowed new business practices which promoted ability, flexibility, and skill deployment in addition to reducing redundancies (Caron et al, 1994).

The above discussion shows that the company structure was hierarchical and functional which was creating difficulties in achieving to achieve strategic objectives such as competitiveness. On the internal side, it causes high cost, bureaucracy and complex processes. People were working in functions and in some cases in isolation. They were not empowered where it was necessary. On the contrary the BPCs were using multi-functional co-located teams in a flat structure. The best practice had to be adopted fairly quickly. The senior manager sensed it and looked into the alternatives available. BPR was offering the solution; they gave a green signal to the company calibre to remove functional barriers and structural layers.

There are some problems associated with the multi-functional teams which were experienced by BAe change agents. First, it is difficult to choose a team from large number of employees. Tony Ward was not sure how to pick a small team of 10-15 persons out of 15000 people in BAe. Second, Denis Armstrong experienced a lack of common language among the participants because they came from different functional departments with different frames of thoughts. Thirdly, many people do not like to learn, which makes it hard to impart new knowledge or skills. With reference to effectiveness of teams, Molta argues that 'flattening the organisation has bottom-line appeal, but it seldom leads to more effective management' (Molta, 2000).

Despite these difficulties team based structure is successful in the organisation as has been mentioned and time span has been reduced from weeks to hours even to minutes in many projects.

2.3. Culture

Morgan views organisations as culture, which refers to the set of beliefs and values that shape an organisation and distinguish it from other organisations in that society (Morgan, 1986). Each organisation is a mini-society, existing within its own legal and physical boundaries.

Given that view of an organisation, this thesis is concerned with a change initiative in a manufacturing organisation where culture can be examined in a radical change perspective. Pettigrew et. al. believe that culture refers to the beliefs, meanings, rationale and language in the organisation. The way the actions (decisions) are informed and whether it constrains or support the change (Pettigrew et. al., 1989). Given that, two aspects of the company culture are worthy of consideration: identification of existing cultural characteristics, their role in the change i.e. whether they supported change or impaired it, and the modifications in culture due to induction of radical change. In other words the research seeks answers to the following questions.

- What is the company culture prior to the current change initiative?
- Do the cultural characteristics support or impede change initiative?
- What are the new characteristics of culture after change?

A survey of company documents and interviews with personnel involved revealed a number of key characteristics of the company culture at the inception of radical change. These characteristics can be grouped into four categories: structural, behavioural, educational, and BPR oriented. Structural matters have been dealt with in section 2.2 above and 2.4 below, others are discussed in this sub-section, since cultural characteristics are embedded in the structure and politics.

Behaviour of people

Although the organisation is high-tech and one of the leading firms in the country the behaviour of the people working within it was conservative, at least, prior to radical change, as had been found during the change exercise. One of the prominent internal change consultants who was involved in most of the BPR projects experienced this kind of behaviour, he describes (Box 4.8),

Box 4.8 Behaviour of people

People want to know the details of the process. I think it is a part of our culture that we have to have a lot of details to convince people. People are very conservative to believe something even if you tell them a hundred times. For instance, to convince people we have to go right to the bottom of a problem and come up again, we cannot really say yes. The conventional behaviour makes it very difficult to think radically, to think out of box. That is why we have to conduct some creativity exercises to help them think more laterally. It might be one of the reasons for us to feel that it is risky to initiate a change programme. (Ward, Interview 1997)

It suggests that the behaviour of the people was conservative, as a consequence management felt that it was risky to initiate change. People were conservative in terms of change for a number of reasons. Since the company had made many unsuccessful change attempts in the past, people believed it might be another such effort. Secondly, the change was inaugurated as BPR, which was famous for redundancies and reduction in headcount,

thus employees were suspicious about their jobs. However, management had conducted creativity exercises to help people think laterally. The amount of communication was also increased to convince people about the usefulness of the change.

Educational perspective

Since the organisation is a high-tech firm, where manufactured products are a unique piece of technology, qualified engineers are required to get the job done. Engineers are not only participating in the design and manufacture of company products but also manage most of the production process. The company has to hire engineers; as a result, a lion's share of employees are engineers, who form the engineering oriented culture. Most of them are specialists in their profession but they have got little training in management or change.

This cultural difference became obvious when the teams were formed from functional departments and engineering/technical departments. The members of the newly formed teams were speaking one language but understanding it differently. Armstrong identified the discrepancy and puts it as, "another problem is the non existence of a common language among team participants because people come from different functional departments with different level of education and experience. They take time to learn a common language in order to communicate effectively in the team environment" (Armstrong, Interview 1997). This kind of problem is common in companies like BAe because of the nature of products being manufactured which require special skills. Nevertheless, the new organisational structure demands a mix of technical skills to work in the teams or manage them (managerial skill). This is why the company has tried to transform engineers into managers. Training was provided to engineers regarding BPR tools and techniques in order to participate in change activity.

Beliefs about BPR

People believe that BPR is a danger to their jobs; many of them would loose jobs or current incumbent. This is nicely put forward by one of the senior personnel in the BPR section. (Box 4.9),

Box 4.9 **People's beliefs about BPR**

The major question used to be how many jobs will go and with how little mismanagement (disturbance) you can do this. It shows that people are concerned with their jobs, they fear management may sack us ... middle management particularly in the early projects when there was no much awareness about what BPR is and when there was probably feelings of insecurity about the future of jobs...people may say 'I may loose my job as a result of BPR'. The word BPR was synonymous for 'Buzzword for Preparation of Redundancy'... people are worried about their jobs, they have the view that if this vision is implemented then it might abolish my job, they used to say 'where is my job, it might not be there' because we are taking people from the functions to the team. People spent years and years to build the job/status (in fact power) and working for it but one day they are told that your job is no more. So all the powers are gone abruptly. It is pretty understandable that people resist defending themselves - their power, prestige and eventually their jobs (Ward, interview 1997).

People learned about the outcomes of other BPR initiatives where the outcome was reduction in headcount therefore they established this belief. For instance, Gumma Consultants reduced head count by 88% (Internet, 2002), GRA group by 50% (Internet, 2002) and so on. Although the company never sacked anyone as a result of radical change but some people view change of their job from a function to a BPR team as demotion, which means loss of the original incumbent, influence and power.

Beliefs about consultants

The change was started with the co-operation of external consultants (principally with Price Waterhouse an international consulting firm), however employees were suspicious about their role in the change because the company had an unpleasant experience with them in the past. They were pessimistic and believed it might be another story of failure. This is what an interviewee described. He says (Box 4.10),

Box 4.10 Beliefs about consultants

Unfortunately the company had a bitter experience with consultants in the past, they cost lot of money and nothing used to happen. For example, BAe have experience with a company called URG, they came to one of our sites and worked with teams and tried to map processes, it was not BPR but they were working with teams and tried to map processes. Six of them came in with very expensive rates. A lot seemed to happen but when they left nothing had happened. Consultants took lot of time doing indirect work with senior stakeholders rather than with the team who were working on the task. They used to look at the politics, behaviour and always kept visible at very senior level. Consultants also look at the nature of change and what it means to them (the senior managers). Quite simply they do it to get more business. Their procedure is to understand the whole organisation and then go down to the process. They tell more people what they are doing so that more people were aware of their presence. This was one of the reasons that a number of people had suspicions about the role of consultants and the change programme. (Ward, Interview, 1997)

It suggests that people believe that they are expensive, try to be visible but do nothing and were motivating management to get more business. Nevertheless, the role of consultants was appreciated in BPR (SBAC, 1995) but many people were concerned about them since they experienced many unsuccessful change attempts in which consultants were employed. The company might not have used the right team of consultants in the early attempts which resulted in project failure. T. Ward recognises the quality of the Price Waterhouse consultants who redressed the belief about consultants by offering quality service to the organisation, which was praised by the team of internal consultants and people in the BPR section (See also section 3.1 in chapter 6).

Beliefs of management about BPR

Management believed that the BPR was more applicable in service and management areas; therefore they chose early BPR projects in these fields. Ward argues the selection of projects in service and management areas (Box 4.11),

Box 4.11 Beliefs of management about BPR

Managers chose these three projects (S&R, PC and Procurement) because they saw them as part of the core of the business. They had the view that BPR could better be employed in service and management areas than in manufacturing areas. Thus the BPR was designed to handle paper work with a five years perspective because the company thought that the programme would take five years to complete (Ward, Interview, 1997).*

* Added

Management may not have comprehended the company capability to absorb radical change in manufacturing or they had the conservative view of the new concept. Secondly, the manufacturing was the core function of the company where managers were wary to introduce BPR. They were piloting BPR in less risky departments in order to gain confidence so that it could be extended to manufacturing processes. This was what actually happened, BPR was started in 1993 but it was not inducted in the manufacturing stream until 1994.

The final aspect of this sub-section is to examine the success of the radical change initiative and the changes it brought in the organisational culture. The structural changes have been discussed elsewhere; as a reminder, the company successfully created the horizontal structure in order to implement BPR and remain as a norm in the new culture. There is a mixed message on the behavioural front where some achievements were felt but a lot of things were still to be done. Tower summarises the impacts of change (Box 4.12)

Box 4.12 Cultural changes understood

Lots of messages have been understood at senior level of management and increasingly understood at lower levels. Coincidentally lots of new trends emerged within the company e.g. team working and support for the radical change. Cultural change is in progress, because it would take several years to fully realize the cultural change. One reason for cultural change to occur is the impact of other initiatives that are/were under way.' (Tower, Interview, 1997).

Support for change was a very positive outcome because it has been identified from the start that the cultural characteristics of the company did not show any support. It implies that management conveyed the message of radical change well and people embraced it. People accepted fundamental changes in their beliefs and working relationships: working in teams, flatter structure, the existence of processes rather than the dominance of functions, IT as major enabler in day-to-day business, the revolving nature of jobs and so on. In an earlier version of its business plan, the company encouraged the kind of behaviour that creates leadership through team-working, the large-scale involvement of people, learning, openness and recognition (BAe, 1995).

The Society of British Aerospace Companies (SBAC) views the role of culture in a radical change initiative from the perspective of the readiness of the organization for radical change. A company's culture and how it reacts to change is a major determinant of success. SBAC's study was based on the existence of a change-management programme, organisational adaptability, conditioning to change (previous evidence of TQM, JIT, etc.), and fear (survival strategy or ability to react to threat). Successful organizations exhibit that they have got a change programme, a change-management programme that takes full account of the human dimension of change, and a culture, which responds positively to new change endeavours (SBAC, 1995). BAe was rated at 3 on a scale of 1-5 in the SBAC survey of 1995. This indicated that the organization had a responsive culture able to embrace change, had a programme of change management and had previous experience of some kind of change initiative. Tony Ward, the Head of BPR mentioned that various change initiatives had been tried before the radical change, but without success. However, the company had learned important lessons from these attempts, which helped it to implement the radical change.

Apart from these changes, the company established five cultural values which were emphasised in the business plan for the year 1996 (BAe, 1996). The following year the business plan was renamed as the 'employee value plan', which summarised the company's values as:

- customers - the highest priority;
- people - its greatest strength;
- performance - the key to winning;
- partnership - the company's future;
- innovation and technology - its competitive edge (BAe, 1997).

These were grand business values imposed by management and were the target for BPR since customers and employees were in the forefront of any action taken in the organisation. Technology and partnership are the instruments to enhance individual and organisational performance while BPR is all about increasing performance.

Analysis of the section

The above discussion suggests that the behaviour of the people was conservative, engineering was the dominating educational background; and people were sceptical about radical change and consultants. Management was not convinced about the usefulness of BPR. Given that perspective, the next question is: Whether the culture prior to change helps or impedes the initiative. The evidences suggest that the culture does not seem to be supportive of the change unless radical changes are made in the culture. Although the culture did not commensurate with the BPR requirements, a series of measures were taken to redress the negative impacts of culture on the change initiative.

The BPR team conducted a number of creativity exercises to help people think laterally. Tanner argues that creativity is the first part of a process enabling companies to outperform competitors and it can be enhanced through lateral thinking, metaphoric thinking, positive thinking, association trigger, and capturing and interpreting dreams (Tanner, 1992). Adoption of new technologies requires creativity (William, 2001). BAe require creativity in order to convince people to support the change and to adopt technology, since technology was the dominant factor in BPR initiative. One way for this was empowering employees because empowerment of employees is a means of fostering creativity and innovation (Ripley and Ripley, 1993). The second strategy to increase lateral thinking was frequency and quality of communication. Increased amount of communication is essential to explain to employees why change is necessary and how it benefits them.

Since the organisation is a high tech manufacturer of aircraft and related products, qualified engineers are required to accomplish the job. Unfortunately many of them were not trained for managerial responsibilities which were required to manage BPR i.e. working in BPR teams and managing them. This issue was managed by providing training to them in BPR tools and techniques. Peter Tower a member of the IPD team informs us that he was trained before assuming responsibility in the BPR team (Tower, interview, 1997).

People were sceptical about the role of consultants and the usefulness of BPR. They were suspicious about consultants because previous change initiatives, which were launched with the help of consultants were unsuccessful. However, PWH the consulting firm for BPR, was an efficient organisation. They transferred knowledge to BAe employees and made BPR a successful initiative. Thus they changed the belief of employees about consultants. Similarly, employees were worried about their jobs in the beginning but since no one was laid off as a result of change, their beliefs about BPR also changed.

The company has felt some changes in its culture. The engineering perspective of employees was augmented with management skills and creativity exercises enabled them to think laterally. Belief about BPR was removed through a 'no lay off' policy. Successful utilisation of consultants revealed their usefulness in the change. Application of BPR in manufacturing processes redressed the reservations of management. These achievements are a sufficient reason for the satisfaction of management and induction of BPR.

2.4. Politics

Pettigrew et. al., refer to three aspects of politics in an organisation: internal distribution of power, direct or indirect impacts on creation or execution of strategy and direct or indirect bearing on competitive performance (Pettigrew et. al., 1989). This sub-section concentrates on three questions:

- What is the structure of power (How is the power distributed among major players?)?
- What are the impacts of power structure on the creation and execution of strategy?
- What is the relationship between distribution of power (or 1 and 2) and the competitive performance?

The power is distributed among a managing director, two deputy managing directors and ten directors in BAe (BAe, 1997c). It has already been mentioned in section 2.2 that the power structure was hierarchical and function based. The Process Improvement Team (PIT) of a pilot BPR project examined the consequences of a function-based structure on

various aspects of organization: strategy and performance. PIT notes that

based on maintaining a status within the organisation, rather than being focused on developing people and teams, and communicating vision and business awareness to employees.

There is a widespread view that a radical re-design of the processes, roles and organisation structure is necessary to bring improvements to the business, though considerable scepticism that this can be achieved from within the current power-based functional empires. For example, the head of an existing directorate or department may strongly resist a re-organisation of the business around process responsibilities, where his current control and influence may be significantly reduced.

Throughout the process, different measures are applied in different departments to judge overall performance. For example, the main priority for the Maintenance Department, when obtaining a replacement part for a machine, might be reducing the elapsed time (to minimise machine down-time), whereas the Purchasing Department might put more emphasis on a reduction in the cost of the purchased part. These different measures cause conflict and delays between people within the process as each individual tries legitimately to achieve his or her own personal objectives.

The hierarchical structure of the functions tends to stifle the generation and implementation of ideas: if only one person in the management chain lacks enthusiasm for an idea, it will go no further.

Having a number of management layers in each function, without anyone being responsible for the business process, means that a number of managers spend excessive time in meetings resolving differences of opinion and approach, and have much less time available to lead or coach their employees, and to get them involved in the process itself.

In the current organisation, an individual's role may have both a Project and a Function responsibility; this may lead to a lack of focus, if not direct conflict, in trying to meet the priorities of both the Project and the Functions.

Lack of understanding of the rest of the process, and a parochial view taken within the functions or by individual budget holders, often causes problems for other areas (BAe, 1993c).

The above quotation suggests a number of characteristics of the company power structure and its impacts on strategy formulation/implementation and performance:

- that the company has a power-based functional structure (creates bureaucracy, causes delays, stifles implementation of new ideas)
- that the leadership is task-oriented
- that different performance measures were applied in different departments
- that there is a conflict of interest in different departments

- that the individual roles are conflicting
- that there is a lack of understanding of business processes

Structure has been discussed in section 2.2 where the purpose was to explore the formal relationships in the organisation. The objective to look into the structure again is to examine the distribution of power, because the power resides in the structure. The nature of organisation structure determines the extent of formal and informal power associated with a certain incumbent and its influence on policy formulation and decision making.

Power-based structure. The quotation suggests that the power was concentrated in a few hands, which were struggling to gain and maintain it. Employees were keen to share power because the concentration of power was depriving them of actively participating in decision making. Since the role of the workforce in decision making was limited, people were not involved in making strategy, consequently the company was not taking full benefit of its employees. Under-utilization of human calibre was reducing the individual and organizational performance; thus the competitive position of the company was weakening.

One of the dysfunctional effects of a power-oriented organization is the existence of bureaucracy. In bureaucracy power gives rise to authority structures, 'power vacuums and struggles for position result if these structures fail to provide a holding framework for members...individuals may protect their position and build up the power of the office' (Jarvis, 2002).

Since the power is concentrated at peak positions in the hierarchy, the people at the bottom are not empowered to give their jobs their best. They have to refer again and again to senior managers who 'allow' them to do this and not do that. This procedure causes delays and limits the ability of the people to react quickly at lower levels. Delays reduce the performance at individual and ultimately at organizational level. Under utilization of the calibre of people causes dissatisfaction and impassivity with their jobs. Less empowered

employees hesitate to accept ownership of job they do and it is difficult to implement new ideas.

Leadership style. Leadership style in the organisation was task-oriented which according to Reddin is 'the extent to which a manager directs his (or her) subordinates' efforts towards goal attainment; characterised by planning, organising and controlling' (Reddin, 2002). It demonstrates a mechanistic view of the organisation, which ignores the people side and emphasises on goal attainment. The contemporary management style is contrary to people orientation, 'under this people tend to have more team-oriented management styles' (Online Newsletter, 1996). This kind of management style is offered by radical change. So it seems that the company has chosen BPR in an attempt to reverse a task-oriented approach.

Departmental conflict. Departmental conflict causes delays and rivalry between people and departments. Conflict between a marketing department and a cost control department is a natural phenomenon in consumer industries where marketing wants more variety (many models and sizes) of a product in order to attract customers, but this increases production cost. Therefore, the cost department opposes such demands in order to keep cost within acceptable limits. However, rivalry between two or more departments in a high-tech high unit value product, like BAe is not a healthy sign because it slows down the pace of the job and creates mistrust among people. The introduction of a team-based structure where people will be taken from all departments involved can reduce such rivalry.

Another issue indicated in the citation is the conflict of individual roles. One manager assumes project/process role and a functional role simultaneously. It pressurizes him to maintain a balance between the two roles. He can only do well in one at the expense of the other. Consequently, his performance was under threat. It can be avoided by separating the process and function role, which can be done in a flat structure where process teams are separate from functional teams.

Performance measures. Various departments were following their own performance measures and did not take an interest in the performance of other departments. For example, the Maintenance department was trying to reduce elapsed time and the Purchasing department was emphasising reduction in cost. Reduction in elapsed time is more important to speed up maintenance of aircraft from a customer point of view. On the other hand reduction in cost was an internal matter of the organisation in which customers were not concerned. This is due to lack of coordination between departments and absence of common performance measures.

Lack of process understanding. As has been mentioned, people do not understand the whole process they are involved in. They make a small mistake, say at the beginning of a process which multiplies at the end and causes significant concern for the company. For instance, 'if a source department places no importance on approving an invoice for payment, the Finance and Purchasing Departments may have to respond to irate queries from the vendors, which tends to degrade our relationships with our suppliers. In extreme cases, the failure to clear a minor invoice in one area could lead to a supplier withdrawing its services from the whole of British Aerospace' (BAe, 1993c).

Analysis

The main issues found in the section include existence of bureaucracy because of function-based power structure, leadership is task-oriented and there is a conflict of interests in departments and individual roles. People were less involved and less empowered. Many departments were following different performance measures. There was a lack of understanding of business processes. Involvement, development and empowerment give power to employees and undermines bureaucracy. It also removes delays and bottlenecks, which can increase individual performance and ultimately organizational competitiveness. So if measures are taken to weaken the bureaucratic structure, people get involved and empowered than the distribution of power could be enhanced in order to welcome change.

Drory and Romm mentioned seven aspects of politics in organisation (Drory and Romm, 1990); three of them have been found in BAe: power attainment, conflict and acting

against the organisation (resistance). The organisation structure is functional yet gaining and maintaining power is central characteristic of it; the people on the top the of hierarchy are the cluster of power e.g. directors of functional departments. There is a conflict of interest in the departments in the processes of customer satisfaction or in day to day business. For instance, if a department places an order for certain goods and is delaying approval of an invoice in order to process payment then the Finance or Purchasing departments 'may have to respond to irate queries from the vendors' (BAe, 1993c). The Finance and Purchasing departments react as an opponent to the ordering department. It implies two meanings to an observer: there is a hidden conflict between the ordering and Finance/purchasing and Finance and Purchasing do not consider the ordering department as part of them. Acting against the organisation implies 'that political behaviour goes against the formal organisational goals and interests' (Drory and Romm, 1990). There are pockets of resistance against radical change as Ward argues (Box 4.13),

Box 4.13 Resistance to change

The role of management is very important in the implementation of change. The first task of senior management is to demonstrate commitment and promote strong sponsorship on the one hand. On the other hand to prove to difficult stakeholders or the middle managers who are initially resisting some of the change to come through. Middle management particularly in the early projects when there was no much awareness of what BPR is and when there was probably feelings of insecurity about the future of jobs, there was a pocket of resistance in the middle management' (Ward, interview 1997).

The main reason for the resistance was lack of awareness of BPR. As soon as people came to know that BPR was not a threat to their jobs they promised to support the initiative. Olivera argues that resistance to change continues to be the bigger BPR obstacle and the main reasons for failure of radical change projects (Olivera, 2000). Lack of awareness can be altered by better communication before and after the launch of change. Belmiro et al argue that "communication aspects within organisational changes have received greater attention since the advent of business process re-engineering. This fact has been attributed mainly to the necessity of eliminating a higher degree of human resistance on the implementation of such a project" (Belmiro et al, 2000).

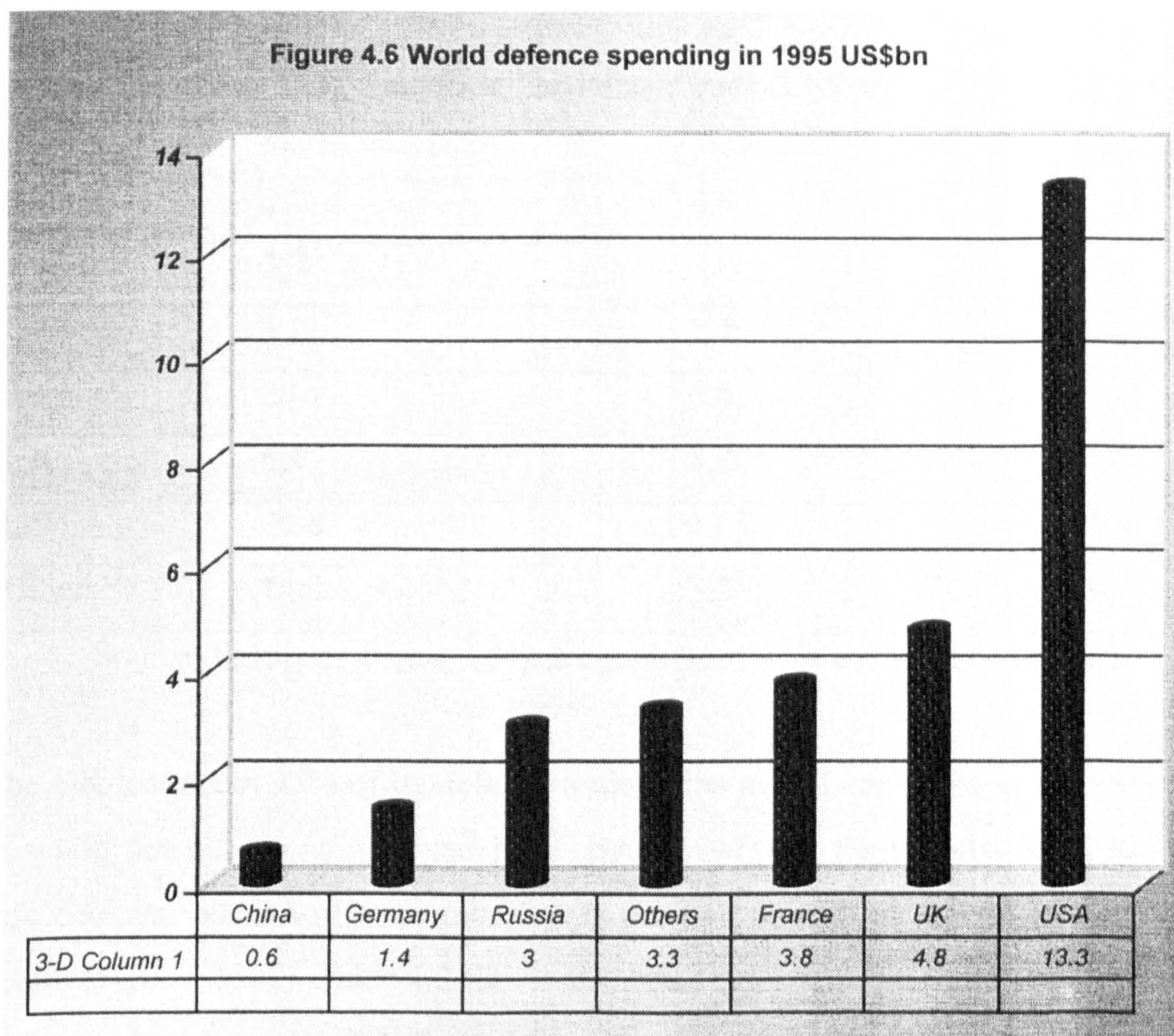
3. The Outer context

The outer context includes economic environment, business environment, political environment and social and economic trends. Economic environment refers to the competitive position of the industry and other companies in the market, competitive status of the company at macro level e.g. exports, and the bases of competition (price or quality etc.). Business environment includes market structure including price leaders (BPCs), dominant strategy models and speed of market change. External political environment encompasses a general pattern of state intervention in the sector and specific policy actions of separate administrations. Social and economic trends involve social and economic trends relevant to the company's fortunes and policies as enabling or constraining conditions (Pettigrew et. al., 1989). It suggests a number of factors in order to examine the outer context: general economic conditions prevailed in the country and at international level (because the company under consideration is operating internationally), competitive position of the industry and the company, nature and bases of competition, political intervention in the industry or the company, social and economic trends prevailed at the time of change.

General economic environment The defence market was a stable and growing market until the late eighties when former the Soviet Union collapsed. A wave of uncertainty had been seen in the military spending almost all over the world. The economic and business environment in which an organisation operates determines its strategy, policy and managerial tactics for growth over its life cycle. The market trends over the period 1992-96 were both threatening and providing opportunities in the defence sector. The defence budgets of traditional customers have been declining the world over since the end of the Cold War. BAe recognised it in her Business Plan (BP), which reads,

The world picture is one of shrinking defence budgets and customers who continue to become more discerning. Such business as remains is prompting intense competition among fewer, better and more widespread defence companies. Latest forecast suggests that defence spending will remain in decline until the late 1990s. Even then, the recovery is likely to be slow. (BAe, 1994).

The defence spending 'is forecast to be reduced by a further 20% from 1994 levels by 1999' (BAe, 1996), especially in North America and Europe defence budgets are continuing to fall (BAe, 1995). The United States cut defence spending by 15% during 1991-95 period. NATO partners in Europe have been reducing their military expenses by 2% annually to the year (Figure 4.6)



Source: Financial Times, 10 October, 1996.

2000; the nations of Eastern Europe have cut their expenditures by over a quarter (BAe, 1992).

Consequently, the Ministry of Defence (MoD) has cut its defence spending proportionately. It is also implementing a policy of off-the-shelf procurement that implicitly reduces the home market. In addition obtaining R & D funds from the Government is increasingly difficult as a result of the reduction in defence research.

Figure 4.6 shows the break up of world defence market.

The total volume of the market reduced from \$78.6bn in 1987 to \$30.2bn in 1997 (Financial Times, 1996). Table 4.2 indicates the loss and gain of the major suppliers of defence products.

Table 4.2 Losers and winners in the defence trade (US\$ bn)

Country	Market share in 1987	Market share in 1997	Gain (Loss)*
China	2.7	0.6	(2.1)
France	3.7	3.8	0.1
Germany	1.9	1.4	(0.5)
Russia	29.1	3.0	(26.1)
UK	6.4	4.8	(1.6)
USA	20.8	13.3	(7.5)
Others	14.0	3.3	(10.7)

Source: Financial Times, 10 October, 1996. * This column is calculated.

The UK lost about 25% of its defence trade in the period compared to the 35% reduction in world defence spending since 1990 (BAe, 1997). At the industry level the aggregate sale declined but BAe has maintained its position as fifth in the world military aircraft business (BAe, 1997). Table 4.3 shows statistics.

Table 4.3 Sales of five big names in the defence world

Company name and position in military aircraft industry	Turnover in billions of \$US (Approximately) in 1995	Turnover in billions of \$US (Approximately) in 1993	% change
McDonald Douglas	7.8	9.1	-14
Lockheed Martin	6.2	10.2	-39
Northrop G	4.2	4.5	-93
Boeing	2.2	4.4	-50
BAe	1.7	5.9	-71

Source: BAe, 1994 and 1997.

The countries in Asia and the Pacific Rim ‘increasingly want their own design and manufacturing capabilities’ (BAe, 1994), and countries of the former Soviet Union are offering cheaper but capable products (Ibid., p.7).

The structure of the defence industry has changed rapidly in recent years. Leading US defence producers are consolidating their resources by *mergers* and acquisitions. The Eastern European political scenario, however does not encourage European companies to consolidate their resources in the same way, though some German and French companies are considering internal restructuring (e.g. 95% of manufacturers reduced their workforce in 1996 (BAe, 1997)), which may increase the possibility of a trans-national consolidation (BAe, 1996, 1997).

Competitive position of the company in the industry is stable since 1993 from where BAe is holding fifth position in the defence industry (BAe, 1995, 1996, 1997). Table 4.4 shows the sales of military aircraft over four years.

Table 4.4 Military aircraft sales of five aircraft companies

Military aircraft sales in \$USbn (Approximately)				
Competitive position	1992	1993	1994	1995
1. McDonald Douglas	7.0	6.7	7.8	7.3
2. Lockheed	3.9	5.7	6.1	6.2
3. Northrop	3.8	3.6	4.0	4.2
4. Boeing	3.7	3.5	3.2	2.2
5. BAe, MAD	1.6	1.7	1.8	1.3

Source: BAe, 1994-97.

However the *competition* is getting tougher and tougher and coming from many sides: Europe, the US, the former Soviet states and the Far East (BAe, 1994). European unification is intensifying competition among European companies to secure European and domestic orders for defence products. BAe will also be pressurized to gain MoD contracts in the future. American companies are trying hard to capture world and home

markets. Excessive capacity forces US companies to concentrate on international markets in order to remain competitive. New competitive powers were emerging from the former Soviet Union and from the Pacific Rim countries: the ex-Soviet states offer competitive products at cheaper rates, whereas the Pacific Rim nations are trying to enter the defense industry gradually, and are developing stand-alone capabilities in order to reduce dependence on Western suppliers (BAe, 1993, 1994, 1995).

The defence business is not only under economic and political pressure but *social and economic trends* are also changing. The most important is the change in customer expectations, strategy and affordability. It has been recognised in one of the company documents, which reads,

Meanwhile the customer expectations continue to rise. They are looking for lower prices and higher levels of service and quality. How much it costs to operate a particular aircraft, for example, as opposed to the simple purchase price, is becoming an increasingly important factor in securing new sales. So too are complex agreements involving technology transfer, industrial participation and 'offset' deals to customer countries, (BAe, 1994). Not surprisingly, these economic trends have caused a range of customer reactions. Some nations have chosen to purchase new multi-role aircraft whilst other have decided to modify and update existing equipment, but all are looking for exceptional value for money (BAe, 1997).

Customers expectations are rising because they have no urgency to buy the products as they used to buy in the Cold War period. Secondly the former USSR was supplying military products to her allies and the Western countries to their allies however both parties are offering their products to the customer. Customers have got more choice now. Therefore their expectations have increased and they are looking for value for money. These factors became the basis of competition in the market.

The economic trend came from airframe manufacturers, who were seeking the status of prime contractors. One of the annual business plans presents the fact that,

Companies like IBM, GEC, Smiths and E-Systems for example, are seeking prime contractor status for new defence contracts. In order to secure its traditional role as lead or prime contractor on aircraft

sales in future, MAD has to ensure it continues to match the level of expertise in systems development and project management that these companies can deliver (BAe, 1994).

The airframe manufacturers are trying to diversify their business because competition is everywhere. Companies are struggling to survive in this time, the viable feasibility is to expand business so that economies of scale can be claimed. It also facilitates buyer since they can get more than one product or service from a single source.

Despite these challenges, there are many opportunities for the company and it has reasonable resources to cope with the challenges. Opportunities are there in the Middle Eastern market, which is increasing at the rate of 4% annually. Asian, Far Eastern, and American markets are also expanding. (BAe, 1994).

The final element in the outer context is the state of governmental intervention in the industry or the particular company. BAe is partially controlled by the government in internal affairs by the exercise of rights attached to its special share. It allows the government to appoint a director and the article of association cannot be changed without the prior consent of the Government. The sales contracts are also subject to the political relations of the UK government with the purchasing country. Some times UN sanctions on a certain nation also influence the business of the company. The Ministry of Defence (MoD) is a principal customer for the company products. So the company has to take the MoD into its confidence which is under the control of politicians. It suggests that the company policies were subject to the government's political agenda.

Analysis of the section

From the above discussion it can be concluded that the defence industry encountered a state of crises due to political circumstances in the early nineties. The aggregate demand shrunk; the big companies in the industry were trying to survive through mergers and acquisitions. Major customers cut their defence budgets and amended purchasing policies. New competitors entered into the defence market and the old ones changed their competitive strategies. Customer expectations were on the increase and their budgets were under pressure. International relations and bilateral relations between sellers and buyers

influenced (and are still influencing) the company's policies and competitive strategy.

The collapse of the former Soviet Union was the result of East-West conflict, her deceptive economic might, dissatisfaction of the Soviet people and her military defeat in Afghanistan etc. The demand reduced because conflicting Blocks did not need military equipment on the same scale as during the Cold War. Since member countries of the two Blocks were the major producers and consumers of military equipment especially military aircraft, the rest of the world had a small share in either production or consumption, hence, the demand was slashed as soon as the conflict was over. It left an excessive production capacity that was a burden on the respective manufacturers because they had to bear fixed cost. Consequently they reduced capacity by closing down many manufacturing facilities and laid off their staff. Business Plan reports that BAe shed 20,000, McDonald Douglas 60,000, Deutsche Aerospace 16,000 and was warning another 11,000 by 1993 (BAe, 1994). Apart from down sizing, the companies had to change competitive strategy e.g. mergers and acquisitions. Lockheed had taken over General Dynamic's fighter aircraft operations at Fort Worth; General Dynamics Missile had linked up with Hughes etc. Italian aerospace enterprises have been subsumed into a single unit and BAe's Dynamic Division was considering a missile joint venture with Matra (BAe, 1994). BAe had established business and BPR partnership with European partners. All these efforts were made to consolidate resources in order to enhance competitiveness.

Social and economic trends were also changed. Customers raised their expectations because more suppliers became available to choose from. During the Cold War they bought military equipment at any price as their security was under threat. They were under no pressure and bought according to their budgets and national priorities. For instance there were some business opportunities in Middle East, Asia and Far East where most of the nations are developing their economies. As these "countries advance, their expectations of increasing health and education puts their defence budgets under even more pressure" (BAe, 1994). The section 2.1 above can also be viewed as part of the outer context.

4. Summary and conclusions

This chapter discussed the context of strategic change, which is the first element in Pettigrew et. al.'s strategic change model (Pettigrew et al, 1989), which has been adopted in this study to assess the change initiative undertaken within BAe. Context is divided into its inner and outer parts. The organisation's structure, culture, politics and historical development have all been examined as part of the inner context. The outer context relates to the external elements affecting the organisation: the political, and economic environments, the business environment and the social and economic trends that prevailed in the economy at the time of the change initiative.

BAe came into being in the early 1980s as a public limited company. Although the government maintained some control, the management was free to make internal decisions about personnel, finance, manufacturing and so on. The collapse of the Soviet Union was responsible for a large reduction in sales, and thus the big companies in the industry were forced to survive through a number of mergers and acquisitions. In response to this decline, major customers cut their defence budgets and changed their purchasing policies. New competitors entered the market and the old players changed their competitive strategies. Customers raised their expectations of defence-related products since their own budgets were under pressure.

The management of BAe implemented a number of change strategies such as Continuous Quality improvement, TQM, everyday improvement and management by performance, but none of those achieved the envisioned benefits. BPR thus emerged as a radical solution to deep-rooted problems such as the hierarchical structure, bureaucracy, empire building and so on. Senior managers in BAe decided to introduce BPR in order to enhance internal efficiency and to increase competitiveness. At that time the organisational structure was hierarchical and people were working in individual functions. This resulted in high costs, complexities in processes, and slowed-down business activity. The company culture was characterised by conservative behaviour, with engineering dominating the educational background, and people were sceptical about radical change and the use of consultants. On the political front, power was concentrated in a few hands, leadership was task oriented,

and there was a conflict of interests and individual roles i.e. individuals were assigned a project and a function responsibilities (he/she is a member of a project team and also working in one of the functions i.e. finance, IT, personnel and so on) at a time which causes a lack of focus.

It can be concluded that although the organisation was a limited company, it remained under the political influence of the government because they controlled the board of the company and had a special share in the ownership (it allows the government to appoint a director and changes in the article of association cannot be changed without the consent of the UK government). The Ministry of Defence was still a major customer of BAe and influenced its total sales and competitive position. International contracts were also subject to political circumstances. For instance, if a country's relations were not good with the UK government then BAe would not sell anything to that nation.

The company had already made a number of change attempts in order to enhance competitiveness but these had not been successful because of the traditional structure, culture and power framework. In addition the economic conditions were not favourable, competition was tough, and social and economic trends had changed due to various political changes.

No major change had happened in the management practices for decades, and the functional structure was a legacy of the old management system from its initial existence. There had been a recent finding that too many layers of management were no longer suitable because senior managers should be as close to the customer as possible, in order to concentrate on them. Despite the fact that customers were in charge now and that workers were knowledgeable and they were capable of resolving many of the issues that used to be solved by senior managers. Almost every organisation was still managed on a functional basis and BAe was one of these.

Culture is closely associated with structure. A functional structure produces bureaucratic elements in the culture whereby people are involved in 'building empires' rather than in sharing authority. People may be unfamiliar with working in teams and managers often

function as a 'boss' rather than as a coach. Some of the managers were not IT literate and so were against the dominance of technology in day-to-day activities. People had unfavourable beliefs about both BPR and consultants. They regarded BPR as a movement for redundancy and consultants as a financial burden on the organisation rather than positive contributors to change. Management had a limited view of BPR's scope or success because there was a lack of awareness of the new management philosophy.

The context describes the situation under which the change was initiated. This chapter has provided an understanding of this context so that the components of the change strategy can be understood. The next chapter examines the components of that strategy.

Chapter 5

Content of the strategy

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Chapter 5

Content of the strategy

1. Introduction

The previous chapter covered the context within which the change strategy was formulated. This chapter discusses the content of the strategy which is to be implemented. The word content refers to the prior competitive strategy (e.g. down sizing), contribution of functions (e.g. personnel), source of the strategy (local or foreign) and evaluation and measurement of outcomes (e.g. cost, speed) (Pettigrew et al, 1989). Contents are important because they shape the proposed changes in different parts and procedures and facilitate implementation. Secondly, change agents indicate the participation of different functional departments and the extent of their involvement in change. They determine the level of achievements the company wants out of this particular change initiative e.g. 20% reduction in cost or 10% reduction in head counts. It helps to convince senior managers about the needs and outcomes of the programme. Change agents can say 'these are the issues the organisation is experiencing and that is the solution, so, let us go ahead to resolve them' (Ward, interview, 1997).

This chapter has been divided into six sections; the introduction and the conclusion are the usual beginning and end of the chapter and four elements form the framework. The second section explores the historical development of the strategy in the organisation. This helps to understand what successful or failed change attempts were made in the past. It also informs the reader or strategists what strategies are in operation so that these can be considered before making a new strategy. For example, BPR was introduced in the last quarter of 1993 whereas a human resource change strategy was announced in the beginning of that year. Existence of a human resource change strategy helps external consultants and internal change agents to take into account the measures already taken under the strategy. The third section is reserved for the components of the strategy: marketing, personnel, IT, manufacturing and quality. Since the research is concerned with a strategy that has been implemented, the researcher explores the extent of

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mail, development of EDI and providing safe access to customers, suppliers and partners to the company databases.

Competitiveness could be strengthened through increased sales and the cost effective manufacturing of quality products. Efficient manufacturing required reforms in the way things were done. Managers were convinced that integrated manufacturing was the best alternative to enhance production efficiency. As a result Manufacturing was given the responsibility to manufacture at as lower cost as possible but not at the expense of quality. There were many quality issues in purchasing goods and equipment from thousands of suppliers. Quality personnel were demanded to concentrate on them. This required a comprehensive quality management system for the whole organisation.

The fourth section outlines the sources underpinning the change because there are concerns among academics and practitioners about the foreign sources of many strategies which may not be applicable in the British industry (Pettigrew et al, 1989). The fifth section describes the method of measurement of outcomes at all levels of management or responsibility centres i.e. processes.

The previous chapter gives an understanding of company context whereas this chapter provides the details of the changes proposed in major areas of business within its context.

2. Prior competitive strategy

There was a wave of restructuring and re-organising in the whole economy in the early nineties. The company was known as Military Aircraft Limited but was split into Military Aircraft (MA) and Systems and Services (S&S) in 1991. Later on Dynamics and Royal Ordnance divisions were brought together with MA and S&S to form British Aerospace Defence Limited (BADL). The company was among the top four defence companies in the world. MA was a key division in the company spread over seven locations in the UK. MA had set a challenging goal in the highly competitive market, **'To be Number One in Europe and World Leader in the Military Aircraft**

Business' which could be achieved through delighting customers by cutting costs and improving quality. However, success was not an easy job because competition was tough, demands were falling and the seller had to compete for its products and the defence budgets of customers. Management argues:

For us to be successful, the customer needs to be convinced that aircraft is what he needs. We are therefore competing not only against our competitors in the aircraft sector but also against suppliers of other types of defence equipment such as tanks, missiles and so on...We must therefore, provide exceptional value for money (BAe, 1992).

This could be accomplished by concentrating on the strategic priorities as outlined in the Business Plan for the year 1992, which reads,

Anticipate and research market needs to ensure MAD is best placed to meet customers' requirements. Maintain or increase MAD's share of the UK, Asian and Pacific Rim, European and Middle East markets through:

- Investing in key technologies
- Entering into collaborative agreements, where appropriate in Europe, the United States, Asia and Pacific Rim
- Increasing our manufacturing business in high technology components and systems
- Targeting selected new American defence programmes (BAe, 1992).

The company had taken a range of measures prior to BPR in order to address the issues identified in the first quotation above through operationlisation of the strategy announced in the second quotation. Four of them were prominent in the strategic portfolio: continuous quality improvement, investment in infrastructure, introduction of critical success factors and people's change strategy. They are discussed below.

Strategies in place

Quality, cost and affordability were the basis of the customer motivation. *Continuous Quality Improvement* (CQI) was launched in order to 'constantly improve how we meet the needs of our internal and external customers' (Ibid., p. 36). PROSPER 2000

programme was started to bring 'together the Division's senior managers to question and recommend improvements in the way we focus our activities', such as: delegate authority and accountability, foster innovation, reduce bureaucracy, improve efficiency and improve team working (BAe, 1992). (See also section 2.1 chapter 4).

It would not have been possible if more resources had not been injected into the organisation. Significant investment was required in *capital investment in infrastructure*, leading edge technology and people. The Value Plan describes the purpose and focus of investment it reads:

Military Aircraft has continued to invest in its infrastructure, processes and people. Our investment is focused on improving business margins and product affordability, as well as developing the technologies that will give us the competitive edge in the next generation of aircraft ... the Electronic Warfare Test Facility and 'Hush House' at Warton and considerable investment in the refurbishment of facilities at our sites (BAe, 1997).

In addition investments have been made in the development of new products, new tools, training and personnel development, consolidation of manufacturing facilities and so on. Short-term and long-term targets are set annually for each product.

Management strategy was based on *critical success factors* (CSFs). CSF is a strategic approach to manage an organisation. Key CSFs include reduction in cost, improve information flow, improve internal performance, achieve a high standard of quality in all areas, applying technology effectively, diversify the product range through alliances and collaborations, exceed forecasted sales, strengthen relations with suppliers and pleasing customers (BAe, 1993).

People are the most valuable resources because they utilise other resources. A *strategy of human resource change* was inaugurated in 1993, which included six critical areas: communication, development, involvement, recognition and reward, organisation and measurement (BAe, 1993). The purpose was to put together different people oriented schemes under one umbrella in order to co-ordinate them. This is based on the culture

the company people demonstrate. In 1991 a cross-section of employees from each site was got together to decide what they considered to be the most important values in the company. They voted for six values as the symbol of BAe employees: openness, professionalism, empowerment initiative, integrity, honesty and trust, supportiveness and team working (BAe, 1992).

The industry was under pressure due to the end of Cold War, which resulted in a reduction in aggregate demand in the defence industry. The US cut 15% during 1991-1995, Warsaw Pact countries by 25% during the same period and NATO nations 2% every year till end of the century (BAe, 1992). It left spare capacity in the defence industry worldwide. The companies were trying to maintain or gain market share. Thus the dominating frame of thought was capturing as much of the market share as possible.

Section analysis

From the above discussion it can be concluded that the company was restructured prior to the introduction of radical change in order to cut cost and improve quality. Strategic priorities were to meet customer requirements and increase market share because overall demand was declining and every defence company had to struggle to win customers' defence budgets. BAe started a continuous quality improvement, PROSPER 2000 and invested in new products, infrastructure, technology and people. These measures were enhanced by specifying short-term and long-term targets so that performance could be monitored. A six dimensional people change programme was also introduced in order to co-ordinate various people oriented schemes. Finally, a set of six company values was identified with the consultation of employees. It illustrates the company culture of the time.

Most of the strategies adopted by the company were common in the industry due to the economic and political conditions prevalent in the world e.g. restructuring, quality improvement, battle for market share, investment in technology, and so on. Restructuring had forced BAe to shed 20,000 jobs since 1990 but the company was not alone in the battle to stay competitive through restructuring. McDonnell Douglas had

shed 60,000, Dassault 12% in 1993 and Deutsche Aerospace cut 16,000 jobs (BAe, 1994). However, restructuring had not resolved their problems since many of them were looking to BPR to rescue them. BAe after shedding thousands of jobs could not achieve its objective. Kahl finds this kind of situation and argues that “any firms emerging from a debt restructuring remain highly leveraged, continue to invest little, perform poorly, and often re-enter financial distress” (Kahl, 2002). On the hand Fu et al states that small and medium size enterprises in Taiwan which account for 95% of all enterprises implemented organisational restructuring successfully (Fu et al, 2001). Consequently, BAe management selected BPR in order to address disturbance created by the political changes in the world

However two measures were to some extent new: the six steps people change programme and the identification and documentation of company values. The former was the result of many stand-alone people strategies which were in place and the latter was by courtesy of the Business Plan produced for the first time in the organisation during 1992. Management might have thought about company culture and how it should be demonstrated to everyone. Managers invited people from each site to agree on the common values. It could help them to control the behaviour of people.

Having described the short history of the previous competitive strategy, the next section examines the components of the BPR strategy.

3. Components of strategy

Two aspects have been suggested to inspect strategy components: the contribution made by each function, key objectives (short-term and long-term) and built-in assumptions and expectations (including contribution of the strategy to stakeholders, customers, employees, communities and others) (Pettigrew et. al., 1989). It implies that this subsection can be divided into two further sections: contribution of functional areas, and objectives of change and assumption and expectations underlying it.

3.1 Contribution of functions in change

IT, marketing and personnel played a central role in the radical change. Financial information is not available for security reasons therefore, finance is not discussed here as such. Manufacturing and QA will be examined under the heading of miscellaneous departments.

It is important to know the set of issues addressed by the strategy prior to identifying the contribution made by each function since the contents of the strategy are based on the issues identified and the objectives defined for the change. One set of issues was indicated in the previous chapter under various headings: structural, cultural and political. The other set of issues was found during analysis of business processes.

Issues addressed by the strategy

Most of the issues were found during the first phase of re-engineering since this phase was meant to identify process issues (see next chapter for four phases of change). For instance, ten issues were found in one of the processes started in 1993. The evaluation report of that process reads:

- 1) Data integrity – correct data in the right place at the right time to enable the process to proceed.
- 2) Price available, both cost and selling, to enable the process to proceed.
- 3) Unforeseen external technical/supply changes result in queries and/or delays.
- 4) Lack of confidence that an order will move to the next stage in the process without a hitch results in intensive progression activity throughout the process.
- 5) Receipt of spares/repairs for delivery into CSD is usually unscheduled and unannounced causing bottlenecks/delays further down the process.
- 6) Large number of deliveries failing to meet advised forecast.
- 7) Problem of asset allocation on receipt due to conflicting business requirements.
- 8) 100% inspection of items carried out both at vendor and to paperwork again at CSD.
- 9) Payment to vendor processes commence prior to goods receiving inspection.
- 10) Systems enhancements/development “takes forever” (BAe, 1993b).

Ward describes common issues found in processes especially presence of non-value-added activities, (Box 5.1).

Box 5.1 **Non-value added activities**

The ratio of non-value-added activities (NVA) was so high in the S&R process that managers proclaimed, 'my god so much time in NVA, we must have done something for it' ...In the Project Control it was more than the impact of the process on the eventual cost of the whole process, it was an issue of not whether we have the best process, the main thing was that the process was followed. The process itself was good but was not followed by the staff, so the issue was implementation (Ward, interview, 1997).

These and other issues found in the company documents can be summarised under six headings: organisation (customer under-satisfaction and high expectation, inadequate pricing, cultural gap, desire to gain leadership in the marketplace, tall structure and lack of multi- disciplinary teams); IT (isolated/fragmented databases, slow and unreliable systems, limited use of technology and multiple systems); people (job insecurity, ineffective and low communication, resistance, powerlessness, demand for a change); process (high cost, slow processes, long cycle time, high proportion of non-value-added activities, projects overrun in cost and time); market (competition, shrinking market size, changes in purchasing policies of key customer); and supply chain (lot of paper work, multi-inspection, supplier rivalry in some cases).

Analysis of issues

Some projects were contaminated with Non-Value-Added (NVA) activities and others were facing the challenge of effective implementation. The presence of NVA activities is not limited to BAe, Maull *et al* identified an abundance of non-value-added activities in a survey of leading UK firms (Maull *et al.*, (1995). However, many firms encountered different problems; Andreu *et al* report higher costs, customer dissatisfaction, employee productivity, poor communication and so on, in a field study in Spain (Andreu, *et al*, 1995). Cycle-time and handling increased volume were found in the financial services sector (Drew, 1994). It suggests that different organisations encounter different issues. However, it does not show that a new picture of issues reside in the organisations. The depth and intensity might be different but the key question is how they were managed. The next sub section explores what the proposed solutions to address these issues were.

3.1.1 Marketing strategy

Marketing consists of individual and organisational activities that facilitate exchange relationship in a dynamic environment through the creation, distribution, promotion and pricing of goods, service and ideas (Dibb et al., 2001). Building customer satisfaction is a fundamental function of marketing (Kotler, 1997). Stanton argues 'you cannot sell a product if you can't first make it. That's why the people or firms who supply the goods or services that we need to produce what we sell are critical to our marketing success. And that's why we consider a firm's suppliers as part of its marketing system' (Stanton et al., 1994). 'Without understanding and co-operation of suppliers a business cannot deliver a quality product which satisfies its customers' (Dibb et al., 2001).

The above definitions suggest the scope of marketing applicable in the study in six domains: product development, determination of product price, distribution of product, promotion strategy, customer satisfaction and suppliers relations. Determination of prices is a bilateral matter between BAe and the customer involved in the sale. Since the product is a high value item the company bargains with the individual customer according to the nature of after sale services. Some customers may require less after sale services and others more. Thus the price depends upon the individual circumstances of customers. Distribution is not a big deal for the company because the ready product can be shipped on customer terms or the customers' can fly away their product. So far as the promotion strategy is concerned, the products are promoted in defence shows and defence related publications, which is beyond the scope of this study.

The remaining three areas are worthy of discussion here in order to demonstrate the role of marketing in the strategy: product development, customer satisfaction and suppliers relations.

Development of new products. The company was investing in new products in order to remain competitive in terms of the product range it offered to its customer. The development of Hawk 100 and 200 training, Light Combat Aircraft (BAe, 1992), Eurofighter 2000 (BAe, 1994) and Nimrod 2000 were introduced recently. Kevin Smith,

the then managing director (MD) of the company describes the marketing efforts made in order to manufacture new aircraft, deliver to the customer and secure new orders. He says:

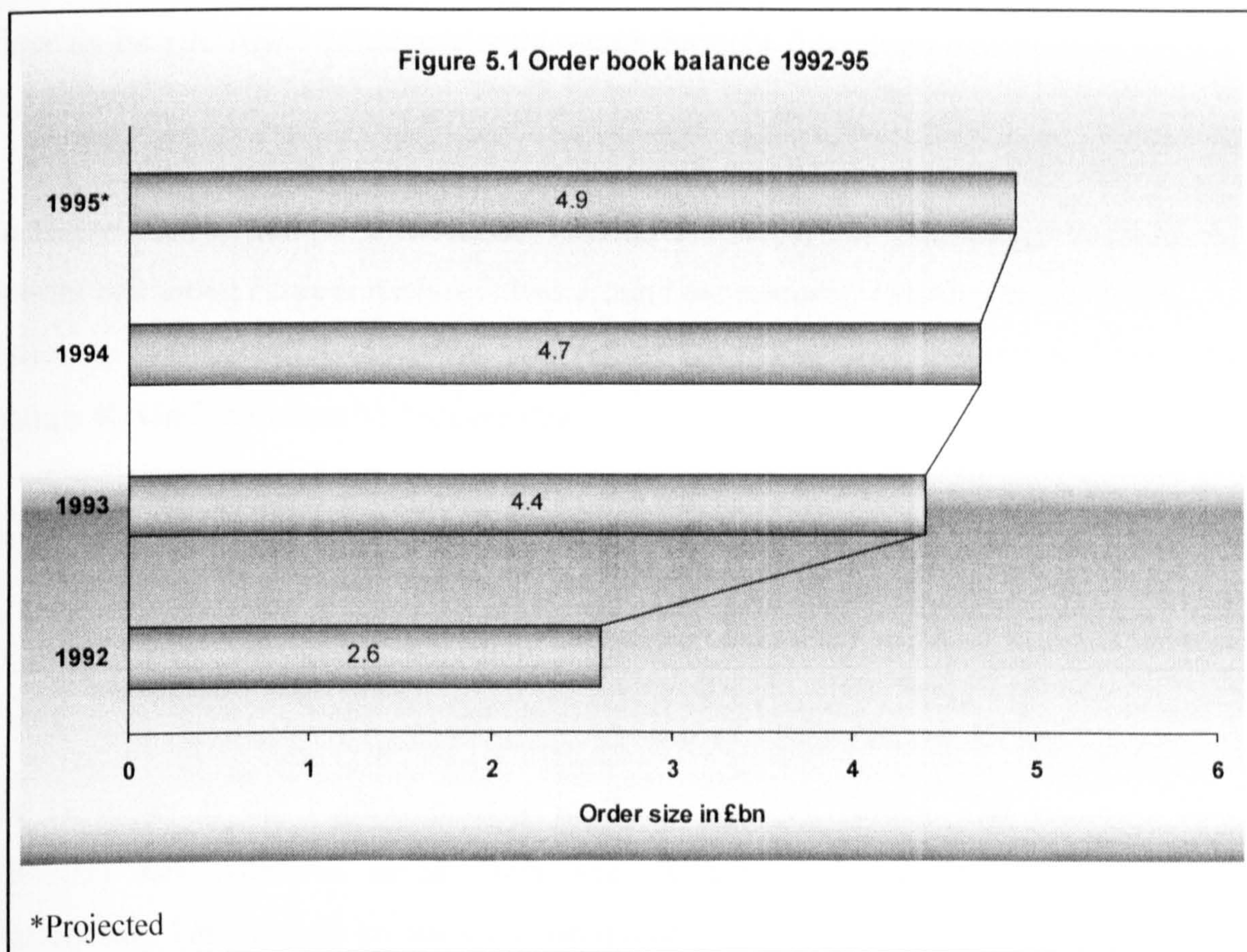
The Hawk 200 entered service for the first time with two export customers and the first deliveries of the new Harrier TMk 10 variant have taken place. T-45 Goshawk completed a successful operational evaluation by the United States Navy and the first student completed training on the aircraft during October. The first stage of the Eurofighter 2000 flight test programme was completed in less than half the anticipated time and with very pleasing results, and on the Tornado and Sea Harrier FRS2 the first newly built fuselages were delivered to the equipping and final assembly sites on Warton and Dunsford respectively on time.

All in all, last year MAD made 352 deliveries comprising new aircraft, aircraft component sets and updated aircraft to nine customers around the world. We leave 1994 with all our aircraft projects on target and with the Eurofighter 2000 development presenting the major programme challenge for 1995.

1994 also saw us securing very significant new orders for Hawk, T-45, several Harrier variants, further batches of orders for commercial aircraft components, the Tornado MLU programme and a wide variety of new development activities across our product range. In all, we secured new orders valued at over one and a half billion pounds (BAe, 1995).

The development of new products, deliveries on time and securing new orders are very significant developments in the marketing arena. For example, the order book is continuously increasing since 1992 (See figure 5.1)

All had been done at a time when recession was wide spread in the industry and competitors were struggling to survive. Some of them were unable to survive on their own and were therefore applying different strategies to remain in the industry e.g. merging with each other to consolidate resources and share responsibilities. Not only this, the company received Queen's Award for Export Achievement in 1995 and Mike Rose the then managing director announces, "over the last 12 months MAD's marketing activities have led to over 25 new business opportunities being pursued in the global



market place” (BAe, 1996). And the same story continues in the following year. Delighted Mike Rouse comments on the business results of the year:

Looking back at the targets we set ourselves in last year’s Business Plan, I’m sure you’d agree that it has been a good year for Military Aircraft. We have won significant new business with Hawk for Australia and Nimrod, and we have seen the Eurofighter 2000 programme publicly supported by the British Government’s formal declaration of their commitment to Production Investment. Add to that further Hawk sales, the Tornado mid-life update, the establishment of a new joint venture with Dassault and the orders we have delivered and you should feel justifiably proud of the part you have played in this success (BAe, 1997).

It seems that the marketing efforts were well-organised and consistent showing positive outcomes. Therefore the reverse side of the coin offers threats and pose challenges. Mike Rouse warns, ‘political difficulties on EF2000 and the MOD’s decision not to select

Tiger as its UK Army helicopter replacement brought frustration and disappointment' (BAe, 1996).

Customer satisfaction is the second important function of marketing, because the modern marketing concept itself revolves around the customer (Stanton et al., 1994).

Customer satisfaction is the prime concern of BAe's business strategy and focus for change. Kevin Smith than MD argues that

We recognise that without customers we are nothing. We are working hard to improve the satisfaction we give to our customers not only externally but internally too. We aim to listen to them, understand their expectations and meet all our commitments to them – we aim to win them and keep them (Smith, 1995).

The customer is the highest priority in the company's values. The Business Plan highlights key measures taken every year to enhance customer satisfaction and involvement. For example on one occasion it reads,

General Projects achieved agreement of a generic model with the RAF Support Authority which recognises our role, and creates an environment where we can become the customer's first choice for support and upgrades to the Canberra and Jaguar.

In the General Projects commercial sector Military Aircraft has been collectively working with the customer on joint procurement, offload strategies and the potential for cost reduction to meet mutually agreed targets...

The Harrier project has continued to use and develop the customer satisfaction metrics established with the RAF Support Authority.

On the Tornado the RAF and RSAF have recognised the improvements made on responsiveness to spares and repairs lead times, on costed proposals and on in-service requests (BAe, 1997).

It has been enhanced with a detailed customer-focused strategy encompassing a range of activities: develop customer strategy, know your customer, understand your customer, delight them and measure the process (Ibid., p. 14). The strategy also includes targets for every year. Customer facing IPD teams were established to develop a direct link with

customers and customer were involved in the radical change process itself (BAe, 1996c). (Customer involvement in the redesign is to be considered in the next chapter)

Customer involvement in redesigning processes through design workshops is a special type of involvement. It is similar to capturing customer requirements in a system development project. Customers involvement creates ownership of the process design and enhances their satisfaction. EDI enables the real-time exchange of information: the customer can access BAe's databases and the company can access the customer's databases simultaneously.

Analysis

Customer concern has been the subject of the majority of BPR proponents (Hammer, 1990, 1993; Davenport, 1994). They view this phenomenon in different ways: e.g. the customer takes charge (Hammer, 1993); CIGNA corporation improved customer service (Caron, Jarvenpaa & Stoddard, 1994); a number of UK companies improved responsiveness to customer demands (CCTA, 1994). AT&T integrated customer billing, ordering and maintenance services into an 'all in one' package. Thus a single employee can deal with all types of requests (Bouvet, 1996). Winco finds customer satisfaction as one of the key elements considered in a reengineering study (Winco, 1997).

A distinguishing feature of BAe customer satisfaction strategy was involvement of the customer in process innovation through design workshops. It might be possible because the company has got a small number of customers who can be contacted relatively easily. Secondly, the products are of a high unit value, which forces buyers to make sure of the functioning and quality of all aspects of it. It compels them to participate in the company events either in redesigning workshops or display shows.

Suppliers management. The last component in marketing strategy was the relations with suppliers. BAe paid special attention to its suppliers; a separate BPR project was launched to manage them because it involves 1,000 employees, 300 suppliers, 300 departments and processes 50,000 invoices annually (BAe, 1995a).

The Procurement project was inaugurated in 1993 with a view to improving the supply of aircraft components and equipment. This process was supported by S&R, Spares & Repairs and the supply chain and the Logistics command processes. The strategy for change was based on the issues identified in the evaluation of the process. PIT reports in the evaluation report of the process that the process is characterised with grave issues, it puts them as,

In some cases, our relationships with suppliers are adversarial, rather than being a strategic partnership with common goals, mutual trust and co-operation. Supplier are not kept informed of our position at all times leading to surprises and ill feeling, and equally, the performance of the suppliers in providing defect free equipment is poor...generating an accurate BOM too late; failure to deliver to the line on time, and the wrong items being purchased, increasing both stock and shortages...a considerable time is spent in non value-added activities such as: expediting, checking and inspection, resolving invoice and GR queries (BAe, 1994d).

Above all the high cost of placing low-value orders, long elapsed times (length of time taken) to place simple orders (BAe, 1994f) and data integrity were also reported (BAe, 1994d). Suppliers management strategy was designed to respond to these issues.

The strategy can be divided into five sub headings: preferred supplier scheme, purchasing through credit cards, direct delivery system, quality control and inventory management. BAe embarked on operational excellence through a *preferred supplier Process*, (PSP) launched in 1994. Business Plan reports the purpose and elements of PSP, it reads:

The Preferred Suppliers Process aims to help us work in partnership with suppliers and to jointly identify key opportunities for improvement. PSP comprises three main elements: Statistical Process Control, a detailed business assessment, and measurement of performance... Each participating supplier is assessed by MAD representatives and, from this assessment, jointly agreed quality and delivery targets are set... The scheme will provide significant benefits to both parties: improved quality, reductions in cost, transfer of best practice and considerably improved involvement and communication between MAD and its suppliers (BAe, 1995).

Supplier performance was improved by establishing a common documentation system including bills of material, single-delivery schedules, implementation of JIT techniques and co-ordination in information exchange. *Delivery* of goods and parts were made direct to the point of use. Logistics centres were established to facilitate the direct delivery strategy. Equipment was divided into low-value items and high value-items. Low-value items were bought through the *corporate purchasing cards* (CPCs) scheme, which allows employees to buy from approved suppliers. CPCs were issued to nominated employees in each process or department. General procurements were made easier by electronic ordering and scheduling. Self-invoicing, single bills of material, standardised documentation and payments at receipt of goods helped to revolutionise the procedure. *Inventory* levels were reduced since suppliers began to stock most of the inventory in logistics centres. Management of stock was tightened through bar-coding and correct labelling on the goods. *Maintenance of quality* was transferred to suppliers, which eliminates inspection and testing, so quality at source was possible to realise. The Business Plan reports that the company was expecting 95% defect free deliveries and 90% schedule adherence by the end of 1996 (BAe, 1996). Most of these measures were implemented under the Procurement process. The importance of the process was argued in the 'TO BE' report. It reads:

The essential theme is a close working relationship between Purchasing, Suppliers and user functions and it contains a number of critical concepts which integrate to form a complete picture: ownership of primary data, long term enabling contracts, quality assured at source, a common delivery schedule for the supplier and manufacturing, direct delivery to point of use payment on receipt of goods and supplier relationships (BAe, 1994d).

Further "The Supplier Management Team have will responsibility for developing closer links with suppliers providing a framework for mutual support, with the aim of improving the performance of the supplier, and of MAD in dealing with that supplier" (Ibid., p. 10).

Key characteristics of these relations include: improvement of the suppliers' processes; on-line access to the company's databases to suppliers and the preferred suppliers schemes (PSP). On-line access enabled suppliers to keep an eye on the BAe's stock levels; at the re-order level, suppliers ship goods to the nominated site/point of use of the company. Quality at source ensures the quality of goods being supplied. Suppliers are functioning as partners in maintaining the desired quality standards. It reduced the inventory and also the level of investment in working capital. In the procurement process, authorised company employees started to purchase direct from the preferred suppliers without prior approval of senior managers. Finally, common documents, schedules and business goals have been established to facilitate transactions between suppliers and BAe.

Analysis

Many other companies experienced changes in the supply chain. Fried envisioned IT's impact on business in the 1990s, for him, "in fact the term *extended enterprise* will increasingly characterise the manner in which businesses operate as they link more intimately with each other's systems in a process chain that reaches from raw material through to distributors and customers" (Fried, 1993). One step further was taken by Dell to turn the myth into reality by eliminating the middlemen to reach customers directly. General electric's (GE) retailers went further and established 'Direct Connect' with the supplier in order to reduce inventory. GE provided direct access to its inventory and ordering system to retailers who receive orders from customers and then supply them from GE's warehouses directly. In this way the retailers did not keep the inventory but served customers through the 'virtual inventory' owned by GE (Tracy and Wiersema, 1995). Berry et al evaluated the impacts of a BPR initiative on the supply chain and argue that "indeed, in material flow terms, it is now a structurally much improved, robust and internationally competitive supply chain" (Berry et al, 1999).

BAe's PSP is an improvement over many organisations since it enabled Military Aircraft to establish a partnership with the suppliers in order to ensure a quality supply of material. Electronic links claim a larger reduction in paper work e.g. 50,000 invoices

were eliminated from the system. Secondly the effectiveness of the supply chain empowered the workforce through the introduction of a CPCs scheme.

3.1.2 Contribution of IT

IT is considered a new 'factor' of production in the radical change movement (Hammer, 1990; Hammer and Champy, 1993; Davenport, 1994; Venkatraman, 1991; Kettinger and Grover, 1995). It is a crucial organisational resource (Coombs and Hull, 1995) which can support re-engineering projects (Moad, 1994). IT is a major enabler of process redesign (Hammer, 1993; Davenport and Short, 1990). Despite its high hopes BAe was cautious about the role of IT in the beginning because BAe change was not IT-driven; however, IT played a significant role in the programme. Therefore, an *IT strategy* was developed incorporating the available IT resources and issues found because technology offers diverse and fast solutions to the internal and external business problems. Peter Tower believes that 'you cannot envision BPR which does not involve IT' (Tower, interview, 1997).

IT was to label a variety of issues in different functions. Some common problems were identified in the evaluation of various processes since the requirements of these processes were different. All this demanded a comprehensive IT strategy to resolve the issues and fulfil the requirements of the processes. The Evaluation report of Ops 1 indicates some problems identified in the 'AS IS' phase. It reads:

The vast number of systems in use, especially at the Warton Site, is a matter of great concern since they cause a number of problems with duplication of effort and data which leads to a lack of data integrity. For the user, difficulties are caused because cross site applications differ. People need re-training to enable them to use several systems and knowledge is often gained through self teach methods which may be time consuming and always adequate. The number of systems also dissipates the effort Information Technology needs to support them. Questions were also asked about IT strategy. There does not appear to be an integrated strategy for engineering definition (i.e. Design and Manufacturing Engineering). There is a strong body of opinion that supports the idea of an integrated engineering database (BAe, 1994b).

Another project suffers from different kind of problems, the authors of the evaluation report state:

The business systems that are currently in use in the Procurement process have generally been developed to mechanise existing processes: processes which can be seen from the results of this BPR activity to be highly intricate. As a result, the systems themselves are complex and cumbersome, which is one reason why they suffer from maintenance problems and why development and enhancement is such a lengthy process. The need for MAD systems to accommodate different methods of operation for different sites, and to integrate with site-specific local systems, has further increased this complexity and compounded the problems (BAe, 1994d).

Poor performance, slow processing (BAe, 1994b), 'systems enhancement/development "takes forever"' (BAe, 1993b) and 'too much reporting and second guessing with uncoordinated management information (BAe, 1994e) were also common problems. Peter Tower argued that learning and common language were serious issues in IT because 'People do not want to learn anything new which is not familiar to them' (Tower, interview, 1997).

Apart from this, individual projects require a distinctive role for IT to become a useful enabler. Martin Kaye, team leader of Ops 4 project argues his requirements (Box 5.2).

Box 5.2 Requirements of IT for Ops 4

Drivers for my project were different from those of other Ops projects, i.e. to cover a wide range of possible products or concepts. Therefore our needs in terms of IT do not require a faster system; rather, we need a system, which covers a large range of ideas. So the task of IT in this particular project was not only to synchronise the speed with other systems but also to increase the number of options to consider. One of the related requirements is to identify new technologies that will be able to incorporate them into new products. In Ops4, the predevelopment process spreads over fifteen years, so 50% or more of the time of IT people is required to develop new technologies, to discover new things. We proposed that the new technologies could be developed in either of the participating companies or in a university (Kaye, interview, 1997).

Marria Harwood IT service director BAe concludes 'previously our IT provided a poor baseline for the future and was becoming a barrier to change' (Morgon, 1996a).

This suggests that there were too many systems in operation, they were slow and complex causing inefficiencies, the systems development process was never ending and new processes needed individual attention in order to accommodate their requirements. In addition, BPR required new investment in IT so as to enable processes to work. Earl argues that such problems are the result of a legacy of architecture, where data and systems were built for functional needs or specific requirements of responsibility centres, incompatible data and inconsistent models (Earl, 1994). A company in Spain 'realised that its existing mainframe applications did not support its process requirements' (Muall et al., 1995) and technical deficiencies together with poor IT management were barriers to BPR (Willcocks, 1995). Joe Dunn, IT Strategy Manager BAe argues: 'traditionally, IT was driven by individual functions when what we really needed to look at were processes' (Morgon, 1996a). In addition BAe's particular problem was too many systems e.g. 200 systems were in place at the induction of BPR. Those systems were designed to serve functional duties rather than process services.

The IT was outsourced to CSC in 1995 who developed a business driven IT strategy to carry out current and future requirements. CSC narrates the aim and components of the strategy in precise words; it reads:

The strategy is aimed at driving maximum business value out of our current and future IT investments and comprises:

- Business and IT principles to guide decision making
- the definition of those areas on which the company will focus its strategic investments, within the context of an overall business vision
- a plan to refresh the company's IT infrastructure
- a plan to address the legacy systems and processes including replacement of MAD's major business systems
- guidelines for the management of IT (policies and procedures)
- funding profile and an investment case (CSC, 1996)

And the 'implementation of the IT strategy is being managed as part of the OEI change programme, which is responsible for the transformation of the business processes within

the Operations sector of MAD's business' (Ibid., p. 13). As part of the strategy a set of principles were drafted in order to operationalise it. They include:

- IT investment was business driven,
- IT was an enabler in change,
- a selection of IT solutions recognised benefits of integration rather than functional richness and user appeals,
- data were created once,
- users were involved in the systems development,
- IT solutions were to provide security,
- support core processes,
- people were trained to use and exploit IT,
- understanding disaster mitigation and recovery,
- data were defined,
- owned and were the divisional asset,
- users were enabled to analyse and manipulate data (BAe, 1995a).

IT investment concentrated on six key areas over a five years period. The investment strategy was outlined in Business Plan of the year 1996, it states:

During 1995 a review of the Division's strategy in this area was undertaken to determine how to obtain the best value from our existing and future investment, currently running in excess of £50m a year. The multi-functional team involved in the review, including a representative from our outsourcing partner, CSC, conducted a series of company wide interviews and workshops and made a number of reference visits in order to ensure that all interested parties were consulted in the review. The conclusion from the review identified six major areas for investment focus over the next five years (BAe, 1996).

The six areas indicated above made a critical contribution to boost the IT capabilities. The individual contribution of each of these projects was described in the same annual plan. It notes:

Integrated Product Development

The new approach will enable a more efficient and effective design and development of aircraft products through the increased use of multi-functional teams. IT tools will support the new process with the use of CATIA, Bill of Material development, and configuration control systems.

G-Host

This project, which is already well established, provides the IT infrastructure to support an improved performance in the delivery of aircraft systems, in terms of cost, timescales and quality.

Integrated Business Logistics (IBL)

This concentrates on facilitating the improvements in operational performance identified from OEI work from the point at which a customer places an order through to delivery of the aircraft. We will aim to streamline our internal processes in order to receipt, manufacturing and procurement and work much closer with our suppliers and partners in the integration of our business systems.

Integrated Business Support (IBS)

Business Support systems look to deliver the information that we need to make decisions. The provision of first class finance, project, resource, and performance information is vital to support our decision making process. We will be looking to implement new systems to aid us in this process by cutting out duplicate information and ensuring that all areas of the business are using consistent data in order to manage the business.

Support the Customer

In the short term many of the systems described above, e.g IPD and IBL will serve to improve our relationships with our customer. However, in the medium to long term we will need to focus on the introduction of systems more closely aligned with our customer requirements.

Best Partner

MAD's business is and will continue to be dependent on successful partnerships; we will be looking to identify systems targeted at being the best in the industry as a key influence on our preferred method of doing business with current and future partners. This will help ensure that we become the 'company of choice' to partner with (Ibid., p.27).

The problems identified in the beginning (too many systems, duplication of data, individual requirements of new processes and so on) were addressed in the new IT strategy. More investment was also made in the new and faster desktop technology e.g. £12m was spent in 1995 to buy PCs, workstations and software.

IT in individual projects

Apart from the overall role of IT in the strategic portfolio of the organisation, IT was an enabler in the implementation of business processes. In Ops3 project Master Production

Scheduling (MPS) became easier to control with the IT, as the envision team argues:

The M.P.S processes highlighted above will become easier to control with an IT Strategy Group (ITSG) implementation of Integrated Business Logistics and Support (IBL/S). This will provide the platform for seamless management of workload across the projects and sites within M.A.D...New Integrated Business Systems Specified around Business Processes (BAe, 1996c).

In the vision of the In Service Fault Investigation (ISFI) project PIT suggests that 'implement common IT to support all fault investigation with EDI links to Partners, Suppliers and Customers through the Integrated Business Logistics and Support (IBLS) system' (BAe, 1996b). The IPL/IPC project requires acquisition of data in digital form (BAe, 1995b). The QA process team asked for integration of data to implement the change (BAe, 1996d). The ISFI team assumes '40% reduction in average timescales within one year of implementation of concurrent fault investigation team with capable IT' (BAe, 1996b). PIT of OpsI developed product model definition data (BAe, 1994a). The Procurement process made significant changes with the help of IT. For example, "the second proposed the development of a new computer system specially for low-value orders, allowing requesting departments to access visual catalogue information, look into supplier's databases for stock, price and delivery details, and to place orders electronically with the click of a mouse" (BAe, 1994f). These examples suggest a variety of roles played by IT in the implementation of radical change projects.

Which IT technologies

A number of technologies were introduced during OEI programme (BPR was a part of it) including E-Mail. The need and benefits of e-mail were recognised by a senior personnel member, he argues:

the primary objective of this contract is to provide a robust Electronic Mail service to cater for up to 10,000 users during 1997 ... in the midst of the major overhaul of our IT systems, it is not possible to resource separately an individual exercise in E-Mail services, so we will integrate the new service as part of the standard desktop facility... the basic services will have a high degree of standardisation covering E-Mail, word processing, spreadsheets and presentation packages... on top of this baseline the new systems supporting the OEI programme will be in place and these tools will be provided, tailored to the work ... the key to success is that all this new technology will be

designed carefully to support effective business processes and properly aligned with our business need (Whitnell, 1997).

The above measures were supported by the installation of on the ground and underground facilities, as described in the company magazine. According to it,

By the time you read this, CSC will have installed more than 100 kilometres of fibre optic cable to create an information superhighway for the Military Aircraft sites...above ground, a team of Engineering Computing and CSC staff delivered 330 workstations and 608 personal computers by the end of 1996...the target for 1997 is a minimum of 300 workstations and up to 800 PCs...in addition, there has been a major investment in Product Data Management Software, which will be progressively introduced during this year (Fastrack, 1997).

IBLS (the IT project mentioned above) delivered new IT services, and the software has replaced with more a popular one such as Lotus Smartsuite with Microsoft Office (Ibid., p. 6). These measures enabled the company to claim key achievements in the IT sector. Table 5.1 summarises them.

Table 5.1 Key developments in IT sector

<i>Key elements</i>	<i>Related factors</i>
Integration	Integrated data/systems Created common databases with suppliers and customers
Responsibility	Assigned data ownership
Enhanced communication	EDI enabled increased communication with the external world Access to external data bases Developed corporate wide INTRANET Integrated Business and Logistics System (IBLS) (an enterprise wide IT project) Data availability for a wide range of business and operational activity On line data access, delivery, publishing and feeding

	speeds up electronic links Implementing Master Production and scheduling through IT and IBLS projects
Effective planning & management	Provision of project planning tools IT library and scheduling Developing inter project links
Technical advancements	Enhanced system interface Multi-skilled compiler/illustrator Parallel data processing Use of laptop technology

Analysis

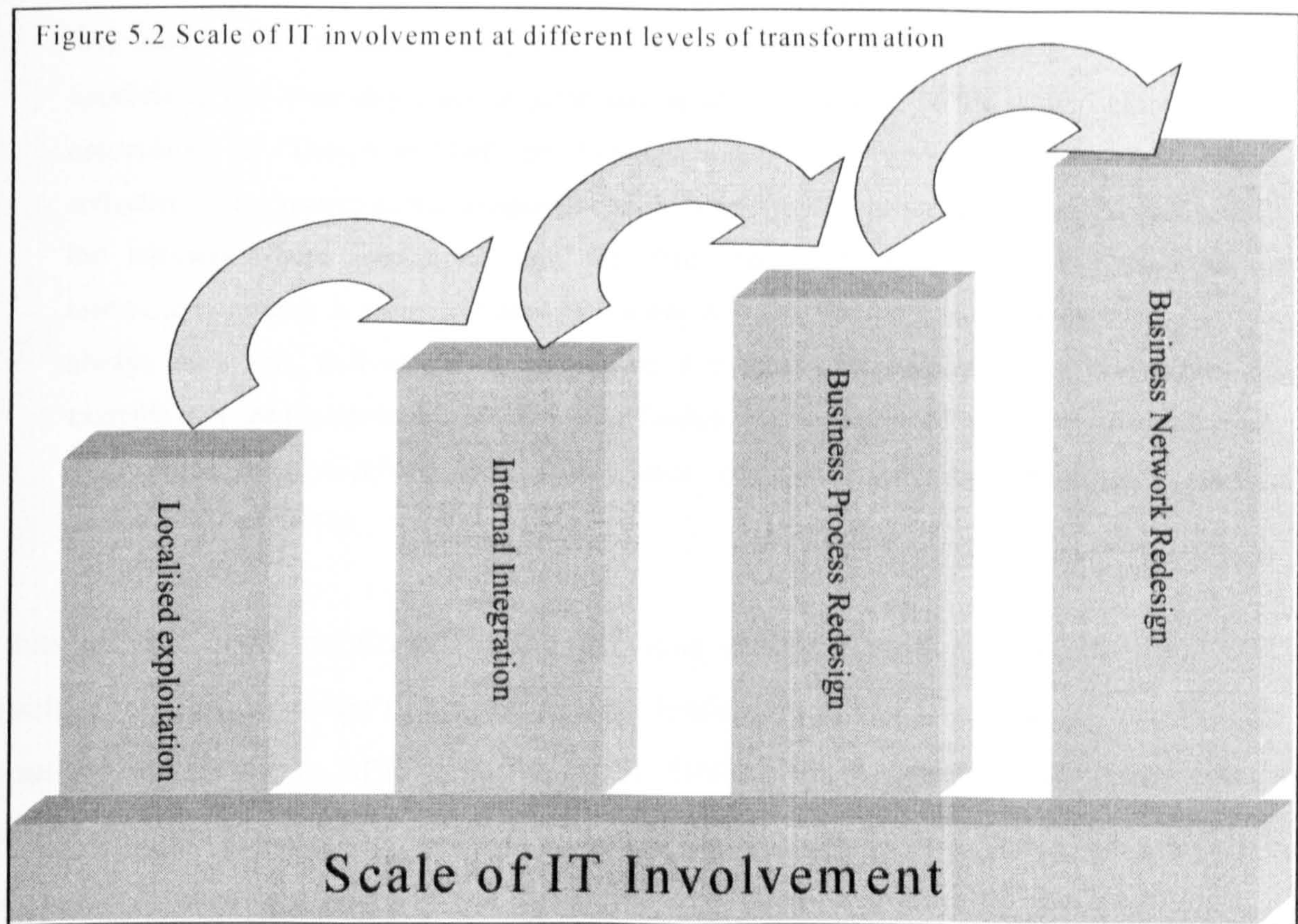
Disintegration of systems was one of the major problems that were successfully tackled by the integration of the hundreds of systems in operation. Information systems were supposed to facilitate communication, and the IT strategy contained a range of steps to enhance it, e.g. E-Mail and electronic data interchange (EDI). As processes need ownership of responsibilities, IT provides ownership of data in order to establish effective control. On the technical side, parallel-processing speeds up the system performance and laptop technology enriches remote access to the organisation's systems.

In short, there were hundreds of systems in operation during 1993 at the introduction of BPR; these are now integrated into a few systems. Efforts are still being made to optimise the effectiveness of these systems. Electronic links were developed with business partners, which increased the flow of information between suppliers, customers and partner companies. On-line access to business suppliers' and customers' databases made external relations much easier as well as more effective. Expansion of e-mail enabled company employees to communicate freely and frequently. IT enabled project planning and scheduling, and digital pre-assembly revolutionised the manufacturing process. Consequently, physical and mental efforts were reduced.

It suggests that BAe's IT strategy was aimed at linking business and technology in order to guide decision making, define strategic investment, refresh IT infrastructure, address legacy systems and effective management of IT. Al-Mashari and Zairi found re-engineering of a legacy system for successful implementation (Al-Mashari and Zairi, 1999). Fried and Johnson report that a Pillsbury company divided its IT investment into foundation, tactical and strategic categories in order to increase its ability to assign technology a wider role to play to achieve its targets. The Chrysler Corporation attained company wide commonality and systems integration through its IT strategy (Fried and Johnson, 1992). InsCom company achieved increased amount of information availability (Chita, 1996). A survey of 1300 North American companies suggests that they were concentrating on information availability and integrating databases for customer

satisfaction (Best Practice, 1996). Chan and Land argue that coordination of IT throughout the organisation is central to the success of BPR (Chan and Land, 1999). So BAe was facing similar issues as most other firms, and undertook them successfully. New hardware/software were put into action and systems were integrated to increase the overall effectiveness. IT based relations were built with customer, suppliers and partners which expand information availability and access to databases. However, EDI is based traditional using applications because more advanced level of applications are available. Downing found that "Web-based EDI experience superior performance in commitment between EDI partners as well as overall performance, while companies using Web-based or traditional EDI experience superior performance in internal operational efficiency as well as overall performance" (Downing, 2002). Figure 5.2 shows the involvement of IT in the initiative. The figure is based on Venkatraman's five stage classification of IT-enabled change. Since BAe only passed through four of them, they are the only ones included.

The first stage deals with the application of IT at a functional level, the second emphasises development of a common IT platform in order to integrate business processes, the third offers redesign of business processes using available IT capabilities



and the fourth level presents “electronic integration across key partners” (Venkatraman, 1991). BAe integrated its systems with suppliers, customers and partners (reached BNR) level.

3.1.3 Human resource contribution

Employee strategy was based on the issues identified and the process requirements stem from the vision of change. Each project bears a particular set of issues as indicated in Ops1 ‘AS IS’ report. It reads,

The depletion of skilled personnel following the restructuring programme and the drive to reduce the ratio of direct/indirect staffing levels has been identified as a major cause of concern. It is perceived that this presents a risk to future projects...following the restructuring programme, there has been a depletion in the level of knowledge and experience in most departments... the numbers of employees possessing a comprehensive knowledge of current departmental methods and methods has reduced and the remaining senior staff are unable to aid in the development of junior staff or act as mentors given increases in individuals workload. Subsequently, time can be consumed in senior staff having to seek advice. In some area, trainees are viewed as a hindrance rather than a future asset. Personnel tend to be self taught and have only picked up what they feel

they need to know in order to carry out the task. As a result, the full capacity of systems is not appreciated and invariably leads to personnel having a poor view of the system...there is little appreciation of "Design to Cost" and "Engineering to Cost" throughout the process; this is reflected in poor matrices...the company needs a culture which encourages people to move around the business where appropriate, and feel free and comfortable to move in and out of teams...concurrency is ultimately seen as the way forward, but the present environment does not always allow this. Individuals are coming up with their own suggestions on collocating, for example they see the advantage of collocating Design Engineering and Process Planning Engineers to facilitate communications and enhance understanding of the dependencies as a sensible approach (BAe, 1994b).

It has already been mentioned in the previous chapter that functional based power structure reduces the scope of empowerment, leadership is task oriented and people fear about job losses due to BPR initiative (BAe, 1993c). Furthermore, it was identified in the Procurement process that 'there is a general feeling that the skill base does not match the required processes, and that the utilisation of resources is poor, in terms of both the skill mix and the balance of resources with the volume of work' (Ibid., p. 29). PIT of another project have concerned about the lack of process understanding, ownership and business awareness. The team speaks out in the following words:

The team concluded during the interview phase that interviewees lacked knowledge of the end to end process. This problem is particularly apparent when "AS IS" process crosses functional boundaries.

As the process crosses CSD, Technical and Commercial, the current organisation requires tracing all the way up to the Managing Director in order to establish one process owner.

Staff are generally not aware of the customer contractual requirements or the impact their decisions may have on other areas of the business (BAe, 1994c).

The interviewees were the employees involved in the process. In the quality sector PIT reports:

There is a poor understanding of what is meant by Quality assurance, Quality Control or Quality (or Process) Improvement, what they comprise of, how they are inter-related, and of the roles and responsibilities of those involved...a misconception exists of the 'Quality Discipline' which inhibits the manager's ability to recognise Quality training requirements as an integral part of their own discipline (BAe, 1996e).

Furthermore, 'limited commonality in roles and responsibilities across MAD and projects' (BAe, 1996b) and 'senior management need to be seen to "buy in" to change – pro-activity. Not just a nod.' (BAe, 1993b).

It suggests a variety of people oriented problems: depletion of skills, poor matrices lead to poor performance measurement and monitoring, inflexibility of job movement, powerlessness, job security, task oriented leadership, poor skill base, lack of process understanding, ownership and business awareness, poor understanding of training requirements, limited commonality of roles and responsibilities and poor communication.

Powerlessness, job security, conflicting roles and responsibilities, lack of process understanding and task oriented leadership have been discussed in the previous chapter. Depletion of skills was due to restructuring; BAe had shed 20,000 people since 1990 during restructuring. A lot of skilled people left, therefore, there was a vacuum of skill. Other problems appeared due to problems in the human resource strategy e.g. poor matrices, inefficient communication (and low business awareness), poor understanding of training requirements etc. Let us see how these issues were addressed within the context of BPR and in general.

The human resource strategy to entertain the above issues and accommodate the process requirements consists of involvement, communication, learning and development, empowerment and recognition & reward.

Involvement. BAe had recognised the importance of its people long before the radical change initiative and had implemented various strategies to concentrate on human issues. The company views people as 'our most vital resource for the future' (BAe, 1993); 'our greatest strength' (BAe, 1997); 'we can win through people' (BAe, 1994); 'competitors may copy our product but our people remain unique' (BAe, 1993). BAe's management views the involvement of the workforce as the root of its people issues. So

BPR was adopted to provide a source of greater involvement. As Tony Ward argues (Box 5.3):

Box 5.3 Involvement strategy

BPR was a mechanism which could help not only improvement of performance but also implement the employee strategy of involvement. In doing so the company needed to develop new kinds of processes. In addition, BPR seemed to invent many things e.g. mission, strategy etc. So it was a logical option to be considered in order to improve performance and involve people at large scale (Ward, interview, 1997).

BAe has applied a number of tools to involve people: employee opinion survey, planning process, BPR and suggestion schemes. An annual *opinion survey* was launched in 1993 in order to provide employees with an opportunity to comment on the key issues that affect both Military Aircraft (MA) and themselves. A majority of 55% of personnel took part in the survey in 1995. People had taken part in the *planning process* since 1993, when only 600 people were involved but the number had increased to 6,000 in 1995. Involvement had continued in the *BPR process* where PIT solicits employees for identification of issues and redesigning ideas in the Evaluation and Envision phases respectively. For instance, 2,000 interviews were conducted and 4,000 participated in challenge workshops (BAe, 1996).

The employee *suggestion scheme* was the oldest form of involvement, and was gaining popularity in BAe. The purpose of the scheme was to encourage people to think about their area of work and invent new methods and technology to enhance the quality of outputs and to cut costs. Shelley Mearns reported "the suggestion scheme has seen yet another increase in participation, with the current rate standing at 42% for MA. This demonstrates that we are well on our way to achieving this year's target of 50% (approximately 7,500 suggestions). This level of involvement and commitment is great to see" (Mearns, 1996). The participation rate increased to 46% (7,740 employees submitted suggestions) and 5,189 suggestions were received. Net savings jumped to £832,474 in the same year as a result of involvement (Mearns, 1997). BAe's rate of participation is second only to Dynamics in five British companies (Bolton, 1995). The SBAC survey placed BAe top for support and involvement (SBAC, 1995). Although the

involvement of people is a necessity, 'it slows down the process of change. Yet investment in people eventually pays back' (Tower, Interview, 1997).

The Federal Quality Institute (FQI) found that these techniques are also used frequently (Federal Quality Institute, 2002). The involvement strategies employed are appropriate to the particular circumstances of the company and is using all of the major involvement techniques in practice in the industry and elsewhere.

TekSci employs such surveys to measure employee satisfaction (TekSci, 1999). Surveys are useful to ask 'employees directly about their perceptions, you can obtain a stunningly clear picture of the health of your organisation' (Penson, 1998). Sherwood argues a range of benefits of employee opinion surveys: reduces turnover, identifies organisation-wide strengths, identifies organisation-wide issues and solicits ideas for corrective action, gathers objective data from which management may develop a meaningful dialogue, establishes benchmark data to evaluate future improvements, commits executives to a process that brings them closer to employees, provides employees with a stake in their employer's success, attracts job candidates and helps to align compensation and benefit programmes to more effectively meet the needs of both employees and management (Sherwood, 2000).

Communication. The need for a strong communication strategy and the measures taken to enhance its process was recognised in the year 1996 business plan. it reports:

Every year people's expectations of communication grows. Everyone wants information more quickly, more often – and we are working hard to try and meet these expectations. As our business and working methods become more advanced, so our communication becomes the thread which binds us together.

The Involvement and Communications Programme emphasises local two-way communication, and in 1995 we ran 215 workshops across MAD. This means over 2,100 people have now undertaken training which is tailored to the needs of the individual departments (BAe, 1996).

A number of instruments were applied to improve the exchange of views to and from management. The business plan outlines the ingredients of the communication strategy:

The Value Plan remains the cornerstone of our centrally produced communication process, this year supplemented by the British Aerospace Value Plan to give you the 'bigger picture'. You will continue to receive local newsletters, Fastrack, LifeStyle, and the BAe-wide journal Arrow, all of which form an important part of our communication strategy ... No matter how many journals and videos we have, there is no substitute for a manager briefing his/her people and getting their direct feedback (BAe, 1997).

Targets were set for the following year to reinforce these measures: provide communication support for projects, use effective media relations to develop good external perception of business, continue to devolve communication through teamboards, a suggestion scheme and chairman's award for innovation, etc. (BAe, 1997).

The communication strategy looks OK. But does it work? Bond worries about the actual functioning of the communication instruments. For him 'according to expert Tana Mason of Simpson Hayward, progress has been made in a number of areas, but some nagging questions remain as to whether company managers are really listening to their employees and their customers' (Bond, 1998). He further argues the state of communication in organisations is not satisfactory. He says: 'communicating has become one of the corporate mantras of the 1980s and 1990s, with corporate communications experts being hired and whole divisions being formed to disseminate the corporate word. But does that really filter down to the average employee and give him or her a sense of being part of a team? (*Ibid.*)

Certain improvements have been seen however Mason says that it is more incremental than by leaps and bounds. She describes some corporate moves to disseminate information as more of a "data dump" than actual communication. Sending e-mails throughout the company instead of memos is not communicating. "Communicating implies a dialogue," Mason says. "It implies information going both ways. Employees have to be able to question and state their own ideas and feel like they are being listened to." (Bond, 1998).

Learning and development. The annual plan reiterates the need for employee development, for instance it says:

“We are putting in place the strategy to keep development tied closely to the needs of our business, and introducing processes to create skills to replace those which, through technological advance, are dying out.

We must train managers to understand development issues better and to be in a position to evaluate individual performance, agree training needs and advise people through their learning experience. By supporting our people in continuous development we make sure that they grow within their roles, develop new capabilities and add to MAD’s ever more sophisticated skill pool” (BAe, 1996).

BAe has designed a development package that suits everyone interested in his/her career development. Carroll reports that “continued commitment to the development of MA’s people has resulted in a planned analysis of personal development plans (PDPs) within finance, IT, and manufacturing. This exercise is intended to better match development opportunities to individual PDPs” (Carroll, 1996). It has been praised in the annual plan as:

“Personal Development Plans are a good way of charting an individual’s progress against set objectives during the year. Everyone can take responsibility for their own career through a Personal Development Plan” (BAe, 1996).

Open learning was a second scheme for personal development. Its usefulness and scope has been mentioned in the following quotation. It reads,

“Open learning is a real success story. There is an Open Learning Centre at each MAD site and during 1995 their usage is continuing to increase, resulting in longer opening hours and an ever-broadening choice of training packages... Open Learning gives everyone an opportunity to develop new skills, while formal training programmes which relate directly to roles and responsibilities means that no-one should be left without an opportunity to learn” (BAe, 1996).

The company won an Investor In People award in 1996 from the Training and Enterprise Council (TEC) in recognition of the company’s “processes to train and develop their people to realise their full potential” (*Ibid.*, p. 34). The TEC acknowledged BAe’s efforts

in terms of the amount of training provided by the organisation, e.g. the annual number of learning days, that were increased to seven days per employee in 1996 (BAe, 1996, p. 34).

The measuring of health and safety performance 'confirmed that there were no significant instances of occupational diseases or ill health' in 1996 (BAe, 1997). In addition, "3,000 employees took part in health surveillance arrangements ... over 6,700 employees attended a range of courses covering such diverse topics as managing safety and substance abuse" (Carroll, 1996): People were encouraged to take formal education as distance learning students at all levels.

The above discussion suggests that three programmes were in place for employee development: PDPs, Open Learning (OL) and BPR related training. The training technique of BAe has also been applied by Surrey County Council successfully using PDP through one-to-one coaching and OL through electronic media (Jones and Tyson, 2002). The Employment Review found that PDPs are used for retaining employees in fifty organisations in the UK (Employment Review, 2000). PDPs and OL are useful initiatives because they provide every one with an opportunity to develop himself/herself at their own pace whilst continuing his/her job. Secondly, there are on-going programmes available to the company employees, one off training sessions were required to train people working or supposed to work in BPR teams. Training for BPR tools and techniques was a precondition for the success of it since most of the participants in BPR were basically engineers. Awareness of management concepts such as working in teams, was a prerequisite to be able to join a team. So training has also been provided to people who participated in BPR teams and associated processes. The content of the training revolved around team building, management and BPR tools and techniques i.e. process evaluation, measurement of NVA activities and so on.

Empowering people. Empowerment is the idea that "every member of a society or organisation is able to take control of their own destiny and realise their full potential. It involves giving more power to those who currently have little control over what they do

and little ability to influence the decision being made around them” (Brown and Brown, 1994). BAe aimed to empower employees in two different ways. Firstly, the teams working on the projects were made autonomous: they planned their activities, control budgets, managed risks and were accountable for their output. For example, “IPD is an empowered team that has the necessary authority to discharge all its activities and products” (BAe, 1996a). Secondly, re-engineering changed the way people used to work or changed the functions they used to perform. For instance, Corporate Purchasing Cards (CPCs) revolutionised the procurement of low-value items. The procurement was split into aircraft and non-aircraft goods and services; the latter were considered low-value items, for which CPCs could be used. Under the scheme MA launched the American Express CPC in March 1996. It was a charge card that was issued to employees responsible for ordering lower value items. The purpose was:

“Delegating responsibility and accountability to user departments within a process framework owned by purchasing, reducing bureaucracy through reduced paperwork, reducing the number of orders raised and subsequent amendments, paying suppliers within five days, improving management information, allocating cost collection numbers for each purchase” (Cotterill, 1996).

It involved 1,000 employees, 300 suppliers, 300 departments and made annual transactions of £18 million. It eliminated the need to process 50,000 invoices. This activity empowers 1,000 employees to purchase low-value items for their departments, as each CPC holder can order direct from the supplier without authorization or paper work. The supplier concerned sends a monthly statement of the items purchased, which is paid after reconciliation. During the first three months after its introduction, 200 users covering 70 departments were issued with the cards (Cotterill, 1996). A summary of measures taken to empower employees is shown in Table 5.2.

Table 5.2 Measures taken to empower workforce

<i>Key theme</i>	<i>Details of the measures</i>
Team related	Redesigning and implementation teams are fully empowered e.g. IPD teams.
Individual (Functional)	Introduction of corporate purchasing cards (CPCs) to purchase low-value items, people were given authority to hold a budget for the credit card system.
Improved communication	Direct communication opportunities provide more freedom to work freely i.e. e-mail.
Process related	Each process is linked to other processes to take benefit so that available information can be made use of. It increased process and business awareness.
Enhanced information	The workforce has a shared view of project status and business objective through the annual Business Plan and other sources

Source: BAe, 1992-97.

The essence of empowerment is to delegate the decision making capacity. This is who Peiperl view it (Peiperl, 1996). The company has delegated decision making at team levels and functional levels i.e. purchasing low-value items directly from nominated suppliers. Customer and suppliers were given access to company databases which enabled them to share information. Employees were also enabled to access an increased amount of information. Psoinos and Smithson found similar actions in a survey of UK manufacturing industries that empowerment relates to sharing of team leadership responsibilities, supplier and external customer management, product modification and development decisions and hiring and firing personnel decisions. The same survey found some differences e.g. problem solving, quality responsibilities, planning and scheduling of their work, equipment maintenance and repair (Psoinos and Smithson, 2002). However the differences are covered in the similarities; when a person makes decisions then he/she has to solve problems relating to that particular decision. So it encompasses

problem solving. It suggests that BAe empowerment initiative was instrumental to implement BPR and was in line with the industry norms (manufacturing).

Managers functioned as change agents who imported viable solutions from other businesses and fitted them into the strategy, objectives and resources of the company. There were some pockets of resistance at different levels of management; however, the majority of BAe's managers were in favour of the BPR initiative, and they extended wholehearted support for the cause of change. Ward is positive regarding the role of managers, he argues (Box 5.4),

Box 5.4 Role of management in change

The role of management is very important in the implementation of change. The first task of senior management is to demonstrate commitment and promote strong sponsorship on the one hand. On the other hand to persuade difficult stakeholders or the middle managers who are initially resisting some of the change to come through. Particularly in the early projects when there was no much awareness of what BPR was and when there was probably feelings of insecurity about the future of jobs, there was a pocket of resistance in the middle management. People may say 'I may lose my job as a result of BPR'. The word BPR was synonymous for 'Buzzword for Preparation of Redundancy'. There was a fair amount of resistance in the envision phase when the principles of new processes were designed. People were worried about their jobs, they have the view that if this vision was implemented then it might abolish my job, they used to say 'where is my job, it might not be there' because we were taking people from the functions to the team. People spent years and years to build up their jobs (in fact power) and working for it but one day they were told that your job is no more. So all the powers are gone abruptly. It is pretty understandable that people resist to defend themselves - their power, prestige and eventually their jobs (Ward, interview, 1997).

They trained and motivated the workforce to implement change. Middle managers sacrificed personal and organizational powers in order to implement structural adjustments in the new flatter structure. Moreover, they learned new skills and synchronized existing business with the new processes. Table 5.3 shows key themes associated with the contribution of management.

Table 5.3 Role of management in the change initiative

<i>Key themes</i>	<i>Related elements</i>
Initialise change	<ul style="list-style-type: none"> • Initiated the project • Visited other organisations to acquire knowledge of best practices in the industry or related fields • Co-ordinated the skills and calibre of external consultants • Synchronised existing business with the radical initiative concurrently
Learning	<ul style="list-style-type: none"> • Learn new skills (BPR techniques and methodology) quickly, efficiently and effectively
Support to employees	<ul style="list-style-type: none"> • Trained and educated the operational employees • Provided moral support and motivated employees to implement the change
Give up power	<ul style="list-style-type: none"> • Sacrificed their traditional positions, power and status to make the change happen

Reward and Recognition

Financial and non-financial motivators were in place to keep the workforce happy. For instance profit related pay (PRP) was one of them. The purpose has been described in two editions of the annual business plan. According to them:

For too long people have looked at reward in purely monetary terms. We want to encourage a broader view of both reward and recognition – there are so many ways in which we can address the need for both...the Profit Related Pay has been a good way of recognising and rewarding our performance. We want to build on that success and become a business which is used to saying ‘thank you’ and sharing success (BAe, 1997). Profit Related Pay (PRP) gives employees a real stake in the fortune of our company. When PRP was introduced in the early part of last year over 98% of MAD employees opted to join the scheme (BAe, 1996).

This is what the company wanted to do – involved people in a way, which created the ownership of responsibility rather than short-lived measures. Reward and recognition is important in BPR initiatives because Hammer and Champy advocated ‘focus of

performance measures and compensation shifts from activity to results and advancement criteria changes from performance to ability' (Hammer and Champy, 1994). Secondly a team based reward system was emphasised as against a traditional individual based system. However it does not mean ignorance of individual performers, they receive their prize according to their performance. The existence of two reward systems creates contradictions (Kerrin and Oliver, 2002). Team rewards are also considered significant motivators to accomplishing organisational objectives (Cacioppe, 1999).

Macaulay and Cook suggest that the success of a reward system depends upon 'taking time to clarify the aims of the scheme and ensuring there is a good "fit" through a full account of the organisational and customer context' (Macaulay and Cook, 2001), effective communication and feedback (Go and Kleiner, 2001).

This suggests a pretty positive picture of the reward system in the organisation but there was no specific reward system for working on BPR projects. Personnel were getting same amount of salaries and fringe benefits. The motivation was to learn more and work with people outside the usual jurisdiction. During interviews some personnel did express their desire to link a reward system with re-engineering jobs.

3.1.4 Other departments

Manufacturing and quality assurance (QA) also contributed in the design of the content of the change strategy because manufacturing is the fundamental business of the organisation and quality has to play a role in every aspect of the business in order to satisfy the customer. Therefore, it was proposed that manufacturing processes should be included in the change.

The process of design and manufacturing was split up into a series of small chunks called Ops 1 (operation 1), Ops 2, Ops 3 and Ops 4:

- concept (mostly paper work, Ops4);
- C scheme (certain level of design of the plane, Ops1);
- tools available (machines are in place to manufacture certain tools, Ops2);

- 1st article (the manufacture and production of the first prototype, Ops3).

Ward explains the rationale of these processes (Box 5.5).

Box 5.5 **The rationale of manufacturing processes**

The objective in re-engineering this phase was to reduce the number of first articles. Ops processes were part of a mega-operational process, so after a successful launch managers felt that the processes must be linked. An integrated view was necessary to gain the synergistic outcome of the effort. In 1995 a lot of work was done to integrate the processes, to bring Ops 1 and Ops 2 together into one continuous process. The arguments in support of integration were strong; for instance, the people in S&R have the view that if our IPL/IPC (illustrated product list/illustrated product code) were better and more available we could do our job lot better. As a result a team was given responsibility to look at the IPL/IPC process. The PC people had the view that if our bids were prepared better our job would be much easier than it is now. A good quality bid can also increase profit (Ward, interview, 1997).

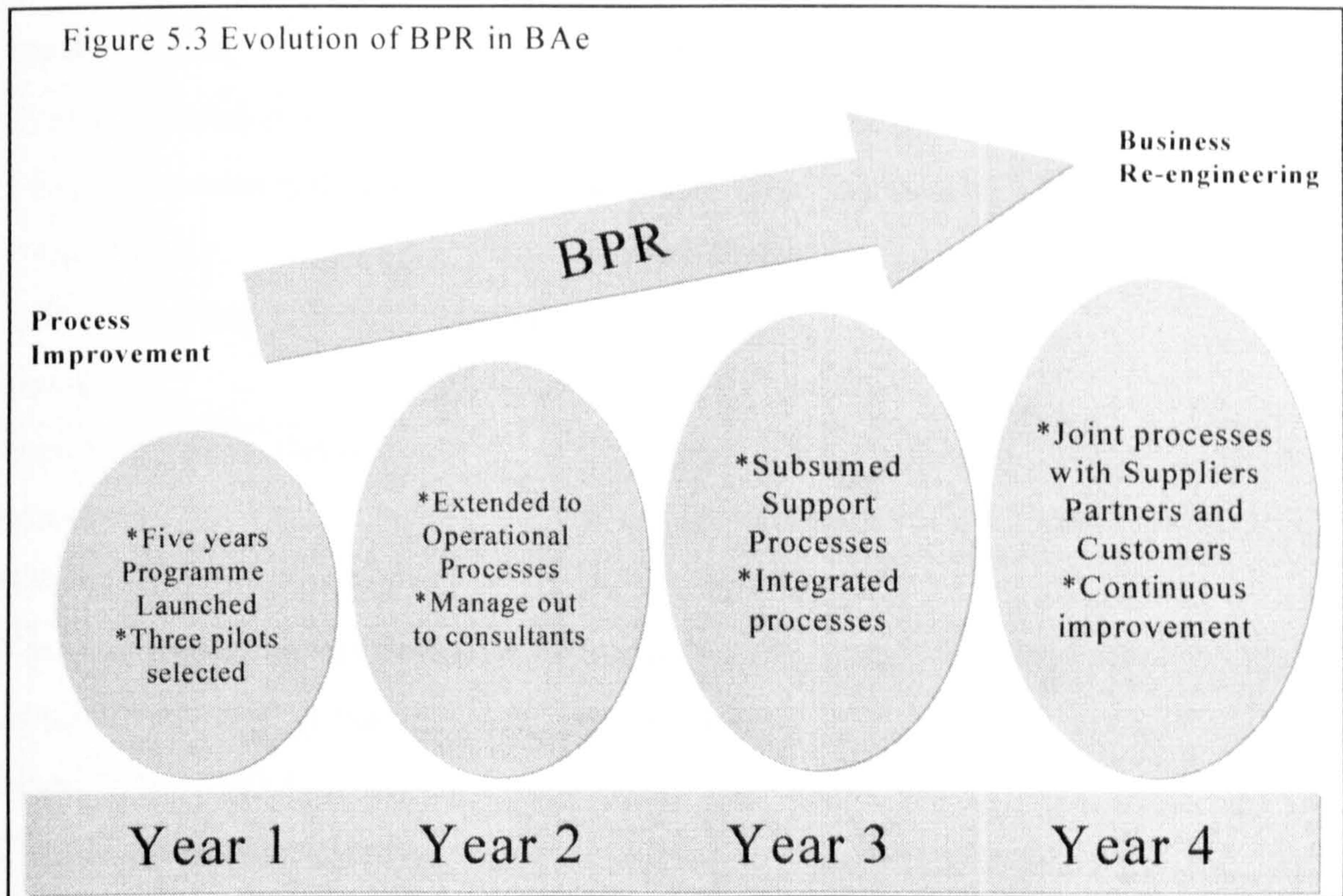
Manufacturing processes were augmented with support processes in order to widen the scope of BPR. Ward describes it in Box 5.6.

Box 5.6 **Support process and product life cycle**

In 1995 we started to look at some of the support processes in the business instead of co-activities again, e.g. QA and works engineering. The purpose was to build the infrastructure, manage energy on the site and made sure that basic services were in place. In this way we used to have three or four projects at a time in progress at different levels of maturity. The purpose was to support our product life cycle (PLC) at various levels of design and development. PLC consists of eleven integrated steps:

(1) Create the proposal, (2) negotiate the contract, (3) get the contract, (4) authorise the work, (5) define the product, (6) design in more detail, (7) propose production, (8) handle the product in the organisation, (9) build the aircraft, (10) deliver it, and (11) support the customer (Ward, interview, 1997).

In 1996 the company embarked on the change partnership. Ops4 was inaugurated as a joint-project with the French aircraft manufacturer, Dassault. With the passage of time and according to company requirements other projects were started (see Figure 5.3).



Among the support processes QA was important because it had to support every project so that a reliable product could be produced and quality can be maintained in other processes such as purchasing parts and equipment. The Evaluation report of QA describes the need and importance of the QA process. It reads:

The objective of the QA process was to keep step with improvements being made in operational activities (such as Ops 1, 2, 3 BPR work) which was one driver for re-engineering the QA process. An effective QA process would also provide a competitive edge to MAD – a customer is more likely to buy from a contractor who provides the greatest degree of assurance. The effectiveness of the QA process is therefore the main focus for the re-engineering activity (BAe, 1996e).

The quality vision and quality assurance vision was proposed which forms the quality strategy. It has been demonstrated in table 5.4.

Table 5.4 Quality vision and QA vision

Quality vision	Quality assurance vision
Quality ownership by all: 1 Process owners (process capability) 2 Process users (product/ service quality)	Assurance re-focused towards up-front activities (risk assessment, planning and fault prevention)
Quality control embedded in processes (Corrective/preventive action)	Customer focus through project quality assurance (contract review, assurance through the life cycle)
Focus on prevention not detection 1 Activities based on risk assessment 2 Planning to achieve quality 3 Quality engineering and fault prevention	Reduction in need for independent fault investigation)
Trained, competent and professional workforce (empowered, accountable)	Professional resources - key enabler
	Business value of QA widely understood and appreciated

Source BAe, 1996d.

The QA process supported both BPR and business in general. It created quality awareness and transferred responsibility to the processes. Other companies made changes in operations through quality measures. For instance, Leo reports “quality changed the entire operation climate in Xerox by giving employees an operational understanding of total quality and of the tools and techniques to implement it” (Leo, 1996). Quality in purchasing parts and equipment was transferred to suppliers in BAe. As a result customers can expect quality products and service. QA and ISFI processes

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- Maintaining schedule adherence
- Achieving lead time reduction
- Improving suppliers performance (BAe, 1997).

These objectives are cascaded down to *project level* (project means each of the aircraft manufactured) goals on the annual basis. For instance short-term and long term objectives of Gripen were expressed in the following words:

The team will continue to actively pursue sales prospects, and anticipate submitting a number of responses to customer requests for information and proposals in 1997 with the aim of achieving a launch order during 1997/8... A series of time critical development activities will commence in 1997 to protect the ability to deliver and support the export standard of the aircraft market... A team will focus on exploring ways to significantly cut all aspects of the aircraft cost in order to further enhance its competitive position.

Long term sales opportunities continue to look good with customers who typically now operate Mig-21, M5 and Mirage III. Following a first order, some further production transfers to Military Aircraft are anticipated. Joint technology development programmes will continue to maintain a competitive product and support new product development (BAe, 1997).

BPR level objectives. BPR was launched to enhance operational efficiency so that project and strategic objectives could be met. Since the bottom line needs more specific targets in order to measure the success in quantitative terms, BPR was given clear statistical objectives in three areas:

- costs reduced by 30%;
- cycle time improved by 50%; and
- schedule adherence to be 100%

Tony Ward argues that the grand objectives of BPR were to improve performance and involve people (Ward, interview, 1997). However, each BPR process was assigned with its own objectives in order to contribute towards overall goals. The Spares & Repairs (S&R) process was aimed at 'to provide a profitable spares and repairs service to achieve effective supply support to our customers' (BAe, 1993), QA was supposed to

convert uncertainty into assurance (BAe, 1996e), Procurement was directed to 'the acquisition of aircraft and non-aircraft goods and services in line with customer required-by dates at the optimum price and consistent with the required quality' (BAe, 1993c). However, each project has to achieve the statistical objectives, which were also known as 30/50/100 formula.

Analysis

The company set strategic objectives to inform employees and, in fact, customers and competitors that the management was ambitious to achieve impressive goals despite difficulties in the marketplace and the adverse political scenario. It was a clear sign of the company determination and commitment to remain a key figure in the industry as it increased its order book to about £5bn. It forced project managers to enhance their objectives in order to comply with strategic goals. As a consequence, they started to 'think big'. Since BPR works across projects the 30/50/100 formula enhanced the capability of projects in order to achieve their objectives. It suggests that strategic and project level objectives were embedded in BPR objectives which forms a web of interdependent goals for all levels of management. It gives a compact picture to management of what is to be achieved and by what channel. At the BPR level scholars suggested a range of objectives. The objective of process innovation is to optimise performance (Davenport, 1994; Hammer, 1995); to improve cost, quality, service and speed (Hammer & Champy, 1993); to maximize effectiveness, efficiency and adaptability (Harrington, 1991).

Reduction in cost and improvement in cycle times were imposed by management in response to market pressure as high cost and long cycle times increased total production cost. It could force management to increase the price of the product. Expensive products were difficult to sell. The schedule adherence is one of the key requirements of the company customers. There were some delays in the delivery schedule, as a result 100% schedule adherence was set a key objective for BPR projects. Management had to concentrate on schedule adherence in order to keep customers happy. The schedule

adherence was an externally imposed objective. However it was not an unusual phenomenon because Johnston et al argue that BPR targets were usually based on external sources (or benchmarks) (Johnston et al, 2001). In the BAe case, the company had no alternative but to impose it in order to fulfil the requirements of its customers.

BAe *assumed* many things in connection with BPR. Re-engineering was interpreted as a new change initiative because the company had tried many other programmes but they were unsuccessful and were abandoned. The novelty was in terms of a management techniques and a change programme at the same time. Secondly, although IT was an enabler the role of IT was cautious or limited at least in the early projects. The initiative was business driven rather than IT driven. Thirdly, people assume that BPR can be built on the existing infrastructure rather than as a 'clean slate' approach. Fourthly, it was a gradual change or 'patch up work' rather than a 'big bang' one off event. Fifthly, people were expecting a step change in performance rather than incremental improvements. Sixthly, it was interpreted as a democratic way of change where a lot of people were involved. Seventhly, people recognised a cultural change that was lasting and created far reaching impacts on the way people used to work. Finally, the programme was a low profile initiative as the company had launched many other programmes but they were unsuccessful and had been abandoned. Management wanted to launch BPR as a low profile initiative so that in the event of failure, people did not get fed up with change programmes.

4. Sources of competitive strategy

Pettigrew et al view the origin and sources of the strategy vital in order to link it to the conditions under which the strategy is to work (Pettigrew et al, 1989). Obviously, BPR came from North America. However, it has been widely scrutinised and critique were written in the UK. A lot of UK companies experienced BPR and many of them were successful. Price Waterhouse found 69% of UK firms in 1993 undertaking some form of BPR, later on another survey reported 59% of organisations planning or doing it. 'The real take off point for BPR in the United Kingdom would seem to have been 1993/94 when 65% of BPR programmes in our sample began' (Willcocks, 1995). BAe launched

it in these days when it was gaining popularity. Nevertheless, most of the redesigning ideas were borrowed and modified to suit with the organisational circumstances. For instance, Ward compares the practices of top flyers and BAe in an attempt to justify the need for change. He argues: (Box 5.7),

Box 5.7 BAe and BPCs in action

As a part of re-engineering, it was decided that best practice companies (BPC) should be visited in order to know the leading examples of the processes concerned. In connection with the S&R process the company came to know that BPCs have got a single process owner whereas we were doing it in individual functions such as purchasing, finance and technical. The process owner had the responsibility to order the goods and send them out. So rather than a lot of functional involvement on the bits of the process one person was in control of the whole process. Secondly BAe had primarily people operating things in a single function. The BPCs have multi-functional teams working together e.g. finance, supply, contract etc. There was a lot of paper work involved in processing a customer order and it used to take days. The Best Practice Companies process an order overnight, they translate the order to a supply source (own factory or other supplier) overnight and without any paperwork - paperless.

We have a similar procedure for answering customer queries, if a customer has a problem, he rings to somebody, he replies 'I will get back to you', then he makes a search for the person who can answer it or where is it. On the contrary in the BPCs the customer dialogues into one of the systems. As we have a lot of IT systems e.g. finance, purchasing, suppliers, customer support, people had to transcribe data between the systems, which is obviously time consuming and complicated. The BPCs had one IT system. There was a big gulf between BAe and BPCs (Ward, interview, 1997).

In short, the BPCs have a single process owner, multi-functional teams and customers have access to company databases. The company had closed the gap significantly between its practices and the BPCs with the implementation of BPR. It suggests that the source of the strategy was imported from North America or borrowed from BPCs within the country.

Role of consultants. Another element in the strategy formation was the *role of specialist advisors* e.g. consultants. The radical change was brought in through Price WaterHouse (PWH), a well known consultancy firm in the UK. They were brought in during 1993 and returned in 1995 as soon as BAe trained its own people to manage the change as Ward describes (Box 5.8):

Box 5.8 Methodological self sufficiency

The programme was started in 1993 with the help of a consulting firm called Price Water House (PWH). There were three consultants and a managing consultant in the organisation. Four or five were working during 1994 however the number was reduced to one in the next year and we were operating independently since the end of 1995. We had hired some part time local consultants who were cheaper than PWH people. In addition local people were trained in methodology but the work load did not reach the level where they could be used. 'The rate of work was far more gradual than we thought. The teams we had were enough to cope with it without external help' (Ward, interview, 1997).

Ward admires PWH for the way in which they inducted the philosophy of change. He says (Box 5.9),

Box 5.9 Role of consultants in change

PWH was a very good organisation that had a variety of consultants...PWH had got a number of strengths. For example, the consultants did not do the work but they facilitated the teams, they gave BAe teams a road map (process) that they could follow. They used to train teams in the technology of the process and facilitated the application of the change throughout the programme. They were very much experienced in change. They declare from the beginning that they believe that the process and what they do was transferable into the organisation. I was brought in in 1994 with the objective that the dependence on the consultants must be minimised. Due to this objective we had only one consultant in the first half of 1995. We need this person in manufacturing expertise in addition to BPR. Thereafter we operate independently.' (Ward, interview, 1997).

Although consultants played a vital role in the formation of the strategy, customers, employees, suppliers and partner companies offered their advice and requirements. PIT for IPL/IPC reports that it formed the 'TO BE' vision with the help of employee suggestions, best practice visits and customer workshops (BAe, 1995b).

Fincham reports a rich picture of the consultants role in change: they provide valuable methodologies, give structure to the project and give background from other companies (Fincham, 1999). "They supply not only a measure of enthusiasm and inspiration for the managerial crusade, but also the mechanisms and how-to procedures with which ambitious goals can apparently be achieved" (Fincham and Evans, 1999). The 'consultancies not only have managed to develop successful survival strategies, but also played an important role in the dissemination and translation of new management

knowledge' (Cristina and Matthias, 2001). However, critics argue: 'that the very act of consulting an external expert implies an inadequacy in the client's own understanding...others have stressed how consultants trade on the rationality of appearances (scientific methodologies, practitioner competence) yet there was little in the way of objective means for judging their knowledge and solutions (Fincham, 1999). The head of BPR in BAe was also concerned regarding the role of consultants, he argues (Box 5.10),

Box 5.10 Experience with consultants

Unfortunately the company had a bitter experience with consultants in the past, they cost a lot of money and nothing used to happen. For example, BAe has hired a company called URG, they came to one of our sites and worked with teams and tried to map processes. Six of them came in at very expensive rates. A lot seemed to have happened but when they left nothing has happened. Consultants take a lot of time doing indirect work with senior stakeholders rather than with the team who were working on the task. They always keep visible at senior level/management in order to get more business. They told more people what they were doing so that more people aware of their presence. This was one of the reasons that a number of people had suspicious about the role of consultants and the change programme (Ward, interview, 1997).

Some times the presence of an external consultant is interpreted as another breed of managers. Fincham views it as a presence of parallel management (Fincham, 1999).

Analysis

From these evidences it can be concluded that many internal and external parties participated in the formulation of strategy. Consultants were called to initialise the programme and other actors helped to configure the change strategy. Consultants were essential to start the initiative but were soon replaced because BAe was cautious about the role of consultants. However, some times the presence of an external consultant is interpreted as another breed of managers. Fincham views it as a presence of parallel management (Fincham, 1999).

5. Evaluation and measurements

Pettigrew et al suggest that the fourth vital part of the strategy is to find a way to evaluate alternatives and how the strategy would be implemented (Pettigrew et al, 1989). Objectives are the yard stick to measure the success of an initiative, project or process. A set of the company objectives has been pointed out in the previous section and the way by which these objectives were supposed to be met was implicitly outlined. Some of them were subjective such as customer satisfaction and others were objective e.g. 30% reduction in cost.

Having analysed the company strategy and its objectives, three levels of measurements were found: company wide, project wide, and process based. BAe had a mission to achieve: to be number one in Europe and world leader in the Military aircraft business. It can be measured in terms of total sale, increase in sale or order intake; it determines the relative position in the industry. For instance, the company was the sixth aircraft manufacturer in 1993 in the world (BAe, 1993). So the first measure of success was the amount of sale and order intake.

At project level, the measure of success was the achievement of targets and the contribution to total sale or overall revenue. For example, the long term targets for Hawk aircraft is to gain orders up to 150 pieces by the year 2000 (BAe, 1996).

At the BPR level, cost, cycle time and schedule adherence were the measures of success for each process. Changes in culture, structure and distribution of political power were subjective measures. The company was expecting to achieve quantitative as well as qualitative expectations due to the induction of this particular change. Besides this each of the BPR processes were expected to contribute in a certain area of business e.g. S&R was aimed to enhance relations with suppliers. So S&R's metric was to establish cordial relations with suppliers. In order to achieve that key performance measures for the project were established in the evaluation report. According to it, the process will meet:

- Business plan objectives
- Continue the drive to achieve customer satisfaction

- Improve efficiency and quality
- Develop the full potential of the people to maximise individual contribution to the business
- Meet the requirements of the profit plan (BAe, 1993b).

The story of performance would be incomplete if Critical Success Factors (CSFs) and related Key Performance Indicators (KPIs) were kept aside. BAe introduced this concept in 1993 when each of the nine CSFs were associated with KPIs as shown in table 5.5.

Table 5.5 Critical success factors and their related performance indicators

Critical Success Factors (CSFs)	Key Performance Indicators (KPIs)
1. Reduction in cost	Reduction in labour and overheads Material and equipment per product Capital expenditures
2. Management of information	Timely Accurate Relevant
3. Performance	Man hour spent Lead time, work in progress and stock Query notes will be answered within 2 hours Spare's lead time will be reduced to 6 months from 9 months
4. Quality	To achieve ISO 9001 Establishment of project quality measures and functional quality measures
5. Technology	Development of key product technology Validation and exploitation technology
6. Wider product base	Development of next generation transport, combat and training aircraft Development of collaboration
7. Exceed sales forecast	To increase sales of different products
8. Improvement of suppliers performance	Key equipment suppliers Delivery of equipment to specification

	<p>Reduce number of suppliers</p> <p>Reduce purchasing costs</p>
9. Customer satisfaction	<p>They will have direct access to One nominated DMC member</p> <p>Conduct of a customer satisfaction survey</p> <p>Establishment of service targets in service and support areas</p>

Source: BAe, 1993.

Implementation. The last aspect of the content is the way in which the strategy will be implemented. Implementation as a part of the process will be discussed in the next chapter, however, it may be kept in mind that each 'TO BE' report suggests guidelines to implement the process. For instance Credit card concept for purchasing low value goods needs the following steps to implement it.

- Assemble multi-functional teams
- Issue implementation plan
- Vision presentation to certain user departments
- Select user for pilot study
- Negotiate with credit card company and main suppliers
- Write detailed operating procedures
- Write training manual
- Agree performance standards and measurement criteria
- Familiarisation training for C&O, Finance and Goods Receiving
- Train end-user departments
- Pilot study
- Monitor/audit/Problem solve
- Report
- Phased roll-out (BAe, 1994d).

Analysis

The main theme of this section was to describe key performance measurement indicators. Kuwaiti and Kay argue that a performance measurement system is a prerequisite for a BPR initiative (Kuwaiti and Kay, 2000). Recognising this argument, the three level performance measurement system adopted by BAe was an appropriate approach. The strategic and BPR measures are common in those organisations which initiate re-engineering programmes. Since BPR is a strategic initiative it needs a place in the strategic portfolio of the organisation concerned, or more precisely in the strategic performance measures. Secondly, BPR level measures are also necessary to gauge the performance of change itself. However, project level measures are associated with those organisations whose products are of a high unit value such as BAe. They set product or project performance measures in order to examine the performance of each project under way.

6. Summary and conclusion

The content of the change strategy is based on the context, objectives and issues identified or present in the organisation. The content is also linked with the desire of the management, like 'where we want to be'. In addition to the characteristics of context and objectives of the change initiative, a series of issues were found during benchmark visits, customer requirements capturing, employee suggestions etc. such as data integrity, 'cold war' with suppliers, customer under-satisfaction, process ignorance and cut throat competition. Management was keen to lead the industry and Europe in the aircraft business. These issues could be achieved through a competitive edge. There were many alternatives available to create the competitive edge e.g. technology, partnership, down sizing, internal efficiency improvement etc. BPR offered to put most of them together for the management in an attempt to cut cost, reduce cycle time, attain schedule adherence, improve quality, neutralise structural imbalance, enhance customer satisfaction and ultimately improve competitiveness. The issues were grouped under organisation wide, project based and process oriented.

The company was restructured and a number of strategies were in progress at the inception of the radical change initiative: CQI, PROSPER 2000, investment in infrastructure, managing by CSF and people's change strategy.

Information Technology, Human Resources and Marketing were the main contributors to form the content of the strategy because the idea of BPR was put on the table by IT and Personnel people and marketing was another key enabler to operationalise the change. Thus these departments were in the forefront to design and implement radical solutions to chronic problems such as hierarchical structure.

Marketing efforts were concentrated on winning orders, introducing new products, satisfying the customer and creating cordial relations with suppliers. The task of IT was to integrate data and systems, speed up query procedures for the customer, partners and internal customers. IT was supposed to enable external parties to access company systems, increase the use of technology within the organisation and support processes and projects. Personnel was supposed to develop people so that they could assume new responsibilities, involve them in an attempt to exploit their full potential and motivate them to keep serving BAe. Another aspect was to empower or liberalise them to work freely and laterally. It also enhanced communication and reinforced the reward system. In short the contents were associated with context, issues and organisational objectives to improve competitiveness.

Achievement of leadership in the industry was the fundamental strategic objective. The second level objectives (short-run and long-run) were given to products. Since the company manufactures a few products therefore each product or project was assigned its own goals. Management decided to achieve product goals or to enhance performance of these products through re-engineering which was given its separate objectives/targets. Basic objectives for BPR were performance improvement and involvement of people. In addition, reduction in cost, reduction in cycle time and schedule adherence were quantitative objectives for each BPR process.

Change agents assume several things about BPR and its implementation such as BPR is a new change technique, the moderate role of IT, 'clean slate' is impracticable, it was a piecemeal change etc. Consultants played a significant role in implementing BPR and helped to transfer change management knowledge.

BPR was the result of a research programme initiated in MIT to identify the role of IT in the 1990s. Hammer and Davenport integrated the elements of re-engineering in the early 1990s. Hundreds of companies in the UK and Europe implemented fundamental concepts of it. Some basic assumptions were challenged and modified according to local requirements such as centrality of IT and clean slate or start over approaches. However, principally the idea of BPR was a foreign commodity which was refined here and adopted widely. It implies that the sources of the strategy were more or less foreign. Nevertheless, concerns about the source of the strategy were not considerable because British companies adopted the radical change approach at large and without any significant implementation barrier.

The final element in the strategy is the system of evaluation and measurement. Strategic objectives were measured on an annual basis e.g. total turn over was shown in the annual report and annual business plan. Project targets were also measured on an annual basis and new targets were determined. BPR goals are defined at the inception of every process and the success is measured after implementation.

From these finding it can be concluded that:

- There were several change initiatives in progress prior to the inception of BPR.
- Core functions such as marketing, IT, personnel and manufacturing contributed positively to make the change happened.
- Strategists divided objectives into several categories: strategic, project and BPR.
- Change agents were defensive in terms of assumptions and expectations.
- The sources of the strategy were foreign.
- The role of specialist such as consultants was significant in the introduction of change.

- Strategic and operational measures were in place to measure the success of the change.

Previous initiatives are important to implement BPR because they serve as pilot projects in change where some kind of work has been done in order to roll out or institutionalise a relatively bigger endeavour. SBAC reports that successful organisations exhibited an involvement in previous change initiative (SBAC, 1995). Secondly BPR united most of the change programmes, which were running relatively separately in the organisation. For instance Continuous Quality Improvement (CQI) was replaced with a new process of Quality Assurance, and people change strategy was merged with BPR.

However there were loads of serious issues to be resolved despite these strategies being in place. This means they were not producing the desired results or were the only strategies in the beginning and needed time to show outcomes i.e. people change strategy.

Core functions such as marketing, IT, personnel and manufacturing contributed positively to make the change happen. The idea of re-engineering was advocated by IT and personnel people and marketing was instrumental to achieve strategic goals such as an increase in sale and achieving competitiveness. IT was in the forefront because most of the re-engineering concepts were developed by IT specialists or consultants and it was a major enabler in the programme. Personnel saw it as an opportunity for organisational development. Manufacturing was a major beneficiary from the change because it was fully redesigned and every process was enabling it directly or indirectly. Finance provided the resources required for implementing change.

Strategists divided objectives into several categories to increase the focus of all activities such as strategic and re-engineering. Strategic objectives such as the management's desire to lead the industry were ambitious and commensurate with radical change philosophy. Although the objective was ambitious and was set prior to the BPR initiative it was capitalised partly through re-engineering. Operational objectives were similar to

other flag bearer of BPR but were more focused towards weak areas in the organisation. Most of them were achieved as a result of BPR initiative.

Change agents were defensive in terms of assumptions and expectations. Since the organisation experienced a number of failed change attempts the internal change agents were cautious about the role of IT and propagation of the initiative. The programme was started silently and as a 'patch work' rather than a 'big bang'. However, as soon as the pilot projects seemed to be successful, the change was extended to the whole organisation and gradually out of its boundaries i.e. partners, customers and suppliers.

The sources of the strategy were not indigenous because most of the re-engineering work has been done in the US. It was an innovation, so innovative work can be done anywhere in the world. However leading local scholar have contributed positively for the advancement of BPR in the country such as Earl, Galliers, Willcocks, Mumford, Joe Peppard, Checland etc.

The role of the specialist was significant in the introduction of change. The idea of BPR was put into action by the consultants and they were offering special knowledge and the know how necessary to introduce step changes in the performance. Nevertheless, the company got rid of them in the second year of progress and became self sufficient. The company had a bitter experience with consultants in the past thus company personnel were trained in order to replace external consultants.

Strategic and operational measures were used to assess the success of change. It formed a multi level performance measurement system. BPR objectives were separate from project and high level objectives because management wanted to measure BPR success on one the hand and project success on the other. In fact BPR objectives - cost cycle time and schedule adherence – were applicable to projects. Reduction in cost was made in each of the projects. similarly schedule adherence and the reduction of cycle time has been designed for all projects.

The chapter provides an understanding of the elements of the strategy within its context, objectives and issues in order to initiate process of change, which is the subject of the next chapter. This and the previous chapter together form the knowledge base on which process can be started.

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Chapter 6

Process of the strategy

1. Introduction

The previous chapter has discussed the changes made in various aspects of the organisation. These changes were based on the contextual characteristics of the company, issues and objectives. This chapter explores the way in which those changes were made. Pettigrew and his colleagues (1989) suggest a number of items to be included in the process: triggers for change, management process and actions, implementation process, availability of technology and time frames for change. Triggers for change are important in order to know why change was made and when it was sensed. For instance, BAe sensed a need for change due to economic and political changes in the early 1990s and low productivity due to technological or methodological obsolescence. It caused increased cost, high cycle time and lack of schedule adherence. Management process and actions include who were the change agents, what were their decision patterns, what model of change they use and how they have managed context. For example, the mix of change agents shows the level of support, and the initiative received in the organisation. Understanding the implementation process is important in order to understand what was the relation between context, content and the process itself, what management style was in place during the change process and whether the importance of organisation learning was felt. It also demonstrates the procedure involved in the implementation and the way the progress was measured and evaluated. The implementation process reveals the key enablers in the initiative. Availability of technology is the key to explore the technological support and its exploitation both for the change programme and BAe as a whole. Understanding the time frames involved helps to know the length of time involved in each of the implementation phases and the entire change project.

The chapter has been divided into seven sections. The second section deals with drivers for change such as external drivers (the contextual conditions) and internal

drivers (cost, cycle time and schedule adherence). The third section is reserved for the management process and actions e.g. kinds of change agents involved, their decision pattern, the models of change they have applied and the way they have managed the context. The fourth section is aimed at seeking a relationship among various elements of change: context, content and process. It also examines the eminent styles of management, organisation learning, its mechanism and phases of implementation. The fifth section explores the availability of technology to control and manage the course of change. The sixth section looks at the time period involved in the change as a whole and each of the phases involved.

This chapter provides understanding of the processual elements of the strategy employed to make the change happen, such as reasons for change, change agents involved, decision patterns, theoretical models applied and strategy for managing context. It shows the relationship between context, content and process, managerial styles (autocratic or democratic) and learning process. The chapter also completes the series of three chapters started from chapter 4 and, in fact, the elements of Pettigrew et al's (1989) model for strategic change. This block of three chapters provides the basis on which the conclusion will be drawn in the next chapter.

2. Triggers for change

The contextual elements discussed in chapter four were the principal triggers for change such as competition, dwindling aggregate demand, poor productivity, traditional culture and structure. Some of them were internal e.g. productivity, culture and so on and others were imposed by the external condition within which the company operates such as competition, changing political environment and reduction in demand. Apart from these high level drivers, business processes had their own drivers e.g. the team leader of Ops 4 process argues about drivers for his process (Box 6.1).

Box 6.1 Drivers for ops 4

The drivers for other OPs projects were affordability and cost through reduction in manpower and time-scale. However, time scale was not a major driver or constraint because the time scale between one generation of aircraft and the next varies from ten to fifteen years e.g. ten years was between the Tornado and Euro fighter and may be 15-20 years between the Euro fighter and the next generation aircraft. So time is not a problem in the predevelopment process. We actually need to cover a wide range of possible products or concepts looking for different options...affordability was the main driver for the process (Kaye, interview, 1997).

Since the change was divided into small chunks called processes in order to introduce change gradually, there were different drivers for each of them on top of strategic drivers sensed by management prior to the change.

Hammer and Champy (1993) identified three types of companies which could embark on re-engineering: companies in deep trouble, companies facing trouble and ambitious companies. The triggers for the first type of company range from comparatively high costs, under-satisfied customers and high product failure rates. The triggers for the second type of company include new competitors changing customer requirements or characteristics, and a threatening regulatory environment. The third type of company seeks market leadership or to maintain its leader position. BAe can be placed as a company of the second or third types. It was a leading defence organization in the international community but was confronting numerous challenges at the beginning of 1990s. The challenges were internal as well as external. Internally, there was strong demand to increase productivity, get overheads down and reduce the layers of management, involve employees, simplify/re-engineer processes and out-source some functions. On the external front, competition was tough and getting tougher; market was more transient; the competitors learnt faster; margins were reducing and, shareholders were more demanding; customer expectation was rising, technology was becoming outdated faster, and aggregate demand was shrinking since the end of the "Cold War".

The triggers for change were internal and external. The internal drivers such as high production cost compared to the low cost of other companies, was a comparative

phenomenon. BAe did not know whether it was producing at a high cost until benchmark visits of other companies took place under the process redesign scheme. Similarly the management did not practise the working of the credit card system for purchasing low value items prior to best practice visits. The BAe workforce was not empowered as compared to an IT and an Automobile firm (See Table 6.2 below). So high costs, employees powerlessness and use of a credit card has become drivers for BAe change programme. The external triggers were common in the defence industry because the political scenario changed. National or international political changes were not in the control of the company but they were triggers for change because BAe had to respond to these changes to protect its interests. For example, the big competitors acquired small companies or merged with each other so that resources could be combined and the competitive position could be improved. This forced BAe management to respond; they adopted partnerships with aerospace companies as a way of gathering strength to compete in the market.

Section analysis

The contextual factors were the result of environmental changes in world politics and consequent pressure on the defence market. BAe was not alone in this particular external threat since other companies were feeling similar pain after the end of the Cold War. It has been indicated in chapter four that major manufacturers of defence equipment suffered from this shock at organisational and national level. On an average 35% of the demand for such products was reduced straight away in the early 1990s (See chapter 4 for details). Consequently, the affected companies adopted restructuring and partnership. Bishop and Williams argue “indeed changes in the defence market have prompted significant restructuring” (Bishop and Williams, 1997). BAe applied restructuring prior to re-engineering, however this did not show a significant result which opened the door for BPR to be considered as an alternative.

In connection with the drivers Plaut identified many similar drivers for change associated with the contextual characteristics of BAe. For instance, mergers and acquisition and undertaking BPR programmes (Plaut, 2002). Myers and Smith found

customer satisfaction, cost reduction and quality improvement as key drivers for a BPR initiative (Myers and Smith, 2002). Although Myers and Smith's triggers were implied drivers in the change they were principal objectives of many business processes, which were redesigned under the banner of re-engineering. This suggests that BAe's drivers for change were similar to other players in the field however the real question was how did BAe address them. In the following paragraphs the researcher will examine this question.

3. Management process and actions

Pettigrew and his colleagues (1989) suggest a number of questions regarding change agents as a part of process of change. These questions led to understanding the change agents, how they have perceived the situation (context), what models of change they have applied and what decisions were made according to that situation. The questions include all but the following:

1. Who are change managers/groups? (Dependent on a few people or coalitions)
2. What are decision arenas - formal and informal decision-making?
3. What models of change govern the conception and implementation?
And how appropriate are they to the context in which the firm operates.
4. How has the management managed, attempted to manage the context and process?

The purpose of these questions was to conceive strategies and put their competitive objectives into operation/actions. It also generates a relationship between management and its strategies (including models of change) to manage the context/process and decision-making process. For instance, a process redesign team (PRT) (as a group of managers) redesigns a process through a series of steps on the basis of best practice norms in order to resolve issues identified in the context

(process context or company context or both). This example encompasses most of the questions raised above. However, these will be discussed in more detail in the following paragraph.

3.1 Variety of change agents

Five groups of change agents managed the process of change: senior managers or DMC members including the one who was responsible for re-engineering the processes, project management team, BPR department team, process improvement teams (PITs) and external consultants. Ward describes the structure in more detail (Box 6.2).

Box 6.2 Change agents and management of BPR process

The QA director was a very experienced person with a blend of technical and personal capabilities to his credit. He ran a site in Kinston and closed it successfully. He was very experienced in change as well. He was promoted to DMC level, during the course of 1993, and was given the technical responsibility to bring the BPR in. He managed our relationship with the consultants and set up a BPR steering board at senior level. It consisted of some DMC (Divisional Management Committee) members from IT, personnel and finance... Other members of the board include directors of production, technical, customer support and purchasing... At the next level we had the project management teams that were chaired by the director of quality assurance. It consists of project team leaders as they grow and representations from IT, personnel and finance. The numbers of project team leaders vary from one to five according to the number of projects in progress. The project management team used to meet monthly and responsible for making sure that the projects are well resourced and working according to specifications. It also monitored the quality of what is coming out of BPR projects in terms of better reports before they went to the steering board (Ward, interview, 1997).

The director of QA was the head of the change initiative and was managing BPR steering group. The steering group/board was monitoring the process at the high level as it consisted of DMC members (DMC is the top management team in the organisation headed by a managing director) and members from Personnel, IT and Finance. At the operational level, BPR departmental team and PITs were involved.

The BPR department team comprised of three members and a head and was responsible to training people in the process and PIT members regarding BPR tools, techniques and methodology through workshops and presentations. PITs were managing a different phases of change: process evaluation, process redesign, implementation and so on. Apart from these internal arrangements, external consultants helped initiate this programme. Ward tells the story in the following words (Box 6.3).

Box 6.3 Consultants as change agents

The programme was started in 1993 with the help of a consulting firm called Price Water House (PWH). There were three consultants and a managing consultant in the organisation. Four or five were working during 1994 however the number was reduced to one in the next year and we have been operating independently since the end of 1995. We hired some part time local consultants who were cheaper than PWH people. In addition local people were trained in methodology in case BAe needed them but the workload did not reach the level where they could be used. The rate of work was far more gradual than we thought. The teams we had were enough to cope with it without external help (Ward, interview, 1997).

It implies that the consultants were in the forefront at the inception of the programme but they gradually transferred the knowledge to the company personnel who took charge of the transformation later on. Company partners, suppliers and customers also participated indirectly in the change (See section 4.4 below for a detailed discussion of these parties).

The management structure was commensurate with the norms of those companies who were involved in the redesign of their processes. Since the top management's support was a critical factor in the success of radical change, the involvement of senior managers ensured their support. Positive feedback from the re-engineering work strengthened it with the passage of time. Moreover, buy-in for the new BPR projects was relatively easy because they were constantly monitoring the progress of the initiative and realised the need for improvements in various areas of business activity. Senior manager's support was even more important for the kind of initiative

BAe had undergone i.e. the change was gradual, patch-work quilt type approach. Where senior managers' buy-in was required almost continuously - new projects used to start after an interval of 3-6 months.

Change agents at operational level were also appropriate for the initiative because members of the departments involved were taken into the process improvement teams in addition to the IT, finance and personnel. Nevertheless different teams were used for process evaluation, redesign and implementation, which caused problems in the co-ordination of processes in the later stage of the programme. The change agents were a coalition of several management groups and related parties. It enabled them to design and implement a balanced but holistic change in the organisation.

3.2 Decision pattern

Decision making in the transformation process was negotiated and seemed democratic. For instance, the teams responsible for evaluation of the processes conducted challenge workshops and reality checks. In the challenge workshops the contents of a process were negotiated by the participants (PIT members, personnel from the department involved and senior managers). The following extract from the evaluation report of a process high-lights it.

A "challenge Day" was organised on 31st August 1993, in order to ensure

- Each sub-process was representative
- All processes linked correctly
- Any omissions were identified
- Levelling of details between each process

Senior managers and representative from each area were briefed on the Project, the progress to date, and were then invited to scrutinise "their" Level 3 process in particular and the Level 3 end-to-end process in general. A wash-up session was then held in which attendees were invited to undertake an assessment of:-

- Strengths
- Weaknesses
- Enablers

- Barriers

with the team members acting as Facilitators.

No major problems or omissions were identified within the Level 3 process and following some minor clean-ups of interfaces, Senior Management expressed themselves satisfied that the end result was a Level 3 process to which they could sign up (BAe, 1993b).

This suggests that negotiation was made by senior managers, PIT members and departments involved in the process. Negotiation was made through 'clean-ups' and 'scrutinising' exercises. This process continued at the PIT level when key decisions such as the definition of value added were made. The same team says, "Considerable team discussion took place upon the interpretation of 'value added'. The consensus of opinion was that 'VA' should be interpreted as 'what the end customer pay for it' (BAe, 1993b).

The decisions were made by a top-down pattern. Two examples were quoted by PIT of the S&R process, the report reads:

The DMC Steering Committee nominated the Customer Support Department as the area for the launch of the 1st pilot scheme; which was initiated with the formation of the Spares Support Project Workshop on 21st July 1993...The DMC has authorised the Project Management Team to proceed with Phase 1 – evaluation only. This directive has been passed to the Spares Process Transformation Team (BAe, 1993b).

In the first instance the customer support department was 'nominated' and in the second DMC have 'authorised' the project management team to proceed further. It implies that departments or areas for improvements were selected by DMC and authorised to proceed for the first phase of the process. It seems an authoritative style of decision making (management) in the first instance but the DMC steering committee was the senior management group who was responsible to look after the change process. As a senior management entity in the organisation, its approval was not a symbol of bureaucracy but an indispensable requirement for the progress of radical change. Since BPR requires patronage of senior managers (BPR steering board) the decision pattern was appropriate with the requirements of the change.

Quick response was not a question at that stage of BPR but support of senior managers was most important. The BPR steering board was composed of senior managers who had guided the change programme all the way from 1993 to its completion. Other teams of various processes such as PIT, IPD and process implementation teams were independent in decision making. They were hardly consulting anyone in their day-to-day activities. It has been argued in the previous two chapters.

3.3 Models of change in use

Three models of change have been found from the analysis of data: delta analysis, force field analysis and system theory. Delta analysis assumes that there are two states in a situation: the present and the desired. A state of change occurs when the present state is converting into a desired state. Alternatively, 'change is seen as converting the way things are now to the way we want things to be' (Fossum, 1989). The company has applied the model where it compares its business practice with the best practice companies (BPCs) in order to convert her practices to the level of best practice companies.

System theory was implicitly applied in the change, it "assume that change in one part of an organisation or a system creates changes in other parts" (Fossum, 1989). Ward argues in support of an integrated process change (Box 6.4). Project Control (PC) was preceded with Bid Preparation process. PC people view Bid as being a vital process, which could make their job easier. Bid process was in itself important, for the whole organisation because an effective Bid process can win orders, which was the basis for subsequent activity and a source of enhancing competitiveness. Spares and Repairs (S&R) view IPL/IPC as an enabler in their process because unavailability of prices was one of the issues in the S&R process (see chapter 5). Therefore an effective IPL/IPC provides a timely and accurate price list to enable S&R to function effectively.

Box 6.4 System view of change and its benefits

After successful launch of operational processes managers felt that they must be linked with one another. Integrated view was necessary to gain the synergistic outcome of the effort. In 1995 a lot of work was done to integrate the processes, to bring Ops1 and Ops2 together into one seamless process. The arguments in support of integration were cogent; for instance, the people in S&R have the view that if our IPL/IPC (Illustrated Product List/Illustrated Product Code) were better and more quickly available we could do our job lot better. As a result a team was given responsibility to look at IPL/IPC process. The PC people had the view that if our bids were prepared better our job would be much more easier than now. A good quality bid can also increase profit (Ward, interview, 1997).

The quotation suggests that improvement in one process ultimately leads towards improvements in other processes. And this is the essence of system theory. The system view of an organisation is congruent with the BPR view, which assumes that the total organisation should be divided into business processes (parts) and improvements need to be made in each part of the process so that the whole organisation can be better off. Secondly, the Delta Analysis (or Gap analysis) is commensurate with BAe approach to re-design her processes. BAe has borrowed ideas from benchmark companies and upgraded its processes according to the standards of the benchmark organisations as has been mentioned in chapter 5. Moreover, BAe had adopted a gradual change strategy or closed the gap between its processes and the benchmark companies slowly.

Two of the theoretical approaches adopted are also in agreement with the context in which the company operates. For instance, Delta Analysis is a defensive approach to change where weaknesses are removed gradually - in a less risky way. Gaps between the practices of BAe and the best practice companies were closed or narrowed down in an attempt to improve performance. BAe context was characterised with hierarchical structure, traditional culture, uneven distribution of power, dwindling demand, cut throat competition and international consolidation/mergers. This kind of context requires a steady change approach so that improvements can be made slowly because BAe was an on going concern where changes in culture and people require time. The company's assumption underpinning the initiative was 'patch work quilt'

rather than 'clean slate'. The former is characterised with stable change and the latter as revolutionary. With this perspective in mind, BAe set a time frame of five years to complete the change in order to implement the change gradually with a minimum of risk involved.

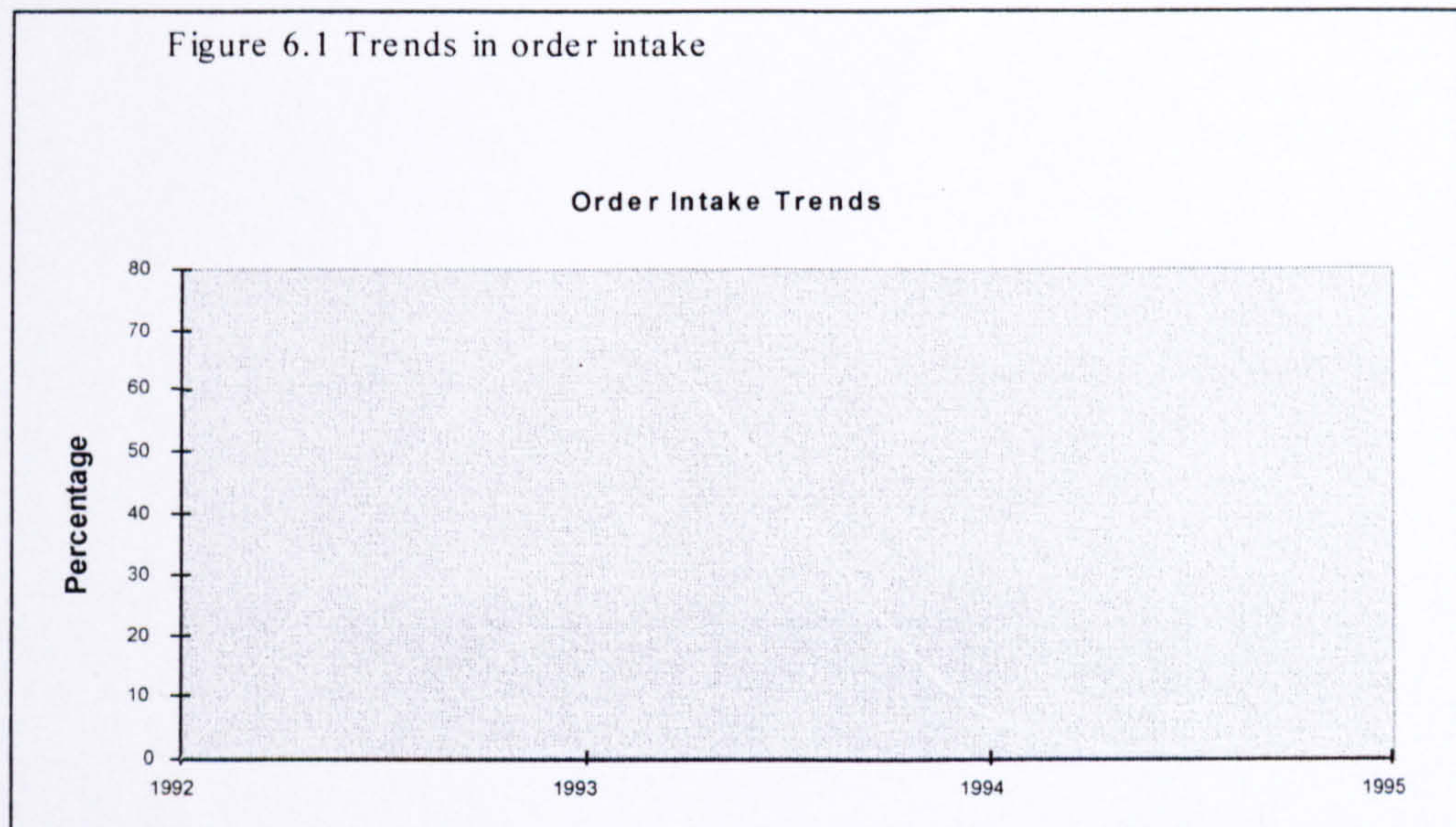
Gap analysis is a simple approach to match the differences between benchmark practices and the BAe practices but it does not provide the opportunity to 'think out of box'. It is less flexible to go beyond the benchmark circle and limits the improvements within the best practice box.

The second theoretical model was a systems view of change. BAe is producing virtually a single product with various models. The purpose of the product is to provide defensive capability to the customer. Every product goes through the same product life cycle: bid preparation, delivery and after sale service. The product production life cycle was almost the same for every aircraft. If one assumes that the production cycle is a system then improvements in any part of it enhances productivity of other parts or sub systems and vice versa. The system theory provides a holistic view of change and demonstrates the importance of small sub systems, which sometimes might be ignored. However, it might impede implementation of a good idea that may not be acceptable to other sub systems in the organisation. In this way it keeps some sub systems under productive at the expense of others.

3.4. Performance measurement

Performance measurement is linked with objectives of the organisation and change initiative. Three types of objectives were identified in the previous chapter: strategic, project level and BPR centred. The strategic objective of gaining leadership in the industry was achieved in 1994 as reported by the Annual Business Plan (BAe, 1995). BAe became the fifth largest aircraft manufacturing company in the world (BAe, 1997). Managers envisioned that the leadership in the industry could be achieved through concentrating upon the following dimensions: increasing order intake, achieving cost reduction, maintaining schedule adherence, achieving lead time

reduction, improving suppliers performance (BAe, 1997). The order intake shows a positive trend from 1992-95 (Figure 6.1).



Source: BAe, 1995.

Although it decreased from the level of 1993 it is still positive. The year 1992 is assumed as a base period in order to measure changes in the order intakes. For example the order intake increased by 69% in 1993, 7% in 1994 and 4% in 1995.

There is some achievement in the cost sector, Ali Dormer team leader of IPL/IPC informs that

Although it is difficult to prove success there are some indications of improvements in the performance. For instance, we reduce cost by 20% and cycle time by 10% (we are 10% quicker than previously). The improvement is still in progress because the people are being trained and re-skilled. Training and re-skilling strengthened the impacts of change (Dormer, interview, 1997).

Cycle time in another project was also reduced by 79% (BAe, 1996a) against a target of 50%. The external suppliers performance has been improved through empowering them by providing access to databases, assigning responsibility of maintaining quality

and reengineering their processes. Details have been discussed in the previous chapter. According to Business Plan,

a number of Business Process Re-engineering projects have identified and achieved business benefits, Examples of such benefits are as follows:

- Reducing process elapsed times by between 20% and 50% in spares and repairs, IPL/IPC compilation, systems engineering, design engineering and production engineering.
- Process improvements within the sub-contract organisation has led to the rationalisation of the supplier bases, reducing costs and improving supplier logistics (BAe, 1996).

Reduction in cost and cycle time is the result of the re-engineering initiative since both were the major objectives of it. The suppliers management and the increase in order intake is a part of the overall strategy. Some contribution has been made by BPR since a couple of business processes (Procurement and S&R for example) were redesigned which enhanced performance in many areas of supplier management. For instance quality at source and direct delivery to the point of use were introduced as a part of the Procurement process. Locus Industries reduced product cost by 20% and engineering cost by 30% through its re-engineering initiative in the early 1990s (Harvey, 1994). Harvey also reports that Xerox cut its cost base by 20%. These examples indicate that reduction in costs has been a popular performance measure in radical change initiatives. Lillrank and Holopainen found cost saving as a key benefit in BPR programmes (Lillrank and Holopainen, 1998). Apart from BAe other companies also improved cycle times. Reuters did it by 400% and Baxi Partnership reduced manufacturing cycle times from nine months to 24 hours (Harvey, 1994). Wills and Wills identified a 75% reduction in cycle times in a logistics process (Wills and Wills, 1998).

Cycle times, schedule adherence and reduction in costs are all cost saving strategies. Cycle times increases the speed of producing products, schedule adherence helps to comply with the planned time and resources allocated for the particular product. Both contribute towards cost saving. Schedule adherence and cycle time are important to

those organisations who manufacture jobs to order (job order) or high unit value products since they produce a small quantity according to customer orders. The Customer satisfaction and savings in costs are associated with completing to the agreed schedule. The shorter the cycle times the quicker the delivery and vice versa. Since BAe is manufacturing the high value aircraft according to the specifications of her customers, both schedule adherence and cycle times are important in order to satisfy customers and keep the cost low. The rest of the chapter examines how the company has attempted to reduce cycle time and adherence to schedules in order to save costs.

Section analysis

Four aspects were examined under management process and action: change agents, decision patterns, models of change and performance measurements. BAe used a coalition of change agents ranging from senior managers to process improvement teams. Pettigrew and his colleagues (1989) appreciated the application of a coalition rather than single agents. The coalition is a blend of consultants, operational management team (members from Product Boards, PITs and BPR service managers or internal BPR consultants) and senior managers. Angenhrn and Atherton call it “a powerful guiding coalition” (Angenhrn and Atherton, 2002) which provides guidance and resources for the implementation of radical change. Senior managers’ support ensures probability of success much more than anything else in the armoury of change agents.

Decisions at operational level are made with consultation and negotiation. PITs at evaluation and envision negotiate the final outcome with senior managers, customers and suppliers. For instance, members of the PIT function as facilitators in design workshops. Liu et al call it empowering leadership that “is a style of leadership where followers are the targeted to develop their own self-control, are encouraged to participate in decision-making, and, to a large degree, charged to innovate and act on their own. The role of leaders is to foster greater self-discipline, enjoyment, and motivation at work, as well as constructive thinking patterns and habits.” (Liu et al,

2002). The CPC scheme for purchasing low value items in the Procurement process was an example of self-control where nominated personnel purchase from the suppliers directly without prior authorization. These measures suggest that the empowering style of leadership is gaining popularity at operational level and it would be helpful to spread it upwards to senior levels of management which is the ultimate aim of re-engineering the organisation.

The Systems Theory, Force Field Analysis (FFA) and the Delta Analysis were the prominent models of change applied during the course of the change. Various business processes were redesigned with a view to make changes in them in order to improve overall performance. The underpinning assumption was to make changes in parts so that 'the whole' can benefit from it. The remaining two models assume a gap between the current situation (the situation prior to change) and a desired situation (How we want to be?). Lewin's unfreezing, changing and refreezing model was popular among psychologists and management practitioners. Schein describes and admires it, he says

“unfreezing as a concept entered the change literature early to highlight the observation that the stability of human behaviour was based on “quasi- stationary equilibria” supported by a large force field of driving and restraining forces. For change to occur, this force field had to be altered under complex psychological conditions because, as was often noted, just adding a driving force toward change often produced an immediate counterforce to maintain the equilibrium. This observation led to the important insight that the equilibrium could be more easily moved if one could remove the restraining forces since there were usually already driving forces in the system.” (Schein, 2002).

Delta analysis or Gap analysis assumes a gap between the current situation and the desired situation. The desired situation can be achieved by closing the 'gap' between the two situations. BAe saw a gap between Best Practice Companies (BPCs) and herself, therefore she introduced reengineering in order to narrow down the gap. Michigan State applied GAP analysis to assess the gap between the agenda of educational reforms and the standards set by the national Business Roundtable's Nine

Essential Components of a successful education system (MCC, 2002). This suggests that the desired situation may vary according to the industry in which an organisation resides. It seems a simple but effective way to transform an organisation in private or public sectors.

Performance measurement was linked with company objectives: strategic, project and BPR (general and process level). The higher level objectives were cascaded down to process level since process is the unit of change and performance measurement. For instance, reduction in cost and cycle time was assigned to individual processes and results are measured and evaluated accordingly. Costs were slashed 79% in Ops 1 process against a target of 50%. However, some scholars worried about the real impact of re-engineering since the impact of an individual process is difficult to measure. Ashford argues that “it is far too simple to say that because one radical project created a number of benefits that even greater radical change will generate larger benefits. It is an attractive idea but further radical change must be as carefully evaluated as the first because it is not always possible to multiply benefits.” (Ashford, 2002). Peter Tower one of the members of the IPD team also agrees with Ashford in that the outcome is difficult to measure (Tower, interview, 1997).

4. Implementation issues

Pettigrew et al (1989) indicated a number of areas where attention is required to implement the change. It includes:

- What implementation strategy was formulated in the content and its major link with process/content?
- What was the style of implementation (negotiated or imposed), communication elements, and training opportunities? What processes were involved in each of these elements?
- Recognition of organisation learning and its mechanism.

These questions are discussed in the following three sub-sections.

4.1 Management of context, content and process

The content of the strategy was based on the context. Here discussion revolves around the processes and sub processes involved in translating content into actions. For example, reduction in aggregate demand was one of the contextual factors (chapter 4), increased marketing efforts were suggested (chapter 5) in order to secure more orders and ultimately sell more. What process was involved in getting more orders and to increase sales is the subject of this chapter. It also subsumes other contextual elements and their corresponding content and processes involved.

Three aspects of marketing strategy were examined in the content: new product development, customer satisfaction and supplier relations. *Product development process* or life cycle (PLC) consists of eleven integrated steps, which have been revealed in an interview with the head of the radical change initiative. He says, it includes (Box 6.5),

Box 6.5 **Product development process**

In 1995 we started to look at some of the support processes in the business instead of co-activities again e.g. Quality Assurance and Works Engineering. The purpose was to build the infrastructure, manage energy on the site and make sure that basic services were in place. In this way we used to have 3/4 projects at a time in progress at different level of maturity. The objective was to support our product life cycle (PLC) at various levels of design and development. PLC consists of eleven integrated steps:

- 1. Create proposal*
- 2. Negotiate the contract*
- 3. Get the contract*
- 4. Authorise work*
- 5. Define the product*
- 6. Design in more detail*
- 7. Propose production*
- 8. Handle the product in the organisation*
- 9. Build the aeroplane*
- 10. Deliver it*
- 11. Support the customer (Ward, interview, 1997)*

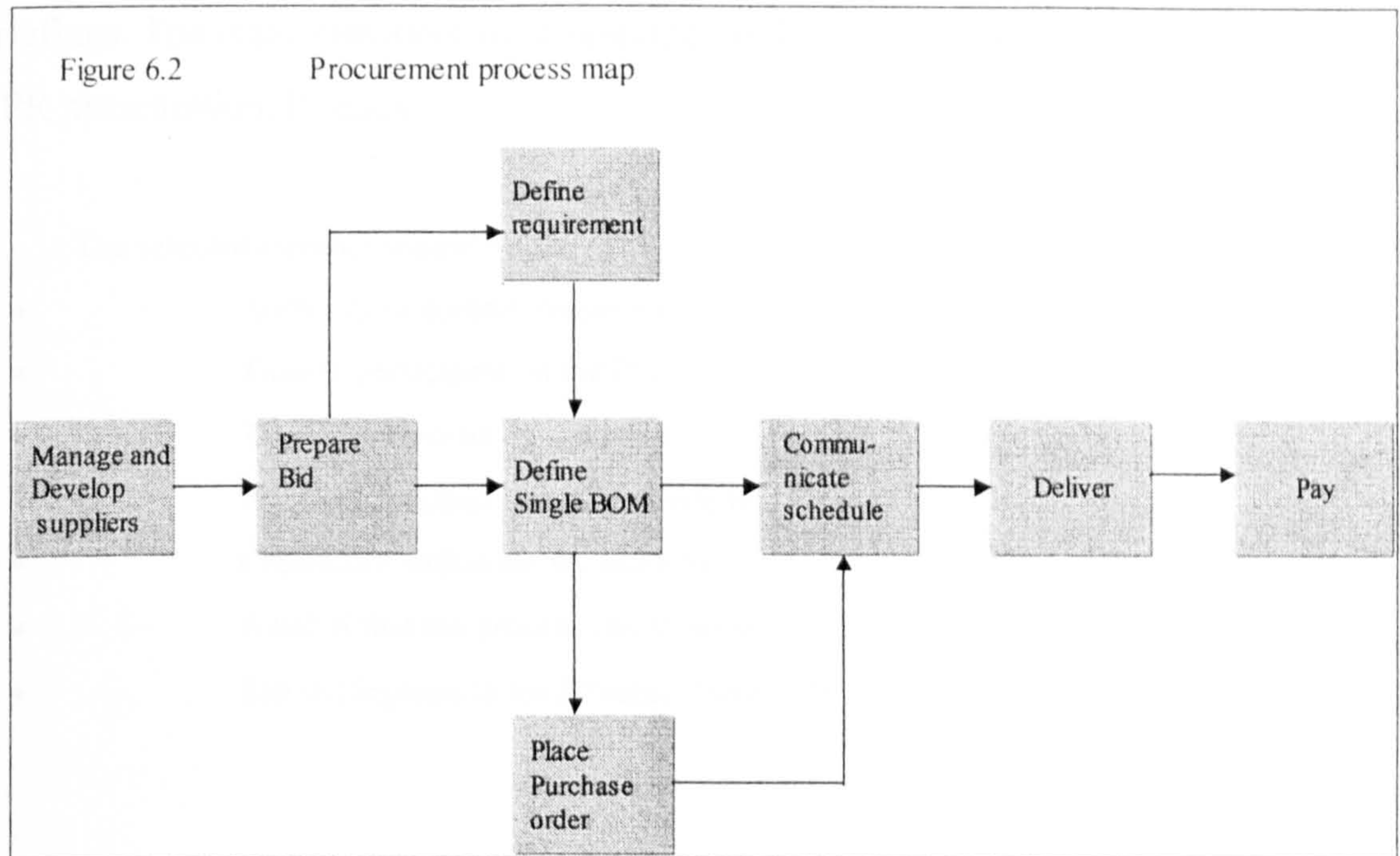
The life cycle is peculiar to the aerospace industry because of the nature of the product being manufactured. An aircraft goes through the phases described above. Customer support is important to keep the product in service since spare parts and technical support is required in most cases. A strong customers focus is needed to delight them before and after sale.

Customer satisfaction process involves five steps. The details have been outlined in the Value Plan for the year 1997, it reads,

- **Develop customer strategy:** this should cover strategic issues and direction for how we wish to deal with that customer and should set the context and policy for carrying out the other elements.
- **Know your customer:** Covers the need to identify and record who the customers are at an individual level, their role and influence on the relationships.
- **Understand your customer:** The need to listen, record and confirm the customer requirements and communicate these to the whole team.
- **Delight your customer:** Agree what is important, measure progress using customer agreed satisfaction metrics and improve.
- **Measure the process:** review progress with the customer, internally and against the competition (BAe, 1997).

To support the process, customers were offered new and quality products at affordable prices. In time deliveries were also assured. With the introduction of BPR the company was enabled to produce at low cost, reduce cycle time and achieve schedule adherence (See objectives for change, chapter 5). The customer satisfaction process supports the product life cycle that shows dependence of both processes in the value chain.

Suppliers relations process. This process is a web of other processes and activities launched during the initiative. For instance, Procurement, Ops 3 and S&R processes focused on suppliers and reiterated the need for better supply chain management (BAe, 1996c). The Procurement process is shown in Figure 6.2 as an example.



Key characteristics of the process is to develop and manage suppliers. It includes the redesign of the suppliers processes so that they can support BAe process. Single BOM leads to business partnership between BAe and its suppliers rather than a separate seller and buyer as in a conventional way. IT provision enabled BAe to establish long-term relations with suppliers through EDI, shared databases and so on. The Suppliers Management Team coordinates operations at both ends i.e. BAe and suppliers.

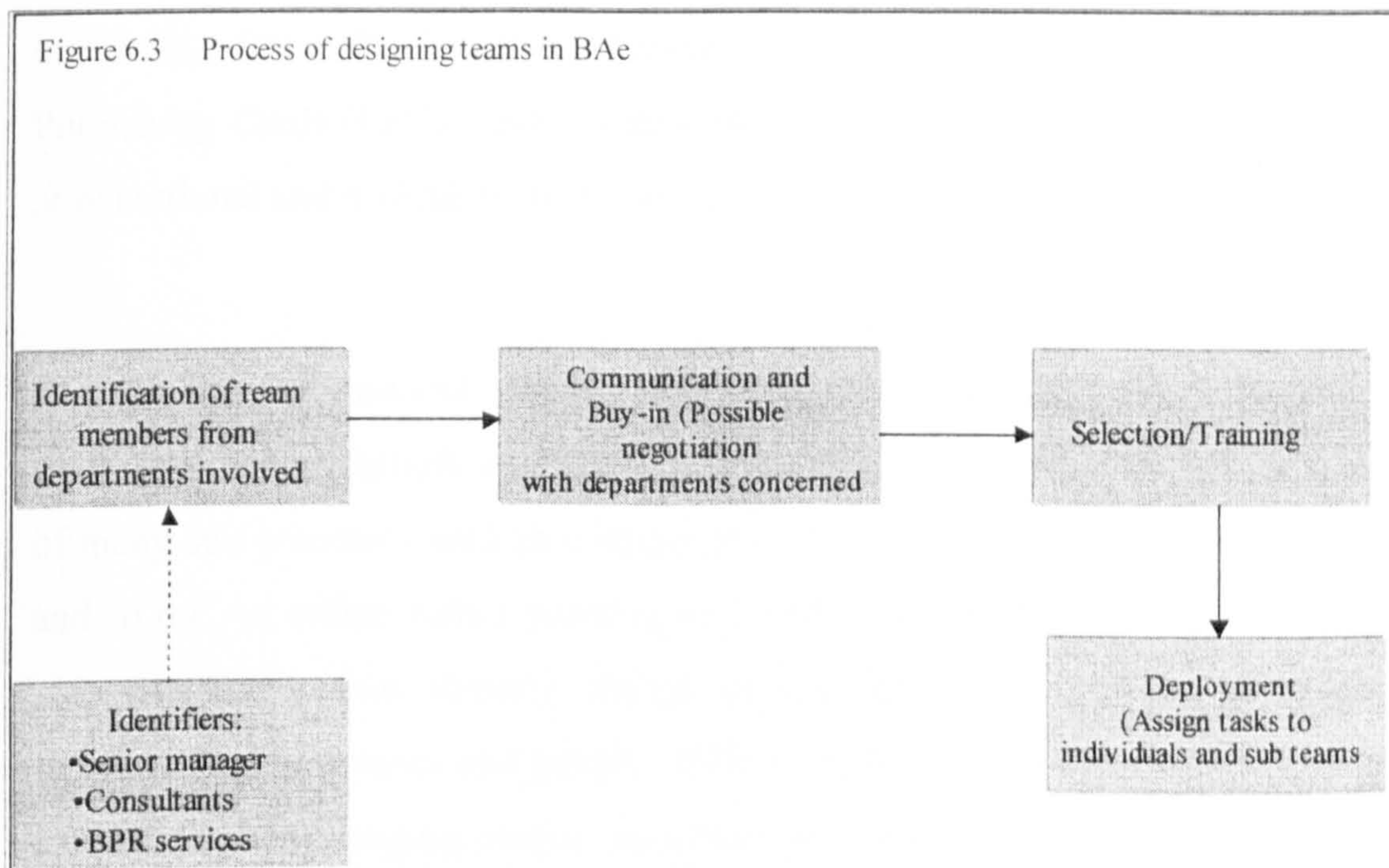
Process of structural change. The second factor in the context was the hierarchical structure which was exchanged with flat structure. The process of flattening structure involves induction of teams in the workplace. Use of teams has been discussed in chapter 5, here the purpose is to examine the process of designing the team. The generic process of formation has been described by Ford et al which includes: forming, storming, norming, performing and adjourning (Ford et al, 2002). Team

formation involves identification, communication, selection, training, deployment and management of teams (Figure 6.3).

Each of these is a separate process in itself. The concept of a team-based structure was communicated through videos, newsletters, circulars, e-mail and management briefings. The team members were selected on the basis of the criteria as reported in a BPR presentation. It reads,

The selected member should have:-

- Authority to commit resources.
- Time to participate on the PIT.
- Time to follow up assignments.
- Practical & actual process knowledge.
- Credibility within the department.
- A belief that the process can improve.
- The willingness to lead change (BAe, 1993a).



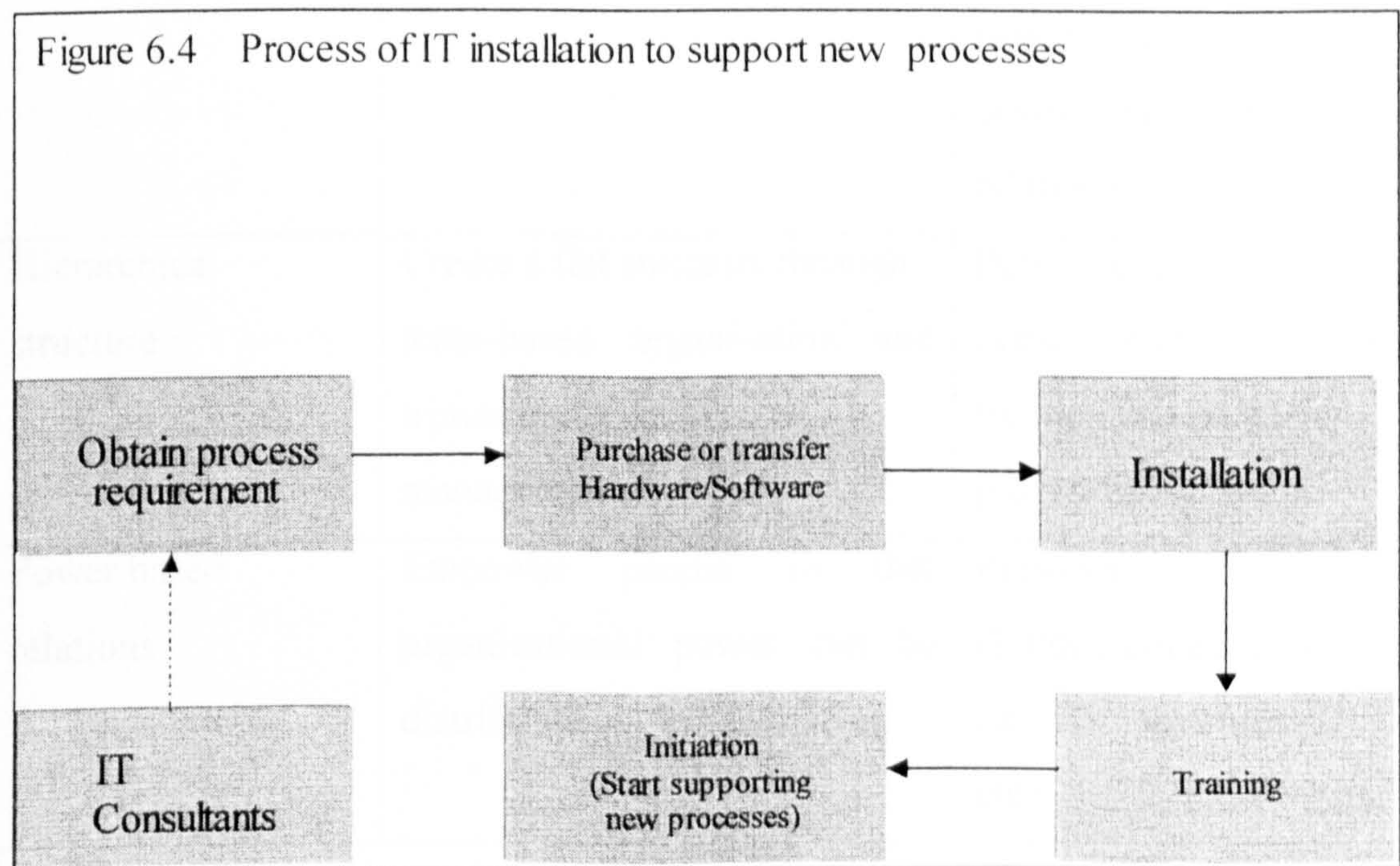
Senior management, consultants and BPR service team identifies the departments involved in the process and appropriate individuals to work on it. The idea was communicated and availability of the related member (s) confirmed. It follows selection and training of members so that they can be prepared for the job. Finally they were deployed and the responsibilities had been assigned to individuals and sub teams.

Process of power distribution. The third element in the context was distribution of power. Human relations were power based where senior managers were building empires and holding sources of political influence. This problem was tackled through induction of teams and empowerment of middle managers. The first team based ad hoc structure was introduced in various assignments. For instance, a Spare Process Transformation team was formed to evaluate the S&R process and was dissolved at the end of the evaluation of the process. The temporary nature of the team did not allow enough time for the team leader or any other person to create a personal influence or hold political power. However these teams were autonomous in internal decision making within the team such as personnel, financial and administrative decisions. Secondly, middle managers were empowered through Corporate Purchasing Cards (CPCs) and flat structure. As a result the power structure changed at operational and middle management levels.

The process of cultural change. The culture of the company tended towards traditional values, beliefs and norms. The cultural change process is a complex web of many sub processes such as changes in beliefs, working habits, language, symbols and so on. An online author working for North Carolina State University argues that “Management cannot directly change culture but it can intervene by changing structures and processes and people” (NCSU, 2002). It suggests that cultural change is embedded in changing people, structures and processes. Changes in these aspects have been examined throughout this thesis, so cultural process is embedded in the processes of human resource strategy, processes change methodology and structure.

In addition, Roehlkepartain suggests a four phase cultural change process which can be applied to the organisation with slight modification. It includes baseline analysis (determining employee needs), developing change agents, introducing employee development programmes, and sustaining changed culture. The last phase 'is the time for sustaining the changes that have been made, evaluating progress, and renewing enthusiasm and commitment to systemic change. The three major hurdles of apathy, scepticism, and blame placing need to be cleared before a culture is on its way to long term success' (Roehlkepartain, 1993). This process is similar to the one BAe has adopted to introduce BPR (See 4.4 below). The cultural change programme also includes many sub processes such as communication process, involvement process, employee development process, reward and recognition process, organisation process and measurement process. These processes were part of an employee change project started in 1993 (See chapter 4 for details).

Process of IT induction. The IT process is concerned with the system development process which is used as a tool to implement changes in technology and organisation. IT personnel can use any appropriate model such as the 'water fall' approach to develop a system. However, the installation of infrastructure to support new processes involves a different process. Figure 6.4 describes the process.



The IT personnel, with the help of any consultants available obtain process requirements from the PIT involved. They translate them into the hardware and software inventory necessary to discharge the function; Purchase or transfer them from other sites to the premises where they are to be used; install them, select and train people who would manage them so that they start supporting new processes. This is the generic but simplified process involved in the implementation of business processes.

Analysis

A number of processes were described above in order to understand constituents of the processes and sub processes involved in the transformation. It aimed to identify the processual strategy applied so that it can be linked with context and content. Table 6.1 summarises the contextual factor, corresponding suggested contents and the processes involved.

Table 6.1 Contextual factors, corresponding contents and processes

Contextual elements	Contents	Related processes
Reduction in sales	Increase marketing efforts in order to reverse sales trend.	Marketing processes (Customer satisfaction, new product development, supplier relations)
Hierarchical structure	Create a flat structure through team-based organisation and trimming layers of management.	Personnel processes (Team related processes, training and education processes and so on)
Power based relations	Empower people so that organisational power can be distributed.	Personnel processes (Empowerment processes i.e. flat structure, CPCs etc)

Traditional culture	Motivate, inform/communicate, train, involve and facilitate people in order to move from the traditional culture to contemporary values, beliefs and norms.	Structural, business process, communication processes and people change processes (Processes involving changing beliefs, values, norms and behaviour)
Fragmented systems	Integrate systems	Technology processes (System development, systems integration, infrastructure installation and data integration processes)
High cost Long cycle time Lack of schedule adherence	Business Process Re-engineering	Various processes e.g. S&R, Procurement, Project control, Ops 4 and so on.

The table shows the relationship between three elements: context, content and process. An alternative view of the relationship can be divided into three elements: problem, a suggested solution and implementation. The problems were identified in the discussion of context, the solution is suggested in content and the implementation is made in the process.

4.2 Management style and communication

Radical change ideas were collected from benchmark companies, customers, employees and partner companies. Suppliers also provided a significant input for the redesign of processes (virtually new processes). The first three phases of the radical change implementation process (see below for the four implementation phases) are an example of negotiated style of management. For instance, in the first phase, senior managers, representatives from each area involved in the process and PIT negotiated

to determine the end-to-end process in a "Challenge Day" workshop (BAe, 1993b). The participants bargained for strengths, weaknesses, enablers and barriers to the process. It implies that the process of negotiation was democratic and each area involved was free to argue for its reservations (if any) in order to arrive at an acceptable outcome. Members of the PIT acted as facilitators between senior managers and representatives from the areas involved. Similarly, in the second phase, design workshops were held to negotiate the content of the potential "TO BE" process. It has been recognised in the envision phase report of the procurement process. It reads:

People from many different functions involved in the procurement process were invited to attend a "Vision Workshop", the purpose of which was to stimulate ideas from those people and to suggest ways in which the process should be done in future. The output from this workshop was a 'vision' of how the procurement process might operate if we were free to change it with few constraints (BAe, 1994d, p. 5).

Thirdly, in the implementation phase, negotiations with the suppliers for various enablers to work and the credit card company were remarkable. For example, preferred suppliers were asked to deliver low-value items direct to the card holder's department instead of designated sites of the organisation. Arrangements were made with the credit card company to implement CPC concept (BAe, 1994f). Thus the first two instances were the examples of negotiation with internal parties and the last one with external parties.

The second question raised above is concerned with the processes involved in training and communication. The team responsible for communication faces an interesting problem similar to the one described by the internal communication manager. He says:

A lot has happened in the time, but one thing never changes. Every so often someone drops in and asks what we're going to do to solve his (or her) communication problem. The conversation goes something like this.

Them: 'Communication in our area is no good.'

Us: 'What is the problem?'

Them: 'No-one tells anyone anything.'

Us: 'Do you get the things you're supposed to get, do you have a team board, do you talk to each other?'

Them: 'I don't know. What do you mean? I thought that was your job, that's why I came to see you, you are communication after all...(Morgan, 1996b).'

The communication issue was taken in the previous chapter as a part of the strategy content, here these issues are taken as a process. How was information communicated? A communication team was working to communicate company policies and business strategies. The team disseminated information orally and in writing. The team members briefed or explained interested people a on one to one basis and advised them on communication issues. Fastrack reports that the principal means of communication include Business Plan, Fastrack, LifeStyle, Arrow, teamboards, priority briefs, job vacancies, local news letters, noticeboards and company merchandise (Morgan, 1996b). Family Days, product roll-outs, air shows, long service awards and project awaydays were also part of the communication strategy. Two thousand five hundred people benefited from the Involvement and Communication Programme whose purpose 'is to make managers and team members more aware of how to communicate effectively, involve and motivate people' (Ibid., p. 27).

It suggests that the process of communication consists of the communication team, communication tools and targets. The communication team collects information when and where it is generated, classify or edit it and communicates it. The communication process is reasonably well and able to address many of the concerns identified in the previous chapter. Draughon argues that a targeted communication "can be viewed as happening and succeeding when the message sent is the message received, the message responded to (feedback from receivers), and the target audience has been influenced and is exhibiting the desired behaviour (s) and taking desired action(s)"

(Draughon, 2002). BAe has increased communication by 10% with its current communication strategy (Morgan, 1996b). It means that the process outcome suggested by Draughon was being met.

4.3 Organisation learning (OL)

Pettigrew and his fellow workers view organisation learning as a part of the process, the third element in the change framework and emphasise the need for creating a learning organisation (Pettigrew et al, 1989). Quintanilla and Snchez-Runde state that organisation learning refers to 'how an organisation can learn the multiplicity of strategies, practices and technologies employed by other successful organisations' (Quintanilla and Sanchez-Runde, 2000). They argue that the learning comes from the industry to which the company belongs to. However, change agents in BAe assumed that good ideas could also come from outside the industry since related processes could be in place in the firms outside the industry. In this connection they paid many visits to the companies in other industries. For instance, PIT of the Procurement process collected best ideas from the following companies. Actual names have been replaced with respective industries (Table 6.2).

Table 6.2 Benchmark Companies visited

Areas of concern	Automobile	IT	Aerospace
Integrated IT	√	Did not discuss	×
EDI	√	√	Partly
X-functional teams	√	Did not discuss	√
Empowerment	√	√	×
JIT Delivery	√	N/A	√
Direct line feed	√	√	√
Long term agreements	√	√	√
Pref. Supplier Programme.	√	√	√
Credit card (low value items)	×	√	Did not discuss

Source: BAe, 1994d. √ = using, × = not using

In the BAe case, new processes were created partly with the ideas of best practice firms (see also section 4.4.2). For instance, the idea of a credit card for purchasing low value items was taken from an IT organisation.

The second source of learning came from the PWH consultants who initiated the process of change and guided BAe people about the pros and cons of BPR. Ward praises the role of these consultants in learning and transferring knowledge/technology of re-engineering to BAe personnel (Box 6.6).

Box 6.6 Consultants as a source of learning

PWH had got a number of strengths. For example, the consultants did not do the work the teams did, they facilitated the teams, gave teams a road map (process) that they could follow. They used to train teams in the technology of process and facilitate the application of the change throughout the programme ... They declare from the beginning that they believe that the process and what they do is transferable into the organisation (Ward, interview, 1997).

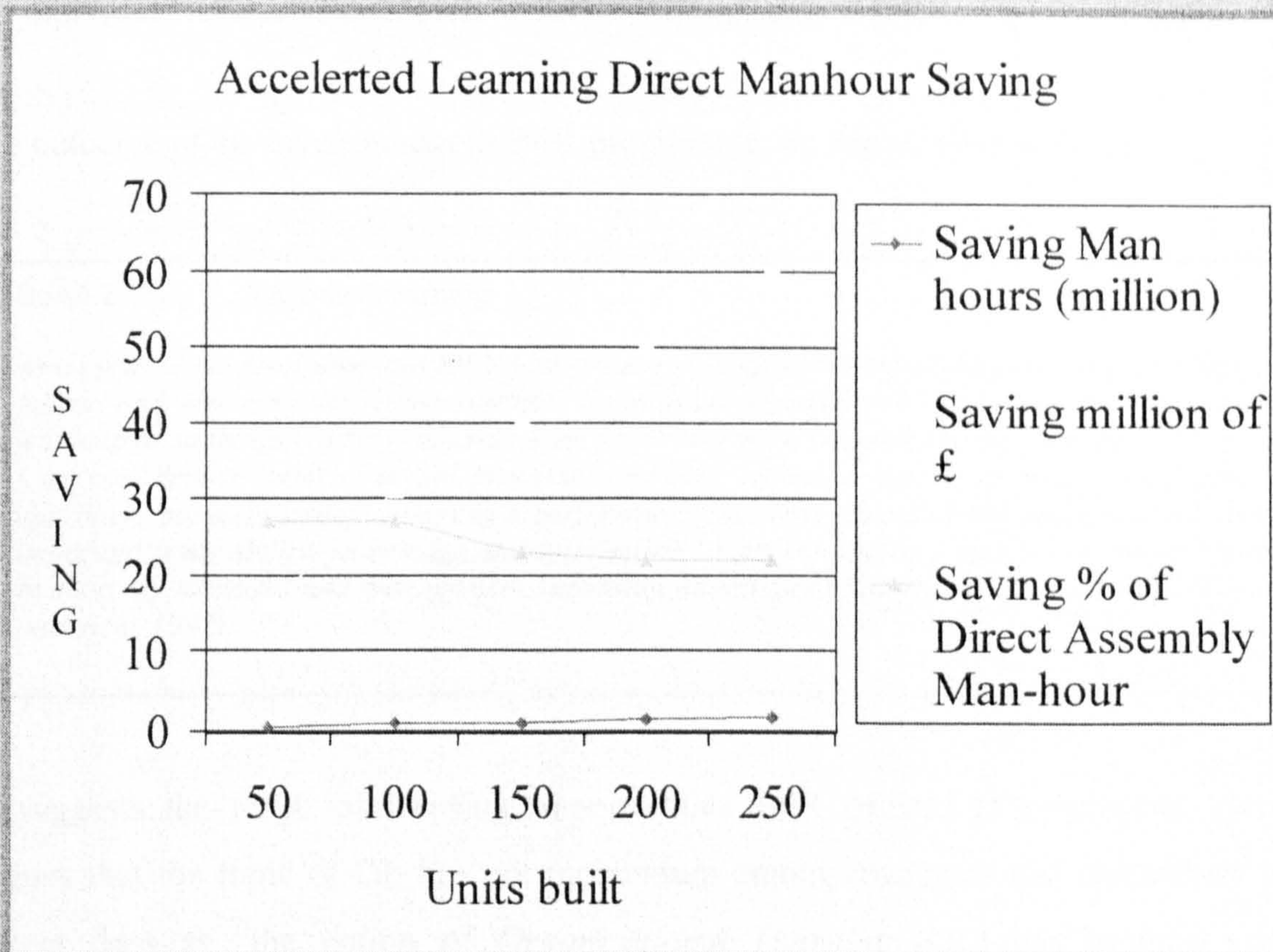
PWH trained BAe people within a given time frame, which helped the company to reduce the dependence on the external consultants. It has been observed by the researcher that the early format of the BPR reports was different from the later. For instance, there was a similarity between the reports of pilot projects i.e. S&R, Procurement and Project Control, but later project reports such as Ops3 was not only sophisticated in presentation but also rich in the amount of material it contained. There was hardly any external consultant at the launch of Ops3. This shows the learning progress of the employee and managers. It also indicates the management's promise to build a learning organisation.

Finally, let us see the outcome of learning. BAe interpret learning as 'the effect where the amount of direct effort required to make an aircraft reduces with the number of aircraft built' (BAe, 1996c). Learning involved in production engineering improvement, design improvement, management control improvement and operator improvement. Accelerated learning offers savings in man-hour (Figure 6.5).

The learning curve of savings in million of pounds is proportionate with the amount of production. Since the savings were based on the man-hour spent on the manufacture of an aircraft the more production the more savings. The percentage savings were almost steady because savings from 50-100 units were 27%, which reduced to 23% at 150 units and 22% at 200 units and beyond. The optimum capacity

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Figure 6.5 Accelerated learning



Source of data: BAe, 1996c.

savings were almost steady because savings from 50-100 units were 27%, which reduced to 23% at 150 units and 22% at 200 units and beyond. The optimum capacity was 100 units, more investment might be required beyond this level which caused an increase in human resources/cost.

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units, more investment might be required beyond this level which caused increase in human resources/cost.

At individual level, managers learn/sharpened management skills e.g. Tower argues the outcome of his involvement in BPR programme, he argues (Box 6.7)

Box 6.7 Individual learning

As a result of my involvement in BPR, I have got a wide appreciation of the processes the company follows and why. How they come together? So in future whatever job I will do my BPR experience will help to do things easily which makes me faster and more valuable for the company. I am confident in terms of actual processes and their technical aspects as well as management approach, business issues, company's performance and how practical the processes are. Most important is my ability, knowledge and satisfaction I have enjoyed as a member of the BPR team. In short my technical and management capability increased because of working for BPR (Tower, interview, 1997).

It suggests the range of learning opportunities BPR offered to employees. Beck argues that the topic of OL has got momentum among managers and researchers in recent days as “the notion of *Organizational Learning* (OL) has become very prominent in the recent past. Managers see OL as a powerful tool to improve the performance of an organization. Thus, it is not only the scholars of organization studies who are interested in the phenomenon of OL but also the practitioners who have to deal with the subject of OL” (Beck, 1997). He divides learning into adoptive and proactive categories. The former is incremental but the latter is radical. Given that figure 6.5 is biased towards adoptive rather than proactive OL, the latter is close to the radical change initiative. It implies that BAe has attempted a proactive approach but it achieved adoptive or incremental results in terms of OL. Secondly, OL is a part of the grand strategy rather than an independent effort to improve performance.

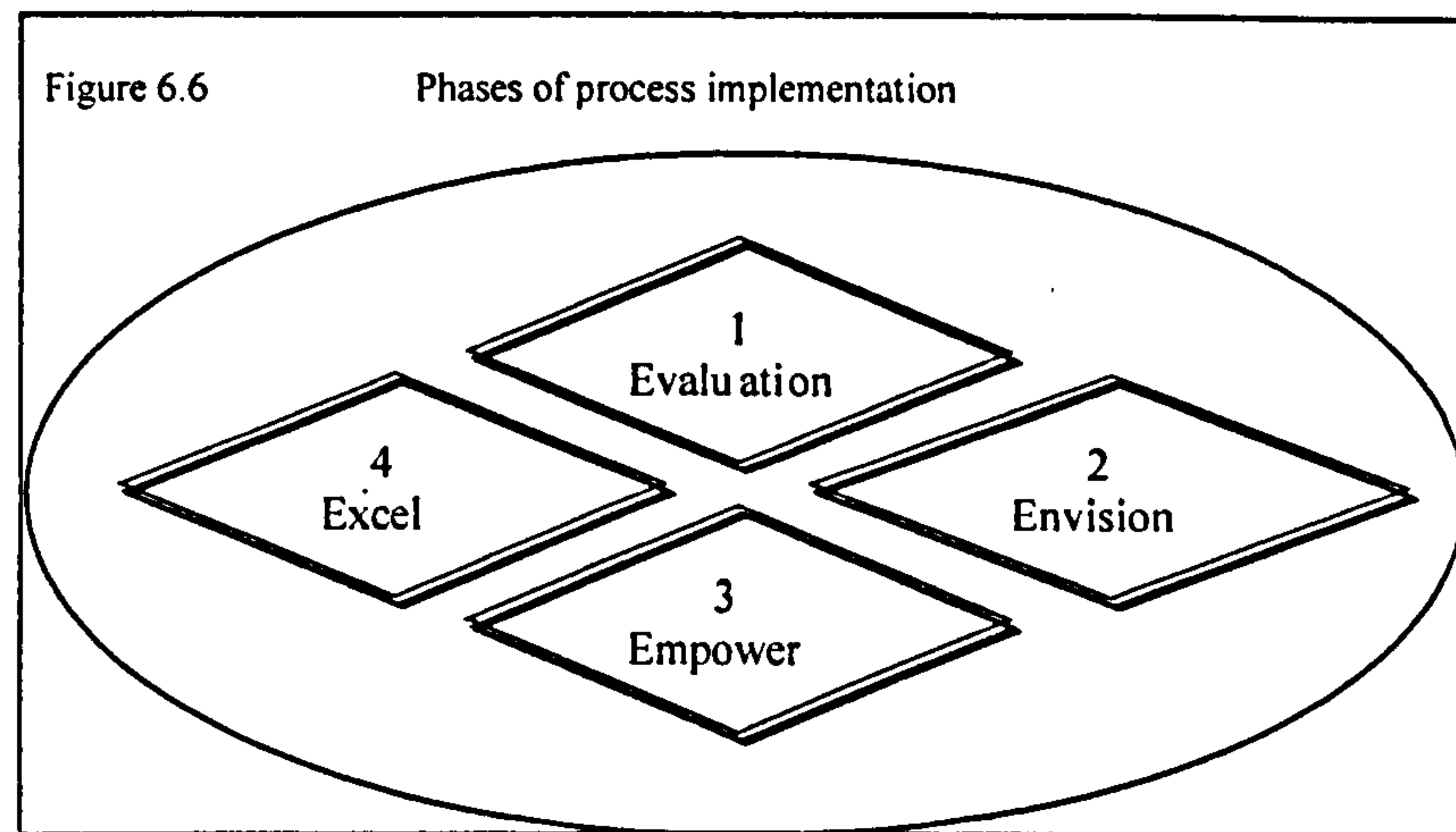
4.4. Implementation of processes

BPR is concerned with making changes in the organisation by focusing on business processes.

It implements change in the whole through process by process. For instance, BAe has divided its change initiative into fourteen processes. Each process was concentrating on a certain aspect of the company e.g. Procurement on supply chain, QA on quality, PC on projects and so on. This change in processes works under grand organisational strategy. Pettigrew et al's model adopted for theoretical support in this study is a grand strategic approach to bring changes in organisation. It focuses on functions. For instance, the previous chapter described the radical change, assuming existence of functions - the content of change consists of marketing, personnel, IT and so on. Given that implementation of changes in processes requires a supporting methodology to implement the strategic change in individual processes, this methodology ought to address processes rather than functions. However, changes in processes would bring changes in functions too. For instance, the marketing department is there but many processes support it i.e. S&R, Procurement, IPL/IPC and so on. In other words, it contains these processes.

A number of scholars put forward methodologies to change processes: Davenport (1993), Morris and Brandon (1993) Kettinger, Guha and Teng (1995) and Harrington (1991) to name a few. Practitioners have constructed their own methodologies to support BPR e.g. Price Water House (PWH) and Computer Sciences Corporation and so on. Since BAe has applied PWH methodology, the following sub section describes it. The purpose is to supplement the Pettigrew et al's model to implement the change in processes. It also helps the researcher to refine the theoretical model to be discussed in the next chapter. This is one of the advantages of studying BPR with Pettigrew et al's model, which was usually applied for the introduction or assessment of generic change.

The implementation has been divided into four phases: evaluation, envision, empower and excel. Each of these phases is discussed in the following paragraphs. Figure 6.6 depicts them.



4.4.1 Process evaluation

Since there were no processes present, like today, at the inception of radical change, defining a process was a big job. BAe scopes the process boundaries in an attempt to separate each process from others. PIT provided guidance to the redesigning team e.g. what to do in the next phase. So it provided co-ordination between the two phases. PIT also identified the issues involved in the process, which were the basis for redesigning it. This phase is also useful in understanding the process in the organisational perspective e.g. which functional departments were involved in the process and what was the role of external parties such as suppliers, customer or partners in it.

The first phase deals with the study and the understanding of the current process. It determines the scope of the process so as to distinguish it from other processes. The objective of evaluation is to identify and document the existing process. It involves establishing process flow, identifying and recording process issues, and gaining management buy-in. The scope of the process is determined, and maps are drawn. Change agents produce an 'as is' picture of the process, evaluate it in terms of cost and value-added ratios. The findings are compiled in a document called 'AS IS' or evaluation report.

Ali Dormer the team leader of the IPL/IPC process describes the procedure involved in the evaluation phase. He says (Box 6.8).

Box 6.8 Procedure involved in the evaluation phase

The IPL/IPC process was started in 1994; we begin with standard BPR tools and techniques. A process improvement team of nine members was formed which were taken from different departments e.g. technical, engineers, finance, personnel, customer support, commercial and purchasing. They were working in different organisations (departments) hence all of them belong to a unique culture. The first task of the team was to identify and scope the process including the number of people working in the process and the resources occupied within a three month time period.

The team conducted fifty interviews of 3-4 hours each. A process map was drawn as a result of these interviews. Then the process map was communicated to the people who were doing the job in the process through a series of workshops (Dormer, interview, 1997).

It suggests three key points:

1. Team formation from the departments involved in the process
2. Task of team was to identify and scope the process
3. Conducting interviews from the people involved in the process and confirmation of data obtained from them through workshops

From the data collected, PIT established the following elements of a process:

- Defined scope and process boundaries
- Map process flow and challenge
- Analysis of activity time, cost and value analysis
- Benefits management – if the process is to be re-engineered what benefits would be expected
- Documentation of issues about people, organisation, IT and infrastructure (BAe, 1993a).

This is the summary of the evaluation phase, the rest of the sub section describes it in more detail.

Evaluation can be examined in three interrelated parts:

1. preparation
2. data acquisition
3. analysis and reporting

Preparation involves the selection of a team, the definition of the process, setting aims and determining the scope of the process. The *team* is formed from the departments involved in the process; e.g. the spare and repair (S & R) the supply process evaluation team contains personnel from purchasing, IT, quality, manufacturing, personnel, finance, CSD (three sub- sections), commercial, Price Waterhouse and flowcharting mapping support (BAe, 1993b). Sub-teams were also formed to assist the main team; e.g. five sub-teams were formed regarding Ops1 for various aircrafts at different sites (BAe, 1994b). The process improvement team (PIT) *defines* the process so as to distinguish it from other projects. Ops1 was defined as the process from completion of "C status design definition through to tools available" (BAe, 1994b, pp.1f). Another process was aimed at "the acquisition of aircraft and non-aircraft goods and services in line with customer required-by dates at the optimum price and consistent with the required quality" (BAe, 1993c). Preparation also includes defining the *scope* of the process involved. The evaluation team limited the scope of procurement to the purchasing of aircraft material, equipment and non-aircraft goods and services (BAe, 1993c).

Data collection. Since there were no business processes in the organization, PITs collected data through interviews and verified this information by challenge workshops. One of the teams deployed in the pilot projects conducted fifty interviews with the staff and held two challenge workshops in order to verify the data collected. In total 139 staff were consulted representing 80% of the staff involved in IPL/IPC process (BAe, 1994c). The purpose of challenge workshops was to ensure that each

sub-process was represented, that all processes linked correctly, that any omissions were identified and that there was levelling of the detail between each process. The workshop participants were invited to assess strengths, weaknesses, enablers and barriers, while team members were working as facilitators in S&R process (BAe, 1993b). Challenge workshops are ended with multi-level process maps. Ops 1 team drew fifty process maps (BAe, 1994b).

Analysis and reporting. In the final stage of evaluation, the team examines cost and the value added ratio of the process. Cost analysis concentrates on the personnel involved and the process cost. Table 6.3 shows the cost analysis of IPL/IPC project (BAe, 1994c).

Table 6.3 Process cost analysis

<i>Cost category</i>	<i>Headcount/amount</i>
Total employees in scope	175
Labour	£4,000,000
Non-labour	£100,000
IT (recurring)	£450,000
IT (non-recurring)	£920,000

Labour cost accounts for basic salary, overtime, pensions, national insurance contributions and benefits in kind (BAe, 1994b). The second part of the analysis is concerned with time and value. Value analysis 'is a methodology for analysing all activities within a process and determining which add value and which do not' (BAe, 1993b). Value added (VA) was interpreted as 'what the end customer pays for it' (BAe, 1993b, pp. 4.2). VA was measured by the following formulae.

Value analysis against activity time = Value analysis activity time/Total activity time

VA ratio = Value analysis activity time/Total elapsed time.

Table 6.4 demonstrates the value added ratio (VAR) of five products identified in the evaluation phase (BAe, 1994c).

Table 6.4 Time and value statistics

<i>Product name*</i>	<i>VAR (%)</i>	<i>Elapsed time in weeks**</i>
A	3.5	197
B	2.1	40
C	3.5	17
D	1.5	204
E	0.4	290

* Actual names changed

** Includes customer elapsed time

In some projects time and value analysis were undertaken for more than one scenario such as Best and Worse (BAe, 1994b).

The outcome of evaluation was combined in an 'as is' process report or a process evaluation report e.g. S&R evaluation report.

A different evaluation procedure was adopted in Ops4, the joint project that was developed by BAe and the French firm Dassault. Both the companies had taken three months to study the existing processes and had mapped the processes individually and looked at their common issues. A list of common issues was compiled which formed the basis of the envision phase. However, a single evaluation report was compiled for both parts of the process.

The evaluation phase is present in many BPR change methodologies, either implicitly or explicitly with slight variations. Elzinga *et al.* (1995) call it 'preparation'; Hahm and Lee (1994) use two additional steps to those described here but the purpose was similar to BAe's evaluation stage. Kettinger, Guha and Teng (1995) place 'evaluation' at the end of the change process with the objective to measure the results

of the change and associated the BPR projects with quality improvements. This kind of evaluation is more likely for appraisal of the change rather than understanding of a process. However, BAe's evaluation phase was biased towards assessment or identification of its processes. It helps PITs to define appropriate solutions to re-engineer the processes involved.

4.4.2 Envision

According to the Envision phase report of ISFI process,

“The envision phase of BPR identifies opportunities to define the vision and establish TO BE process in terms of organisation and structure, people, process and procedures and systems and technology. It is based on the involvement of key stakeholders within the process to identify a programme that will deliver real and sustainable performance improvements to the business” (BAe, 1996b).

It suggests that Envision consists of opportunity analysis, redesign of the process, cost-benefit analysis and an implementation strategy.

Opportunity analysis covers examination of issues identified in the evaluation phase, conducting envisioning workshops and benchmarking visits. The starting-point in the envisioning is the analysis of the key findings of the evaluation stage. In one of the processes included in the study, it was found that cost and elapsed time were high (and therefore could be reduced) and the value added was low. Supplier relations in some cases were adversarial, the level of stock holding was high, the quality of equipment was poor and the databases were fragmented (BAe, 1994d). The second source of redesigning ideas was vision workshops. The purpose of vision workshops was to explain the concept of BPR and to collect ideas from the people working in the process for the new vision. Fourteen such workshops were held in order to capture 800 improvement ideas involving 140 people, representing 80% of the staff involved in IPL/IPC process (BAe, 1995b); and the Project Control (PC) process 1,800 ideas were collected through 18 workshops (BAe, 1994e). The benchmarking visits were the third source of ideas. Members of PIT collected new ideas about best strategies in practice in related processes. In one case the process team visited four high-profile

indigenous companies and collected data about reduction in time scale, customer satisfaction and effective operations (BAe, 1996b). In another process, PIT visited ten best practice national and overseas companies, gathered hundreds of ideas relating to quality management systems, IT, teams and supplier management (BAe, 1996d). Customers were also involved in some processes (BAe, 1995b).

In addition, the vision is created within the broad category of envisioning principles e.g. integrated strategy, improved processes, realigned organization and customer management (BAe, 1997a) and transformational principles (BAe, 1994a):

1. organizing around outcomes;
2. cross-training and multifunctional workers;
3. preparation reduction;
4. small batch sizes;
5. demand-led workflow;
6. capturing information at source;
7. assuring quality at source;
8. visual control systems;
9. parallel processing;
10. customer-supplier relationships

These principles are well supported in the literature. Peppard and Rowland (1995) suggest many of them: eliminating, simplifying, integrating or automating. BAe has applied most of them e.g. 2 was applied in designing the team based structure, 6 and 9 in IT strategy, 10 in developing relations with suppliers and customers, 7 in QA and so on.

The outcomes of the opportunity analysis together with vision/transformational principles were brought together in *design* workshops. These workshops were designed to create the proposed vision of the process. The Envision report of the Procurement process describes the procedure and purpose of it, which reads:

Output from the Opportunity analysis (*analysis of issues from evaluation phase*), Vision Workshops and Best Practice visits was brought together to create a Procurement "Vision" and subsequently this was refined into a more detailed Design by establishing the Process Components:-

- Workflow and procedures
- Systems and Technology
- People and Organisation
- Infrastructure

At both the Vision and Design stages, several Reality checks were made with stakeholders to get feedback of views and test the validity of the output (BAe, 1994d).

The vision report of Ops3 states that the process will be changed in order "to create a 1st Article Product & Process that provides maximum benefits:

*Within the 1st Article Environment

*With recurring manufacture ... and continuously improve the process until such time that a 1st Article is no longer needed" (BAe, 1996c).

The vision indicates where the change is required and why. A snapshot of the Procurement process vision suggests the following changes to the current practices.

- Form a contract team to own primary data about purchasing, lead-time, etc.
- Establish long-term contracts and relationships with suppliers.
- Quality to be assured at source.
- Establish a common delivery schedule for the supplier and for manufacturing.
- Arrange delivery direct to point of use.
- Payments made on receipt of goods (BAe, 1994d).

PIT estimates the costs associated with the change and benefits to be realized. Table 6.5 shows the cost of an early BPR project in terms of the number of days required to do the job (BAe, 1994d); Table 6.5 demonstrates the benefits envisioned in another process (BAe, 1996c).

Table 6.5 Costs associated with a pilot project

<i>Cost element</i>	<i>Expected costs of pilot scheme (number of days)</i>	<i>Expected cost of roll-out (number of days)</i>
Negotiation with the credit card company	15 days	
General set-up tasks	60 days	
Pilot report	5 days	
Selling concept to main suppliers	10 days	10 days
Training requestors	60 days	40 days
Suppliers liaison	10 days	30 days
Monitoring/audit/problem solving	70 days	130 days

Source: BAe 1994d.

Table 6.6 Benefits envisioned in a process

<i>Area of concern</i>	<i>Potential savings (%)</i>
Reduction in new project assembly man-hours	25
Reduction in assembly work-in-process during programme 'ramp up'	25
Reduction in assembly rate rolling during programme 'ramp up'	10
Reduction of 'in scope' lead time	25
Reduction in assembly overtime requirement	10
Reduction in assembly diversions	5
Reduction in working capital	10-25

Source: BAe 1996c Note: * Some of the savings are applicable in recurring manufacture

The benefits may extend to many projects in the organization e.g. the potential benefits of Ops 3 go beyond its own scope.

The company's redesigning strategy is well articulated and based on pragmatic ideas accumulated from the variety of sources. Employees, senior managers, customer, suppliers and benchmark visits provide very useful ideas for improvement. Employee suggestions were important because they were actually involved in the process and knew the pros and cons of it. They put forward their ideas on the basis of their working experience which were relatively easy to implement. Involvement of senior managers at this level is a source of motivation for employees and facilitates buy-in of top management. It ensures their commitment for the change that is critical for the success of entire programme. Practices of benchmark companies provided the tested instances from the users of similar processes. Customers were the focus of all company activities; delighting them was one of the aims of strategic change. Their involvement will be instrumental for performance improvement, which increases the probability to achieve the strategic objectives. Customers' awareness of the company processes, product design and manufacturing would enhance their confidence on the products and services. Supplier involvement and participation in redesigning helped BAe to develop cordial relations with them because they were enablers in re-engineering projects, such as Procurement. The envision phase was a major step towards fundamental changes in the business processes and was compatible with the overall change strategy.

Since the final element in the envision phase is about implementation strategy, the discussion about implementation has been delayed until the next section in order to avoid repetition. Actually the Envision team suggests the way forward - how to implement the envision. On the contrary the researcher is describing the total process implementation methodology, so it seems logical to discuss implementation at once.

4.4.3 Empowerment

Implementation concerns the actual changes made to the areas outlined in the previous stage. BAe implementation consisted of a framework for change, managing change and project management.

A *Framework* for change relies on defining, initialising, implementing and consolidating change. In defining change, the process enablers are divided into four categories (systems and processes, people and culture, structure and technology) in order to move them from the existing situation to the desired situation. Normally an implementation team leader is nominated for the project to ensure that common enablers are implemented (1995b). He establishes a relationship between elements of the framework, evaluation issues and the vision established to address evaluation issues. For example, Table 6.7 relates the change framework elements with the issues found in the evaluation and the vision established in the previous phase.

Table 6.7 Relationships between various elements of change methodology

<i>Framework elements</i>	<i>Related issue found in evaluation</i>	<i>Vision established in envision phase</i>
1.Systems and processes	1.Payment to vendor starts before goods receiving inspection	1.No inspection, payment starts at receipt of goods
2.People and culture	2.Empire building	2.Working as facilitator
3.Structure	3.Functional ownership	3.Single process owner
4.Technology	4.Multiple entry of data	4.Single system/single entry

Under *change initiation*, the team leader inaugurates one or two pilot projects or areas where he/she can test the vision before roll out (BAe, 1994a). However, a pilot may not be necessary in certain projects (BAe, 1996b). The purpose of the pilot is 'to test as much of the overall design on a pilot area prior to extending this to the total

organisation' (BAe, 1994d). The ideal area to start with is the one that is enthusiastic to embrace change, poses less risks, shares common characteristics with the rest of the areas and has done some work in the transformation or part of it. (BAe, 1994d, pp. 28f). The successful test of one or more pilots follows migration planning which is preparing the organisation for roll out.

Full implementation is introduced in phases and begins with the drafting of an implementation programme. One of the earlier projects outlines the implementation plan for the first two years as shown in Table 6.8 (BAe, 1994d). It helps to visualize what is to happen and when.

Table 6.8 Implementation plan of an earlier process

<i>Planning element</i>	<i>Activities to be completed: Year 1</i>	<i>Activities to be completed: Year 2</i>
Manage and develop suppliers	Set-up for pilot suppliers Pilot staff selected and trained Manual systems used	Set-up for 1/3 suppliers Rolled-out to future suppliers base All staff trained Partial automation – selected suppliers
Prepare bid	Options identified and evaluated Selected and trained initial pilot staff Develop technology Initiate at bid stage of a representative contract	Pricing data integrated into catalogue Select and train balance of pool
Define requirements	Pending further analysis by OEI	
Place order	Options identified and evaluated Training developed, pilot use of "PRICE" software	Pilot options implemented Training refined, extended use of "PRICE"
Communication schedule	Combined-site schedule reports written and faxed to pilot suppliers Progress to schedule reported manually/verbally	Automated transmission of schedule to 1/3 suppliers via SMS Pilot automated communication re-schedule adherence

Deliver the goods	Set-up for pilot suppliers/area initial function delivered Pilot suppliers delivery using bar codes	Extended suppliers base, all sites extended function delivered 1/3 suppliers delivery using bar codes – all sites
Pay suppliers	To Pilot suppliers after receipt on monthly basis	To 1/3 suppliers after receipt on monthly basis

The first year is the preparation for the migration (including training to pilot staff and testing of change in pilot areas) of the old system to the new. More staff were trained and the pilot was enhanced to one third of suppliers in the second year. Experimental work with 1/3 of suppliers enabled the company to identify problems (if any) and implement solutions. It provides an opportunity to learn from a few instances in order to get prepared for the roll out phase. In the third year, new practices, procedures and technology will be implemented in all areas.

These kind of plans were accompanied with change management infrastructure and a milestone plan. The former encompass as procurement delivery, jurisdiction of project teams and process enabler. The latter was a pictorial depiction of the elements indicated in the above table with a time scale (BAe, 1994d).

The implementation team also defines the requirements for processes and systems (sometimes called procedures and workflow), for people and culture, structure and technology. For instance, one of the consultants indicated the process requirements in a training workshop (BAe, 1994a). Table 6.9 shows the details.

Table 6.9 Process requirements

<i>Processes and systems</i>	<i>Culture and people</i>	<i>Structure</i>	<i>Technology</i>
Procedures	Management	Functions	IT hardware and
Workflow	style	Team structure	software
Decision processes	Values and	Delegation	System
Non-IT	beliefs	Resources &	integration

information Performance analysis	Team working People development Personnel appraisal	facilities Staff location	Data integrity System security
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The implementation team has to ensure that resources are in place, that other arrangements have been made and necessary training has been provided to the people involved. *Change consolidation* concerns the reinforcing and refreshing of the improvements made as a result of transformation (to be dealt in the next section). The implementation team concentrates on *change management* and project management issues. The procurement BPR team suggested that the

The change management organisation recognises the need to manage the implementation in a controlled way. It establishes a structure that:-

- Has process enabling teams which will be of a limited life-span, responsible for delivering the improvements to the process. These teams will be led by senior people in the organisation, be multi-functional and will be responsible for clear deliverables.
- Embraces the Supplier Management Team and Procurement members of the Contract Team which have longer term roles.
- Manages the implementation through a programme office.
- Works as a team led by the Procurement process owner. (BAe, 1994d).

Management of change introduces new working methods, relationships, skills, communication channels/modes and so on. Change management provides an opportunity to change culture, values and beliefs of the people. Changing people is a lengthy and difficult process. However change agents in BAe worked hard to convince people to behave and work differently. For example, Table 6.10 demonstrates a range of comments (issues) identified in an empowerment workshop.

Table 6.10 Change management issues

<i>Areas concerning the issue</i>	<i>Comments</i>
Vision	The programme lacks leadership and direction
Stakeholders' impact	The extent of change in this department was not recognized
Uncertainty	What will happen to my job?
Participation	We were consulted too late
Resistance	We seem to be the losers in all this
Consolidation	We thought the job was done after the 'live data'
Benefits	I am highly sceptical of the promises made
Commitment	We have to do the changing but the benefits are elsewhere

Source: BAe, 1994a.

It suggests resistance of people disguised in various words. The process sponsor and his team designed an implementation strategy that minimised the impacts of the above concerns and prepared the organization to sustain the benefits of change.

Wells argues that determination of the process enablers increase the likelihood of BPR implementation (Wells, 2000). They are the necessary elements for a process to function at full specifications. There were separate enablers for each process redesigned, however, change agents combined them to facilitate understanding of overall change. The following sub section describes them in more detail.

4.4.3.1 Process enablers

A process is 'a set of logically related tasks performed to achieve a defined business outcome' (Davenport and Short, 1990). They may be core, support, management or network (Earl, 1994), and the focus for change will vary from internal to external, or both (BAe, 1996). A process 'takes an input, adds value to it, and provides an output to an internal or external customer' (Harrington, 1991). Inputs may be called 'enablers

of a process', i.e. the elements that facilitate the functioning of a process. Grover, Teng, and Fiedler (1995) identified technological and organizational enablers for BPR projects. Change agents in BAe identified organizational, environmental and IT enablers (BAe, 1995a).

Organizational enablers include: the elimination of internal progression, introduction of standardized working practices and simplification of work authorisation in order to weaken the bureaucratic roots in the managerial hierarchy. It also includes establishment of a flatter structure, an empowered workforce and the availability of multi-functional teams. *Environmental enablers* refer to those where the co-operation of external parties, such as partners, suppliers and customers was required. The implementation of certain enablers require the partners' co-operation: e.g. Ops4 is a joint- process between BAe and Dassault, the success of which depends in part on the extent of co-operation from Dassault because the functioning of some of the enablers was the responsibility of Dassault. The Preferred Supplier Scheme could work effectively provided the suppliers provide the resources and the co-operation to implement them. Customer involvement in the design workshop was also linked to their willingness. *IT enablers* contained integrated IT systems, EDI links, online data access, multi-skilled compiler/illustrator, laptop technology etc (See contribution of IT in the previous chapter). In addition each process required one or more of these enablers. The majority of them was applicable to all of the processes considered/redesigned such as the integration of data, removal of bureaucratic elements and son on.

Analysis

The above description of the implementation phase shows that the change agents were careful in implementing new ideas. They have divided it into three distinct but inter-related phases: pilot, partial penetration and roll out. Phased implementation is a defensive strategy since changes are introduced gradually. People learn from the pilot (s) and then from partial implementation. These two phases give them clues to the problem areas, migration from the legacy to the new system. Employees resolve them

in the real world situation, which help them to welcome roll out. It gives them an opportunity to learn the process of change and involve people gradually towards overall change.

Although phased implementation was a secure strategy there were some problems associated with it. Individual processes should be completed/implemented within six (implementation) months in the original plan but some processes took four years to complete. Hammer and Champy suggest twelve months for the completion of a process (Hammer and Champy, 1993). It seems a long period during which keeping the workforce motivated is not impossible but it is difficult. Holding members of the implementation team is beyond the jurisdiction of the team leader because the team members may leave the organisation or retire. Measurement of the envisioned benefits was also a question mark over the implementation period. There is additional work involved in determining the accumulated benefits over a four year period.

Despite these shortcomings the implementation phase is commensurate with other phases of change. The BPR methodology allows managers to continue improvements in performance. The strategy of continuous improvement is discussed in the next section.

4.4.4 Excel

Excel is an on-going exercise during the life of the process or project and concentrates on the performance improvement and ensures continuous and constant performance. The process owner is designated to keep management's eye on the process, raising prospects of quick results, using a benefit tracking system with milestones, identifying and utilizing change agents to engage participation. The process team will hold meetings regularly, reviewing operational performance and taking corrective actions. Ideally the team should design a communication system that can forecast deviation, problems and interruptions well before their occurrence so that preventative measures can be taken. Re-engineering reiterates on preventing potential problems - an offensive strategy - rather than just correcting problems - a defensive

strategy. The time has gone when such a strategy of defensive management was used to be effective. The excel can be viewed from three dimensions: tasks to be performed, techniques to be applied and deliverables to be completed.

Performance review gives priority to process performance over functional performance; process performance must be measured before proceeding to functional performance. Process activity is aligned with functional activity and reward criteria are related to process and functional goals. Three areas require attention: implementation of quality improvement systems; benchmarking; and performance monitoring. The organization uses EFQM, or the European model of quality assurance, for which a separate directorate has been set up to implement the EFQM model together with the re-engineering of the QA process. To become a benchmark company by the year 2000 was the target of the company at the time of this research. Performance monitoring is the main objective of excel. The key factors of the excel stage are summarized in Table 6.11

Table 6.11 Key factors in the excel

<i>Key factor</i>	<i>Associated activities</i>
Fundamentals of excel	Appointing a process owner Process team reviews operational performance Implementation of quality improvement systems Benchmarking Performance monitoring Review of process and performance
Objectives	Keeping management's eye on the processes Increasing the prospects of quick results Applying a benefit tracking system with milestones Identifying and utilizing change agents to engage participation
Performance	Customer satisfaction

monitoring criteria	Costs Quality of measures Clarity of documentation
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Source: Various presentational material on the nature and methodology of BPR

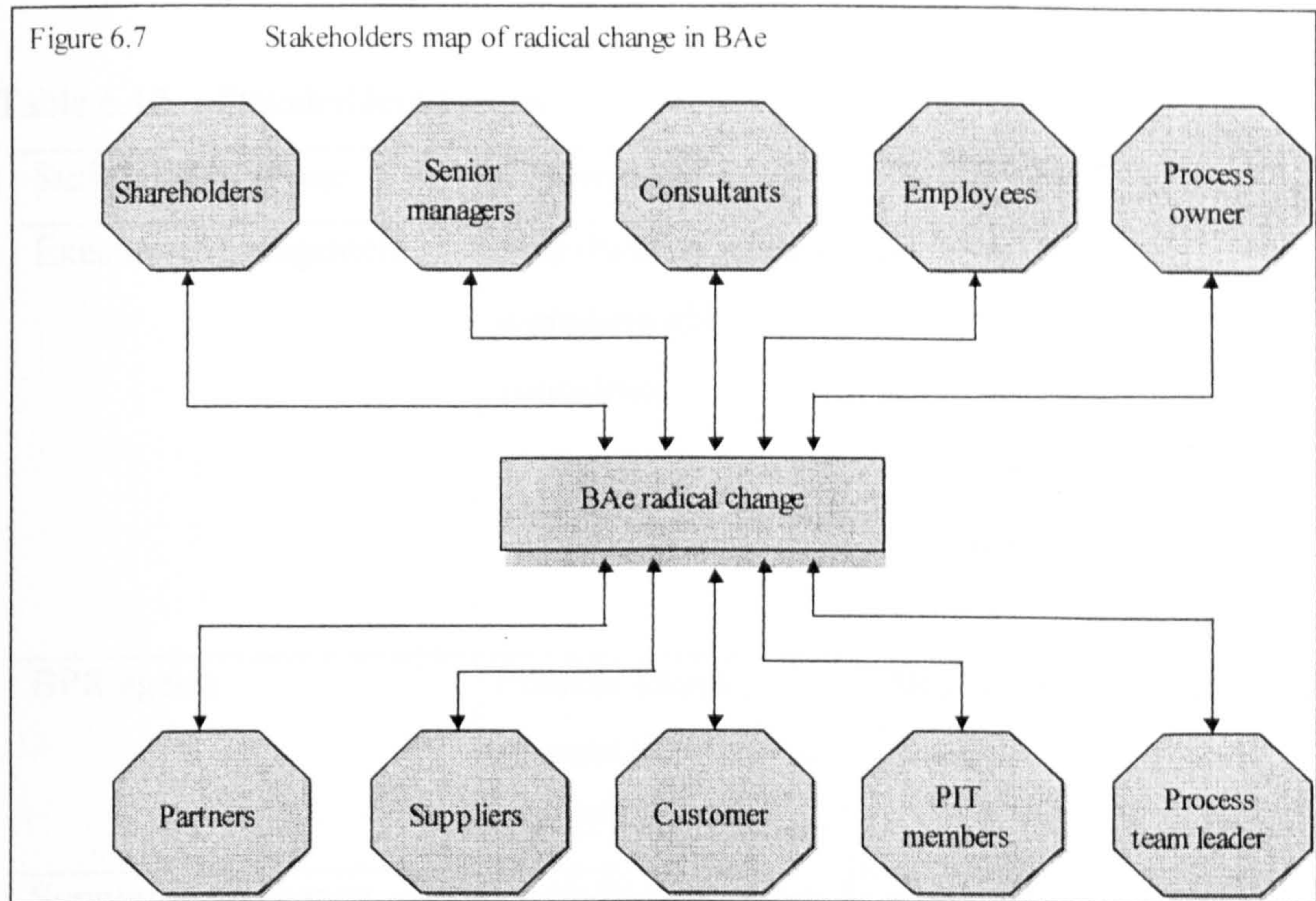
Elzinga et al (1995) suggest a continuous improvement cycle which draws on the redesigning process described. Nevertheless, 'excel' is more than a mere repetition of the redesigning process and is rather more biased towards benchmarking. It ensures the level of success envisioned in the change because it was aimed at measurement of success and taking actions to realise the targets. It keeps the process alive and fresh at the level of implementation; any discrepancy or disagreement is identified and corrected to the desired level. So continuous improvement is necessary to keep control on the performance and to inject new ideas as and when required.

4.4.5 Effectiveness of the approach

The effectiveness of an implementation approach can be measured through the extent to which the approach addresses the issues identified. The multi perspective analysis (MPA) strategy will be used to evaluate the BAe methodology. The MPA is a useful approach because there is no best way to analyse effectiveness of the methodology described above. It provides flexibility for analysis and enables the analyst to look into the same issue from different aspects.

Stakeholders analysis

Under MPA strategy stakeholder analysis and examination of Technical (T), Organisational (O) and Personal (P) perspective are important. The former demonstrates the interests of various stakeholders involved in the change and its impacts on them. Stakeholders can continue their support for a positive outcome and vice versa. The latter divides the issues into three categories to facilitate understanding of them i.e. T.O.P. (or TOP).



Methodology is an instrument to implement BPR since the success of change initiative satisfies stakeholders and vice versa. Therefore it is useful to analyse stakeholders and the extent of their interests in the change. Secondly, an assessment of BPR methodology is necessary so that the success of the initiative (or various projects undertaken within the BPR) can be determined. Thirdly, a comparison of success and the stakeholders interest can be made. The comparison would show the overall success or otherwise.

BAe's shareholders, senior management, employees, process owner, process team leaders, PIT members, suppliers (in some cases), customer, partners (in some cases), outsourcers (CSC) and consultants (PWH) are the main stakeholders (Figure 6.7).

They can be grouped into various categories to facilitate analysis. Table 6.12 shows groups of stakeholders.

Table 6.12 Stakeholders groups

<i>Stakeholders group</i>	<i>Constituents</i>	<i>Stake in the initiative</i>
Executive/management	Shareholders, senior managers and consultants	<ul style="list-style-type: none"> • Invested capital • Launched BPR • Provided human, methodological and IT support
BPR agents	Process owner, process team leaders and PIT members	Design and implemented the change
Supporters to change	Customer, suppliers, partners and consultants	Functioned as enablers, supporters and collaborators. Consultants provide methodological support and designed and implemented IT strategy
Employees	<ol style="list-style-type: none"> 1. Middle managers 2. Operational personnel 	<ol style="list-style-type: none"> 1. Sacrificed power and influence and participated in the change 2. Forwarded improvement ideas, participated in change

The shareholders invested capital for the entire organisation and enabled every one to participate in business activity. Senior managers include the managing director (MD) and members of the divisional management committee (DMC), who launched the BPR programme. In particular the director of IT and the Personnel were 'promoters' of re-engineering. Both of the departments were enablers for implementation of change. Personnel provided human support while IT provided technological assistance. The second category of management were those individuals or organisations who support the change in an advisory capacity as an outsider. For

instance, PriceWater House had advised the design and implementation of radical change and CSC was responsible to design and implement IT strategy. IT was a major enabler to BPR, thus CSC was indirectly involved in the change. They were very keen to see the outcome of their contribution.

The BPR agents are those who evaluated, designed and implemented the theory of radical change. The process owner offered managerial services to the process concerned. The team leader was on the front of the change management team. He was responsible to monitor the day-to-day business of change. PITs is the term generically used for various teams who work in any of the three phases of change e.g. Evaluation, Envision and Empowerment. The PIT members accumulated employee suggestions, customer requirements, partners' proposals and suppliers' recommendations to form the future shape of processes. The Empowerment teams were implementing the suggested changes.

The fourth group of stakeholders were external but independent entities: supplier, partners and customer. *Suppliers* were the enabler in many processes e.g. Purchasing, QA, S&R etc. They were instrumental to reduce 50,000 invoices from the BAe system. The CPC was implemented with the help of nominated suppliers and Preferred Supplier Scheme (PSS) worked with the cooperation of company suppliers. One of the company documents shows that the S&R process serviced 31 customers, supported 17 products, dealt with 700 suppliers and processing more than 74,000 order per annum in 1993 (BAe, 1995a). Some BAe *partners* were also stakeholders in the change e.g. the Ops 4 process was redesigned jointly with a French firm called Dassault. Change agents shared experience and to some extent resources with the partner company. The Evaluation was launched simultaneously in France and the UK. The process issues were identified and then a list of common issues was prepared so that the second phase of BPR could be started. This was a joint venture between the partners. *Customers* input their requirements in a number of workshops held for the collection of improvement ideas since they were one of the beneficiaries

from the outcome of the change. For instance they would receive quality and hi-tech products according to their specifications at the end of the day.

Employees are the key to convert concepts into actions. Success of the change would encourage them, enhance their value for the company and they would expect financial and non-financial benefits from the company. However, they are probably the only group who was worried about their jobs since BPR reduces headcount due to the application of effective methods, procedures and technology. Some of them may lose their existing jobs or place of deployment; so they can be called 'victims' of the change.

Multiple perspectives

In the second stage the issues identified will be divided according to three perspectives followed by analysis of these perspectives so that effectiveness can be evaluated. The data is based on the company documents and interviews taken from the company personnel.

Organisational Perspective of BPR issues

The contextual issues were in the forefront in the organisational issues. Cultural, structural and political aspects were part of the inner context and reduction in demand, intense competition, key customer's purchasing policies and affordability were the main concerns in the outer context. Functional ownership and working in single functions were primary problems. Some of them were legacy problems and others came from the external environment, which is obviously not in the control of the organisation. Although general customers were satisfied their demands and expectations were increasing. For instance, they had to contact BAe personnel to resolve queries. Nevertheless they wanted access to the company systems so that they may resolve queries themselves. Participation, involvement, training and development were also important. *BPR agents* identified lack of price availability, dual inspections, ineffective supply chain and lack of confidence in order-processing in the S&R process. High cost, long lead time and lack of schedule adherence were

also organisation wide problems. They were implicitly involved in the redesigning activity. *External supporters* were deprived of collaboration in the designing business strategy prior to re-engineering. Suppliers were considered outsiders and even rivals in some cases. It required participation in viable areas so that supply chain issues, such as dual inspection, both at the suppliers base and BAe's reception department could be avoided.

Technical Perspective

Competitors were manufacturing at a lower cost than BAe due to the application of radical techniques such as BPR. Management was concerned with controlling cost, enhancing schedule adherence and reducing lead-time. There were multiple systems in operation where data were entered many times. Lack of access to suppliers, customers and partners' databases was causing delays and consequently an increase in cost. Customer satisfaction was also at risk due to technical inefficiencies. Finally, there were some problems in the coordination of various processes after implementation.

Personal Perspective

Management's main concern at this level was communication and the resolution of cultural problems. There was no lack of communication but it was not effective. For instance, people did not know the process for which they were working. Employees' participation in the preparation of company wide documents such as Annual Business Plan was limited to a handful of people working in the 'edit' section. Secondly, people were not empowered where necessary so that they could discharge their duties freely. Functional and power based culture was an impediment on the way to liberalize the organisation. Training and development was required to switch over from hierarchical to flat structure. People believe that implementation of BPR will result in job loss. Some of the external supporters, such as customers, wanted participation and involvement in the design and implementation of change. They wanted to input their requirements at the foundation (as an enabler in the change), get the right things at the right time.

The three perspectives are summarised against respective stakeholders groups in table 6.13.

Table 6.13 Relationship between issues (TOP) and stakeholders interests

Stakeholders interests				
Issues	Executive/management	BPR agents	External support	Employees
Organisational	Contextual (inner and outer) Customer satisfaction Participation & involvement Training & Development Functional ownership and working in single functions	Price availability Supply chain Order processing Dual inspection Participation & involvement Cost, lead time & schedule adherence	Participation & involvement Collaboration Dual inspection	Participation & involvement Training & Development
Technical	High cost Coordination of processes Multiple data entry and multiple systems Systems development takes 'for ever'	Coordination of processes Multiple data entry and multiple systems Systems development Unforeseen technical changes	Data sharing Access to BAe systems	Coordination of processes Multiple data entry and multiple systems Systems development Unforeseen technical changes
Personal	Communication Powerlessness Cultural	Training & Development Cultural Job security Participation & involvement	Participation & involvement Customer satisfaction	Job security

What issues were addressed and what were not?

The analysis is being made on the basis of the three perspectives because it helps to understand which issues were met by the application of radical change methodology and which still remained unresolved.

Issues successfully addressed

The methodology addressed most of the *organisational* issues with a few exceptions. Customer satisfaction, involvement, training, functional ownership, working in single functions were met to a reasonable extent. BPR issues were the principal target of the radical change. On the external front, customer, suppliers and partners were involved in the initiative and partnerships were developed with them. Dual inspection took place in the QA process where the responsibility of quality was transferred to suppliers. They were supposed to make sure that all items shipped were of an agreed quality and quantity. Other supply chain issues were met in the Purchasing, IPC/IPL and S&R processes. Schedule adherence, reduction in cost and lead-time were the objectives of every BPR project. These were also met.

On the *technical* side, management and IT issues were tackled well. The product cost was high compared to competitors, which has been reduced by 30%. Reduction in lead-time (cycle times) enabled to save some cost. The removal of schedule backlog also saved some resources (costs). Technology was instrumental for data integration; hundreds of systems were amalgamated in a few big systems. Multiplicity of data entry was reduced too. Suppliers, partners and customers were given access to BAe systems, which accelerated resolution of queries. Suppliers replenished inventory as soon as the stock approached re-order point; it reduced the danger of being out of stock.

Most of the *personal* issues were addressed effectively. Communication was improved through the induction of published, electronic and personal contacts with employees. Annual Business Plan, LifeStyle, Arrow and Fastrack regularly communicate company policies, strategies, objectives, targets, and market condition

to every one in the organisation. IT networks (e-mail, internet, etc.) and videos were the electronic tools in use. On top of that personal briefings, workshops, intranet and other contacts enhanced the communication process. Feeling of powerlessness was turned into empowered attitude. Job security was ensured, at least, to the extent of BPR because no one was laid off as a result of its implementation. People were retrained and redeployed. Cultural changes were felt. People work in teams, use IT extensively, empire building is difficult and so on. Participation and involvement was not only a norm within the organisation but also customer, partners and suppliers joined hands. Customers are satisfied because they were involved in the redesigning exercise and were enabled to access the company systems and work as partners with BAe.

Unresolved issues

There were some unresolved issues in the external context: influence of the Government on the organisation, pressure on the customers' budgets and changes in the purchasing policies of the key customer. It seems that the methodology has not been designed for consideration of such (external) issues. So far as the technical issues were concerned, the coordination of processes remained an unresolved issue. It is probably due to the use of different teams in different phases of the change. For instance three different teams were used for Evaluation, Envision and Empowerment. All the teams were dissolved at the end of each phase. The team for Evaluation of S&R was formed in July 1993, submitted the Evaluation report in September 1993 and had then been dissolved. Another team was formed for the next phase – Envision. So there was no coordination between various teams. It led to the problem of coordination in the whole process later on.

In short, most of the technical, organisational and personal issues were successfully addressed by the application of BAe process implementation methodology. However, it did not resolve some of the organisational and technical issues, such as influence of the government on the company, pressure on customers' budgets and changes in the purchasing policies of key customers. The influence of the government may not be

within the jurisdiction of the methodology since it is a legacy characteristic of the organisation. Nevertheless, coordination among various processes could have been established by the appointment of a single team right from the Evaluation to implementation.

The above discussion shows that most of the issues identified were resolved by the application of the BPR methodology. However, some remained unresolved. The former are greater than the latter. It suggests that the methodology was an effective approach to implement radical change in the organisation.

Section analysis

Implementation issues and process have been examined in this section. Management of context, content and process was important to understand the actions taken by managers. Managerial style explains the approach applied by management to implement these actions, and organisational learning helps to institutionalise the change. Implementation of business processes is the important aspect discussed in the section. Effectiveness of methodology has also been evaluated using MPA.

The contextual issues were managed through content in the process. Since contextual circumstances were threatening the competitive position, their management was utmost a necessity of the time. The participative style of management had been adopted by managers in order to address the contextual problems. BAe is a private organisation where an authoritative style (e.g. police organisations in the UK) of management is not suitable since people are working freely. Hero manager (e.g. Microsoft Corporation in USA) strategy of management is also no longer practicable in BAe because it is a public limited company owned by the public, other organisations and the UK government. Participation and involvement was the way to success.

Although organisation learning is not a sole strategy for change, it is a part of the strategic plan or grand strategy. Given OL fosters new ideas, practices and keeps

people motivated to assume an ever-changing job description in the team based environment, motivation and ability to learn is an essential requirement for flat structure to work since joining a new team demands new skills to manage the issues involved in that particular assignment. For instance, PIT members in Evaluation mostly worked within the BAe while Envision teams had to solicit ideas from customers, partners, benchmark companies and suppliers. To collect the viable ideas in order to redesign business processes PIT had to visit benchmark companies, customers and suppliers. It enhanced their learning on top of what they had learned to work in a BPR team.

Implementation of change by small chunks called business processes was a safe strategy to avoid the risk of failure. As has been argued elsewhere BAe's gradual approach was named as "patchwork quilt" where a set of three or more processes were selected for redesign. One reason for such a strategy was the failure of a large number of BPR projects; according to Melanie and Munro around 70% of the BPR projects were unsuccessful (Melanie and Munro, 1997). Secondly, the "clean slate" approach or "Big Bang" was not viable because of the high risk involved. It has also been criticised by leading BPR scholars such as Davenport and Stoddard (Davenport and Stoddard, 1994).

The effectiveness of the methodology is the focus of this study. The purpose is to assess the relationship between the methodology employed and the success of BPR. MPA strategy has been applied to evaluate the effectiveness of the approach applied for the implementation of business processes. The rationale for the application of MPA is that there is no best way to judge the effectiveness of the methodology. Looking into the same problem from different dimensions provides a rich picture for the analysis in order to draw a meaningful conclusion.

5. Availability of technology to control change process

Pettigrew and his colleagues argue that whether "technology available (either in-house or brought-in) which can lend greater coherence and deliver enhanced control

over the strategic and operational change process” (Pettigrew et al, 1989). They might worried about the availability of technology in the late 1980s but the 1990s was a revolutionary decade where technology was advancing very fastly. Secondly technology was a key enabler in the radical change initiative and the concept of re-engineering was fostered under the umbrella of IT. Technology was available to support design and implementation of change. For example, there was a PIT member in the evaluation team from Flowcharter Mapping Support in the S&R process, one of the pilot projects the company had undertaken. Other examples include EDI, e-mail, CAM, CAD and so on. Technology enabled BAe suppliers to access its databases to determine the status of the inventory and replenish it without much hassle.

Since the objective of radical change was to improve operational efficiency, the availability of technology was important for improvement in the individual and organisational performance. Performance improvement is closely associated with controlling cost, increasing speed and delivering products and services in time. All these can be achieved through a better or innovative use of technology. For instance, placing a multi-functional loan approval team around the table where each of the members is equipped with a PC or laptop connected to a company’s central systems enables the team to approve or reject the loan application on the spot. All the decision makers regarding loan application are there and they have got the information they need to make decisions. So technology coupled with team based structure facilitates and speeds up the process of loan approval. It saves time, reduces cost and ultimately improves profitability.

6. Time frames involved

Pettigrew et al argue that “companies exist in a plurality of time frames, any account of the management of strategic change must pay attention to the wealth of temporal features involved” (Pettigrew et al, 1989). Management of change with reference to time involved is important because pace and rate of change determine the fruitfulness of an action. If external environment presses management to respond within a calendar year in order to determine the outcome of the action then its fruitfulness is

limited to that particular time period. In other words, time limit is necessary to measure the performance of an action with reference to time period i.e. month, half-yearly of a calendar year.

BAe defined time frames for each of the phases of the initiative. For instance, the re-engineering project was started for five years. Ward puts the context of the management decision and the time frame associated with it (Box 6.9).

Box 6.9 Time frame and its context

They (senior managers) chose these three projects (S8R, PC and Procurement)* because they saw them as part of the core of the business. They had the view that BPR could better be employed in service and management areas than in manufacturing areas. Thus the BPR was designed to handle paper work with a five years perspective because the company thought that the programme would take five years to complete (Ward, interview, 1997).*

** (added by the researcher)*

As has been described above each process was split up into four phases and a time frame was given for each of the steps involved. Evaluation and envision were to be completed in three months each and empower was to be done within six months. However, no time limit was set for the final phase. Perhaps the final phase was meant to be continuous improvement. It suggests that the total time from Evaluation to implementation was twelve months. Hammer and Champy also suggest the same time frame. They argue that “our experience suggests that twelve months should be long enough for a company to move from articulation of a case for action to the first field release of a re-engineered process” (Hammer and Champy, 1993).

A time frame is helpful in order to give a target to change agents and to measure performance with reference to time. For instance reporting profitability on the annual basis is a norm in public limited companies and other low regulatory organisational forms. This a good idea to relate redesign of processes on time basis and link their

performance with financial reporting requirements. The period for process change is appropriate with Hammer and Champy's recommendations who suggest one year for implementing changes in a business process (Hammer and Champy, 1993).

7. Summary and conclusion

This chapter discusses the process of change as suggested by Pettigrew and his colleagues (1989). The process contains five parts: triggers for change, management process & actions, implementation process, technology availability and time frames for change.

Principal triggers for change were the contextual factors identified in chapter 4: competition, dwindling aggregate demand, poor productivity, traditional culture and structure. The drivers for the processes, which have been redesigned, have their own triggers for change e.g. affordability and reduction in cost. The practices of benchmark companies were also drivers for change. For instance, as soon the company came to know that some companies were using credit cards for purchasing low value items, managers considered it worthwhile and feasible to be used in BAe.

Management process & action comprise change agents, their decision-making patterns, the models of change they apply and the way they manage context. Radical change was led by senior managers, project management team, BPR department team, process improvement teams (PITs) and external consultants. The decision pattern was generally democratic and negotiated. For example, the outcome of the evaluation and envision phases of change were negotiated by senior managers, PIT members and the people involved in the process concerned. The change agents applied Gap analysis and System theory for the redesigning processes. BAe managers managed context through marketing efforts, development of partnerships, integration of various change initiative such as CQI, TQM, Management by Performance under BPR banner, flattening organisation structure and empowering people. Changes in culture among other things, were attempted through creating a paperless office and the introduction of electronic means of communication e.g. computers. People

understand flat structure, sharing of power, management by facilitation, working in teams, role of technology, empowerment through using CPCs etc. They also participate in these activities frequently.

Five core processes have been launched to manage context: marketing process, structural process, cultural process (es), IT process and Re-engineering process. These were linked with context and content. Each of them contained two or more sub processes. For example, structural process comprised of the building the team, training teams, communicating with teams, managing teams and so on. The management of main processes and their sub processes led to organisation learning. Managers and employees learned from benchmark visits, external consultants and the implementation of processes. New business processes were implemented in four phases: evaluation, envision, empowerment and excel. Evaluation was aimed at identifying, determining scope and understanding a process. Envision was reserved to suggest the future shape of the process evaluated in phase I. Empowerment was the implementation of suggested changes in phase II. Excel was meant to measure outcome and monitor the process in the rest of its life.

Each of the phases were supposed to be completed within a specified time frame; evaluation and envision were to be completed within three months and empowerment within six months.

The role of technology was central in the implementation of radical change and advanced technology was available to launch and control the whole process of change. For instance, CAD, CAM, EDI, e-mail, CPC, Flowcharting software etc. were on hand to assist the initiation, implementation and monitoring of re-engineering.

From the above facts it can be concluded that features of context, high cost, long cycle time and lack of schedule adherence were the main triggers for change. BAe used senior managers, middle managers and consultants as key change agents. The

decision pattern in the change process was democratic and negotiated. They managed context through marketing efforts, development of partnerships, BPR, flattening organisation structure and empowering people. The change agent applied structural, cultural, technology, re-engineering and marketing processes in order to convert suggested content into visible actions. As a result people felt cultural changes such as working in teams, communicating through PCs, e-mail, using company credit cards and so on. Implementation was accomplished in phases, which were completed in a given time framework and technology was available to assist the change initiative.

This chapter is the final in the series of three: context, content and process. The next chapter presents a consolidated analysis of these chapters and a conclusion will be drawn out of it.

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Chapter 7

Conclusions

1. Introduction

The strategy for the design and implementation of radical change was the subject of the last three chapters, which comprised of context, content and process of change. The context has been divided into inner and outer parts. The inner context comprised of the company history, structure, culture and politics. It “helps shape processes through which ideas for change proceed” (Pettigrew et al, 1992). The outer context contained the economic environment, the business environment, the political environment and the social and economic trends which prevailed. Lau argues that outer context is important because if it changes, the inner context needs to respond concurrently (Lau, 2002). Context is important given “that the intended audience can see how the current situation under investigation emerged” (Klein and Myers, 1999). Chakravarthy states that the lack of fit between the context and the strategic plan chosen can impede corrective action (Chakravarthy, 1987) and Lau concludes that “different contexts do have different impacts on strategic implementation” (Lau, 2002).

The content constitutes the prior competitive strategy, contribution of functions, source of the strategy and evaluation and measurement of outcomes (Pettigrew et al, 1989). Contents are important because they shape the proposed changes in different parts, procedures and facilitate implementation. Secondly, change agents determine the participation of different functional departments and the extent of their involvement in change. Contents also establish the level of achievement the company wanted out of this particular change initiative e.g. 20% reduction in cost or 10% reduction in head counts. In this way the senior managers can be convinced about the need and outcomes of the programme. Change agents can say ‘these are the issues the organisation is experiencing and this is the solution, so, let us go ahead to and resolve them’ (Ward, interview, 1997).

Pettigrew and his colleagues (1989) suggest a number of items to be included in the process: triggers for change, management process and actions, the implementation process,

availability of technology and time frames for change. Triggers for change are important in order to know why change was made and when the need for change was sensed. For instance, BAe sensed the need for change due to economic and political changes in the early 1990s and low productivity due to technological or methodological obsolescence. This caused increased cost, high cycle time and lack of schedule adherence. Management process and actions are crucial in order to know who are the change agents, what was their decision pattern, what model of change they followed and how they managed context. For example, the mix of change agents show the level of support the initiative received in the organisation. Understanding the implementation process was essential to imagine what was the relationship between context, content and the process itself. What management style was in place during the change process? And whether the importance of organisation learning was felt. It also emphasises the procedure involved in the implementation and the way the progress was measured and evaluated. The implementation process reveals the key enablers in the initiative. Availability of technology was significant to explore the technological support both for the change programme and BAe as a whole. Understanding of the time frames involved helped to inform the length of times involved in each of the implementation phases and the entire change project. This is the subject of section two.

2. Key findings from the study

Given the elements of the Pettigrew et al's framework the findings have been divided into three parts: context, content and process. They are inextricably interconnected and almost in a sequential manner. For instance, the contents are based partially on the context and the process is linked with content.

2.1 The context

The context describes the conditions within which the change initiative had been launched such as the economic environment of the country, the political conditions within the country or at the international level, the culture, organisational structure, cost behaviour, and so on. Context can be split up into the inner and outer sections.

2.1.1 The inner context

The first key finding of the study of the inner context was to do with the hierarchical structure of the organisation at the start of the change initiative. This was a legacy of the prevailing management philosophy in place since the commencement of the organisation and had been a successful strategy until the emergence of the process based management approaches such as TQM and BPR. Advocates of such approaches argue that a hierarchical structure is no longer useful in the new era given that the work force is more knowledgeable and customers are well informed. Customers have much more choice in selecting the product they want. Knowledgeable workers and middle managers are capable of performing many of the roles, that used to be done by senior managers, therefore the layers of management should be truncated to close the gap between management and the customer. The customer thus becomes the most important element in the business world of today and needs far more attention from senior management. Fewer layers of management will close the gap between the customer and the senior managers so that the latter can pay attention to issues of most importance to the customers.

The second aspect of the organisational structure related to the power-based relations between the higher levels of management and the lower levels in the hierarchy. A rigid hierarchical structure enabled particular managers to accumulate sources of political power, influence and encouraged the growth of a bureaucracy, given that the characteristics of such a bureaucracy were already there.

Power based relations were also a legacy of this hierarchical structure. This kind of structure allows senior managers to hold the incumbent for a long period of time, which provides them with enough opportunity to develop empires and misuse their organisational status. The communication channels pass through them and that makes it difficult for the lower levels of management to approach higher levels of management. The senior managers function as 'law enforcement agencies' and follow a hardline strategy to implement rules, regulations and procedures. Negotiation and facilitation did not exist. However it does not mean that bureaucracy is responsible for all organisational problems. Jarvis argues that it provides co-operation, co-ordination and structure to decision makers/organisations (Jarvis, 2003).

Organisations need to subsidise dysfunctional aspects in order to take benefits of bureaucracy.

The nature of the company culture was the third element within the context. There were mixed views of the company culture. The Head of BPR services declared it to be traditional in nature (Ward, interview, 1997) and a BPR report supported this view saying that "MAD's way of working is still biased towards schedule adherence and mainly influenced by functional and site traditions" (BAe, 1996e). On the other hand, another report claimed that the company culture was dynamic, and driven by product change (BAe, 1993b). An independent survey by SBAC placed the BAe culture to be above average as characterised by its previous evidence of involvement in TQM and JIT, the existence of a change management programme looking at the human dimension of BPR and change culture which easily responded to change together with employees who saw BPR in a positive light (SBAC, 1995). BAe had previously tried a number of change initiatives such as TQM, CQI and Management by Performance, altogether none of them had been successful, however, they provided useful input into the BPR initiative. The human element of BPR was evident from the human resource strategy of the company (see chapter 5), and as reported in the S&R evaluation report, "middle management were aware of and willing to change (in general)" (BAe, 1993b). All of this shows that the company was in largely part fulfilling the conditions of a positive culture for change.

There was an interesting relationship between these various findings. The study which claimed to identify a dynamic character and an adaptability towards change was made in 1993 and 1995 respectively. The contrary findings however were identified in 1996 and 1997. The report which concluded that the culture was mainly influenced by functional and site traditions was compiled in 1996 and the interview in which Ward says that the company culture was traditional was conducted in 1997. Since the research data was collected in 1997, the researcher assumes that the later view of culture was valid for this study.

Although the existence of a functional influence has already been analysed under the second factor above, the site traditions were also a distinctive feature of the BAe culture because the

company was spread out over five sites – Brough, Dunsfold, Samlesbury, Warton and Farnborough. Each site was equipped with different facilities and used to perform different functions. For example Warton hosted major facilities such as Finance, Commercial, IT, Customer Support, and Final Assembly whereas Samlesbury was reserved for major sub-assembly work, US sub-contracts, and major machining, and Brough was doing product design, structural testing, cockpit displays, fuel system rigs, and training systems (BAe, 1992). The complementary nature of work created a number of so-called ‘site traditions’. Geographic distance also made every site an implied organisation in itself whereby employees developed their own culture, or at least a sub-culture. BPR however helped to generate some common practices such as working in teams, process awareness, increased moral, sharing power and the extensive use of technology.

Culture is closely associated with organisational structure, and functional structure often produces bureaucratic elements in the culture whereby people are involved in ‘building empires’ rather than in sharing power. People may thus be unfamiliar with working in teams and managers had to function as a ‘boss’ rather as a coach. Some of the BAe managers were not IT-literate and tended to be against the dominance of technology in day-to-day activities. People also had unfavourable views about both BPR and consultants in general. They regarded BPR as a movement for redundancy and consultants as unproductive externals. Overall, therefore, BAe management had a limited view of BPR’s scope or its possible success because there was a general lack of understanding of the new management philosophy.

Performance ineffectiveness was the fourth element identified in the study of context. The higher cost (compared to competitors) forced the management to reduce cost through the radical change initiative by up to 30%, and thus it became one of the major objectives of the re-engineering initiative. Long cycle times, delays in delivery and other inefficiencies were implicit reasons for such high costs because organisational resources were engaged in the completion of an aircraft for longer than the estimated time. This not only causes increases in cost and delivery times but also causes dissatisfaction in the customers. Another reason for the high cost of projects was the existence of non-value-added activities (NVA). Value-added

activities (VAA) are those activities for which the customer pays. Value added time as a percentage of elapsed time ranged from 0.02% to 4% (BAe, 1994d). This meant in turn that the percentage of NVA activities ranged from 96% - 99.95%. The costs were high at a time when competitors were offering “cheap” products (e.g. Russian MIG family of aircraft) and key customers were buying from the open market (e.g. MoD the company’s principal customer is committed to an open competitive procurement policy) instead of from BAe alone. Such a perspective created a more serious situation for the organisation in that the company stood to lose its market share if this situation were to continue without action being taken to correct it.

2.1.2 The outer context

The first factor to note was the decline in the aggregate demand for the company’s products. The military expenditures of its major customers were reduced as Eastern European countries cut their military expenditure by 25%, and the USA 15% during the period 1991-95; the NATO countries also reduced expenditure by 2% year on year until 2000 (BAe, 1992). Consequently sales declined, BAe, Military Aircraft, slid from sixth to eighth position in Military Aircraft sales between 1991 and 1992 (BAe, 1993, 1994). Much of this fall was due to the collapse of the former Soviet Union. Secondly, the UK Ministry of Defence (MoD) had been a key customer but the magnitude of its business was jeopardised when the MOD implemented a policy of off-the shelf procurement and competitive tendering (BAe, 1992). There were a few opportunities in the Middle East, Asia and the Pacific Rim countries whose demand for military equipment was increasing at the rate of 4% a year.

The “Cold War” ended in 1990 and communism in Eastern Europe was scattered, as the former satellite states of the Soviet Union started to convert into market economies. The military threat from the West was no longer considered effective and instead consequently, they launched economic welfare programmes and cut their defence expenditures. This was also due to the military and moral defeat of the Soviet Union in Afghanistan and worse economic conditions; the former Soviet Union was unable to provide an economic shelter to their allies so the “empire of labourers” collapsed.

The third important factor involved the strategies of the international defence companies. Given that too many competitors were competing for a declining share of the market, they were re-aligning their resources. For example, General Dynamics sold its military aircraft division to Lockheed and Soviet Design Bureaux brought perfectly capable aircraft to the world market at low prices (BAe, 1993). General Dynamic Missiles had been linked up with Hughes and General Electric with Martin Marietta (BAe, 1994). In Europe similar trends showed the way towards consolidation, for example almost all of the Italian aerospace industry was subsumed into a single unit called Finmeccanica.

Such reactions were also the result of the end of the "Cold War". The overall decline in demand and the intensification of competition compelled the defence companies world wide to consolidate their resources. Mergers and acquisitions became viable alternatives in order to meet competition and retain or even increase market share. BAe however chose partnership instead, because it was more attractive from a European perspective.

The fourth important finding identified was the pressure on the military budgets of customers. When there had been a threat to their security during the "Cold War", they had been buying military equipment at any cost. As soon as that threat was removed they changed their behaviour. Without this pressure, they bought according to their available budgets and national priorities. For instance, there were some business opportunities in the Middle East, Asia and the Far East where most of the nations were developing their economies. As these 'countries advanced, their expectations of increasing health and education put their defence budgets under even more pressure' (BAe, 1994). This made it difficult to secure new contracts in these emerging markets (Middle East, Asia and Far East) and more complicated to convince European customers to buy defence equipment.

The fifth external factor related to changes in the procurement policies of key customers. Since the military danger from the former Soviet Union was now over the Ministry of Defence (MoD) had cut its defence spending. It was also implementing a policy of off-the-shelf procurement and competitive tendering that implicitly reduced the home market and made it difficult to win new contracts easily. Any contracts obtained were competitively

priced and thus they were not as profitable as they had been during the “Cold War” era. Since the Government also reduced spending on defence research, obtaining Research & Development funds also became increasingly difficult. These conditions were the aftermath of the political adjustments of the early 1990s.

This off-the-shelf policy had been adopted by the MoD because of price, delivery schedule and quality. The MoD could obtain cheaper aircraft, for example, from other sources such as the Eastern Soviet states who were offering the same or higher quality products at lower prices. The BAe Annual Plan reported that the MIG family of aircraft were competing against three renowned BAe products (BAe, 1992). Thus competitive products were available at lower prices and this was one of the reasons for the change in policy. Also since one of the objectives of the BPR initiative was 100% schedule adherence, this would indicate that there were actual delays regarding delivery to customers and that’s why this particular factor was set as one of the major objectives of the change initiative. The MoD was worried about the timing of deliveries from BAe, whereas other suppliers were able to meet the schedule deadlines. Thus the MoD changed the policy of purchasing solely from BAe and decided to purchase on the open market.

Finally, although the organisation was a limited company, it remained under the political influence of the British government because they continued to control the board of the company, and maintained a special share in the ownership. The Ministry of Defence was a major customer of BAe and influenced its total sales and competitive position. International contracts were also subject to political considerations in that if a country’s relations were not good with the UK government then BAe would not be allowed to sell anything to that nation. This was the result of an international political scenario over which the government of the UK only had a limited control. As a result this was and remains an uncontrollable factor for the company. A summary of all these findings is shown in Table 7.1.

Table 7.1 Summary of findings regarding the company context

Internal	External
Power based relations	Intense competition
Hierarchical structure	Dwindling aggregate demand
Traditional culture	Political changes due to the end of so called 'Cold War'
Comparative inefficiency and ineffectiveness	Competitors policies (international mergers and acquisitions)
	Pressure on customer's budgets
	Changes in procurement policies of key customer
	The company was under the political influence of the UK government

From the above it can be concluded that the company was under the political influence of the UK government, suffering from power based relations, a hierarchical management structure, traditional culture with inefficiency in many areas of its operations such as cost, lead times and schedule adherence. On the external front, competition was tough and competitors changing competitive strategies, and demand shrinking due to various political changes. There was a strong downward pressure on customers' defence budgets and key customers were changing their procurement policies.

Analysis of the findings

The hierarchical structure, power-based relations, traditional culture and operational inefficiency are the key characteristics of BAe's inner context. They are not conducive for the implementation of a radical change initiative and the creation of a culture that can sustain it. Seddon argues that traditional culture impedes effective change, he says "in traditional command and control cultures, managers think about their organisations as a collection of functions... In many cases BPR is treated as a project. The project team is to do the analysis and implement the required changes. However, if management thinking and behaviour remains the same (attending to functional performance), the result is only a re-arrangement of the original pathology" (Seddon, 2001). BAe personnel also feel that the hierarchical structure and functional influences stifled creativity and ultimately change (BAe, 1993c). Many other companies were facing similar problems during the period.

Harvey reported that the Baxi Partnership was implicitly experiencing problems in her organisational structure and was forced to re-organise herself into six strategic business units prior to embarking on BPR (Harvey, 1994). The purpose of re-engineering is to change the organisational culture by flattening the organisational structure, encouraging empowerment, use of IT and improving operational ineffectiveness by the removal of non-value added activities and streamlining business processes.

The outer context was also not supportive; competition was tough and competitors were changing competitive strategies, and demand was shrinking. There was strong downward pressure on customers' defence budgets and key customers were changing their procurement policies. BAe was not alone in confronting competition in the defence market since the collapse of the former Soviet Union pressurised the whole international defence industry. As a result, the demand started to shrink in the first place due to absence of a military threat from the East, competitors changed the basis of competition from technology alone to consolidation and price. It also opened the doors for the defence customer of the former USSR defence industry. They have got more choice to select from the best of breed products, consequently they changed the procurement policies. Some of them re-directed their national budgets towards economic and social welfare programmes.

These concerns were dealt in industry through restructuring and down sizing. Bishop and Williams state that "The defence market is characterized by a close relationship amongst management, the military and the state. In the UK this stability was broken as a result of changes in the domestic and international defence environment in the 1980s. Many defence companies suffered. Some moved into civilian markets, others went overseas. These developments appear to have been associated with restructuring" (Bishop and Williams, 1997). Restructuring was the viable alternative available to save the industry. However this was a very hard decision since BAe alone lost 20,000 jobs from 1990 to 1994 (BAe, 1994). The company was not alone in the disaster, the other side of the Atlantic also suffered heavy losses. Bates and Kukalis report that "in the golden years of the 1980s, almost 12,000 Southern California firms were linked to the aero- space/defence market. Since 1989, the

year when the Berlin Wall fell, Southern California lost 175,000 (44.7%) of its high-tech jobs. Base closures will shrink the market by another estimated 33,000 jobs and the aerospace/defence industry expects to lose another 220,000 before 1995" (Bates and Kukalis, 1998). From this perspective and being tired of restructuring BAe launched re-engineering in the hope that this was the better option in order to save the future of the organisation. The BPR initiative helped BAe in addressing these external pressures as well as internal issues such as resolution of legacy issues in IT and changing company culture.

2.2 The content

Content covers the components of the strategy that was formulated and implemented under the banner of radical change. These components were divided according to the suggestion of Pettigrew and his colleagues, namely, prior competitive strategy, contribution of functions including objectives of change, sources of competitive strategy and evaluation and measurement (Pettigrew et al, 1989). The content aimed at addressing the key concerns identified in the context, the objectives of change and some other issues which were identified.

There were several other change initiatives in progress prior to the inception of BPR: CQI, PROSPER 2000, investment in infrastructure, managing by CSF and people's change strategy. TQM was also tried but was not as successful as BPR. The parent company was also restructured which changed the structure of BAe (means MAD) as well i.e. Military Aircraft Limited was separated into two divisions - Military Aircraft and Systems and Services.

Previous initiatives are important when implementing BPR because they can serve as pilot projects in which some kind of work was done in order to roll-out or institutionalise a relatively bigger endeavour. In this connection, SBAC reported that successful organisations exhibited an involvement in previous change initiatives (SBAC, 1995). Secondly, BPR united most of the change programmes, that were running separately in the organisation. For instance, Continuous Quality Improvement (CQI) was replaced with a new process for Quality Assurance, and the people change strategy was merged with BPR. However sometimes small initiatives had to be closed in order to create a large one. For example, it is

relatively difficult to run both TQM and BPR simultaneously. In such a case the smaller project has to be discontinued in order to operationalise the larger one.

Secondly the core functions such as Marketing, IT, Personnel and Manufacturing all contributed positively to making the change happen. The idea of re-engineering was advocated by the IT and Personnel directors and Marketing was instrumental in achieving strategic goals such as an increase in sales and achieving competitiveness. *Marketing* activities were divided into new product development, customer satisfaction and supplier relations for the purpose of analysis. These activities were influential in achieving competitiveness. New products could induce new and existing customers which could in turn increase sales, for example Eurofighter 2000 was a new aircraft that enabled the company to develop a partnership with three European partners and competitors, share both resources and technology. It also helped in accessing European markets that were under the influence of its partners. It seemed to be a successful strategy in capturing additional market share. New variants of existing product lines had been a priority in order to keep up with the advancement of both technology and customer requirements. Thus the induction of new products and the updating of current product lines enabled the company to maintain its stability of demand.

Customer satisfaction was the second element in the marketing strategy. Although all company efforts were initiated to win customers, a range of measures were taken during the radical change. For example customers were involved in the redesign of business processes through vision workshops and design workshops. Secondly cost control and cycle times reduction are the key objectives of BPR; cost has been reduced up to 20% and cycle time from 20% to 50% and in one case by 79%. This can keep the product cost lower than before. If management decides to transfer some benefit of cost advantage to her customers they can expect high tech products at lower prices. The schedule adherence is also one of the basic objectives of the radical change, the target is to achieve 100% schedule adherence by 1999, if this would be achieved, customers would receive deliveries on time. The In Service Fault Investigation (ISFI) process was launched to support in service products, thus customers would receive enhanced product support. These measures and promises were necessary

because competitors were approaching them to offer their products, and at the same time their budgets were under pressure due to social and welfare programmes.

The third important factor was the relations with suppliers, which were not pleasant and were adversarial in some cases prior to the inception of radical change. Cordial business relations were essential to the manufacturer in order to provide quality products to customers and manage resources involved. The company spent £800m with 3,800 suppliers and sub-contractors in 1995 and the key suppliers represent about 80% of annual expenditure. The plan was in place to reduce the supplier base in pursuit of seeking 100% schedule adherence and 100% quality adherence by 1999. Given this perspective, BAe had launched a new process called Procurement in order to re-engineer the supply chain process. This process was supported by the S&R and the Logistics command processes. BAe provided suppliers with access to its databases so that they could monitor, reorder the required quantities and send shipments accordingly. Secondly, the Purchasing of non-aircraft parts and equipment was split up into low value items and high value items. The former were separated from the normal procurement stream, they can be bought through charge cards called Corporate Purchasing Cards (CPCs) by the cardholders from the suppliers. It involved 1000 cardholders spread over 300 departments and approximately 300 suppliers. An amount of £18 million is spent through CPCs and 53,000 invoices had been eliminated from the system.

Thirdly, Preferred Suppliers Process (PSP) was launched in 1994 to work in partnership with suppliers by jointly identifying key opportunities for improvements. The PSP was extended to 60 suppliers by 1996 and plans were in place to include 95 suppliers in the process by the end of 1997. The purpose of this was to maintain and motivate suppliers to continue to supply parts and equipment, since company activities would not have been possible without the help of its suppliers (See chapter 5 for details).

Information Technology was at the forefront of the change because the idea for BPR was put forward by the Directors of both IT and Personnel. IT provided integrated data and systems to the organisation as a whole and thus enabled the functioning of individual processes (See details in chapter 5). IT was outsourced to the Computer Sciences Corporation (CSC)

because there were so many systems in use and internal resources alone were not capable of consolidating them. The CSC had got the resources and expertise necessary to manage the volume of work required. Secondly, it was relatively easy for the CSC to examine usage of the systems in operation in order to determine the requirements of new systems and then develop the appropriate solutions. Data integration was necessary to get rid of hundreds of systems and avoid the duplication of effort that was causing an increase in operational costs which contributes negatively towards the achievement of strategic objectives.

Personnel saw BPR as an opportunity for organisational development through the involvement and development of staff. The main contributions of Personnel were in the areas of structural, cultural and political issues. The organisational structure was made efficient through the introduction of a team-based organisation and a flattening of the structure. On the political front, people were empowered in an attempt to allow them to work freely and independently. Empowerment enabled employees to share power and discouraged building of empires. These measures were coupled-with the increased use of IT to make the cultural change meaningful and such measures were important in increasing the organisational effectiveness. In addition, the effect of bureaucracy was weakened, people became motivated and functional influences were reduced.

Manufacturing was a major beneficiary of the change because every process facilitated it directly or indirectly. Ops 1-4, IPD and Works Engineering were directly involved in the manufacturing activity and many others were supporting it such as S&R, Procurement, IPL/IPC, and PC. Manufacturing was the core process of the organisation, achieving competitiveness was the strategic objective of management this would not have been possible without having efficient manufacturing facilities and processes. Secondly the company was competing on the basis of technology, and the application of technology was critical in manufacturing. Other areas were simply supporting it, so even if other areas were advanced in technology, this did not mean anything unless the technology was applied within manufacturing in order to gain competitive edge. For instance CAD and CAM were available to be utilised in order be of benefit.

QA was involved in each of the business processes and in all aspects of manufacturing, delivery and customer support. For instance, customers require and demand high quality products because it offers them reliability and durability. BAe therefore has to maintain quality in order to satisfy customers. On the other hand, the company itself needs quality in its parts and in the equipment they purchase from their suppliers because low quality parts and equipment increase manufacturing costs. For this reason BAe transferred responsibility for maintaining quality to its suppliers. This was part of an overall supplier strategy and a stated aim of the QA process. QA ensured quality in manufacturing and other internal activities of the organisation. The essence of the QA process was to create an awareness of quality and to transfer responsibility to appropriate people in order to achieve the overall quality objectives.

Finance was important because it managed the resources required for implementing the change, which demonstrated the commitment and support of senior managers for the cause of such change. Investment in the new initiative was a risky venture due to failure of many previous change initiatives. However, because the senior managers and other major stakeholders were all involved in the process of change, the acquisition of the necessary funds was not a problem for the change agents. The prudent use of these funds was the main challenge and this apparently was done well.

Strategists generally divide *objectives* into several categories: strategic (leadership in the industry and strengthening competitiveness), managerial or operational (improving suppliers performance and increasing order intake), project level (pursuing sales prospects and protecting the ability to deliver, supporting the export standard of the aircraft market), BPR (involvement, 30% reduction in cost), and process level (QA process to convert uncertainty to assurance). The overall purpose was to increase the focus on all activities at each of these levels, including both the strategic and the re-engineering.

Strategic objectives such as the management's desire to lead the industry were ambitious and commensurate with a radical change philosophy. Although the overall objective was demanding and had been set prior to the BPR initiative it was capitalised on through re-

engineering. Other radical change objectives were similar to the flag bearer of BPR but more focused towards perceived weak areas in the organisation: cost, cycle time and schedule adherence. These also complied with the BPR agenda set out by Hammer and Champy (1993) who argued in "Re-engineering the Corporation", that the outcome of process redesign should be not less than 20% improvements in cost, quality, service and speed. Most of the objectives were achieved as a result of the BPR initiative i.e. cost 20%, cycle times up to 79% and schedule adherence 98%.

The change agents used were defensive in terms of their *assumptions and expectations*. They assumed that BPR was a new management approach, that the role of IT would be limited in the beginning but would gradually improve, that the initiative was business-driven rather than IT-driven, that a 'clean slate' approach was no longer practicable, that BPR was a gradual change or 'patch up work' rather than a 'big bang' one-off event, that people were expecting a step change in performance rather than simply incremental improvement, that it should be interpreted as a democratic process of change where lots of people were involved. Finally, although people felt that there was a cultural change that would be long lasting and would create far reaching impacts on the way people were to work, the programme was seen as a low profile initiative.

Since the organisation had already experienced a number of previous failed change attempts, the internal change agents were therefore cautious about the role of IT and the propagation of the initiative. The programme was started quietly and as a 'patch work quilt' rather than as a 'big bang'. However, as soon as the pilot projects were judged to be successful, the change was extended to the whole organisation, and, then gradually outside its boundaries for example to partners, customers and suppliers.

The *sources* of the ideas for re-engineering came mainly from the USA. MIT's IT in the 1990s, Hammer & Champy, Davenport, Kettinger and Grover amongst others were the principal contributors. BPR was concerned with innovation, and innovative work could be carried out anywhere in the world. However leading local scholars have also contributed

positively to the advancement of BPR in this country including writers such as Earl, Galliers, Willcocks, Mumford, Peppard, and Checland.

The Role of the specialist was significant in the introduction of the change. The ideas of BPR were put into practice by the consultants who were offering the special knowledge and know-how necessary to introduce step changes in organisational performance. Nevertheless, the company got rid of them in the second year in order to become self-sufficient. SBAC study however supports the involvement of external individual specialists in BPR programmes (SBAC, 1995). Fincham and Evans argue that such people provide enthusiasm and inspiration, mechanism and how-to procedures in order to realise the required ambitious goals (Fincham and Evans, 1999). On the other hand, Grint and Case have argued that BPR was a product of bellicose US management consultants (Grint and Case, 1998) and there were many benchmark companies in the study by SBAC who did not involve consultants in their re-engineering endeavours (SBAC, 1995). Despite these reservations, BAe, however, clearly benefited from the involvement of the consultants.

Strategic and operational *measures* were put in place to assess the progress of the initiative and these formed a multi level performance measurement system. BPR measures were separate from both project and strategic measures because management wanted to measure BPR success on the one hand and project/product success on the other. In fact BPR measures such as cost cycle time and schedule adherence were also applicable to individual projects/products. A reduction in cost was achieved in each of the projects, and schedule adherence and the reduction of cycle times were included into all projects.

Strategic performance measures such as industry leadership were the speciality of BAe. BPR was instrumental in realising these through concentrating on relatively weak areas in terms of performance. Nevertheless, re-engineering measures were also commensurate with Hammer's (1990) performance measures – cost, quality and speed. Schedule adherence and reductions in cycle time were examples of speed. Table 7.2 summarises the key findings regarding content

Table 7.2 Summary of findings regarding content

Key content	Related aspects
Several change initiatives were in progress prior to the radical change initiative being implemented	CQI, PROSPER 2000, investment in infrastructure, managing by CSF and people's change strategy, TQM and restructuring.
Marketing, IT, Personnel and Manufacturing contributed positively to the cause of BPR	Marketing (new product development, customer satisfaction, supplier relations), IT (Data integration, EDI, access to databases), Personnel (Involvement, empowerment, training and development) and manufacturing (design and development of aircraft and supporting the customer)
Strategic, project and BPR levels of objectives were set for the change	Strategic, project, BPR (Generic BPR and process)
Change agents were defensive in terms of their assumptions and expectations	Less risky approach was selected to implement the change
The sources of the strategy were foreign	Mostly US oriented
Role of specialists was significant	Consultants, internal specialists
Strategic and operational measures were in place to measure the success of the change	Cost, cycle time, schedule adherence, people involvement

It can be concluded that there were several change initiatives in progress prior to the inception of BPR. BPR was launched as a 'patch work quilt' but also as a strategic approach with the help of consultants in order to gain leadership in the industry and to improve operational efficiency. Marketing, IT, Personnel and Manufacturing were instrumental in the process of change. The change agents themselves suggested a less risky strategy for transforming the organisation, and strategic and operational measures were put in place in order to measure the impacts of the change.

Analysis of content

Although the previous change initiatives were not as successful as envisioned they provided a basis on which the radical change was started. The presence of previous initiatives has been supported by SBAC, which notes that successful organisations who implement BPR

were involved in previous initiatives such as TQM and JIT etc (SBAC, 1995). Since BAe experienced TQM, which shares many characteristics with BPR e.g. business processes as the basis of improvement and focus on customers, this experience was useful for embarking on re-engineering. Several functional departments played a significant role in the implementation. The Marketing department was in the forefront because supplier relations and customer involvement/satisfaction were the corner stones of marketing strategy. This was necessary to establish backward integration with suppliers and forward integration with customers. SBAC's survey has indicated that "the biggest gains are being made by companies that include suppliers and customers in their Business Process Re-engineering programmes." (SBAC, 1995). It also provides the basis to establish inter firm relations (in BAe case with suppliers and partners) for economic advantage, learning implications and strategic appropriateness (Sobrero and Roberts, 2002). They argue that "individual organizations can no longer rely on their own resources to compete in today's world. Rather, they should look for strategic interactions allowing them effectively leverage internal resources by investing in some core competencies and contracting out other knowledge domains" (Ibid., p. 159). IT and Personnel were other enablers and key participant in the change. The directors of both departments were proponents of the idea of BPR in BAe partly since the concept of re-engineering was developed in the IT field and Personnel saw it as an opportunity for the development of the organisation. Researchers identified IT as a critical enabler for the success of BPR projects (Teng et al, 1998). Personnel or human resource issues were also prominent in the literature. Researchers at Warwick argue "that failing to give priority to human factors at a time of radical change can break an existing social contract within an organisation" (Peltu et al, 1996). Ranganathan and Dhaliwal identified lack of human resources in the implementation of BPR projects in Singapore (Ranganathan and Dhaliwal, 2001). From these arguments it seems that the directors of IT and Personnel were on the right track to advocate bringing in the re-engineering programme. The change agents adopted a defensive attitude (e.g. 'Patch Work Quilt' as a change strategy) towards the radical change. The change agents were conservative because Patch Work Quilt was a less risky strategy, which could be tailored with available resources. The 'Clean Slate' strategy did not allow utilisation of existing resources. Secondly, since the company experienced a number of failed change attempts, a

low risk initiative was a logical direction in order to avoid probability of failure. Management consultants played a vital role in the change initiative. BAe borrowed the services of external consultants in order to share knowledge and experience with them. It worked well since managers learned the bits and bolts of BPR within two years and then external consultants were withdrawn from the re-engineering team. Researchers support the application of consultants in the reengineering initiative; Carter and Crowther regard them as “fuelling the process” of change (Carter and Crowther, 2000). On the other hand there are some reservations about the use of consultants in generic change programmes but the researcher did not find any reference, which opposes the use of them in BPR projects. SBAC reported a firm who did not use consultants on the ground that the firm wanted to promote its own people rather than objecting the role of consultants in BPR (SBAC, 1995).

Four levels of objective were legitimate to the nature of the organisation and the products it manufactures. For example, strategic objectives were for the whole organisation, project objectives were for individual products such as the Harrier or Tornado aircraft and reengineering objectives were split up into generic objectives and individual processes objectives. The generic BPR objectives consists of 30/50/100 formula whereas each process has its own objectives such as, S&R was to satisfy the customer through quality spare and repair services, QA has to change uncertainty about quality into certainty and to create confidence about the company products and services. Performance measures were designed according to these objectives in order to evaluate the achievements made at various levels. This hierarchy of objectives and related performance measures strengthened the way to achieve the envisioned success in terms of the strategic competitiveness required to compete in the twenty first century.

The political objective of the change is to enhance control on the employee, customer and suppliers. For instance, the QA and Ops projects strengthened control of employee activities and put more control on them by specifying standards and integrating manufacturing activities. IPL/IPC, S&R and ISFI facilitated customer by specified lists of parts and equipment, providing effective supply support and prevention and correction of

faults of in-service aircraft. This gave increased control on the products/equipment in use, which were actually not the company's product.

The QA develops confidence in the employees about the output and its standard. Many of them were not sure about the quality of what they were manufacturing or receiving from the suppliers. However, the implementation of QA provides additional assurance that the right product will be delivered at the right time since this is the responsibility of suppliers to ensure the quality of the products they supply.

The above picture of strategy content shows a pretty good balance of human, material and technological resources. The next section examines how well these resources were utilised in order to achieve the envisioned objectives.

2.3 The process

According to Pettigrew and his colleagues, the process contains five key components: triggers for change, management process & actions, implementation process, availability of technology, and time frames for change (Pettigrew et al , 1989). They are taken in turn.

Principal *triggers* for change were the contextual factors identified in chapter four: competition, dwindling aggregate demand, poor productivity, traditional culture and structure. The triggers for individual processes were different e.g. affordability was the main driver for Ops 3. The practices of benchmark companies were also drivers for change. For instance, as soon the company knew that some companies were using credit cards for purchasing low value items, managers considered it worthwhile and feasible to be used in BAe.

Some of the contextual factors – competition, reduction in demand – were similar to other companies in the industry because of political changes. Reduction in demand forced other players in the industry to reduce the workforce. For example, in the USA McDonnell Douglas had lost 60,000 jobs since 1990, in Europe Deutsche shed 16,000 jobs and gave warning of another 11,000 in the same period (BAe, 1994). Hierarchical structure also

prevalent in the industry but was shrinking due to the adoption of process based management techniques such as TQM and re-engineering. This type of structure was also responsible for traditional values and beliefs i.e. empire building, abusing organisational authority, bureaucracy etc. This kind of structure and culture was the target of radical change in BAe and elsewhere. Process related drivers were unique to each of the processes due to the exclusive nature of the process itself. Two or more processes may be overlapping but each was designed to distinguish it from others. As a result its drivers must be different because it was addressing a specific area e.g. Bid Preparation was designed to win the business. The third type of drivers came from benchmark companies. Every company was practising differently but was not known or was not in the practice of BAe (e.g. CPCs), so as soon as the company came to know its viability, it became a driver for the company.

Management process & action comprise change agents, their decision-making patterns, the models of change they apply and the way they manage context. Radical change was led by five groups of *change agents*: senior managers, project management team, BPR department team, process improvement teams (PITs) and external consultants. The involvement of senior managers was important in order to solicit their views for designing the new process. It helps to gain and maintain their support, which has been widely considered a critical success factor for re-engineering projects (ProSci, 2003). The importance of consultants has already been argued in the content section. Other change agents were appropriate for this kind of initiative because process improvement teams and a set of internal consultants were common in the radical change programmes. PITs were responsible for assessing current processes (if any), identify solutions and implement them. The BPR department team provided support to PITs and employees involved in a process. The project management teams provided requirements of their projects such as what level of sophistication they need in terms of technology. The *decision pattern* was generally democratic and negotiated. For example, the outcome of the evaluation phase of change was negotiated by senior managers, PIT members and people involved in the process. In the second phase, the future shape of the process was articulated, vision workshops were held to collect improvement ideas from the people involved in the process. Other stakeholders were also involved in the negotiation of the potential shape of the process in design workshops. This kind of approach was useful in motivating stakeholders to

get approval and to keep them involved. However, involvement may cause dissatisfaction because those involved wanted to see visible outcomes of their suggestions. If change agents say 'well we have asked you for improvement ideas, but they are not practical therefore they are not included'. Two *change theories* were applied by the change agents Gap analysis and System theory for redesigning processes. The Gap analysis was meant to fill the gap between best practice companies and BAe with the aerospace industry or big companies outside the industry. It seems that this might be the first step towards the benchmark status, which was the intention of the company in many areas such as quality. Secondly, people felt that they were competing with the high flyers in the country. Thirdly, it improves performance straight away. However, this was not an innovative approach to the redesigning process under which ideas were borrowed to close the difference between benchmark companies and BAe. The System theory of change was the second theoretical model applied. This meant that changes in one part of the organisation brings changes in other parts. This kind of rational model was appropriate in connection with re-engineering implementation, which emphasised holistic transformation in an organisation through improvement in business processes i.e. sub systems. Nevertheless, sometimes it impedes optimisation in one part (or sub system) because it might de-optimize in other parts (main system or sub systems).

BAe managers *managed context* through marketing strategy, development of partnerships, integration of various change initiatives such as CQI, TQM, Management by Performance (MBP) under BPR banner, flattening organisation structure and empowering people. Changes in culture among other things, were attempted through the extensive use of technology. *Marketing strategy* contained three aspects: new product development, customer satisfaction and suppliers relations. The development of a new product including updating the existing range was legitimate to handle the problem of falling demand. It helps to induce new customer and offer better products to present users. For instance EU2000 was developed with the help of European partners which created demand within the country and in the European union. This was also helpful to compete with new entrants in the market such as the MIG series of aircraft. Secondly, customer satisfaction strategy was directed towards existing and new customers. This was also necessary to establish long-term relations with them and resolve relevant concerns. Involvement of the customer in the change increased their interest

in the programme and company activities especially as they get to know more about BAe products and the way they are manufactured. Thirdly, relations with the suppliers were a priority to ensure proper functioning of the supply chain and to redress concerns about them as indicated in the issues identified in the assessment phase. The suppliers were enablers in the Procurement, S&R and Spare & Repair and Supply Chain processes. These processes were instrumental in developing business relations with them. The suppliers also benefited from the company initiative, BAe provided them access to its systems, their processes were redesigned and their people worked as members with the BAe teams. On the contrary, it increased dependence on suppliers and they knew business secrets, which urged the BAe management to establish a business partnership instead of working as an independent business unit.

The company had established business and re-engineering *partnerships* with competitors, customers and suppliers. Partnerships were the counter strategy against competitors especially US companies because they adopted mergers and acquisitions as the competitive strategies after the Cold War. Joint ventures with American companies facilitated access to US technology and markets. A business partnership was also necessary to soften the competition in Europe, e.g. Dassault was a French competitor but was a partner in the development of the EU2000 fighter aircraft. Dassault was also a partner in the redesign of the Ops 4 process. Collaboration with the customer was aimed at developing confidence between BAe and its customer and to transfer technology so that the customers may manufacture a whole or part of the product on its own. It also helped to develop manufacturing facilities abroad. Partnership with suppliers was important to ensure a timely supply of quality parts and equipment.

Integration of various initiatives in progress was important because BAe had started a web of stand alone initiatives for the development of people and increasing organisational performance as mentioned above. They were launched by management as and when necessary and were working independently. With the introduction of BPR, they were put under the management of it. For example, a quality improvement strategy was in operation but as soon as BPR took over other key processes, management started thinking to 're-

engineer' quality itself. So the QA process was launched to tackle all quality issues and initiatives. Human resource development strategy was announced in the beginning of 1993 but was merged with BPR later on. These steps gave a consolidated view of BPR and provided a clear direction for each main process or sub processes.

Five management processes were instrumental in the management of context: marketing process, structural process, cultural process (es), IT process and re-engineering process. These were linked with context and content. Each of them contained two or more sub processes. For example, structural process comprised of a building team, training teams, managing teams, and so on. The roles of these five main areas have been examined in the context and the content sections. The purpose of looking into them here is to understand them as major processes that were involved in turning content into action. Marketing, structural and cultural processes, were designed to cope with the contextual characteristics. Re-engineering was considered to integrate them and IT was both a main process for the whole organisation and an enabler to sub process in the BPR activity. Procurement, S&R, IPL/IPC, PC, QA and a series of Ops processes, to mention a few, were constituent processes of radical change (See appendix A).

Management of main processes and their sub processes lead to *organisation learning*. Managers and employees learned from benchmark visits, external consultants and implementation of processes. It resulted in proportionate savings in manhours (See Figure 6.5). Implementation methodology provided a good opportunity for learning different aspects of change: methods, tools and techniques (Chapter 6 section 4). In this connection, Vakola found in a study based on three organisations that implementation of re-engineering had a close link with learning in organisations (Vakola, 2000). BPR methodology enables participants to share knowledge and experience which is according to Griego et al is an indication of a learning organisation (Griego, 2000). BAe's learning centre was a good example of the company's strategy to provide maximum opportunity for learning. On top of that radical change initiative brought external inputs like benchmark ideas and consultants to enhance the process and speed of learning. The implementation process itself was a great source of learning. For instance, Peter Tower was an engineer by profession but he was

provided with training for BPR tools and techniques, which increased his understanding of organisational functioning and management know how. This was one of the direct benefits of the induction of BPR in the organisation.

New business processes were implemented in four phases: evaluation, envision, empowerment and excel. Evaluation was aimed at identifying, determining scope and understanding a process. Envision was reserved to suggest the future shape of the process evaluated in phase I. Empowerment was the implementation of suggested changes in phase II. Excel was meant to measure outcome and monitor the process in the rest of its life. Each of the phases was supposed to be completed within a specified time frame; evaluation and envision were to be completed within three months and empowerment within six months. These are sequential but logical steps forming a consolidated approach for introducing change in an organisation. It was a successful strategy since most of the processes launched by applying it were successful. It assists involvement of stakeholders and applies the best of breed concepts for designing the future shape of the organisation. Sensible use of the approach makes positive changes in culture such as 'working together' and building confidence among processes, sub processes and individuals. It allows a free and frequent flow of information upwards and downwards, which breaks the communication barriers and encourages creativity and innovation. There were some limitations associated with the approach. The improvement concepts were borrowed from other organisations instead of innovating them. Collecting ideas from benchmark companies was a time consuming and costly activity, and it did not encourage creativity and innovation within the company.

The *role of technology* was central in the implementation of radical change because advanced technology was available to launch and control business processes as well as the entire change. For instance, CAD, CAM, EDI, e-mail, CPC, Flowcharting software, JIT etc. were on hand to assist initiation, implementation and monitoring of re-engineering. Key features of the packages available included integrated databases, client/server architecture, continuous development, common look and feel, standard maintenance and technically current (BAe, 1995a). Three information threads were supporting the core processes e.g. win business (operational requirements and analysis), Develop/deliver (product performance information,

product definition/process information and business planning information) and support customer (defect analysis, maintenance, spare parts lists, service history, in-service cost, maintenance schedule etc.) (BAe, 1995a). The IT strategy was capable of being classified as the best of the breed because it could support core processes and enable BPR to work. As a major enabler to re-engineering it had to offer the best infrastructure, top notch skills and extraordinary enthusiasm. These qualities were all there in the strategy. Table 7.3 summarises the findings regarding process.

Table 7.3 Summary of the findings about process

Constituents of the process	Related factors
Triggers for change	Contextual elements, process related (e.g. affordability and cost were main drivers for Ops 3) and practices of benchmark companies
Management process & action	<ol style="list-style-type: none"> 1. Five types of change agents managed BPR 2. Decision-making pattern was negotiated and democratic 3. Delta analysis and system theory were eminent models of the change they apply
Management of context	Marketing strategy, development of partnerships, integration of various change initiatives such as CQI, TQM, MBP under BPR banner, flattening organisation structure and empowering people and extensive use of IT. Five processes (marketing process, structural process, cultural processes, IT process and re-engineering process) and many sub processes were instrumental.
Implementation of change was divided into four sub processes	<ol style="list-style-type: none"> 1. Evaluation 2. Envision 3. Empowerment 4. Excel
Role of technology was substantial in the execution of change	Examples of technology applications: CAD, CAM, EDI, e-mail, CPC, Flowcharting software, JIT etc.
Time frames for the change	Evaluation (Baseline analysis) 3 months Envision (Redesigning solutions) 3 months Empowering (Implementing) 6 months Excel (Monitoring) rest of life of a process

From the above facts it can be concluded that the features of context, high cost, long cycle time and lack of schedule adherence were the main triggers for change. BAe used senior managers, middle managers and consultants as key change agents. The decision pattern in the change process was negotiated. They managed context through marketing efforts, development of partnerships, BPR, flattening organisation structure and empowering people. The change agent applied structural, cultural, technology, re-engineering and marketing processes in order to convert suggested content into visible actions. As a result people feel cultural changes such as working in teams, communicating through e-mail, using company credit cards and so on. Implementation was accomplished in phases, which were completed in a given time framework and technology was available to assist the change initiative.

Analysis of process

Contextual factors were the key triggers for change. Cost control and affordability stem from them since contextual elements forced management to reduce cost and make the product affordable to customers. Context has already been discussed above, however, most of the contextual elements emerged from legacy of management practices such as hierarchical structure and political changes i.e. collapse of the former Soviet Union. They can be grouped into three headings: competitive environment, pursuing strategic benefits, and process issues. Similar reasons have been identified in a recent survey; Kallio et al found that 78% of the respondents started BPR in response to changes in the competitive environment, 59% in active pursuit of strategic benefits and 47% for problems recognised in business processes (Kallio et al, 1999). BAe's triggers were no different from other companies in the industry since the cause of all their problems was the same i.e. end of the Cold War.

Five types of change agents were used for implementation. Senior managers were an essential input in order to involve them and gain their commitment. The Product Board of various aircraft such as EU2000 offered coordination between product and PITs. The internal and external consultants were necessary for training the employees and the PIT members about BPR tools and techniques. The external consultants brought in the radical change methodology which provided a starting point and a structure for the change initiative. The Process Improvement Team functioned as an operational management team during the whole

process of change. This shows that the change agents were an integrated rich picture of the management structure used for BPR. It seems a strong coalition of internal and external managerial experience and resources. Research in other organisation throws light on the variety of change agents involved in reengineering. For example, Withman identified that “business managers, executives, administrative/staff personnel, IT personnel, and consultants are actually involved in re-engineering projects”(Withman, 1996). Functional executive were also key participants (Ranganathan and Dhaliwal, 2001). The involvement of senior managers was a dominant factor in the success of BPR. Dennis et al argue that “The key difference between the successful and the unsuccessful cases was when and how senior management was involved” (Dennis et al, 2002).

The decision pattern was democratic and negotiated. For instance, participants in the design workshops negotiated for the future vision of a process. Recommendations were forwarded either by consensus or on the basis of majority. The negotiated style of management is commensurate with the sort of organisation BAe is, since command and control culture is difficult to work in such an organisation. Force Field analysis and Delta Analysis were used as dominant theoretical change models. The Delta analysis assumes filling a gap between the current situation and the future desired situation. Force Field analysis is also based on similar parameters where driving forces and restraining forces are identified. The restraining forces are removed to achieve a state of change. As BAe upgraded most of the business processes to the standard of best practice companies, this implies that a gap has been closed between BAe culture and the best practice culture. It seems a conservative and less risky strategy, which is an appropriate approach within the company context and international circumstances.

Management of context is linked with strategic and operational measures. The characteristics of internal and external context were the input for the formulation of the strategy content. The content in turn was the basis for implementation. It created a chain of context-content-process where process was based on the content and the content was based on the context. However there was a lack of process orientation in the context-content-process model since it was predate to the process movement (i.e. the change programme whose unit of concentration was a business process e.g. TQM and BPR). A business process

implementation methodology was brought in by the company consultants in order to implement business processes. It consists of four phases. The first deals with identification of a process, the second is reserved for designing an appropriate solution, the third focuses on implementation and the final monitoring and evaluation. The approach is an effective strategy to implement meaningful changes in the business process. It addressed most of the issues the company was confronting at the time of the present change. The context-content-process model was combined with this approach in order to introduce changes in the business processes.

Technology played an enabling role in the programme. Redesign of many processes was possible due to deployment of appropriate technology enablers. For example, EDI was applied in supply chain related processes such as S&R, Procurement and IPC/IPL processes. Without availability of technology the redesign of these process would not have been possible. Wu views technology as an enabler, he says, "IT is a major facilitator of BPR and it must be considered in the process" of implementation (Wu, 2002). Thus technology is not only available to support the change but also there is an 'overload' of technology. Finally, the time period for process redesign was one year. Six months were allocated for implementation and evaluation and envision took three months each. The evaluation and envision were complying with the time frame but implementation took more than the estimated time period. Hammer and Champy suggest a same time frame for a radical change project (Hammer and Champy, 1993).

This is the overall picture of the change initiative, which has been analysed according to the context, the content and the process. The next section examines the individual contribution of various processes examined in this study.

3. Contribution of BPR projects examined

Nine projects have been examined in the study. Individual contribution of them is being offered here. The researcher could not access any report of Ops 3, however, an interview was conducted with the team leader of the project which has been referred to in the thesis and is the input for the material being presented here.

1. Initial Provisioning List (IPL)/ Illustrated Parts Catalogue (IPC)

“The Initial Provisioning List (IPL) is a priced list of aircraft parts/ground equipment recommended for customer purchase associated with aircraft initial acquisition. The Illustrated Parts Catalogue (IPC) shows the component breakdown and part numbers down to sub module level and is used extensively during aircraft maintenance” (BAe, 1994c). The purpose of the process was to provide accurate and timely information to customers so that they can buy parts and equipment as and when required. It also helps BAe to reduce cost by 25%, large reduction in elapsed time and improvement in quality (BAe, 1995b). The process concentrated on a bundle of issues including lack of early product definition, lack of export reliability data, poor contractual definition of vendor data, tardy pricing process, too many IT systems holding the same data, poor IT systems design, lack of ownership of the end to end process and lack of staff’s business awareness (BAe, 1994c). Most of these issues relate to IT or IT systems. Implementation of the proposed changes in the process enabled the company to acquire data in digital form, electronic illustration of parts and equipment and parallel processing of data, which speeds up the whole process. Organisational issues such as lack of process ownership and business awareness of the process have also been resolved. Thus employees involved are well informed about the process and responsibility of the process has been fixed to certain individuals and teams.

2. Spares and Repairs (S&R)

The aim of the process is to provide spare parts and a repair service in order to achieve effective supply support to customers. It is an order management process for spares, which includes receiving order, purchase/manufacture parts, delivers to customer and collecting bills. It strengthened the supply chain as a part of achieving increased competitiveness within the world- wide market. Other organisations also experienced improvements in performance by enhancing the supply chain process. For instance, Berry et al evaluated impacts of BPR on a product delivery process of an electronics products supply chain. They identified that “in material flow terms, it is now a structurally much improved, robust and internationally competitive supply chain” (Berry et al, 1999). EDI has been used to receive order since the customer can access BAe databases. Recently McIvor et al conducted three case studies on

how various electronic commerce technologies such as electronic data interchange and internet have been implemented in a number of buyer/supplier environments. They identified that application of these technologies is radically changing the way in which organisations have been traditionally trading (McIvor et al, 2000). It shows that EDI was instrumental for the establishment of electronic links with customers. The process addressed three key organisational issues: data integrity, cost and price availability and smarter use of existing systems. Implementation of data integrity enabled the company to reduce the number of systems in use. Smarter use of technology, data integrity and availability of cost/prices not only streamlined the S&R process but also facilitated other processes to work effectively. For instance, data integration allows users to enter data once, which is available to everyone in the organisation. In short, this process identified one or more organisational level issues and resolved them successfully in order to achieve competitiveness.

3. Procurement

Procurement has been divided into non-aircraft and aircraft items. The purpose of the former is to create an impact on most of the process rather than just functional parts of it and quantum leap improvements in cost and speed. It addressed four key issues: high ordering cost, long elapsed time, high volume of invoice queries and high amount of non-value added activities (BAe, 1994d). The redesigning team visualised a range of benefits once the process was to be implemented. Since the requesting department deals directly with suppliers upon raising a requirement, purchase authorisation will no longer be required. Secondly, the Purchasing Department will no longer process vast numbers of low-value orders e.g. over 6,600 under £2,000 in 1993. Bought Ledger clerks will not process 30,000 invoices, it saves the work of about 9 people. The lead-time would be reduced from 17 weeks to a few hours (Ibid, p. 3).

The objectives of the aircraft procurement were to reduce cost, increase value added activities and reduce lead-time. The process concentrated on suppliers relations, stock levels, quality of material, delivery schedules, accuracy and timing of Bill of Material, data integrity and abundance of non value added activities. The essential theme was development of close working relationships between Purchasing, Suppliers and Users functions. Implementation of

a redesigned process enabled the company to create ownership of data, long term enabling contracts with suppliers, quality assured at source, common delivery schedule for the suppliers and manufacturing, direct delivery to point of use, payment on receipt of goods and closer links with suppliers. The whole organisation benefited from these measures in addition to the company suppliers and partners. This process was instrumental to build a business network involving suppliers and partners. This working partnership is helpful for the company to ensure a secure supply line and creating confidence among customers about delivery and post delivery service expectations.

4. Project control

Project control (PC) includes “the control of project business and operations throughout the organisation. It is not project management as a separate function. Project control must expose and predict operational problems. But it cannot directly change operational processes and performance.” (BAe, 1994e). The process concentrated on three key issues: schedule and budget adherence, poor visibility and under achievement of customer expectations. The first issue is a common problem in project management since many projects are not completed on time and use more resources than initially planned. The schedule adherence is one of the BPR objectives, which is equally applicable in PC, however, special attention has been paid to control so that each project must complete at or before schedule. Secondly poor visibility was more a psychological problem than a technical issue. One of the motivating factors for employees is to know where their project is going. Meeting customer expectation is the highest priority in the organisation, redesign of PC facilitated the company to meet customer expectations. It enabled BAe to anticipate problems and take early preventive/corrective action. This demands advanced planning, identification and control of potential risks, assessment of the impact of accumulating change, regular evaluation of remaining work and the adoption of open, forward looking, project-supportive attitudes (Ibid., p. 13). PC covers all stages of the company product development cycle (See Figure 7.1), its contribution reaches all products and all phases of each product. The main contribution of PC is the establishment and maintenance of common objectives, early warning of problems, improved forecasting and increased profitability (BAe, 1994e). The process concentrated on schedule and budget adherence, poor visibility and under achievement of customer expectations.

5. In-Service-Fault-Investigation (ISFI)

In-Service-Fault-Investigation was triggered with the reports that the “customers were dissatisfied with the timescale performance regarding such investigations, though some recent improvements were noted” (BAe, 1996b). Given that the aim of the process includes,

“In-Service Fault Investigations will be handled by a visibly owned and capable generic seamless process. This will be conducted effectively to agreed Customer timescales in concert with Partners and Suppliers resulting in satisfied customers.

Fault Investigation will be the part of a closed process which applies lessons learned widely across projects and to future designs becoming recognised as the Industry Benchmark.

...and will contribute to improvements of the product until such time that a Fault Investigation process is no longer required” (Ibid., p. 3).

Implementation of the process enhanced customer satisfaction by achieving timescales for fault investigation of in-service aircraft. Partners and suppliers were involved for the accomplishment of the target set out. It makes it a seamless and visibly owned process, which is based on continuous learning across projects and future designs. These features made it possible for BAe to boost customer satisfaction, involve the supplier and partners in satisfying them, increase the pace of learning and establish ownership of processes in order to develop the company as a truly twenty first century organisation.

6. Quality Assurance (QA)

Quality assurance refers to “all those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality” (BAe, 1996d). The objective was converting uncertainty into assurance. QA was to keep in step with improvements made to the operational processes such as Ops 1,2,3 and 4. It provides a competitive edge to the company because “a customer is more likely to buy from a contractor who provides the greatest degree of assurance” (BAe, 1996e). Full implementation of the process assures re-focusing towards up-front activities (risk assessment, planning and fault prevention), customer focus through project quality assurance (contract review and assurance through the lifecycle), reduction in the need for an

independent fault investigation, professional resources are the key enablers and the business value of quality assurance widely understood and appreciated (1996d). In short QA provides assurance to everyone within and outside the organisation.

7. Operations 1 (Ops 1)

Operations 1 refers to “the process from completion of “C Status design definition through to tools available”.” (BAe, 1994b). The purpose of the process “is to produce in a timely cost effective manner optimum design and manufacturing solutions across projects and sites” (Ibid, p. 2). It involves the design of aircraft and preparation for the inauguration of the manufacturing process such as availability of necessary tools. Ops 1 has addressed a range of systems, people, structural and process issues. Discussion of all of them is beyond the scope of this sub section since they have been examined elsewhere in the thesis. However, the contribution of Ops 1 in the radical change endeavour is significant because it facilitate BAe to reinvent its manufacturing process. For example, design tools such as CATIA were introduced to enhance electronic product design.

8. Operations 3 (Ops 3)

Operations 3 is a manufacturing process which covers a part of the product development process from “tools available to 1st article”. Since the aircraft is a high value item which is manufactured as a single product first time. This is called first article. Modifications are made to the first aircraft in order to standardise it according to the agreed quality with the customers or senior management. The purpose of Ops 3 is “to create a first article product and process that provides maximum benefits to within the 1st article environment and within recurring manufacturing ... and continuously improve the process until such time that a 1st article is no longer required” (BAe, 1996c). It is a revolutionary process which is aimed at achieving the highest level of quality in manufacturing. At the starting stage the objective of Ops 3 team was to create an efficient and effective manufacturing process so that it could support the 1st article and subsequent production of aircraft. In the second stage the process had to be improved to such an extent that 1st article was no longer required. The first article is produced as a prototype in order to make improvements in it up to the required standard. However, the Ops 3 process eliminated the need for a 1st article since the high standard of

quality would be attained. This would save a lot of money and effort in all products including accelerated learning, reduced batch size, improved supply chain management techniques and manpower effectiveness through planning and reduced engineering change.

9. Operations 4 (Ops 4)

BAe has experienced a new joint venture with a French aircraft manufacturer for the redesign of a predevelopment process. The purpose was to meet the need and affordability of a next generation aircraft. Re-engineering the process jointly was the best alternative available to achieve affordability and share experience and resources. IT capability was one of the key enabler of the process, which can cover a large number of concepts or products looking for different options. This triggered the diversification of IT capabilities since data integration and speed were key enablers in other processes. However, Ops 4 needed a different set of capabilities in order to design various models and variations of the original product. This process made it possible to extend the re-engineering partnership abroad and learn from the experience of those who were involved in the change. BAe researched new technologies which can be used for years to come in the existing or potential products. Table 7.4 summarises the contribution of each project examined.

Table 7.4 Individual contribution of the projects examined

Project	Contribution
IPC/IPL	The process is directly related to customers, it provides parts and equipment information such as price and code number available for them to purchase with the acquisition of an aircraft. For BAe, it was instrumental to reduce cost, elapsed time and improve quality.
S&R	The process provides spare parts and offers a repair service to the company customers. Internally S&R helps to integrate data and the availability of price both cost and selling. Externally it strengthened supply support and achieved increased competitiveness.
Procurement	Procurement both aircraft and non-aircraft reduced cost as well as lead-time and increased the amount of value added activities. The use of CPC in the process empowered hundreds of employees and middle managers.
PC	Meeting customer expectations through schedule and budget adherence, which were the principal contributions of the process. It enabled BAe to anticipate problems and take preventive/corrective actions, establishment and maintenance of common objectives, improved forecasting and increased profitability.

ISFI	Customer satisfaction by meeting the agreed timescales for fault investigation of in-service aircraft. Organisational learning was applied as a basis for improvement in the service. Suppliers and the partners were used as core parties in ISFI which implies that a BAe problem was resolved by suppliers and partners together.
QA	QA's job was to convert 'uncertainty into assurance'. This is an organisational level process which supports every process and function. It provides a competitive edge to BAe since a quality product and service persuades present and potential customers. QA also enhanced the performance of operational processes by recognising the awareness of quality and implementation of its core concepts.
Ops 1	This process managed "optimum design and manufacturing solutions across projects and sites" since the organisation is a manufacturing enterprise, efficient and effective operations helped her to attain competitiveness.
Ops 3	It made it possible to manufacture the first article with minimum time and effort. Secondly the process has been designed in such a way that a stage would come when the quality will increase to such an extent that a first article will no longer be required.
Ops 4	The main contribution of the process is the establishment of a re-engineering partnership with one of the French aircraft manufacturer. It enabled BAe to share the resources and experience of her partner and spread the cost of re-engineering between two parties – BAe and Dassault.

The appendix A provides more details of these projects.

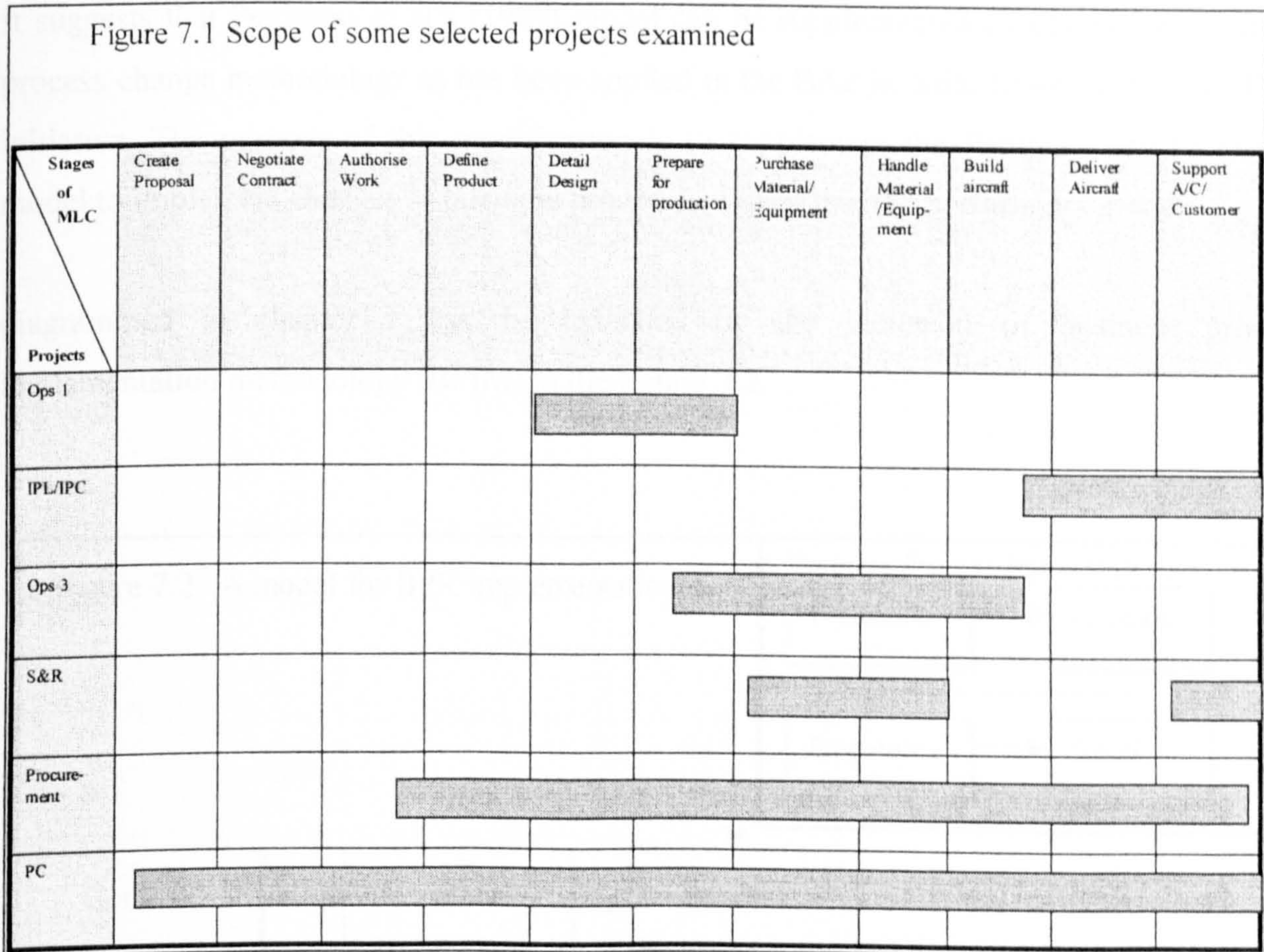
4. Revisiting the change model

The revision of the model is being made in two stages: combining change methodology with business process change methodology and extending with an additional element.

Strengthening the framework – combining with BPR methodology

The major strength of Pettigrew et al's approach is that it examines the context of a change by focusing on the functions. For instance, the previous three chapters described the radical change assuming an existence of functions - the content of change consists of marketing, personnel, IT and so on. However, it does not address the issues of business processes since it is predate to the process based change. On the other hand, BPR is concerned with making changes in organisation by focusing on business processes. It implements change through process by process. For instance, BAe has divided its change initiative into fourteen business

processes. Each process was concentrating on a certain aspect of the company activity such as Procurement on supply chain, QA on quality, PC on projects and so on. Each process supplements the total change. For example, Figure 7.1 depicts the scope of selected business processes undertaken in BAe on the basis of the Manufacturing Life Cycle (MLC).

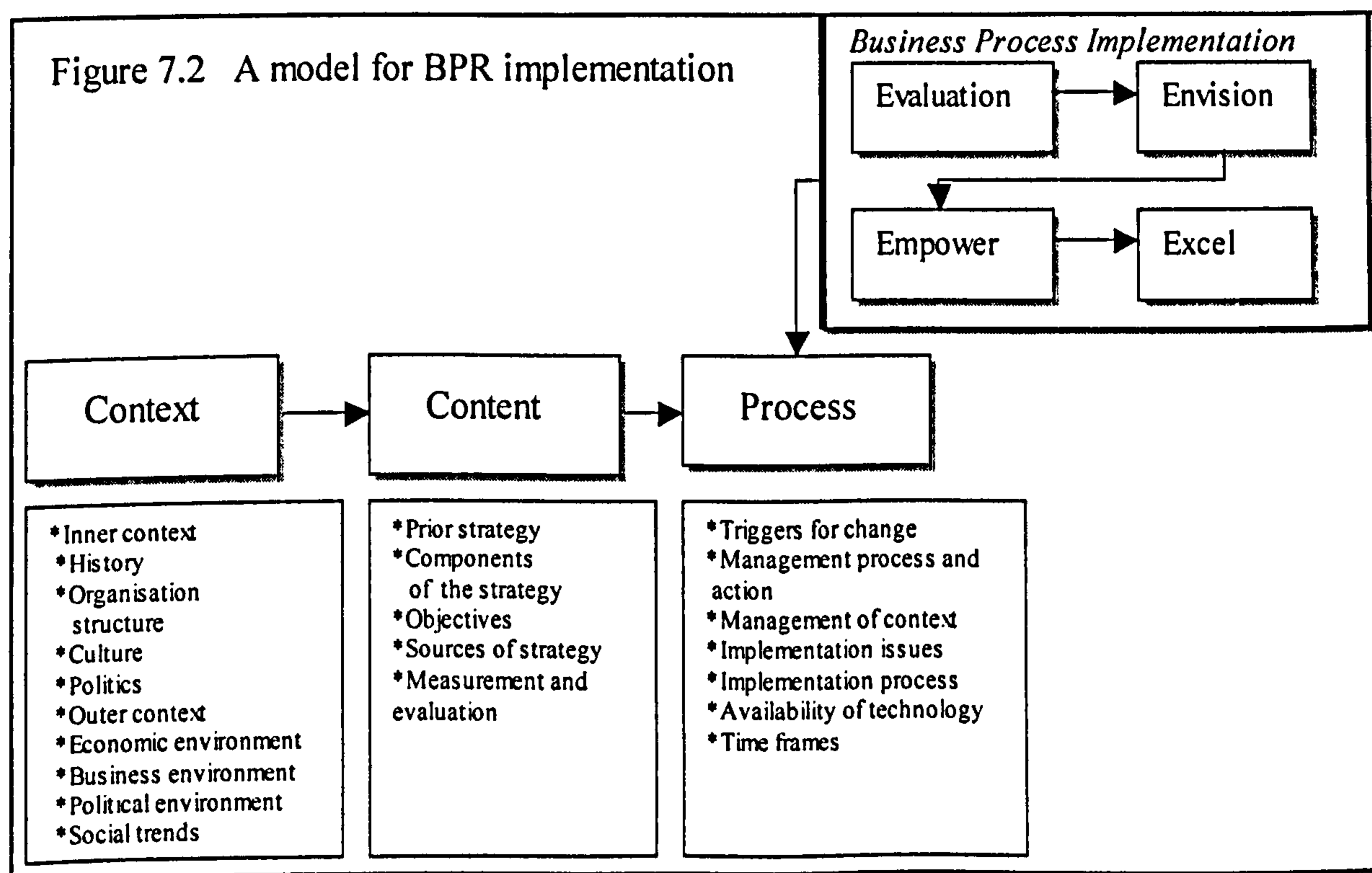


There are eleven stages of the MLC; IPL/IPC process covers three of them, Ops 1 deals with two of them and PC spread over all of the MLC. Given that, implementation of changes in processes requires a supporting methodology to implement the strategic change in individual processes. This methodology ought to address processes rather than functional issues alone. However, changes in processes would bring changes in functions too. For instance, the Marketing department is there but many business processes support it such as S&R, Procurement, IPL/IPC and so on. In other words, the marketing department consists of these processes.

Pettigrew et al's model lacks in process orientation since it is predate to process based change. On the other hand BAe's process based approach lacks in context orientation. The latter pays little attention towards context of change as has been identified in the previous chapter.

It suggests that Pettigrew et al's (1989) model can be supplemented by combining business process change methodology as has been applied in the BAe in order to implement the BPR initiative. The purpose of this modification is to supplement the Pettigrew et al's (1989) model to implement changes in business processes. Given that the preliminary model

diagrammed in chapter 1 can be extended by the inclusion of business process implementation methodology (BPIM) in the Figure 7.2.



BPIM enhances the model so that it can be applied in process based change initiatives. In this way it takes the benefit of process based change methodology whereas BPIM enjoys the advantages of contextual orientated strategic change framework. Therefore the combination

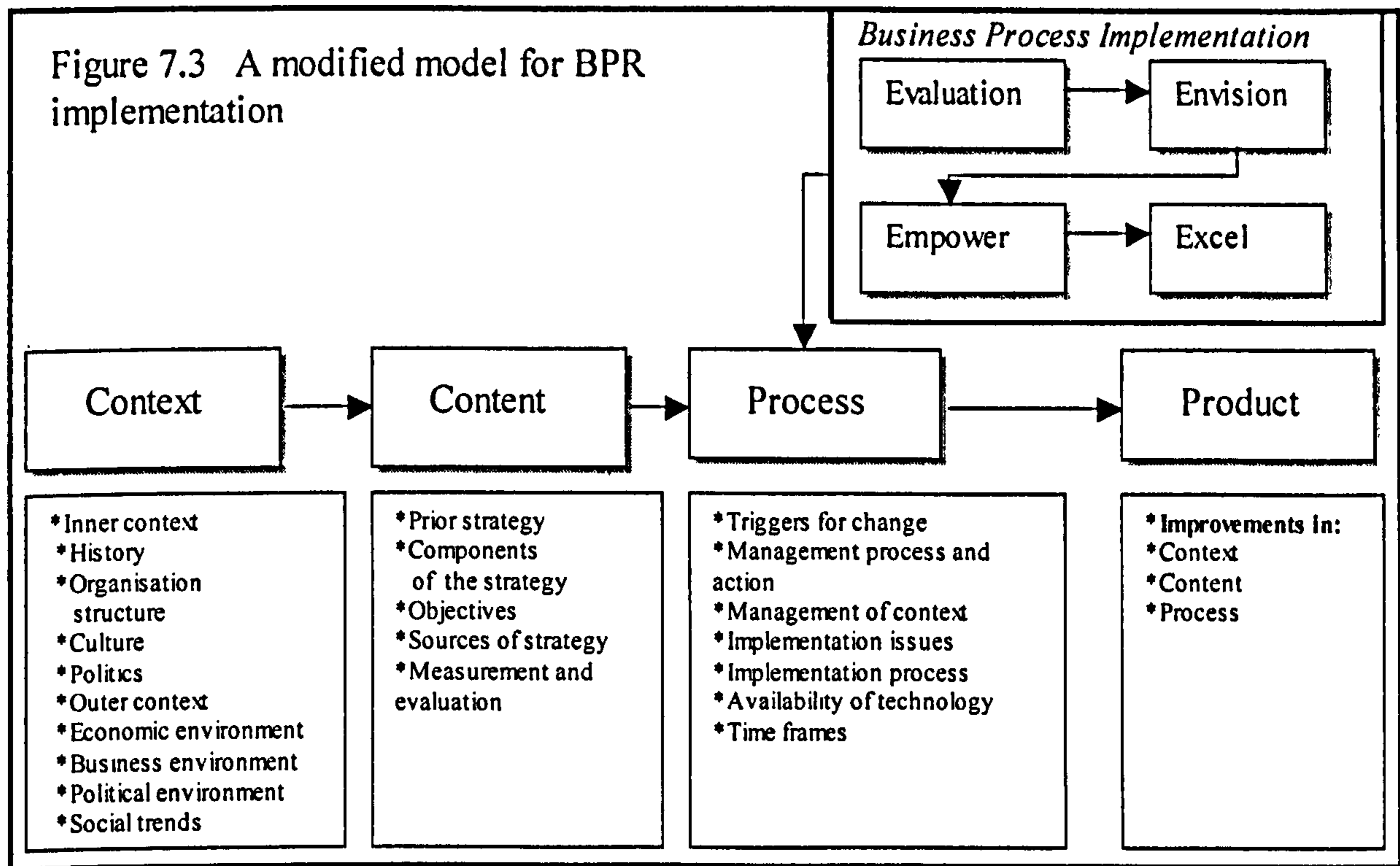
balances the shortcomings of both the approaches and produces an enhanced process based strategic framework, which can be applied in radical change initiatives.

The extension of the model – inclusion of an additional component

Further development can also be introduced in the original framework. To begin with, the first phase of the model deals with the assessment of the current competitive position of a company, the second looks into designing the solution on the basis of the assessment made and the final is reserved for implementation since the model is aimed at making some improvements in the outcomes such as enhancement of competitiveness and increase in shareholders' value and so on. However, performance indicators are limited to traditional measures such as productivity and profitability. The model is predate to process based change therefore it did not recognise the performance metrics related to business processes or team based performance. Secondly, it ignores the improvement in the process of change itself and emphasises on the outcome that happened as a result of the change process. It implies that it does not recognise the changes made in the Context, Content and the Process for instance, what changes have been made in the characteristics of the BAe context. Since the model emphasises assessment of a change initiative on the basis of the context, the content and the process but the performance is measured on the basis of profitability and productivity. It suggests an inconsistency in the measurement of progress.

The outcome is a part of the Process in the framework at the moment which intermingles the Process and its outcome whereas the well-known process model includes Input-Process-Output, which suggests the outcome as a separate component. Given that a fourth component in the model can be added as 'the Product'. The 'Product' is based on the changes made in the components of the framework. Thus under the 'Product' the outcomes would be more visible and understandable.

Given the other elements of the model and the above arguments, Figure 7.3 depicts the modified model which includes Product as a fourth element in the framework.



The proposed name of the component is associated with other components in the framework and is a logical name to extend the model. The Product as an independent element is necessary to inform management and external parties such as the customer, partners, shareholders and suppliers about the performance of the initiative or the organisation concerned. It has been realised by Willcocks and Margretts when they were applying Pettigew et al's same framework in an IS project. They have extended the model and added 'Outcomes' as a fourth component of the framework in IS perspective (Willcocks and Margretts, 1994). Their performance metrics include cost, time, technical performance, operational efficiency and so on. It was a good attempt to extend the model, however, these performance indicators were limited to traditional measures rather than related to the components of the framework.

On the other hand extension based on the components of the framework assesses the company position after the current initiative so that a new initiative can be launched. For example, the Product examines the company context after the re-engineering, therefore, it

shows the new context at the end of the current initiative. At the moment the changes are scattered in the context, content and process sections, the new component would consolidate them in one place where they will be much more visible and understandable. For example, in connection with the Context the company management can look into the company's ability to respond to external environments such as economic, political and social trends. For the Content, Product would examine the contribution of various functions including IT and would suggest potential areas where further improvements are required. Regarding the Process, it would suggest what are triggers for change now (after the change initiative), which change agents will be appropriate and what should be a new implementation process. Which triggers were resolved and which are still to be achieved? Thus the Product opens the way for continuous improvement rather than starting over and providing basis for individual and team learning.

Suppose the Product is the fourth component in the model, what does it look like? Given the other elements of the model and the above arguments, the Product from this study can be similar to the one which is discussed below. It has been divided into three parts: context, content and process. The division helps to understand the changes made in each of these elements.

The Product

The Product will be examined in three parts: context, content and process. The purpose is to identify the changes made in each phase and how they would create impacts on a future initiative.

The context

From Table 7.1 the findings concerning the inner context were the contextual characteristics of the organisation. Let us see how much has been achieved regarding these factors and what has not been achieved. Hierarchical *structure* in the middle management has been changed into a team based flat structure. Teams are norms in day-to-day business such as IPD teams, Suppliers teams, Master Production Schedule teams, PIT teams, IBLIS teams and so on. Structural changes are similar to changes in other organisations but IPD teams are distinctive

in BAe, which aimed at integrating a production system. Other teams are functioning as autonomous bodies and are responsible for their financial, personnel and administrative decisions such as IPD teams. Teams were formed for a specific project or task and were dissolved at the end of it e.g. PITs were formed for Evaluation or Envision of processes. As soon as the Evaluation or the Envision was completed, the team was dissolved. This discouraged building empires and the creation of a personal image.

Hierarchical structure encourages concentration of *power* at the higher levels of management, senior managers make key policy decisions e.g. managing director and directors of various functions. No change was found at that level in the structure but middle managers were empowered to get rid of authorisation and approval. For example, low-value items can be purchased from nominated suppliers without approval of senior managers through CPCs.

Flat structure, empowerment and the extensive use of technology led to changes in organisational *culture*. People are working in teams (they understand the temporary nature of teams) instead of working in the individual functions, where they used to work for years. Computerisation enabled them to communicate through e-mail and Internet. Mobile phones also helped to communicate freely; they can also be used for the exchange of short messages. Short messages introduced a new form of the English language. For example, 'you are' is written as 'u r' and 'for you' as '4 u'. E-mail also changed the traditional format of letters and memos. These cultural developments changed the way people used to work and talk. The beliefs about consultants and BPR were redressed. People used to say that consultants were very costly and were doing nothing. This was due to the involvement of consultants in previous unsuccessful change initiatives such as CQI or MBP. However success of BPR with the involvement of consultants changed this belief. Secondly, people were opposing BPR in the beginning on the grounds that it causes loss of jobs. No one was sacked because of implementation of the BPR programme, there were some redundancies in some processes but the extra staff was retrained and redeployed in other areas. It communicated a clear message to those who were suspicious about the negative outcome of the initiative. In addition, management believed that BPR was suitable in service and management areas. Later on BPR

was also implemented in manufacturing processes. So it convinced managers that BPR was applicable in all aspects of the organisation.

The company was experiencing higher cost than competitors, long lead-time and lack of schedule adherence. These factors were responsible for ineffectiveness. The re-engineering was launched to handle these issues and was improving these deficiencies e.g. 30% in cost, 50% reduction in lead time and 100% adherence to schedule.

With reference to Table 7.1, the findings about *external context* can be divided into two categories: controllable factors (declining demand, competitors policies and procurement policies of key customer) and uncontrollable factors (pressure on customer's budgets, influence of government on the company and the end of the Cold War). Under the former classification, the company had achieved some success. Declining demand was turned into stability in sales (See table 4.5 chapter 4), which says that the company had maintained its fifth position in the Military Aircraft business since 1992 in terms of sales. The order book also shows signs of improvements. Competitors' strategies (mergers and acquisition) were met through development of competitive partnerships with competitors, customer, partners and suppliers. It strengthened the competitive position because the resource base was expanded and confidence had been developed among key players in the industry. Procurement policies of the key customer were encountered by enhancing the Bid Preparation process which is now able to win contracts at competitive costs. Bid Preparation has been reinforced by the Project Control (PC) process. The PC supports Bid Preparation in submitting quality bids and provides quality information for designing it. These measures and results improved competitiveness, the visible sign of better competitiveness was the achievement of its strategic objective such as leadership in Europe. BAe became the number one aerospace organisation in the continent since 1994. This was the outcome of organisational efforts, the share of BPR was significant especially in reducing cost and increasing the probability of delivering products on time.

Declining demand, tough competition, competitors management strategies and dependence on key customers were high profile issues. It was a question of survival, which was taken

seriously by managers. Competitors in Europe were invited to join hands in order to compete with the rest of the world. Collaboration with the US companies enabled BAe to share their resources and access the US market because the USA was the largest spender on defence even after the Cold War.

The policy of dependence on key customers was changed so that BAe prepared itself to compete as an independent provider of defence products. Since the company received support from the MoD in the Cold War era, as a result management did not bother to introduce aggressive policies to compete in the past. But this taught a lesson to management 'do not depend on a few customers', following the change of the MoD's off the shelf procurement policy the company diversified its demand base.

The uncontrollable factors in the external context remained unresolved. The company had no control on the customers' budgets and the political influence of the Government. BAe was trying to get out as much as possible from the existing budgets of the customer but with little response. However, new orders were gained due to better marketing strategy. The end of the Cold War was also beyond the scope of management however the aftermath was being managed successfully e.g. competition and reduction in demand.

From these arguments it can be concluded that the company was capable of managing external context more effectively than before re-engineering because it had gained the industry leadership, was operating as a networked organisation and was meeting the competition successfully. Table 7.5 shows the main achievements regarding context.

Table 7.5 Principal achievements about context

<i>From</i>	<i>To</i>
Internal context	
Concentration of power	Empowered workforce
Hierarchical structure	Team based structure
Traditional culture	Glimpses of the modern culture
Comparative inefficiency and ineffectiveness	Effective processes

External context	
Dwindling demand	Stable demand
Intense competition	Normal competition
Flying on its own	Networked organisation
Dependence on key customer	Competing as one of the suppliers

The content

The content was designed to address the contextual characteristics, strategic and operational objective and issues identified. There were several *initiatives* in progress such as CQI, human resource strategy and MBP. They were consolidated under the banner of re-engineering, consequently synergetic benefits were claimed. It provided small programmes with a big platform to explore a better way to work and share resources and experience. Management was comfortable to pay attention on a single project instead of many. It saves their energy and time which can be directed towards other matters. The functionality of various functions was much more improved. Marketing is capable of achieving ambitious targets such as holding the lead position in sales and winning new businesses. It had won 25 business opportunities in one year and the company achieved number one position in Europe during the financial year 1994. It had developed new products, enhanced relations with suppliers and increased customer satisfaction. IT was an enabler in BPR and hundreds of systems were integrated into a few systems. Business Plan reports that the new IT strategy streamlined technology with business requirements such as the introduction of recurring (manufacturing systems), non-recurring (e.g. CAD) and support systems (labour booking system) (BAe, 1995). Personnel implemented structural, political and cultural developments. Operational processes were put together in manufacturing i.e. Integrated Product Development was launched. QA coordinated major activities such as BPR and created quality awareness and transferred its responsibility to appropriate individuals and groups.

Strategic, project and BPR *objectives* were established to achieve competitiveness. Strategic objectives such as leadership in Europe were achieved in 1994, development of strategic

partnerships was underway and BPR processes were achieving their targets i.e. 30% reduction in cost, 50% reduction in lead time and 100% schedule adherence. Project objectives are also on track. For example the EU2000 aircraft completed test flights and was working according to specifications.

Since the outcome of the initiative was not predictable in 1993 when the programme was started the change agents were conservative in terms of assumptions and expectations. Management believed that BPR could be applied in service and management areas to control paper work. They launched three pilot projects in these areas e.g. S&R, PC and Procurement. However successful accomplishment of these projects encouraged change agents and stakeholders. For example, about 50,000 invoices were eliminated in Procurement, S&R became three time faster than before and project control was much more effective than before. These results compelled them to modify their beliefs about the outcome of BPR and were ready to take a risk. Therefore, BPR was extended to manufacturing and operational processes i.e. Ops1, 2, 3 and 4, but the assumptions remained unchanged, the managers continued to follow a safe approach to change. Clean slate was still not practicable. They believed that change could still be designed and implemented with an existing infrastructure. Table 7. 6 summarises the 'Product' in terms of content.

Table 7.6 Summary of achievements in the content

<i>The content element</i>	<i>From</i>	<i>To</i>
Change initiatives	Several change initiatives were in progress prior to radical change initiative	One consolidated initiative was in progress
Contribution of functions	Marketing, IT, Personnel and manufacturing contributed positively for the cause of BPR	Much more improved in functionality e.g. integrated IT systems are in place now
Objectives	Four levels of objectives were set for the change	All objectives are being achieved
Assumption and expectations	Change agents were defensive in terms of assumptions and expectations	Change agents are encouraged and ready to take risk

The process

It is important to include three aspects in the product: triggers for change, management process and action and the time frame involved. These are important because achievements can be measured in these areas. The contextual elements were triggers for change because attention was required in the structure, distribution of power and the culture within the company. In the outer context, declining demand, tough competition and a changing political environment were threatening competitiveness. Some achievements were seen in the internal context such as improvements in the structure, political relations and culture. But still more work is required to change structure in the upper levels of management. If this is to be done then it will bring changes in distribution of power and ultimately in the culture. Visible improvements have been made in the external context such as stability in demand, controlling competition and strengthening competitiveness. However, the new challenge is to maintain these achievements and keep the customers happy in order to sustain their patronage. Process related triggers were the targets of the various processes redesigned such as affordability, development of the relationship with suppliers, integrated manufacturing and so on. Most of them were achieved, such as development of relations with suppliers, and some are on the way to being achieved e.g. affordability. Integrated manufacturing or product development will be visible as soon as all the Ops projects will be implemented. The practices of benchmark companies were implied triggers for change because the management wanted to achieve the status of a benchmark company by the year 2000. Until then the practices of benchmark organisations were on the list of the company ambitions. Some were met such as a team-oriented structure in the middle management instead of functional hierarchies. Others such as empowering operational levels of management are still to be met.

The above analysis suggests that there were mixed messages from the triggers' point of view. Some of the factors are still unresolved and remain triggers for change probably for another cycle of change e.g. distribution of power, organisational structure at top level, practices of benchmark companies and so on.

The use of change agents especially external consultants and decision making patterns, were included under *management process & action*. A wide variety of change agents participated in the change which is a healthy sign of involvement of people in the programme because 'two heads are better than one'. Although external consultants were used in the beginning after two years they were no longer required. The internal BPR team managed the rest of the processes. This is the methodological gain the change agents learned in the process of implementation. Secondly, since the organisation was functionally managed prior to BPR, the decision making pattern was presumably top down but BPR introduced consultation and participation in different phases of the initiative e.g. challenge workshops and design workshops. So it changes the decision making pattern from authoritative to participative. This is the significant advancement towards establishment of an empowered culture.

The *time frames* involved were of two types: the time frame for BPR, and the time frame for individual processes. The time for the former was five years from 1993 to 1998. So far as the time frame for individual processes was concerned the first two phases were completed as specified but implementation was taking more time than it was expected. It might be due to the lack of attention from the senior managers, loss of key personnel or urgency of other programmes. Most of the processes were in different stages of maturity but the final phase was not started. Table 7.7 summarises the achievements regarding the Product.

Table 7.7 Achievements in terms of the process

<i>Processual factor</i>	<i>Before change</i>	<i>After change</i>
<i>Triggers for change</i>	<ol style="list-style-type: none"> 1. Contextual elements 2. Process related 3. Practices of benchmark companies 	<ol style="list-style-type: none"> 1. Mix results 2. Most of them achieved 3. Many still to be achieved
<i>Management process & action</i>	<ol style="list-style-type: none"> 1. Used external consultants 2. Decision-making pattern was top down (autocratic) 	<ol style="list-style-type: none"> 1. External consultants are no longer required 2. Decision-making pattern was negotiated and democratic
<i>Time frames for the change</i>	Evaluation (Baseline analysis) 3 months Envision (Redesigning solutions) 3 months	<ol style="list-style-type: none"> 1. Implementation takes longer than expected 2. Excel not started yet

	Empowering (Implementing) 6 months Excel (Monitoring) rest of the process life	
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5. Lessons learned and recommendations

A series of lessons were learned during the course of change. Some are similar to other BPR programmes undertaken elsewhere and some are different. The learning may be helpful to design another change initiative of the same magnitude in the future. They are a non-quantitative outcome of the research.

The first important aspect of the initiative was the involvement of senior managers. They were involved in initiation of the radical change, evaluation and envision. Tony Ward states that the idea of BPR was put on the table by IT and Personnel directors (Ward, interview, 1997). Next, they participated in 'Challenge Day' or challenge workshops in order to establish the shape of the level 3 end-to-end process. They were also involved in finding out strengths, weaknesses, enablers and barriers of a process (BAe, 1993b). Finally, they participated in 'design workshops' and 'vision workshops' along with other stakeholders (BAe, 1994d). Involvement was important to solicit the ideas of senior managers at various stages of change. It opens the way to gain and maintain their commitment. Commitment of senior management has been a key success factor in BPR initiative. However, involvement is more than commitment because under commitment PIT members or any other convince senior managers to support the initiative by explaining the need and benefits of the programme, whereas under involvement senior managers virtually convince other stakeholders and PIT members about the usefulness of change or a particular idea. In this way the commitment automatically takes place. On the other hand seeking commitment is an independent task for those who wanted to initiate change.

The second important learning from the change initiative was the establishment of partnerships with partners (or competitors), suppliers and customers. The company developed a re-engineering partnership with a French company called Dassault for reengineering the Ops 4 process. Martin Kaye the leader of the Ops 4 team describes that he led a joint team

with Dassault to look at BPR (Kaye, interview, 1997). In addition, relations with suppliers and customers were extended to the extent of partnership as has been examined in chapter 5. The development of partnerships was important to secure the supply side, delight customers and extend relations with partners in Europe so as to consolidate resources, compete with US companies and access European markets. The company has established a kind of business network incorporating partners, customers and suppliers. In other words it is a backward integration (with suppliers) and forward integration (with customer) and horizontal integration (with partners). Partnership suggests the scope of change and jurisdiction of benefits claimed through radical change initiative.

Technology played a useful role as an enabler to BPR, its contribution was minimal at the beginning but gradually increased. Change agents concentrated on organisation wide IT issues such as data integrity and systems development problems in the beginning rather than the smart use of IT in business processes. This was a fundamental reason for a low profile of IT participation in the beginning. As soon as these legacy issues were resolved, participation of IT increased in the change activity. Now, the future package based systems provide integrated business information systems, integrated product definition and integrated product performance information.

External consultants contributed positively for the cause of change. They brought the radical change methodology and the experience to implement it. They transferred knowledge to the organisation so that it became self-sufficient in the technology of change. BPR consultants also removed the negative beliefs about consultants in BAe (See chapter 4 for more details). The SBAC study identified that successful organisations used/hired consultants and applied a methodology (SBAC, 1995). The constructive point of these consultants was that they did not remain in BAe till the completion of the change rather they left in the second year of the re-engineering programme. They believe in transfer of knowledge. The methodology they brought in was a successful approach to implement radical change because most of the projects launched achieved their objectives. The methodology was simple to learn and comprised of only four phases.

Finally, BAe adopted a less risky approach for re-engineering its processes. Change agents assume that the 'clean slate' approach was no longer useful for them. They build their initiative on the existing infrastructure, the change was launched slowly and in less risky areas such as service and management processes. This is called 'Patch Work Quilt' approach as applied by BT and British Alcon. Managers in BAe could not relinquish their infrastructure and were not convinced about the usefulness of reengineering in the more critical areas e.g. manufacturing. It led them to follow a safe/conservative strategy. However, later on management changed its view due to success of BPR projects and subsumed manufacturing processes in the transformation stream. Table 7.8 summarises key learning points.

Table 7.8 Learning from the radical change initiative

Ranking	Learning point
1	Involvement and commitment of senior managers
2	Development of re-engineering partnership
3	Cautious role of technology
4	Positive input from external consultants
5	Patch work quilt strategy

How to use learning to launch radical change in the future

The above lessons can be used to launch similar change in the future. Change agents ensure involvement of senior managers, their commitment is not enough. It is preferable for senior managers to start the change so that other managers can cooperate in the initiative. Involvement of senior managers is important because they provide support and resources over the life of a change programme. Olorunniwo and Udo emphasise that "research and experience support the fact that the degree of management support of a project will lead to significant variations in the degree of acceptance or resistance to the project, and by extension, to the degree of success" (Olorunniwo and Udo, 2002).

Secondly, the involvement of consultants and the application of a change methodology is useful at least to start the work. The involvement of consultants is important for two reasons. They bring the experience of similar change initiatives which they have already done in other organisations and a methodology. The methodology provides the rough idea of what is involved in a major change initiative. It can be modified according to resources and the requirements of the company involved. The company can get rid of consultants as soon as her employees learn the pros and cons of change. It promoted their confidence, motivated them and reduced expenses.

The role - extent and depth - of technology depends upon the nature of business processes the company involved. However a cautious approach is a middle way because there are examples of extremes. For instance, Carol et al found re-engineering of business processes without involvement of IT in SCIGNA Corporation (Carol et al, 1994). On the other hand Hammer & Champy (1993) suggest a central role of technology and the CSC Foundation research team found that IT/IS 'has made a significant and visible contribution to business reengineering' (CSC, 1999). A moderate way is appropriate for those organisations which are affected by legacy issues such as disintegrated systems and duplication of efforts. Fried and Johnson report that the Chrysler Corporation directed its IT strategy to gain company wide commonality and system integration (Fried and Johnson, 1992). So an intermediate approach can be suitable for companies like the Chrysler Corporation and BAe who were suffering from legacy problems.

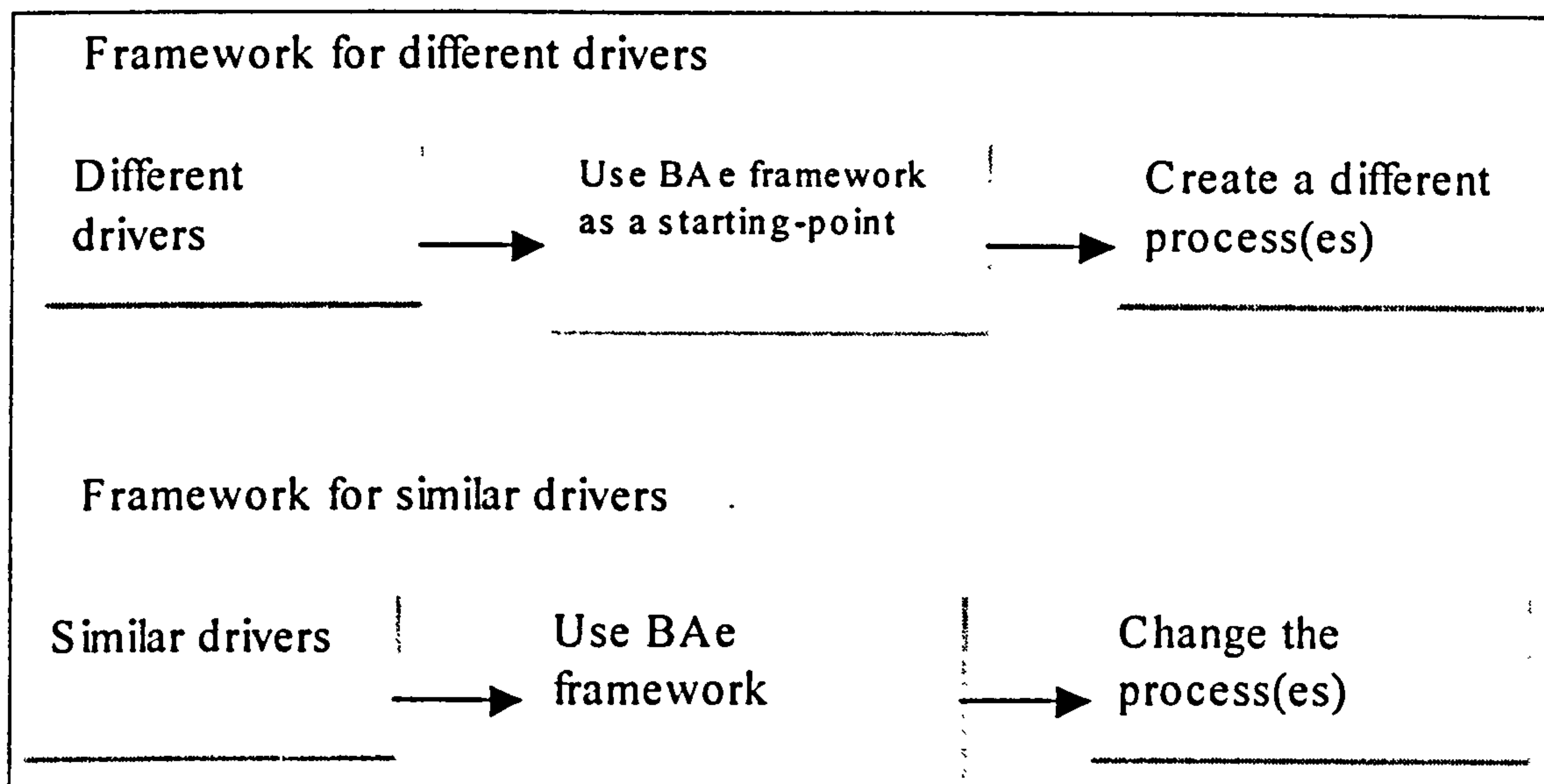
There are two approaches to induct a re-engineering initiative: Big Bang and Patch Work Quilt. The former is revolutionary and the latter evolutionary. It depends upon the management of an organisation to decide the pace of change. Big Bang demands quick action and deployment of more resources. It may pay back rapidly but involves additional risk. BT adopted a Big Bang strategy to re-engineer its business processes (Bartram, 1994). Patch Work Quilt is less risky, evolutionary and pay back steadily. It enables managers to synchronise with existing resources and business activity to new processes. Bartram states that it seeks redesign of the individual processes that ends up with a complete re-

engineering of the organisation. British Alcan Aluminium and others experienced it (*Ibid*, p. 61). It is the choice of management to select one of these however, the latter is more safer and steadier.

Finally, partnerships can be developed under the banner of re-engineering. They can be established as a reengineering partnership or strategic partnership as a result of expansion in the re-engineering activity. In the former case, similar processes can be redesigned in two or more companies taking advantage of the experiences of one another. BAe had redesigned its aircraft predevelopment process with the cooperation of Dassault aircraft manufacturing firm. Dassault also redesigned a similar process with BAe. Both companies were manufacturing fighter aircraft and both have redesigned their predevelopment processes. They collaborated in the process of change for learning from each other. BAe had also developed a strategic partnership with suppliers for re-engineering activity because suppliers were key enabler in some processes e.g. Procurement and QA. For this, BAe had to re-engineer the supplier's processes too so that they can coordinate or commensurate with BAe processes. Potential change agents can consider any of these according to their scope of change and company conditions. Partnership cannot be developed in the beginning because the company involved has to gain some experience to invite others in order to join a redesigning endeavour.

The second aspect of the application of learning in another initiative can be considered from the view point of the people involved. Eric Whiteside argued that we can not copy the principles or experience of others exactly, but that a framework can be developed to start a change based on the learning of others, which is useful in developing your own framework and eventually a new process. The use of such a framework depends on the business drivers of the organization. A company can follow BAe's framework only when its drivers are similar to BAe's drivers however, a company with different drivers can develop a different framework starting with BAe (Figure 7.4).

Figure 7.4 Use of previous learning for developing a new framework



Peter Tower, one of the members of the IPD team had a similar view about the re-use of the BAe experience. He said, 'I do not believe that the BPR can be implemented in another organization as has been carried out here' (Tower, interview, 1997).

Ali Dormer, the team leader of IPC/IPL, said that basically the fundamentals for a change initiative are still there. Some of the important points for introducing a similar change are as follows:

1. Get the backing of senior managers.
2. Develop a clear vision.
3. Create a change culture of readiness for change.
4. Clearly understand what the change agents need to do. (Dormer, interview, 1997)

Denis Armstrong an internal change consultant and an active participant of the QA process, summarizes the essentials of introducing a similar change in the future. For him, the following elements are fundamental for radical change initiation:

1. strong sponsorship and commitment;
2. giving resources;
3. developing people;
4. process thinking; and
5. team work. (Armstrong, interview, 1997)

Linking drivers with organisational change offers coordination between business strategy and operational activities. Kamara et al linked their knowledge management framework (a change initiative) with drivers for change (Kamara et al, 2002).

Recommendations

A number of points can be suggested to improve the effectiveness of the initiative. First the implementation needs a big push in order to complete the change as soon as possible. It is important to finish quickly because full benefits can be realised after completion, which are not known so far. Resources are tight up in the process of implementation and are increasing the BPR administrative cost. Some of the projects such as QA deals with the whole organisation, a backlog in the process can create backlog in other processes. It generates counter synergistic effects or snowball effects on the whole organisation.

There is no special reward system for working in teams or re-engineering projects. It is the time to introduce a financial or non-financial reward framework for those who work in special teams such as IPD teams or PITs. Because people sacrificed their functional career spread over years for nothing. They were promised to work in teams for 'learning' and 'job enrichment'. This might work for a short period but it is not enough for the long-term. If management wants to institutionalise change than a new reward structure based on team and individual performance is required in order to keep people motivated.

Since the EXCEL phase has not been started yet, a proposed structure of Excel within the resource constraints needs to be designed in order to manage any crises in the future. It will help to track changes systematically and monitor them effectively. Measurement of

achievements as part of Excel will facilitate to determine the contribution of different participants.

Some elements in the context and process have not been addressed or not resolved fully so far, which can be concentrated now. They can be counter productive elements on the way to achieve competitiveness and the status of a benchmark organisation. They require early attention to achieve overall organisational goals such as contextual factor which were not resolved so far (See Product above). Table 7.9 summarises these recommendations.

Table 7.9 Summary of recommendations

<i>Serial number</i>	<i>Recommendation</i>
1	Implementation process should be speeded up
2	A reward system should be designed for team participants
3	A plan of action should be drawn for Excel phase
4	Remaining contextual characteristics and processual matters should be dealt with

5 Miscellaneous themes

According to Patton (1990), interpretation involves going beyond description. It calls for the attaching of significance to findings, offering explanations, drawing conclusions, and attaching meanings, imposing order and dealing with rival explanations. In short, delineating causes and consequences and finding relationships are the real tasks of a researcher at the conclusion stage. Silverman suggests that the researcher needs to establish the relationship of his work to the previous work either quoted in literature review or that has emerged during the course of the study. He also suggests that personal learning of the researcher, which he has gained out of the research experience, implications of the findings and any further research that might follow on the topic - findings, methods or concepts (Silverman, 2000). Denzin (1996b) argues that interpretation is 'moving from the field to the text to the reader'. A synthetic view of these

suggestions has been adopted in this section focusing on Silverman's model for interpretation. His model highlights three aspects of the study under investigation:

1. relationship of the researcher's work to the existing work (work published before the study or which emerged during the investigation);
2. implications of the findings;
3. further research that might follow.

All these will be taken up in what follows.

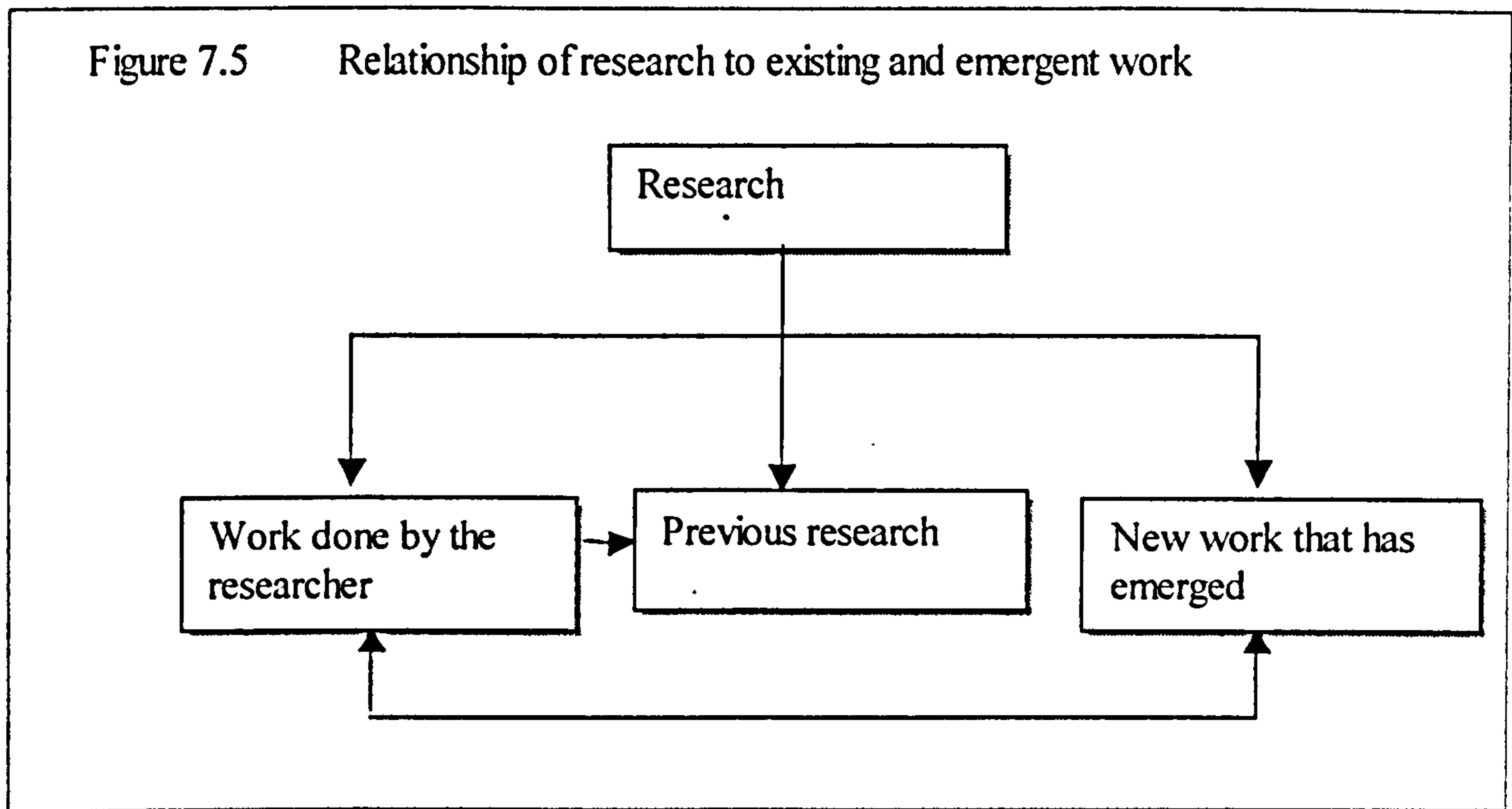
5.1 Relations, applications and implications

This sub-section deals with each of the four aspects mentioned above.

5.1.1 Relationship of the study to the existing work

One part of the conclusion is concerned with the development of a relationship between the existing work on the topic and the present research. Silverman suggests that the conclusion should demonstrate the relationship of the research to works listed in the literature review or new work that has emerged during the course of the study. This is to be linked with the research question (Silverman , 2000). Figure 7.5 represents this relationship.

Figure 7.5 Relationship of research to existing and emergent work



This research has examined a change initiative in an organization and the effectiveness of the methodology used by that organisation in the process of change. The study intended to produce an exemplar to be used fully or partially in the future change initiatives. This research is similar to previous work in terms of a BPR case study. Previous BPR studies are exemplars of organizational change and this is a similar effort. It is a different study because it examines a particular organization which has never been studied from a radical change perspective. Secondly, the effectiveness of the methodology has been examined in this study, whereas methodological effectiveness has received limited attention in the literature. This research has found that the learning which came out of this initiative can be useful to another company initiating a radical change programme only if that company's drivers for change are similar to BAe's because the learning points cannot be copied directly. The third element in figure 7.5 is the emerging themes in the field. It is discussed in the next paragraph.

The concept of re-engineering was based on 'clean slate, out of the box, thinking' step improvement in performance, etc (Hammer and Champy, 1993). Most of these concepts were questioned by the experts because they were not universally applicable (Davenport and Stoddard, 1994). Therefore, they were given up with the passage of time and a more

realistic picture of re-engineering remains today, which emphasizes the management of an organisation by processes, a flat management structure, working in teams, and with IT given a pivotal role. This suggests that in present BPR some of the 'very radical' constituents have been trimmed and a more pragmatic shape of the approach has emerged. This is known as Process Management. Armistead et al's recent work is an example (Armistead et al, 1999). There is no significant change in the original research question because the examination of a change endeavour, the effectiveness of its methodology and the re-use of learning from an organizational perspective are as important in the present process management as in the 'old' BPR. So a new study can be conducted with the same research question or parameters.

5.1.2 Implications - a wider perspective on BPR

The implications of the study can be seen in a wider perspective than the obvious debate of a change programme. For instance, the process of change can be seen as a general problem-solving mechanism, and involvement can be viewed as a modern organizational model. To put them in question form:

- How can re-engineering be seen as a problem-solving process?
- How can employee involvement be seen as a modern organizational philosophy?

Let us take up each question to examine its relevance to real-life problems.

A problem-solving mechanism is meant to identify a problem or deal with a complaint from a customer; e.g. a personnel manager receives an employee absence report. The problem solver designs a solution or a set of solutions to choose from. He implements the desired solution and receives feedback. If the outcome is positive, then everything is OK; but if the results are not according to expectations then he takes further measures to rectify the situation. Thus the process of problem solving consists of four implied steps:

- problem identification;

- designing solution;
- implementing desired solution; and
- monitoring effectiveness of the solution and planning to prevent such problems re-occurring.

Radical change methodology offers a similar procedure that can be applied in any problem situation. Thus BPR looks like a generic problem-solving mechanism.

The involvement of employees is more than a human resource strategy because employees are skilled, knowledgeable and well informed today. They can invent valuable tools and techniques in order to increase productivity and profitability. BPR offers large-scale involvement of people, as has been seen in the BAe case. It gives them job satisfaction and boosts morale, which are very positive signs of healthy working conditions.

5.1.3 Areas for further research

Time and resources are the principal limitations on how research is conducted. Formal research projects such as the fulfilment of university requirements for a certain academic qualification is limited by time. In the first place, the research project has to be completed within a specified period, and this can limit the scope of the project undertaken by the researcher. Secondly, the extent of access to information sources is limited, especially in the case studies. Thirdly, the quantitative data is difficult to obtain because of security issues in the study's settings. These factors can mean that the researcher is unable to complete the job as effectively as it could be done. In one sense research is always incomplete: more research is always possible. Since the BAe change process was still in progress, further research can be conducted in many areas. Projects which have not been included in the study can be examined from the same perspective and those which have been analyzed can be considered from a different angle. For example:

1. contributions of the senior management, the middle managers, employees, IT, consultants, suppliers, customers or partner companies in the initiative.

2. effectiveness of various phases of the re-engineering methodology: evaluation, envision or implementation; effectiveness of the structure, organizational strategy and resources employed and so on.
3. any combination of the above using a different research methodology.

The current research can be used as a starting-point because it provides the basis for such future work.

5.2 Originality and contribution of research

Originality refers to 'making a synthesis that hasn't been made before; using already known material but with a new interpretation, bringing new evidence to bear on an old issue ... [and] adding to knowledge in a way that hasn't been done before' (Phillips & Pugh, 1994). This section attempts to say how far the current work fulfils the technical requirements outlined above.

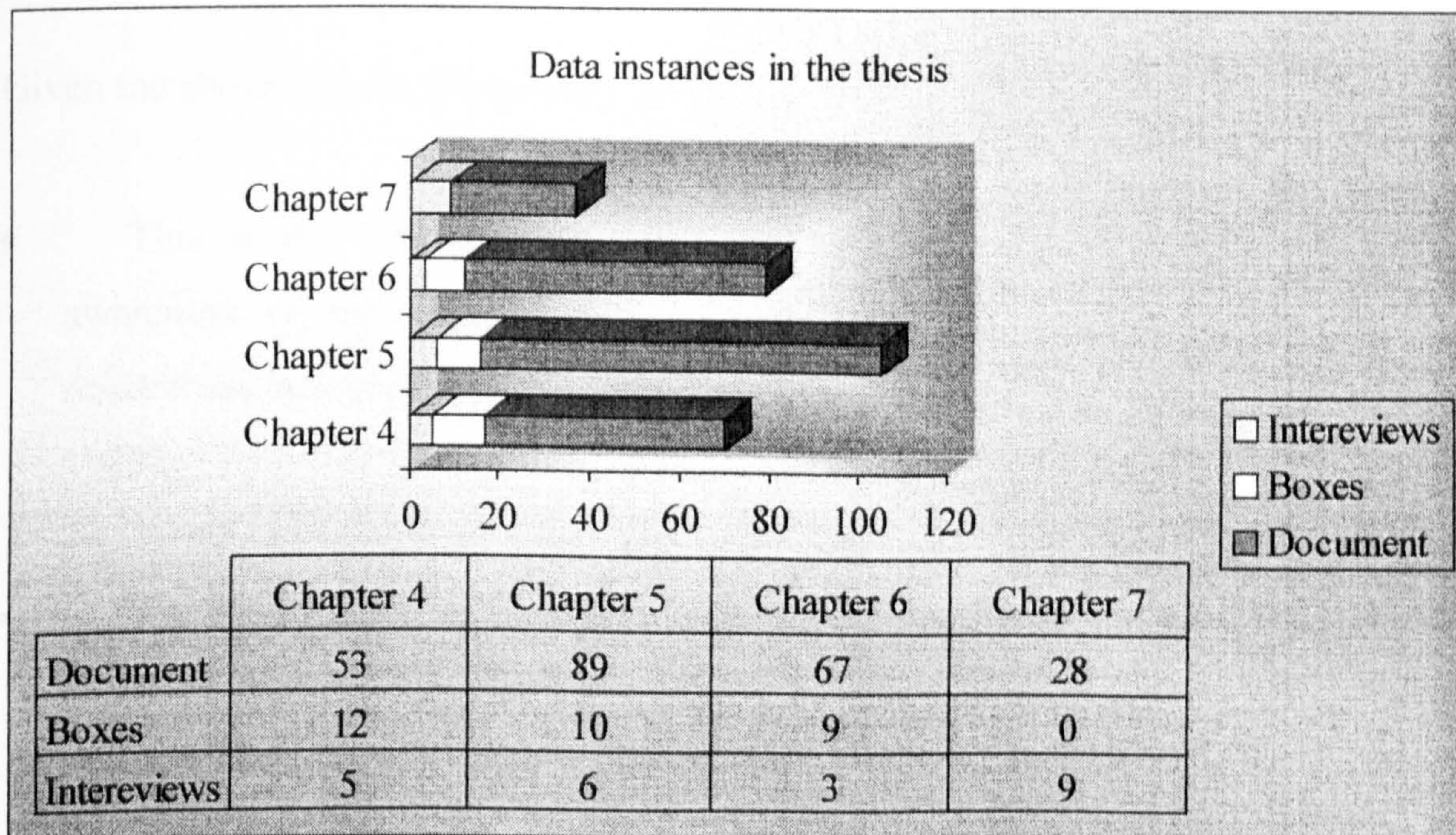
5.2.1 Validity and reliability

It is important to recall the criteria of goodness which determines the technical value of a study prior to making any assertion about the originality and contribution to knowledge. The criteria are the validity and reliability of an inquiry. Validity refers to 'the extent to which an account accurately represents the social phenomenon to which it refers' (Hammersley, 1990). Reliability is the 'degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions' (Hammersley, 1992); Silverman prefers to call it 'truthfulness' (Silverman, 2000). Mehan (1979) suggests that truthfulness can be proved or strengthened provided that the researcher provides:

1. sufficient exemplary instances to support the 'story';
2. criteria for the inclusion or exclusion of instances; and
3. the original material on which analysis is performed i.e. the raw data.

The reader can see the amount of examples included in the account. For instance, Figure 7.6 shows the data instances referred to in the thesis. The study is based on the nine BPR projects which have been included in the study, and the researcher provides the criteria for inclusion or exclusion of projects in the analysis. The third concern is preservation of original material. The researcher has preserved the audio tapes, field notes and reports on which analysis is based (the reports do not include the classified material, but they can be consulted in the organization concerned). Some surveys and short studies conducted by consultants or other organizations are also preserved.

Figure 7.6 The data instances referred to in the thesis



Silverman (2000) suggests two more criteria by which the truthfulness can be proved: triangulation and respondent validation. Triangulation requires the use of more than one data collection method. Three sources of data collection were used in order to corroborate data: documents, recorded interviews; and informal meetings with the internal BPR consultants. The researcher could not get the respondents' validation individually; however, the contents of the thesis have been examined by the internal co-ordinator in the company and the overall content of the thesis has therefore been validated. Individual

respondents could not be approached either because they had left the organization or were not available at the time of analysis.

5.2.2 Contribution

Phillips and Pugh's (1994) criterion suggests four ways of contributing to knowledge:

1. making a synthesis that hasn't been made before;
2. using already known material but with a new interpretation;
3. bring new evidence to bear on an old issue; and
4. adding to knowledge in a way that hasn't been done before.

Given the above criteria, the research has contributed to knowledge in the following ways.

- This is the first investigation of BPR in BAe. It increases the institutional awareness of the academic community and its practitioners because academic researchers lack institutional knowledge as argued by some experts (e.g. Gummerrson, 1988).
- The effectiveness of the change methodology has been evaluated, and this is an important factor which has received little attention in the literature. The kind of analysis presented here has not been attempted before.
- The research has produced a range of ideas about the introduction of a radical change initiative in the same organisation or in any organization. Some of them coincide with current BPR theory and others have emerged in the course of the study. For example, it was found that BAe's BPR model can be applied only by other organizations who have business drivers similar to those of BAe. The study suggests that the findings are transferable to other settings, as has been argued by Hammersley (Hammersley, 1992, quoted by Denzin and Lincoln, 1994, p. 480).

Researchers, academicians and practitioners can apply the outcome of the research. Researchers will find secondary data on many subjects such as qualitative research, management of change, the case study research and BPR. Practitioners can benefit from the exemplar in designing their own change initiatives. The general public can enrich their understanding of radical change and organisational practices.

5.3. Limitations of the research

The researcher realizes that there are limitations to the data gathering and reporting. He managed to gain access to nine radical change projects out of fourteen inaugurated over the time period covered in the study. Usually three months are allocated for data collection, however, it took about one year to complete the data collection. This was because the authorities allowed a fortnightly visit to consult documents or conduct an interview. The researcher was treated as a visitor to the organization; he was escorted to and from the reception between fixed venues. Therefore, he could not observe the live functioning of the change process. Also he could not participate in a meeting or workshop in order to gain a real-time experience. In addition, the organization is a restricted business entity, hence financial data cannot be reported in numerical terms.

The researcher was enabled to access some classified material and the reports prepared by independent consultants. The interviews were conducted in a friendly and co-operative environment.

The researcher tried to minimize the impacts of these limitations on the outcome through a number of measures. Justification has been provided for the number of projects included in the analysis. Percentages have been used to display financial information in order to hide the actual figures, yet these still provide performance in an understandable manner. Triangulation of data collection through different sources corroborates the findings.

5.4 Difficulties encountered and how they were overcome

Participants have different views of the difficulties they encountered. The first problem was felt in the evaluation phase where exploration/determination of customer requirements was difficult because customers lacked a clear idea of product features. To address this, BPR teams have conducted a number of modelling exercises to define the product. Secondly, capturing ideas about new technologies was difficult. For example, in the pre-development process considerable time was required to capture ideas about new technologies. Third, measurement of the performance of a process is necessary in order to activate corrective mechanisms, but it was difficult to establish the metrics to measure how well the current processes perform. Fourth, although empowerment of the workforce is a popular topic in BPR, managers in the company have the view that empowering 'right through the process', is not an easy job and may not be useful. Fifth, Tony Ward, the Head of the BPR, said: 'We felt in the beginning that we are suffering from initiality, because the company had tried a number of change initiatives but none of them worked' (Ward, interview, 1997) Sixth, Eric Whiteside the team leader of the works engineering process has had a different experience. He says: 'I was initially very sceptical about my process because it requires a lot of resources and time to change. For instance, six months for evaluation, six months for envisionment and one year for implementation. But I received support from internal consultants and senior managers to continue it. I also received training in change and the management of people's behaviour. These factors support me physically and psychologically to complete the transformation of my process' (Whiteside, interview, 1997). Denis Armstrong, one of the internal consultants, argued: 'We felt perseverance and management buy-in and involvement as major difficulties in the way of change (Armstrong, interview, 1997). Dave Edmondson, the BPR service manager said: 'We encountered some problems in the integration of processes, which was due to the usage of different teams in the various phases of change' (Edmondson, interview, 1997). A considerable number of the interviewees hold the view that 'changing people' is the most significant problem. Finally, the affordability of products was also a serious question.

5.5 Salient features of BAe's programme

The details discussed in the last three chapters are the basis of the view established here together with insights gained in the course of research. The distinctive features of programme are summarized as following:

- Cautious approach to IT.
- A detailed analysis of how the company works. Most of the processes redesigned did not exist in their present form. They were identified and documented.
- The change was divided into business processes. Three or four processes were under transformation at any time.
- Most of the redesigning solutions were imported or borrowed from other organizations and then re-applied to BAe processes.
- High involvement of staff at all levels.
- Implementation took the form of separate activities that were carried out by separate teams.
- Although not widely publicized BAe's BPR initiative involved a large-scale change.
- Change extended to suppliers' and partners' processes.
- BPR was not a threat to jobs. While processes utilize a smaller workforce now, redundant staff were re-deployed after necessary training to other roles in BAe.
- BPR balances process and organizational issues.
- The programme established re-engineering partnerships with partner companies.
- BPR was itself an end rather than a means to an end.
- Throughout there was a focus on cultural change.

5.6 Evaluation of BAe's BPR initiative

Hammer in a recent writing put forward four conditions to qualify for a re-engineering drive (Hammer, 1995):

- Dramatic improvements (minimum change must be 20%) should be aimed at.
- Change should be radical (Greenfield's approach).
- Change should involve a redesigned idea.
- There should be a process based change.

BAe's BPR initiative fulfils three of the above conditions. For instance, the targets for performance improvements were dramatic, ranging from 30-50%. Processes were redesigned using the core techniques of re-engineering and the change was process based rather than 'paving the functional walls'.

The practices of benchmark companies were the basis of the change . Although SBAC recommends the best practice approach, adopting other companies' practices seems to involve 'up-gradation' to the level of the best practitioners rather than *inventing* new ideas.

On the contrary many companies have invented processes which did not exist in the industry.

BAe's radical change programme brought about numerous changes in the working practices and organizational culture as indicated in this study and other surveys (referred to in the study) that took place. This suggests that the change initiative was a radical transformation for the organization.

6. Conclusion

This case study is an example of a radical change initiative in BAe. The contextual circumstances were main triggers for change which include hierarchical structure, power-based politics, traditional culture and operational inefficiency. It enabled the organisation to improve schedule adherence to 98% (100% is the target and will be achieved shortly since a bit of the total is gained annually), reduced cost by 20% as against 30% so far and reduced cycle times by 50% (in one BPR project by 79%). Working in a team, extensive use of technology and empowering people were also key achievements. Senior managers,

operational management and external consultants played a significant role in implementation. Literature extensively supports the involvement and commitment of senior management in order to make the change successful (McDonough III, 2000).

The study provides a range of benefits to researchers and practitioners. For instance, lessons learned can be applied in the future change initiatives which would reduce the possibility of failure and increase the probability of success since more informed decisions will be made in light of the learning from this exercise. This was the first successful change initiative in the 1990s since many others were doomed to failure which created disappointment among employees, however, re-engineering increased morale as well as business and process awareness. BAe has successfully combined re-engineering and its managerial practices in order to achieve quantum leaps in performance. Pearl has achieved the same without discarding its prevalent management philosophy (Stafford, 1995).

A three-phase framework has been applied in order to assess the initiative. In other words the change has been split up into three stages: content, context and process. The framework guided throughout the researcher the research

The purpose of the research was to produce an account of a radical change initiative and measure the effectiveness of the process change methodology. Objectives of the research were to be achieved through a case study. Given that it is worthwhile looking at the basic parameters of the study, such as the research question, the objectives and the approach. Three questions are worth discussing:

1. How far the research question is answered.
2. How far the research objectives are achieved.
3. How far the research methodology is appropriate.

So far as the research question is concerned, the answer has been provided in the presentation and analysis of BAe's re-engineering initiative (chapters 4-6). The account has been divided into three elements in line with the theoretical model adopted for this

research. Thus the objective of the study was to produce an exemplar of a transformation process, and that has been achieved. The appropriateness of the case study approach was considered. It has been argued that the case study was an appropriate approach for the detailed examination of a social phenomenon and to address the research question. So it seems that the three questions raised above are answered appropriately.

The next concern is to find out implications from the BAe account. A range of *implications* for management stems from the analysis of the case study. For example:

- * Customer satisfaction can be achieved through technology, i.e. technology enables remote involvement and feedback.
- * Organizational changes and IT are the most important enablers. Organizational change implies changes in both structure and culture.
- * Structural changes (e.g. the flat structure) enable empowerment techniques to work successfully. Simplification and co-ordination of procedures strengthened the liberation of people.
- * Online data access and the integration of systems themselves empowered the workforce. So IT enhances the rate and depth of empowerment.
- * Internal autonomy and better use of technology clear the way to develop cordial relations with external parties such as suppliers, customers and partners.
- * The change has internal as well as external drivers.
- * Fundamentals of the redesigning strategy came from best practice companies, customers and sometimes partners.
- * Management of processes requires a flat organisational structure in order to keep managers close to the customer. Managers should be close to the customer because managers are informed and knowledgeable.
- * People resist change because they do not want to change. They do not want to change because they do not want to learn new working methods and technology. They do not want to learn because they do not have the basic knowledge to learn technology and technology is changing rapidly.

* IT is an enabler because rapid development in technology offers new and improved solutions to human problems. Advancement in technology is due to the availability of additional resources for research and development.

The next set of implications comes from the analysis of individual BPR projects. What does each project offer to the company?

* ISFI provides an example of customer involvement and satisfaction.

* QA signifies the role and strengths of IT in the organization. It turns uncertainty into assurance.

* Procurement took the maximum amount of redesigning techniques, which support the suggestion that as many redesigning ideas should be collected as possible. Procurement was instrumental for the establishment of relations with suppliers.

* Spares and Repairs increased customer satisfaction and streamlined the supply chain.

* Project control enhanced management control and increased organisational effectiveness.

* Ops projects were helpful for manufacturing effectiveness.

* IPC/IPL provide an up to date product catalogue and product (mostly spare parts) prices to customers. Thus it facilitates them and ultimately increases customer satisfaction.

These implications can be useful for managers and change agents of the potential radical change initiatives. Researchers can also benefit from them since they can augment their research from the point where the current work ends up.

Overall conclusion

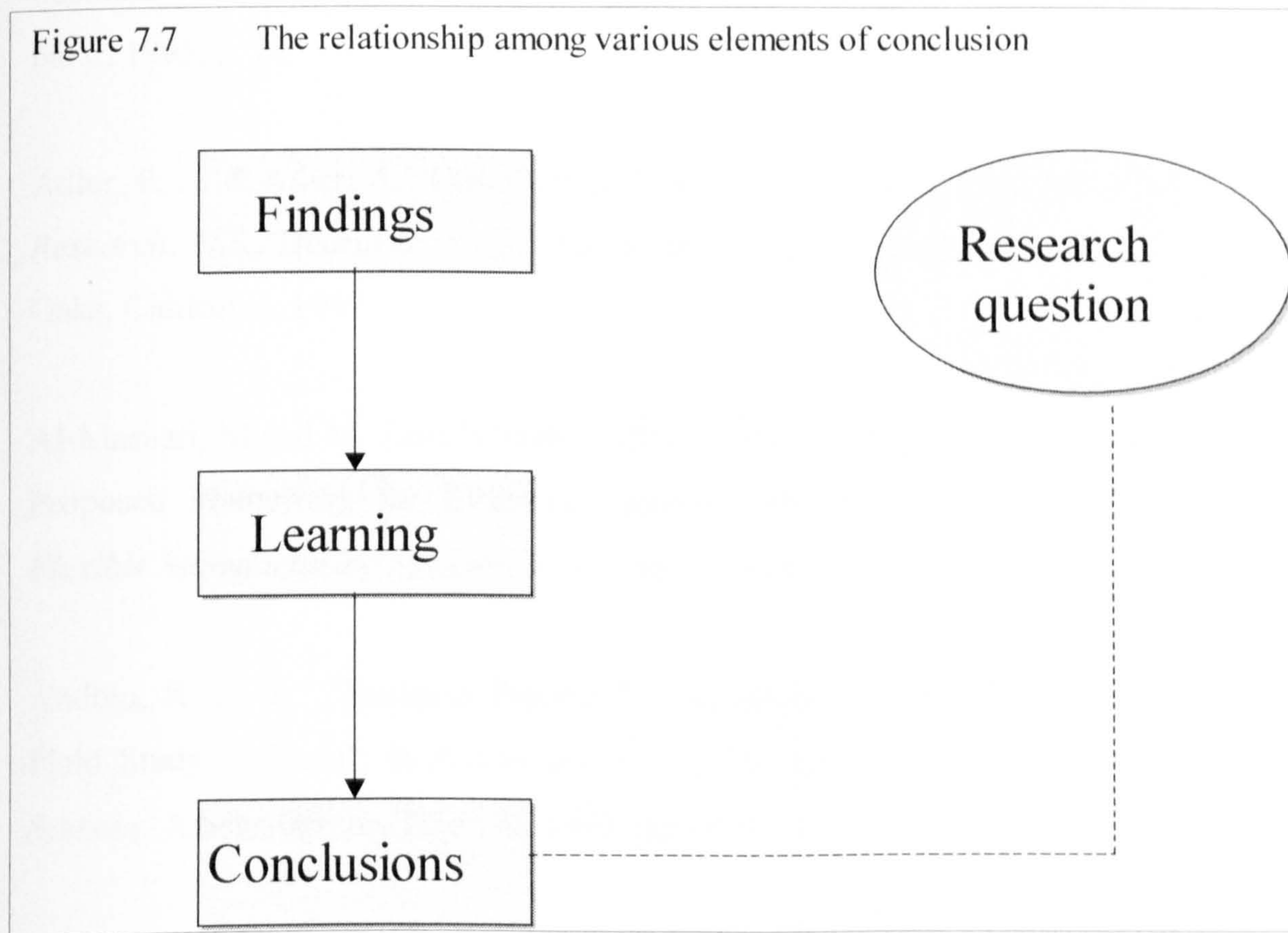
The conclusion is based on the findings which led to learning and linked with the research question or more precisely is the answer to the research question. Figure 7.6 depicts the relationship among these elements.

In the light of the above, the study concludes that the radical change programme was a successful initiative, which enabled BAe to overcome some environmental, structural and operational problems such as tough competition, dwindling demand, under satisfaction of customers, traditional culture and operational inefficiencies. This is because of continued sponsorship and involvement of senior management, flat organisational structure, effective application of technology, a structured change methodology, meaningful cooperation of suppliers, customers, and partners. The experience of the company can be used in other organizations provided the drivers for change are similar to those of BAe.

The conclusion suggests that the study is a confirmatory investigation of a radical change initiative. It corroborates that sponsorship of the senior management is essential, flat organisational structure necessary, application of technology is desirable, use of a change methodology is preferable and co-operation of suppliers, customers and partners is helpful for the success of such programmes. The study provides an exemplar for the researcher and practitioners in order to embark on similar change endeavours in the future. It is the pragmatic contribution of the research.

This research identified that processual framework adopted for the study was no longer useful for a process-based change since changes in business processes requires a different set of 'rules'. Consequently two models (Pettigrew et al's (1989) processual framework and BAe's Business Process Change Methodology) were combined in order to implement radical change in the organisation. Pettigrew et al's model was also modified by the inclusion of an addition element. This is the theoretical contribution of the study.

The conclusion also provides an answer to the research question raised in the first chapter. Figure 7.7 shows the relation between the conclusion and other elements.



The end

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Appendix A
Description of the BPR projects examined

APPENDIX A

RE-ENGINEERING PROJECTS INCLUDED IN THE ANALYSIS

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Introduction

The appendix summarises the description of projects included in the analysis. The contents are based on the BPR reports, interviews and conversation with internal consultants/project team members. Since all the reports were not available about a single process in order to establish a comprehensive view of the process, different aspects of the processes have been emphasised to understand a broad picture of the processes. The same strategy has been adopted in the body of the thesis.

1. IPL/IPC Project

This project was started in April 1994, its evaluation made in October, envision stage completed in May 1995 and implemented in the same year but full benefits of cost reduction, elapsed time reduction and quality improvements has been realised in 1996.

Three high tech products were selected to reengineer IPL/IPC process however; a fourth product was subsumed subsequently. These products will be called A, B, C, and D respectively for the security reasons. The project involves five processes; product 'A' has IPL and IPC processes separately whereas other products have only a single process for IPL and IPC.

The Initial Provision List (IPL) is a priced list of product parts/ground equipment recommended for customer purchase associated with product's initial acquisition. The Illustrated Parts Catalogues (IPC) is a list of the component breakdown and part numbers down to sub module level. The primary purpose of the later is to assist in customer supply activities and maintenance (BAe, 1994c). Although IPL/IPC is a single project and its benefits are also common, however, the requirements of each of the products (aircraft) are different, that's why the processes are different from each other.

Product A

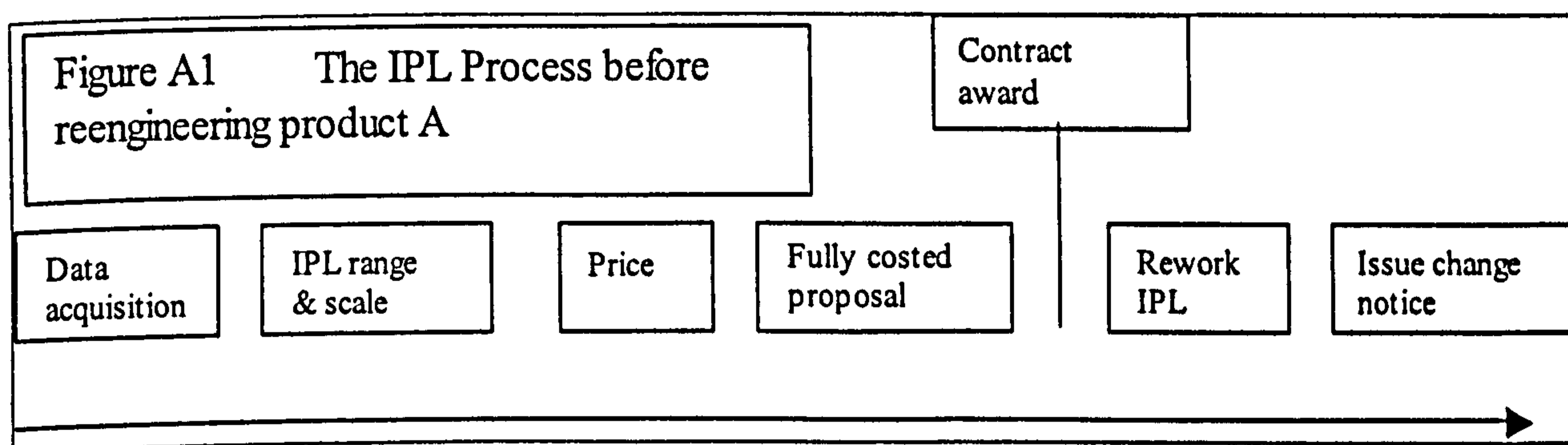
It has two separate processes for IPL and IPC equipment required to deliver and maintain the product over its life cycle. Both are addressing the same reengineering objectives as well as issues raised in evaluation stage. The reengineering objective encompass cost, quality, and

elapsed time whereas evaluation stage identified such issues as:

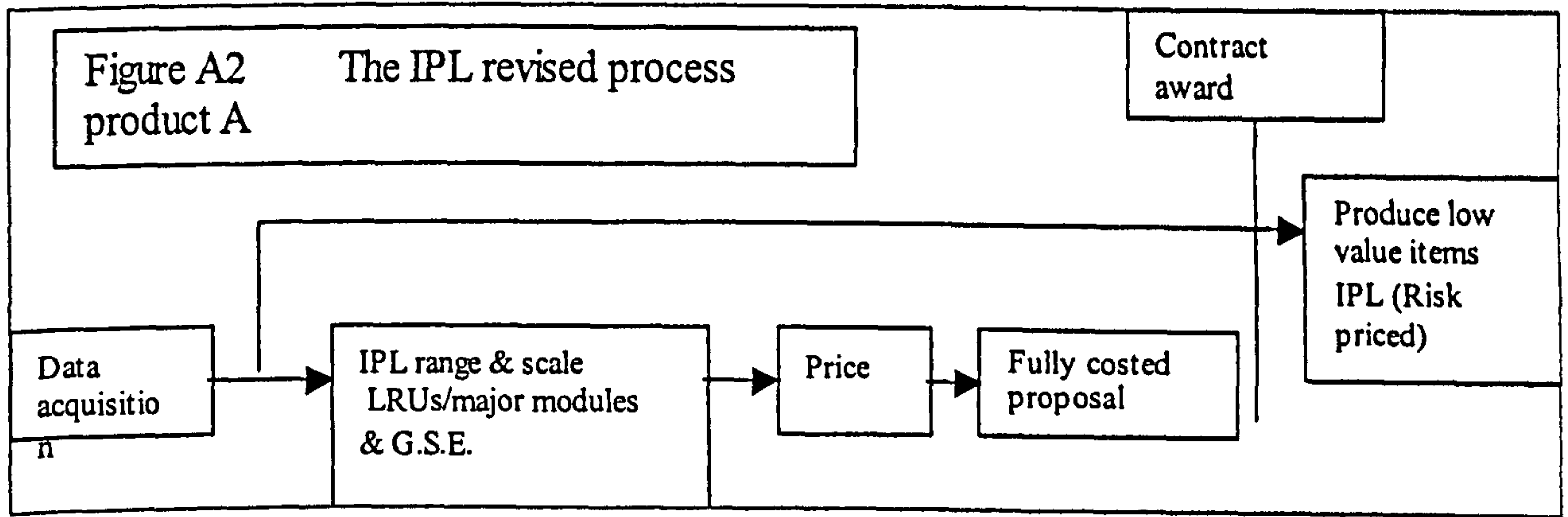
- * Lack of early product definition causes a high level of rework,
- * Lack of up to date reliability data giving inaccuracies in the IPL scaling, and
- * A tardy pricing process resulting in an unnecessary high level of unplanned commercial risk pricing.

a) IPL Process

The reengineered process needs to resolve these issues. New process can be better understood by examining the old one. Figure A1 shows the 'AS IS' map of the process. It consists of six steps where award of contract takes place after fourth step, the fully cost proposal.

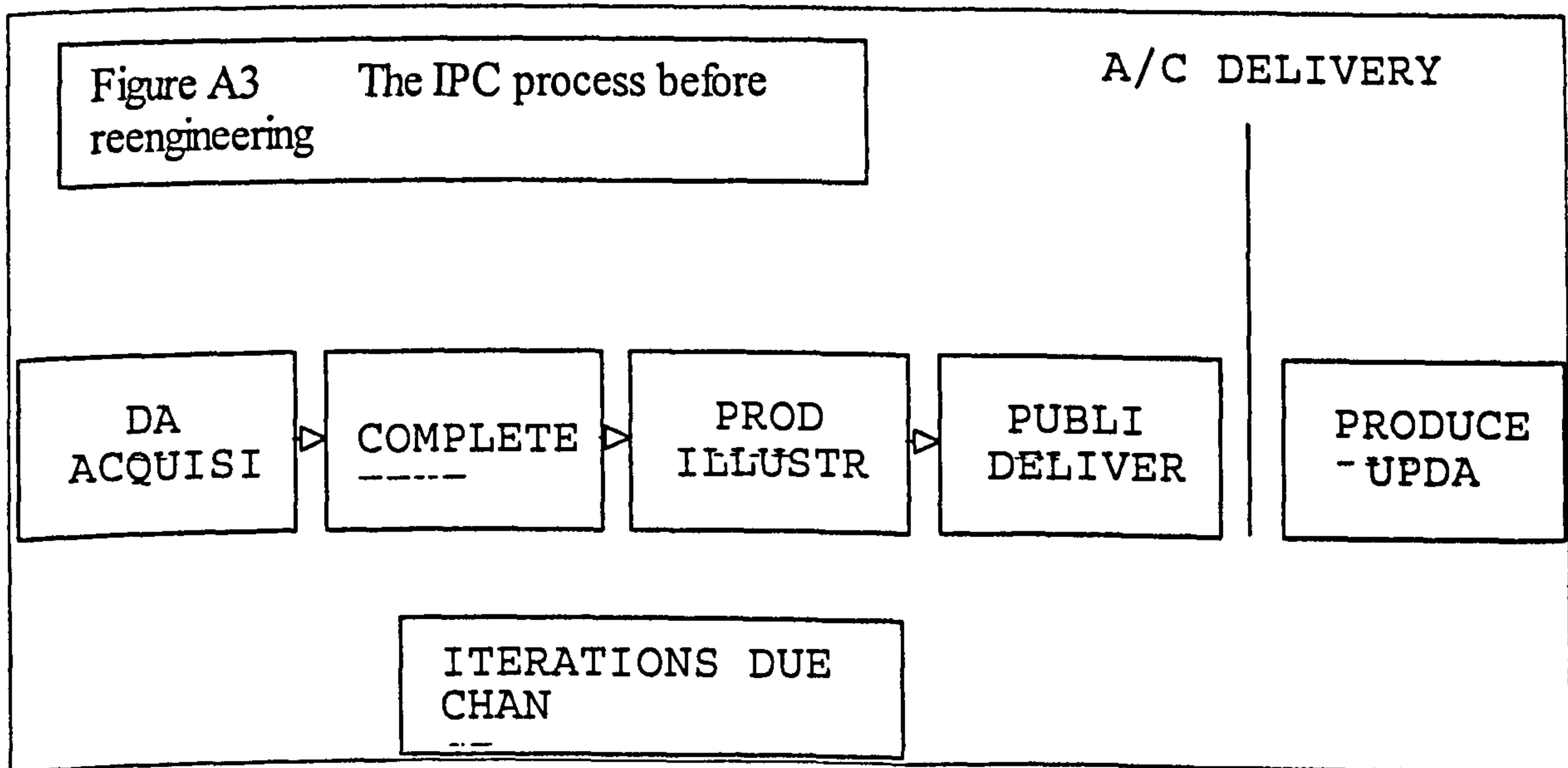


The process has been redesigned incorporating recommended changes to fit in the current and the future needs of the customers at a minimum cost with maximum customer satisfaction. Figure A2 shows the changed process. It consists of four sequential steps. The fifth is the parallel step. It is noticeable that award of contract takes place after only three steps and before the fully costed proposal. The pricing strategy has been changed from producing whole IPL/IPC list into two parts. Therefore, low value items have been separated from the high value items. It is recommended that the list of low value items would be prepared as a free delivery or as a fixed price package.



B) The IPC process

The process is concerned with the future business of the product. It takes into account past product in service, product in the process of manufacturing, and potential sales. Figure A3 shows the map of the process before reengineering.



It consists of five steps with some iteration due to design change. A/C delivery is made after completing four steps; iterations may be required in compilation of text, production of illustration, and publication and delivery of IPC.

The process redesign will have to address the following issues identified at the evaluation

stage:

- The initial issues of the IPC do not reflect the product delivery standard due to late design definition.
- Protracted IPC production times, results in a considerable amount of re-work due to design changes.
- The BOM not being in disassembly sequence causes re-work within CSD.
- The interface between the compilers and the illustrators is not optimised adding delays into the process.

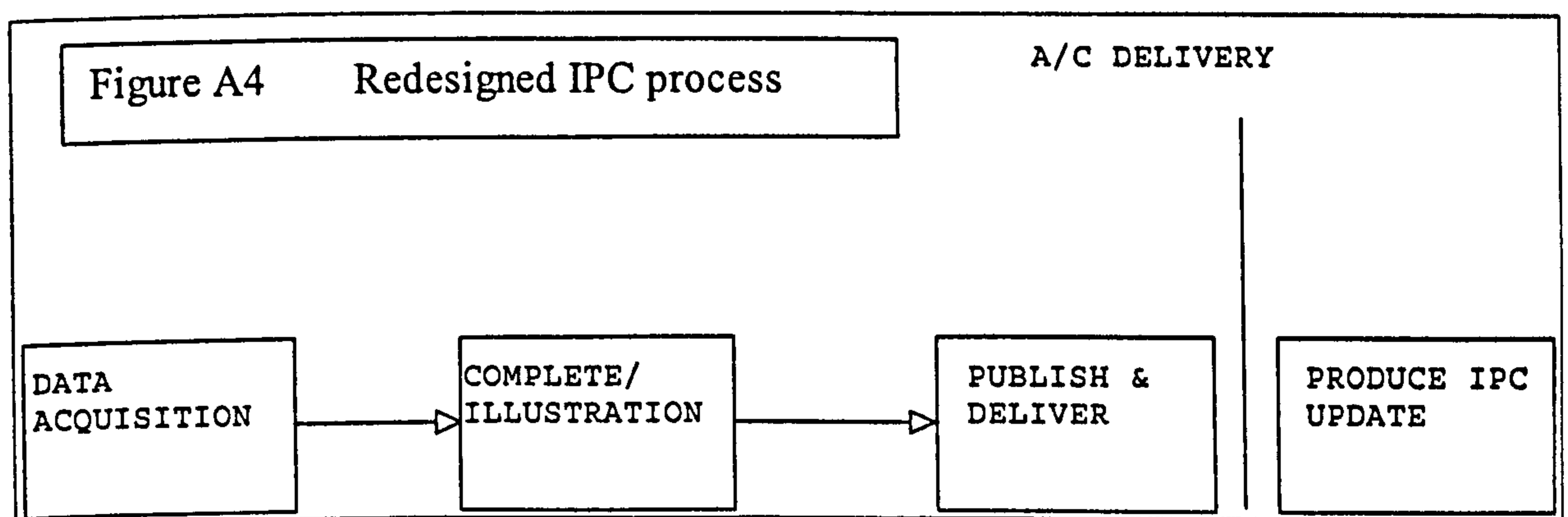


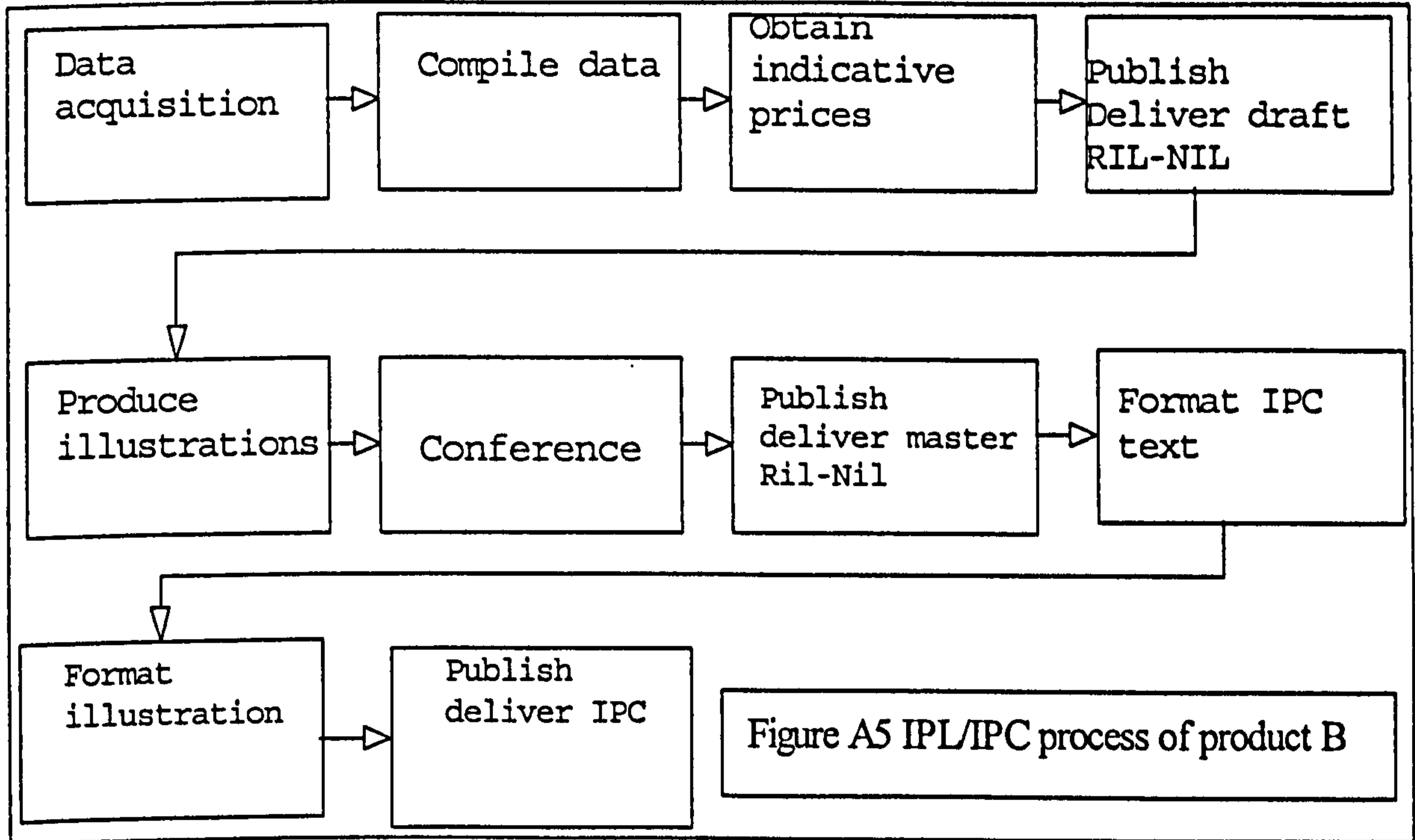
Figure A4 shows the new process. One of the five steps has been removed in the new process in addition to the elimination of iterations previously required in three steps. A 50% reduction in elapsed time (multi-skilling 37%, digital data acquisition 13%) and 40% reduction (multi-skilling 28%, digital data acquisition 12%) in cost is expected.

Product B

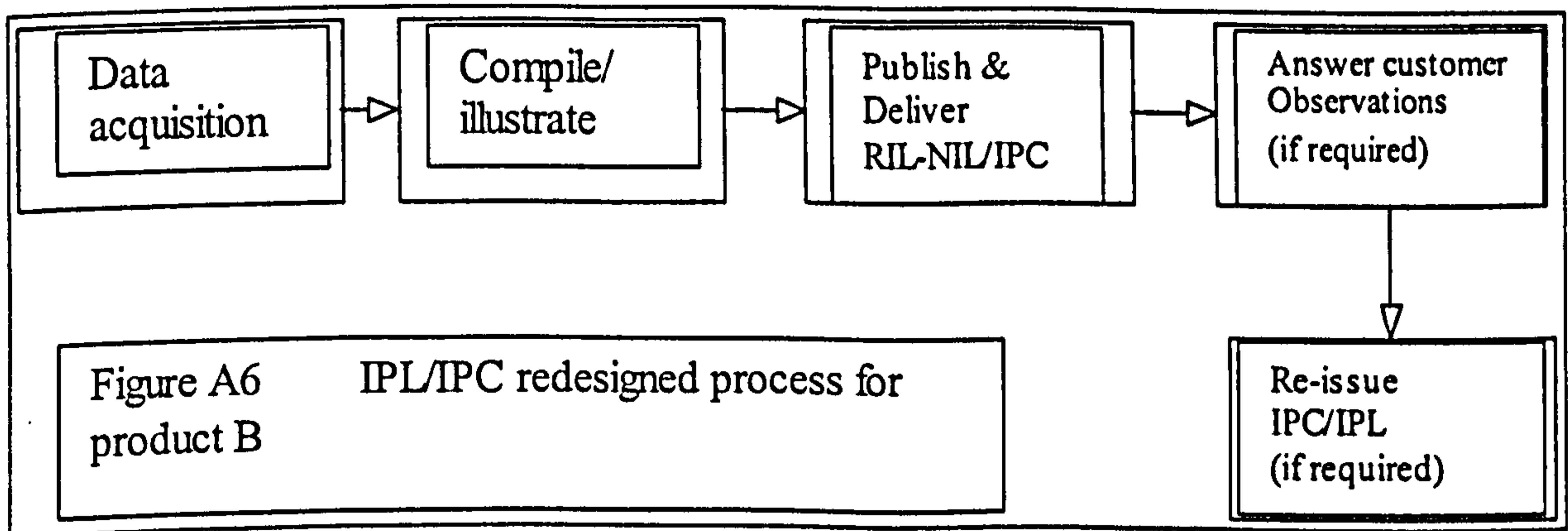
This is a similar process for the same line of product. The IPL/IPC document is desired as an outcome of the process. The process is supposed to achieve BPR objective in addition to address the problems raised in evaluation stage including:

- The process is customer driven and bureaucratic historically
- The Bill of material requires re-sequencing resulting in re-work within CSD and the vendor contracts are complex and open to interpretation which also needs rework within CSD.
- Duplication of data occurred because data are held by difference systems and processed by different teams.

In net shall it is an inefficient protracted process with a high level of rework required that can be imagined from the analysis of figure A5.



The process contains ten boxes of the diagram, which obviously demonstrates its lengthy procedure. The sequential nature of the process is questionable. The inefficiency of the process could be imagined by the fact that the redesigned process consists of five steps only. Figure A6 shows redesigned process. The number of steps has been reduced to five from ten; thus a 50% reduction was achieved. Two of them are optional which further curtails the number of steps and increases success rate. Moreover it shows about half of the steps were non-value added to the customers or organisation itself.



Product C

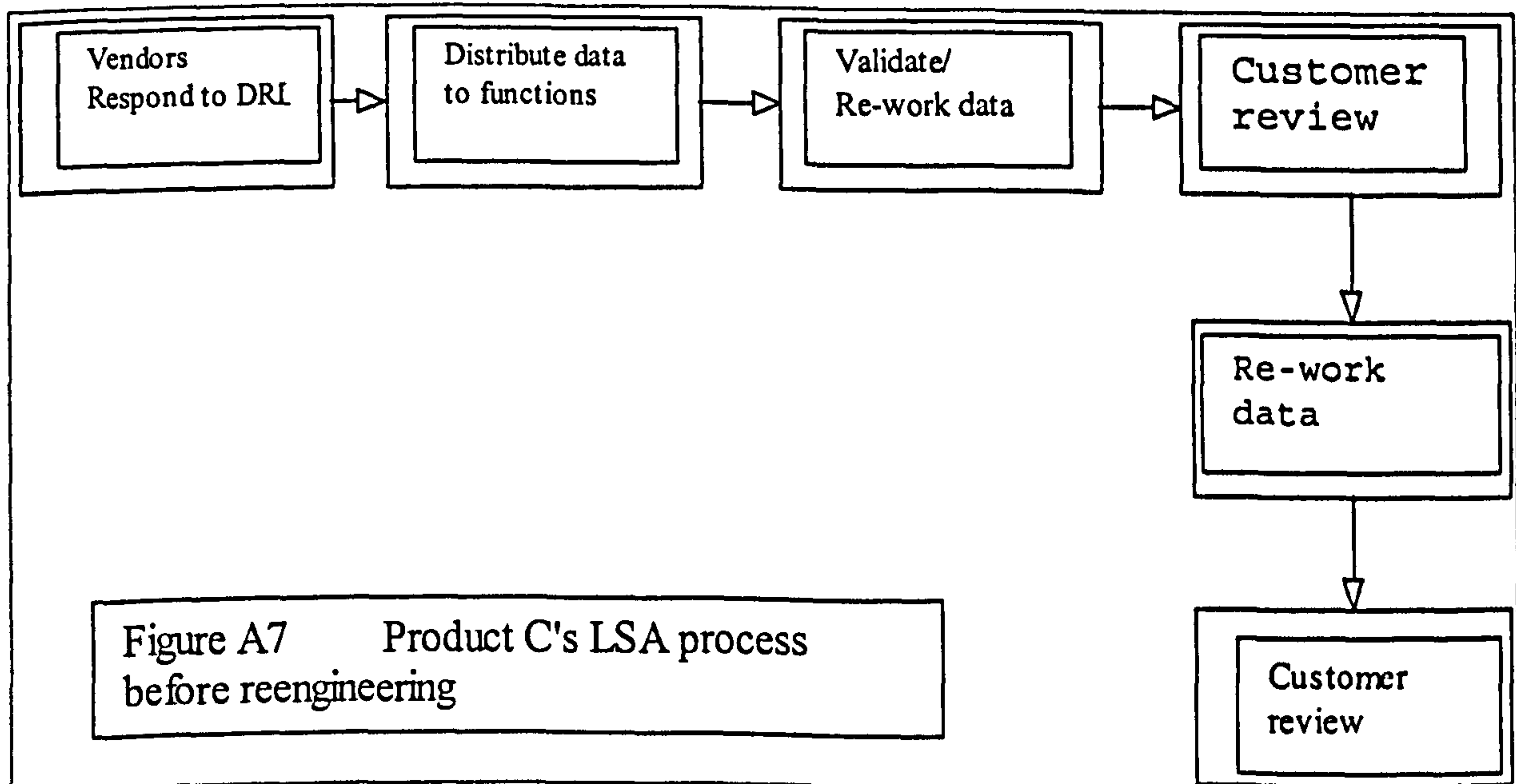
This product is under development at the moment in the organisation, therefore, its IPL/IPC process has been developed first time taking into account the experience of other similar products, nevertheless its Logistics Support Analysis (LSA) process has been redesigned. The significant features of the evaluation phase indicate such matters to be considered in redesign phase as:

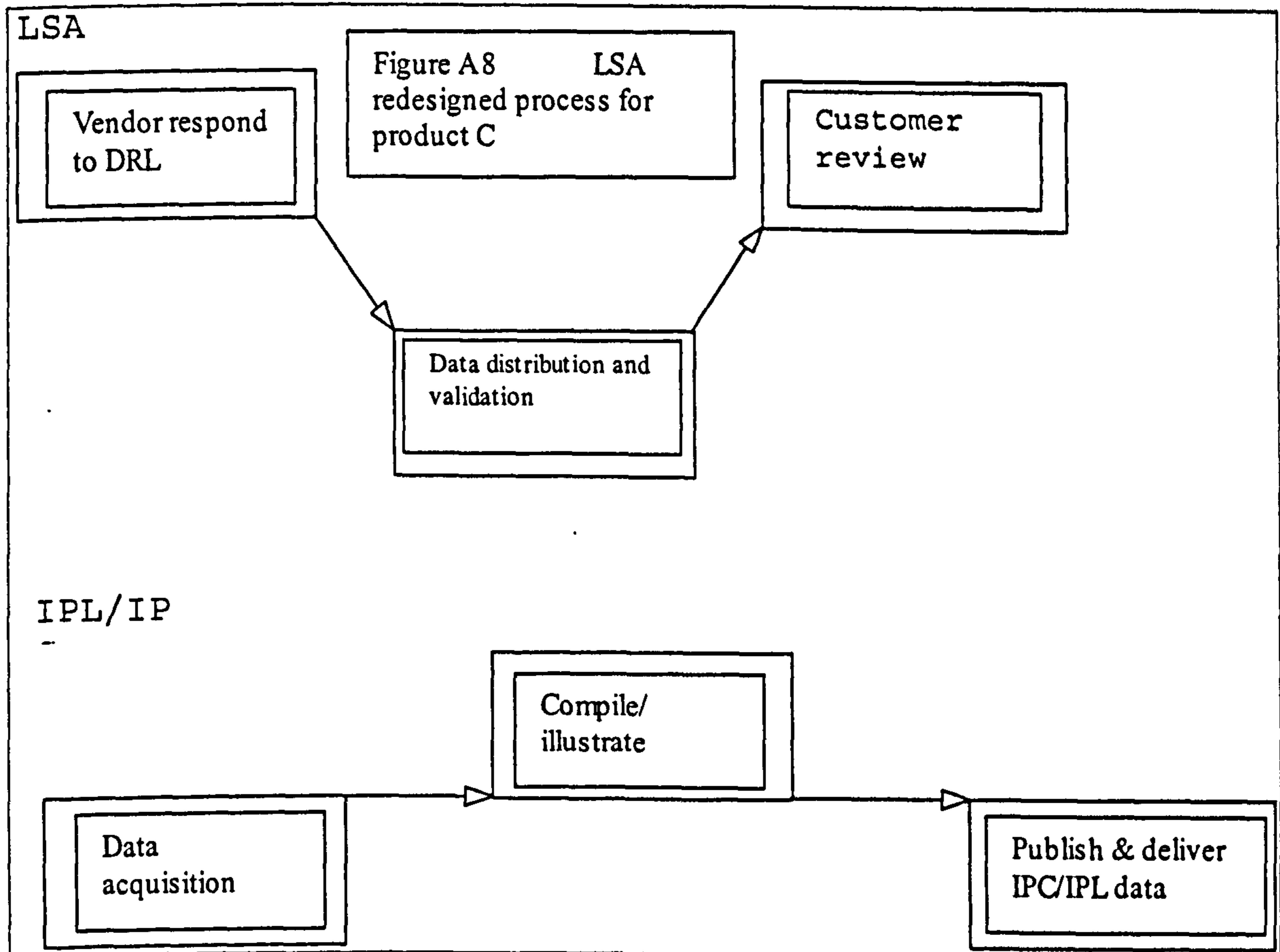
- Fixed price contracting tends to preclude formal change to vendor contracts and poor contractual definition of vendor data
- Insufficient teamwork between functions and lack of ownership of end to end process.

The pre-reengineered process is detailed in figure A7. The process designers conclude that it is an inefficient process, which requires a high level of re-work.

The process contains some non-value-added functions and steps, which causes problems for the organisation i.e. re-work which increases cost.

The problematic nature of the existing process forced process team to change it. Figure A8 detailed the redesigned LSA process and also shows newly designed IPL/IPC process.





It seems to be a 'smart' process because the number of steps has been reduced to three from six.

This process is based on the learning curve gained by redesigning other process of the same nature.

Product D

The old process has been shown in figure A9 As the diagram depicts it is a sequential lengthy process, which is characterised as inefficient producing an inaccurate product. The redesigned process accommodates vision requirements (issues identified in evaluation phase) as well as BPR objectives (see figure A10 for the new process).

Figure A9 The IPL/IPC old process of product D

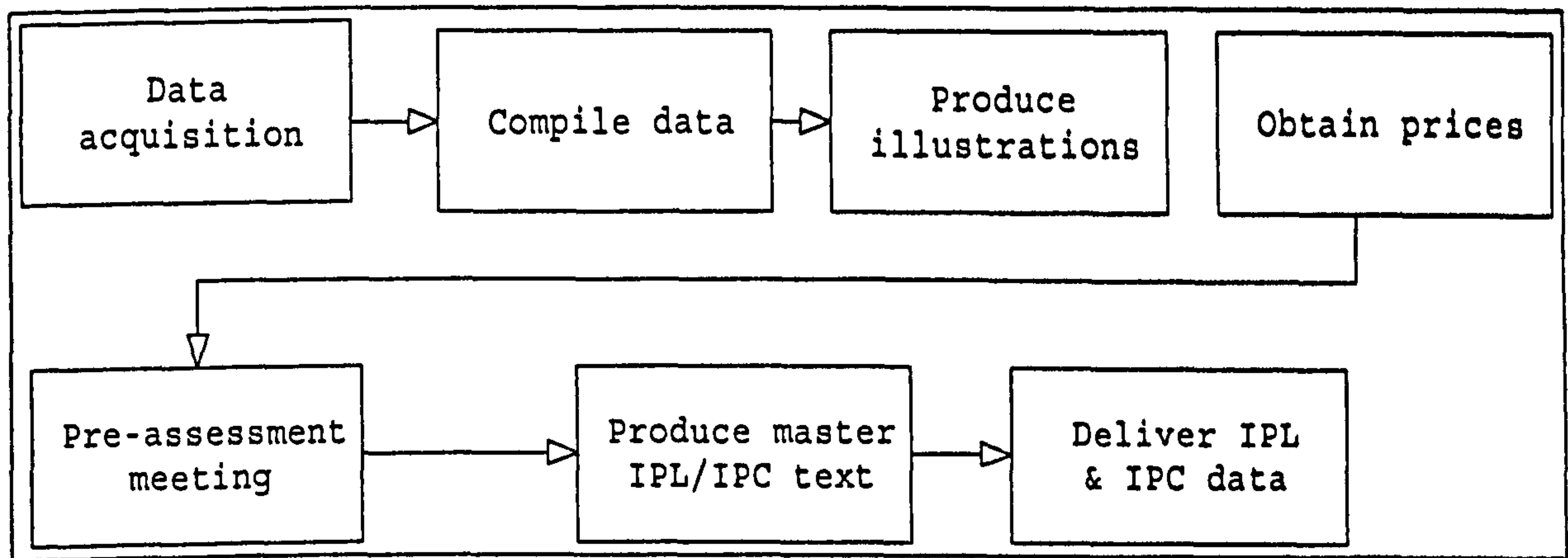
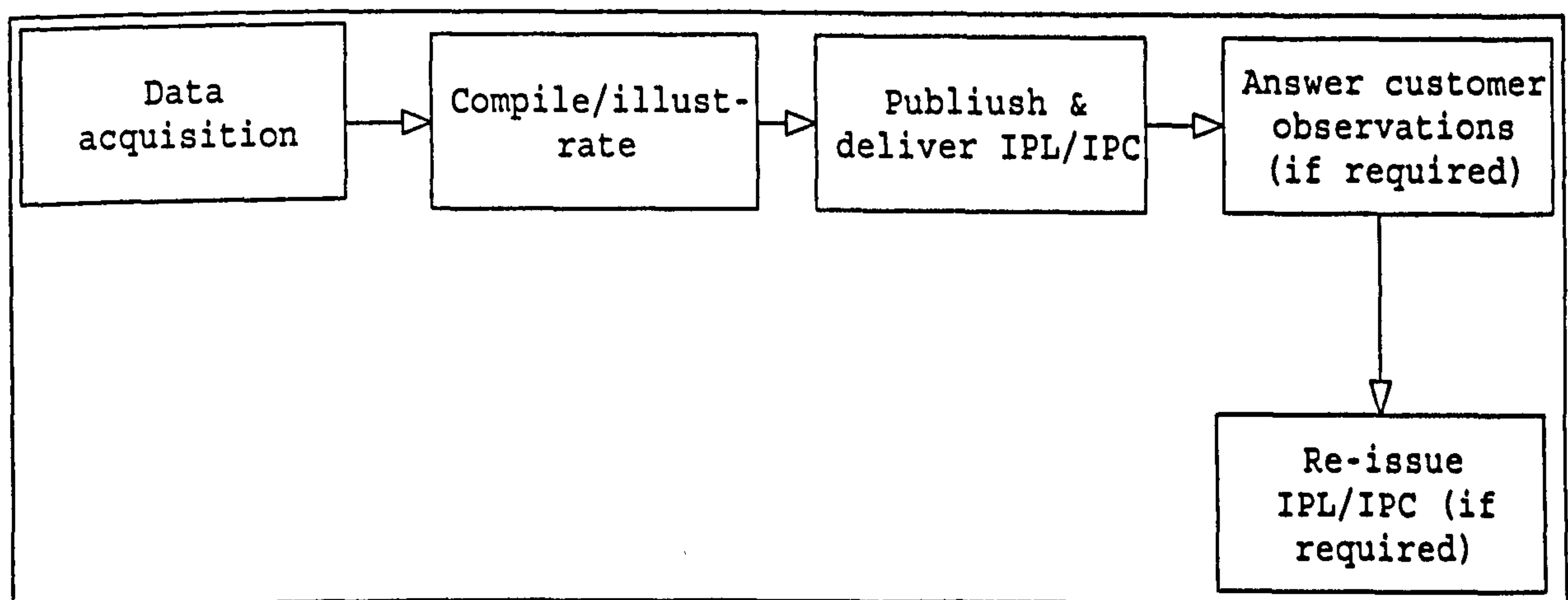


Figure 10 The IPL/IPC new process for product D



2. Spares & Repairs

It was started in July 1993 as an initial process for the pilot study in an attempt to provide quality supply support to the customers. Evaluation and Envision were completed in the same year Empower in 1994 including pilot implementation and extend to rest of the supply support in 1995, and Excel continued in 1995 and beyond. It is one of the largest processes in the supply chain. Its importance could be imagined by the fact that it was serving 31 customers, providing support with seventeen products, was dealing with 700 suppliers, processed more than 74000 orders per annum, and made multimillion trade with 500 persons in the process. The purpose of the process was to "provide a profitable spares and repairs (S & R) service to

achieve effective supply support to *the* customers” (BAe, 1993b). The main thrust of the process was customers satisfaction.

The old process was infected with a number of ‘viruses’ but three of them (so called ten top issues) include data integrity, price availability, and smarter use of existing systems were prominent. Above all unforeseen changes, lake of confidence in process integrity, unscheduled receipt of S & R, poor schedule adherence, asset reallocation on receipt, dual inspection at vendor and CSD, payment prior to goods receiving and inspection, and time consuming and unreliable systems were dominant issues.

The jurisdiction of ‘hard’ cost ranges from value added to elapsed time, which looks like the following.

	Best	Worst
<i>Value added</i>	0.55-57.00%	.08-40.00%
<i>Elapsed time</i>	19 Weeks	125 Weeks

A high level map of the process is shown in figure A11.

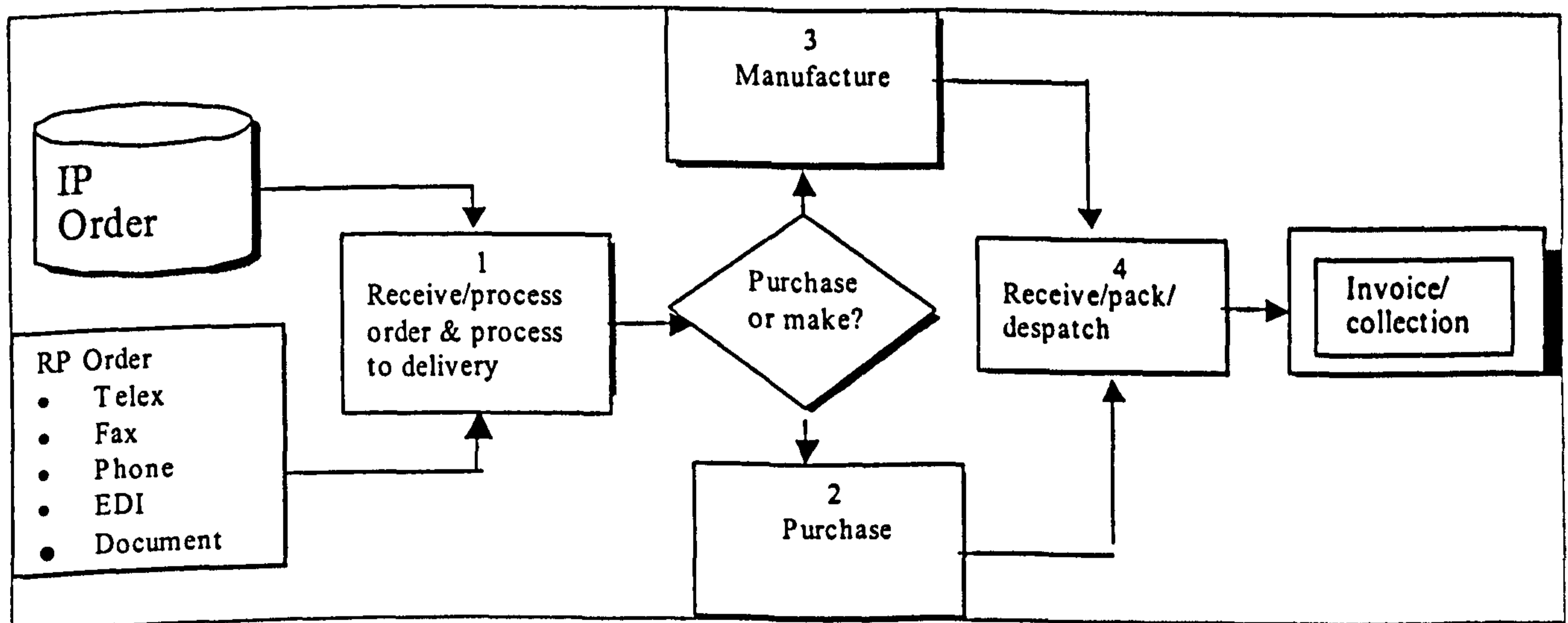


Figure A11 Spares & Repairs high-level process before change

The process was redesigned in an attempt to get rid of the above mentioned problems. It was envisioned that process could cost less, process time could be elapsed from 19-126 weeks, and process value-added could increase from 0.08 to 55% against elapsed time. Fully implemented new process requires 50% less staff, reduce cost by 2.3m p.a., three times faster than the old, increases value-added by X10.

Redesigning of the process enables organisation to gain envisioned benefits amicably. These benefits are linked with the enablers of the process. The enablers have been split into organisational and business. Organisational enablers encompass removal of functional process barriers, teamwork, multi skilling, elimination of internal progression, and standardisation of procedures and working practices. Business enablers include linking of customer and suppliers with EDI, enhanced system interface, high quality data management (90% availability & 95% integrity), preferred suppliers relationships, pack at supply source, Quality Assurance at source, and maximum use of direct shipment. Organisational enablers saved 40% cost (42% envisioned) and business enablers saved 10-15% at the end of 1995 (58% envisioned).

The new process was considered lean process which requires clear data ownership, maximum use of EDI ownership, minimum internal progression, quality at source, preferred external supplier relationships, maximum use of enabling orders, pre-packed spares to customer standard, maximum direct shipment, payment on goods received which eliminates invoice system.

The new process was organised customer satisfaction, availability of assets, deliver assets to customers and get paid. It was made possible through independent but interrelated teams: customers teams responsible for contract with customers, acquisition teams vested with managing suppliers, and distribution teams authorised to receive, pack, despatch, and invoice goods. Many structural changes were also made but concentration of process ownership in a single hand was remarkable.

A pilot was experimented before the full implementation of the process. Approximately 18% of the staff were involved with three major suppliers; eight repairs suppliers, and in house manufactured items. A goods receiving area was set up to support the pilot. Similarly, arrangements were made to manage despatch, shipping, and finance to help customer.

3. The Procurement Project

The procurement of material and equipment is a vital activity in those organisations that assemble artefacts. Lead-time, inventory holding cost, ordering costs etc are directly affecting performance and profitability. There were many loopholes in this important process. Management was highly concerned with the process; hence this was one of the early processes, which were selected as a target for reengineering.

The project was divided into three processes, procurement of aircraft material, procurement of aircraft equipment, and procurement of non-aircraft goods and services. Three teams were formed to accomplish *evaluation* phase; it included only one product in the evaluation but ultimate object was to generalise it for all the products. The *envision* phase was completed by Process Improvement Team (PIT) which designs a new process by analysing process opportunities, conducting vision workshops, and reviewing industry and related practices. It also envisioned potential benefits of the redesigned process. It identifies process issues in technological, human resources, and implementation areas.

Aircraft equipment and material processes have been merged for redesigning reasons. But non-aircraft goods and services process has been kept separate. Aircraft equipment/material process is renamed as *aircraft procurement process*. A map of these processes before reengineering is depicted in

Figure A 12& A13.

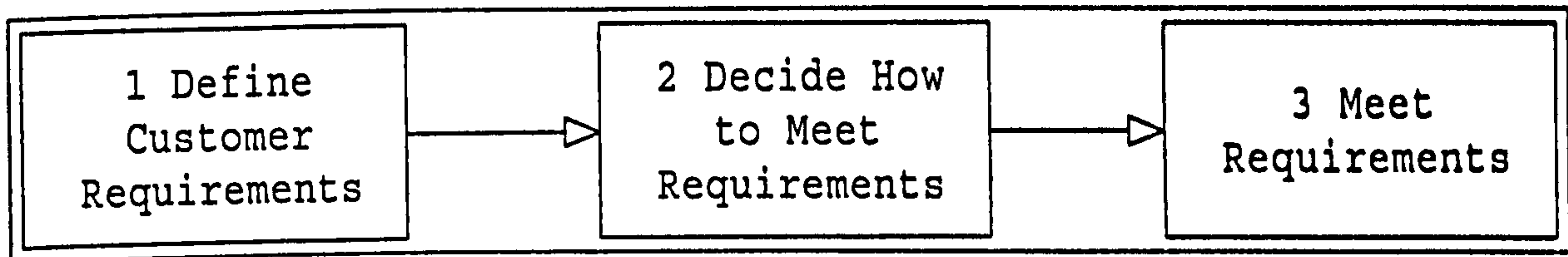
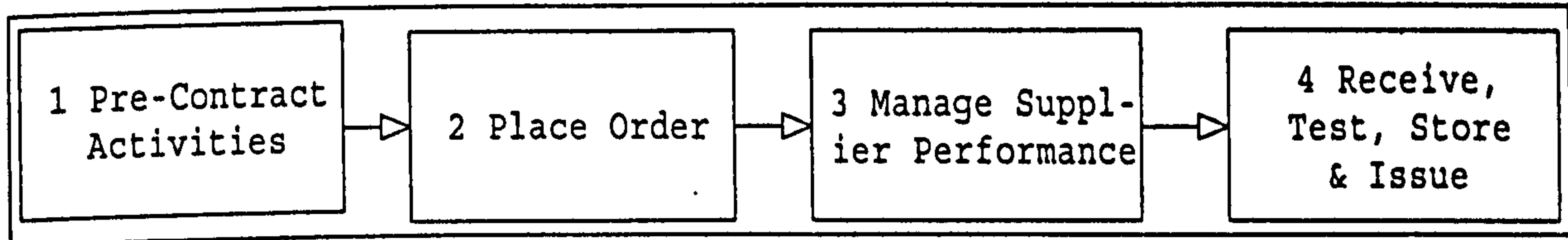


Figure A12 Aircraft Material Procurement process before reengineering map

Figure A13 Aircraft Equipment Procurement process before reengineering map



The evaluation phase indicated a number of problems associated with the current process. For example, relationships with suppliers are adversarial, they are not informed of the company position at all times leading to surprises and ill feeling and equality. That is why the performance of suppliers is poor. Strategic partnership, setting common goals, building mutual trust, and co-operation were recommended. Inventory turnover is very low (less than 2) which causes heavy investments in working capital as well as storage cost. In addition, poor quality of equipment delivered which is tested on the site and requires a lot of returns further build storage. Inaccuracies in the Bill of Material are serious and need changes. The BOM is only 55% accurate for a certain product.

The quality of information held by different systems is highly questionable; it needs to be integrated in a single reliable source. Behavioural and cultural factors impede the true picture of the process; employees feel difficulty in understanding the issue, which disrupts the nature of the process. Finally, non-value added activities are part and parcel of daily routine. For example, expediting, checking and inspection, and resolving invoice and GR query.

The evaluation team identified at least three opportunities regarding with this process. The process could cost less (£3m annually); the process time could be collapsed (from 1.2-140 weeks); and the process value added could increase (0.04-4.04% against elapsed time).

A very important part of the analysis discover innovative use of IT, need for cultural change, strategic alliance with suppliers and application of Japanese inventory management technique in the process. For instance, employment of Just-in-Time (JIT), Electronic Data Interchange with suppliers was recommended as future strategies.

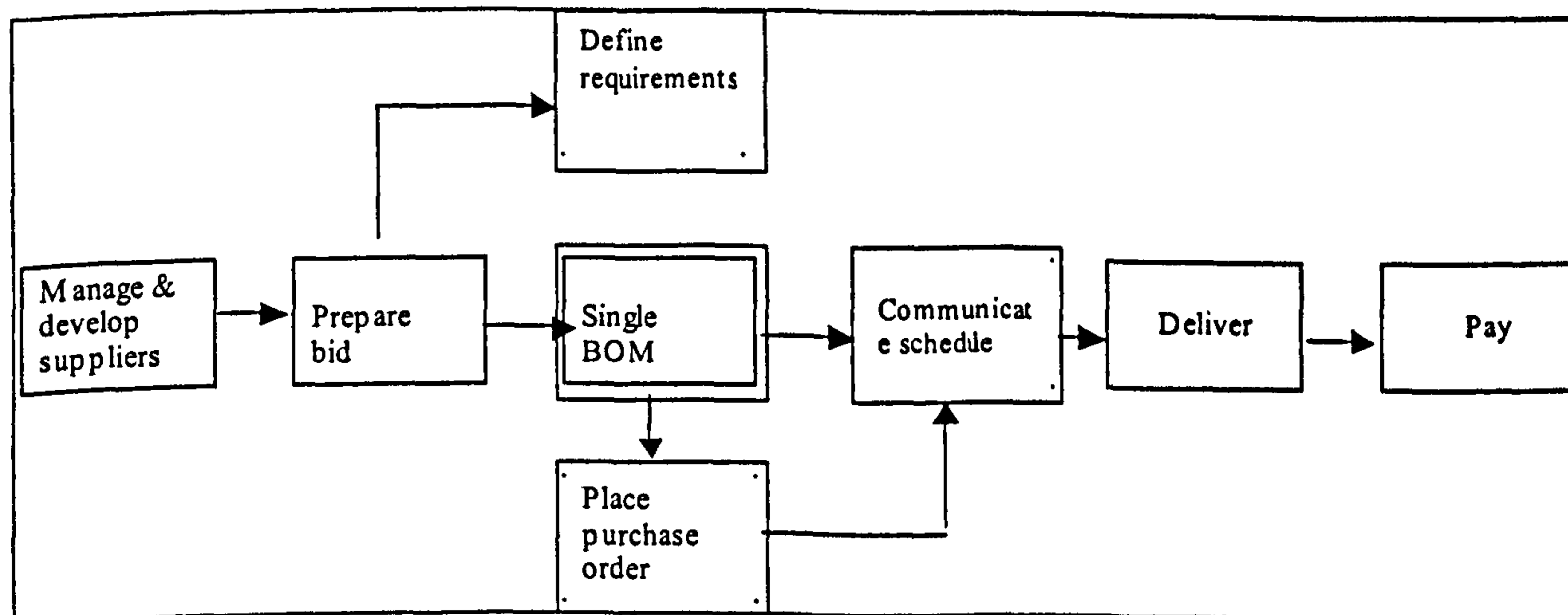
The redesigning of the process is based on such Process Enablers as:

- A contract team was formed to define clear requirements and the related data was vested to it.
- The Supplier Management Teams (SMT) were responsible for long term agreements and contracts with suppliers; Statistical Process Control was introduced to enhance quality. The SMT improved suppliers' performance by applying such mechanisms as Preferred Supplier Programme (PSP). Developing closer links with suppliers providing a framework for mutual support is a key strategic move.
- JIT was implemented with common delivery (single) schedule for the supplier and manufacturing. Similarly, direct delivery of defect free items to the point of use is a major feature of the design.
- The receipt of quality items was considered the trigger for payment, thus eliminating paper work involved.

The redesigned process

The aircraft equipment procurement and material procurement processes were consolidated to form the aircraft procurement process. The map is shown in figure A14.

Figure A14 The Procurement Process



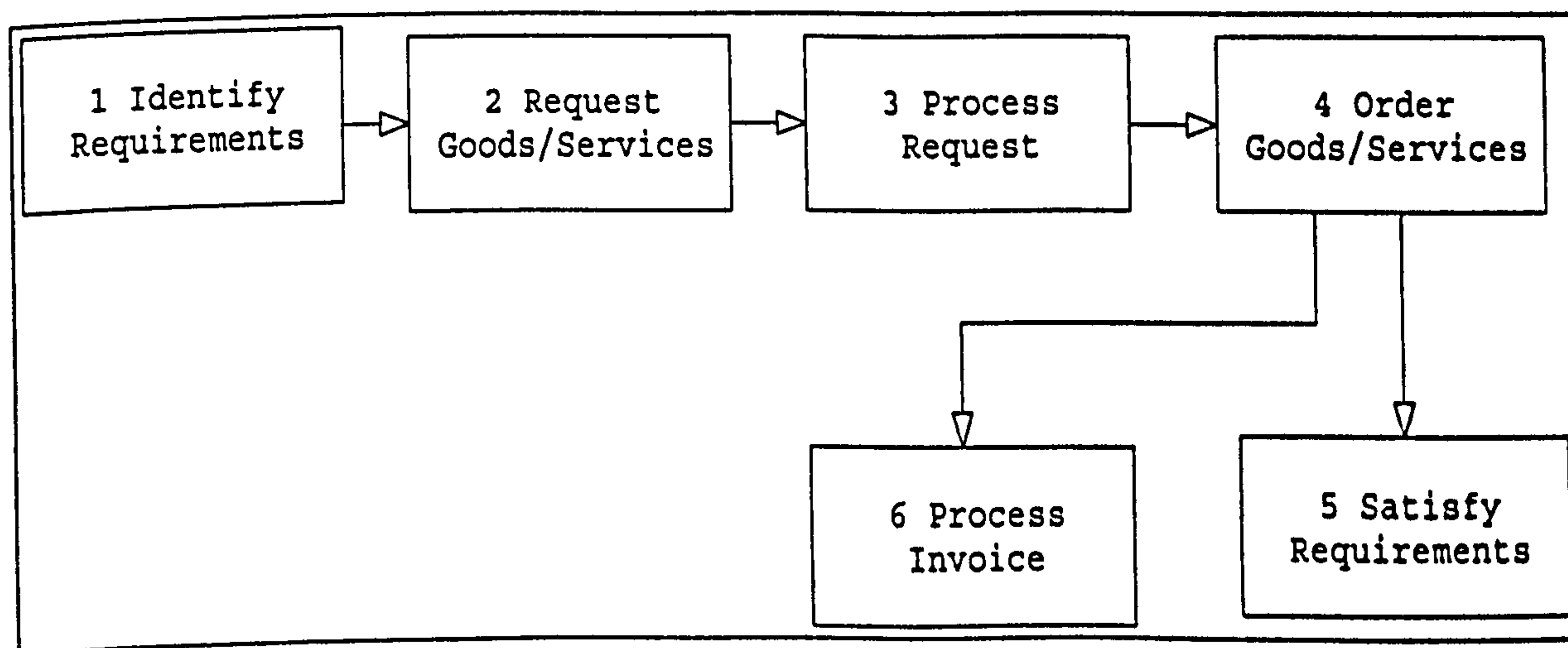
Non-Aircraft Procurement

The second part of the project concerned with non-aircraft procurement. It deals with those material and equipment, which is less than or equal to the value of £2000. Hence known as low value items. They were procured with the other 'high value' items; however, it was separated from the *main* items for redesigning reasons. They were associated with serious operational and cost problems. For instance, high ordering cost, long elapsed time, unnecessary invoice queries, non-value added activities, and high level of checking, approving and documentation.

The process was also characterised with human, organisational and IT issues. Bureaucracy, organisational conflict between project and the functions, poor communication, lack of empowerment, inadequate training, complex and cumbersome, slow and unreliable IT systems and last but not least the poor quality and integrity of data were the major issues.

Apart from the above noted problems, the process had enjoyed the same opportunities as aircraft procurement process had e.g. cost, elapsed time etc. This problematic process has been mapped in figure A15.

Figure15 Non-Aircraft Goods & Services process before reengineering map

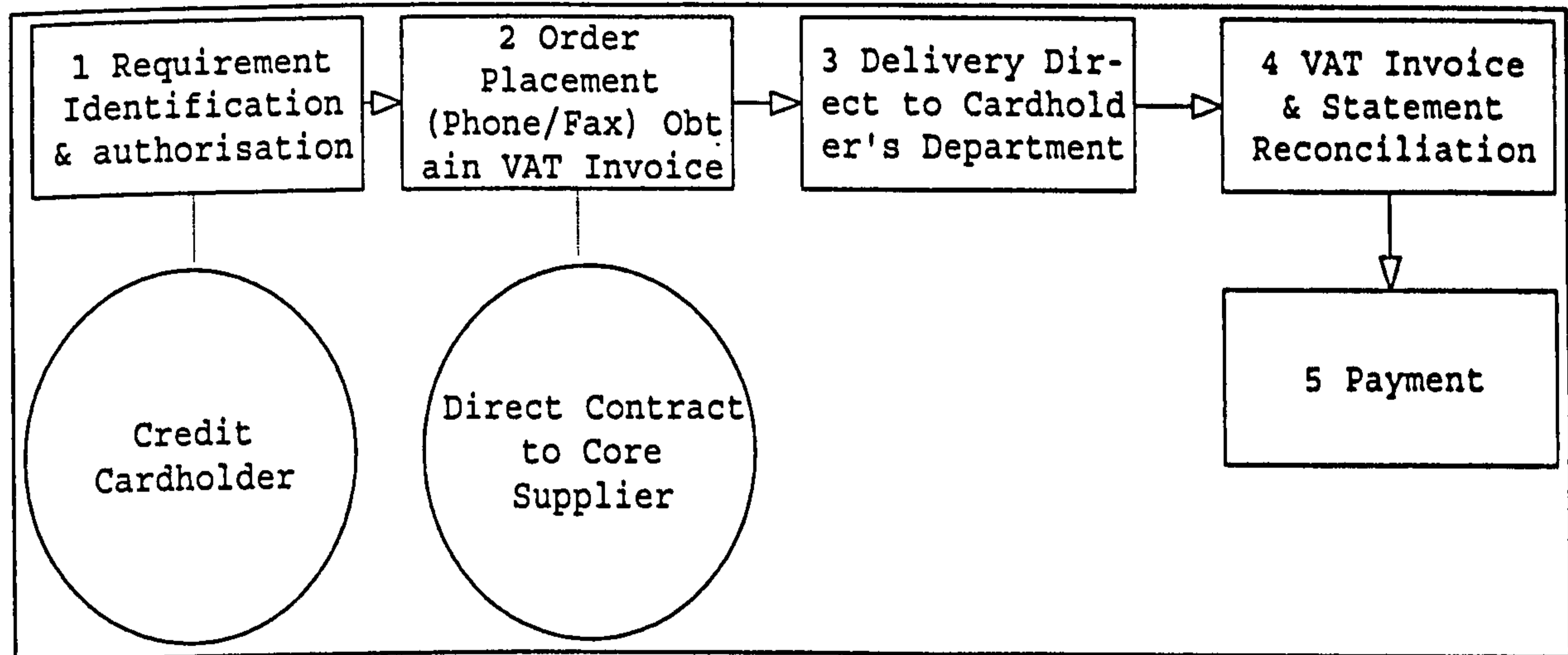


Process Activity in the Purchasing Department Purchasing department was processing over 6600 low value orders in 1993; Bought Ledger Clerks were maintaining 30000-50000 invoices of these low value items; lead time ranged from a matter of hours to 17 weeks, the typical averaged time was 25 days; ratio of value added time ranged from 0.02-15%; and it was

estimated that 76 people had been directly or indirectly involved in the process with £1.2m expenditures.

The new process has been designed in order to overcome most of the problems entailed in the old process. A complete new way of doing things was proposed which eliminated many functions or reduced them dramatically. See Figure A16.

Figure A16 Non-aircraft Goods & Services process



Expected benefits of the redesigned process include: savings of headcount by nine persons per annum; Purchase Orders by 6000 (91%); number of invoices reduced from 30000-50000 to one cardholder per annum; elapsed time reduced to a fraction of hour from 1.25 days to 17 weeks; value added ratio increased from 0.02-15% to 5-75%; Purchase Orders by 7000. Reduction in paper work caused to increase morale that was considered a significant qualitative achievement.

Reengineering efforts changed roles and responsibilities of employees and departments Concerned however, it restricted the list of low value items slightly. On the other hand audit/control and MIS have to change existing procedures to accommodate the requirements of the new process. Training was provided to some people to manage the project in the redesigned perspective.

4. Project Control

Project control is the control of project business and operations throughout the organisation. It must expose and predict operational problems. However, it is not project management as a separate function and can't directly change operational processes and performance. Thus the scope of the project control is to make decision to bid, receipt of contract, commence operations, delivery of last product and closure of acquisition contract. It excludes post contract support to customer and operational control.

The focus of the project was on management control, which needed to be improved/reengineered because existing process was slow and costly, had a poor vision, and did not coincide with customer expectations.

The evaluation phase identifies a series of problems with the old process. For example, inadequate tasks planning, unclear process, with weak linkages and unclear roles and responsibilities, managerial style can best be described as monitoring rather than managing, no ownership of problems, excessive reporting, second guessing with uncoordinated management information, lack of trust and honesty, historical preoccupation, fire-fighting as management tools, impact of change on business not appreciated, inadequate risk identification and management, inadequate financial performance assessment. The process has been detailed in figure A17.

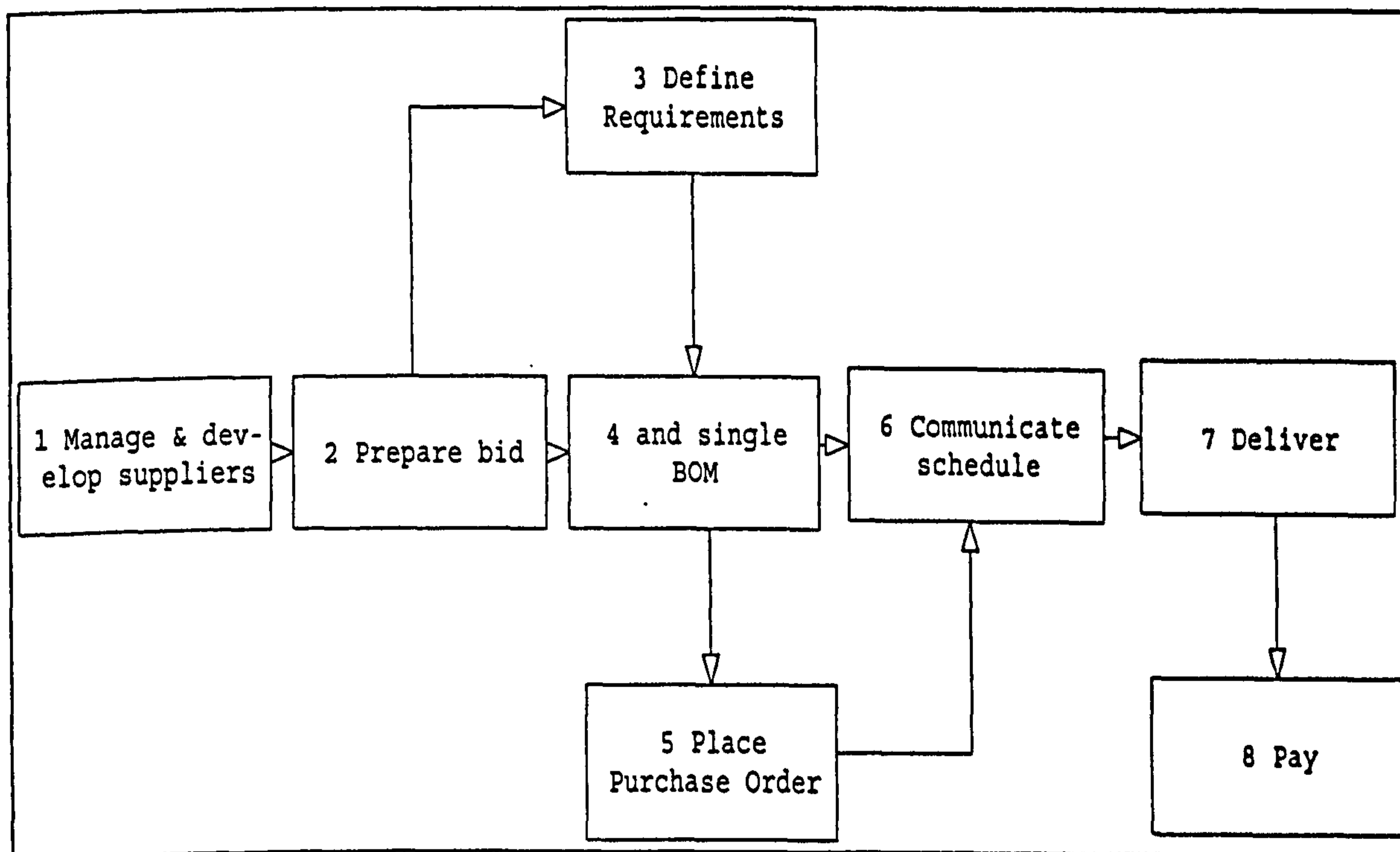


Figure A17 Project control process before reengineering

To remove most of the above problems the process was reengineered. The initial objectives of the reengineering were customer satisfaction by anticipating problems and taking early preventive/corrective actions. It requires detailed advanced planning, strong risk management, managing change by assessing the impacts of accumulated change, evaluation of progress, and adoption of open, forward looking, and project supportive attitude. In nutshell the vision of the future project was established which argued that the project control should be based on advance planning, looking forward, management of risk and uncertainty, create a shared view of project status and objectives, and takes pre-emptive action.

Different objectives will be achieved at various stages of project control that is a part of planning efforts in addition to streamlines the project goals. Figure A18a and b outlines what is to be achieved at which stage of the project life cycle.

Figure A18 High level project control redesigned process

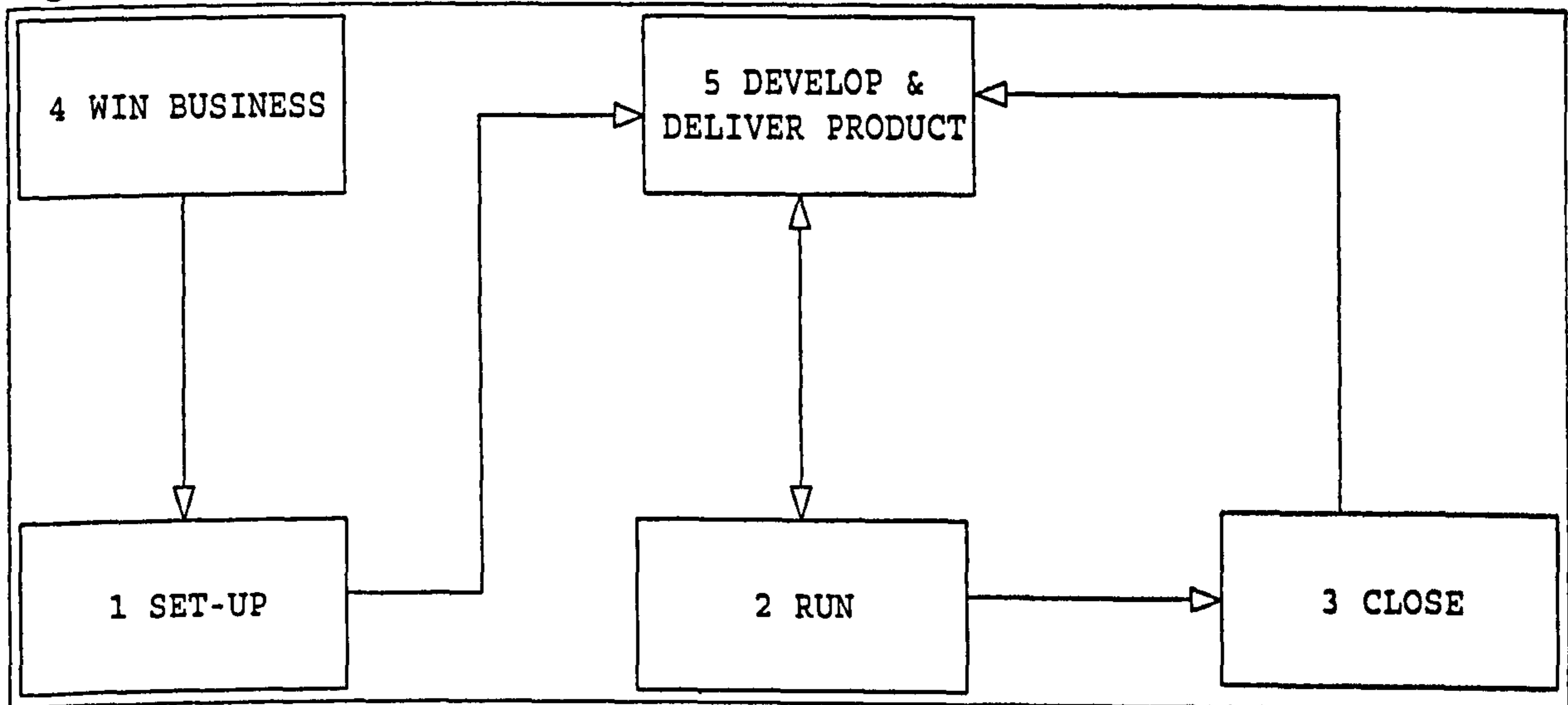
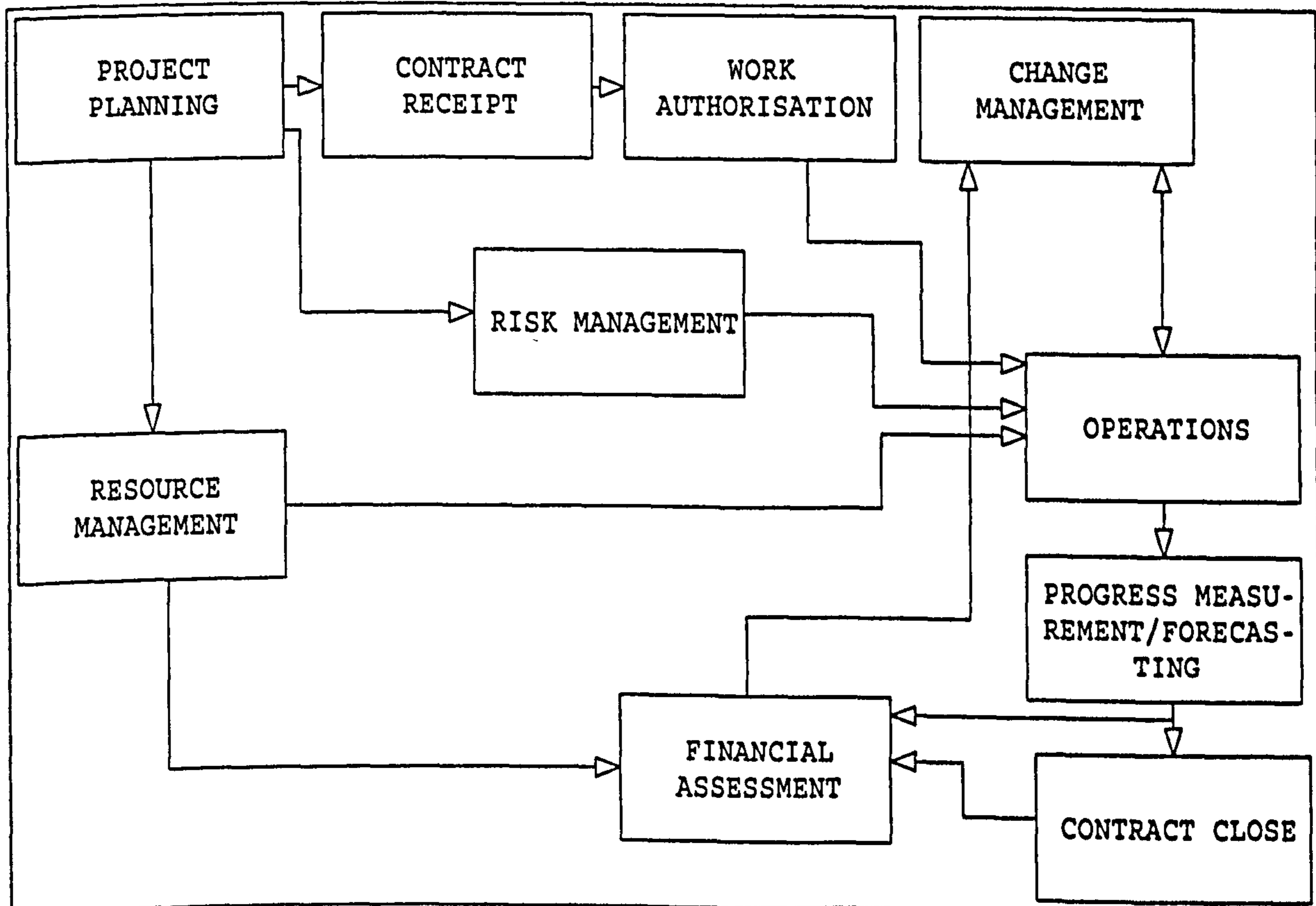


Figure A18a High-level project control redesigned process

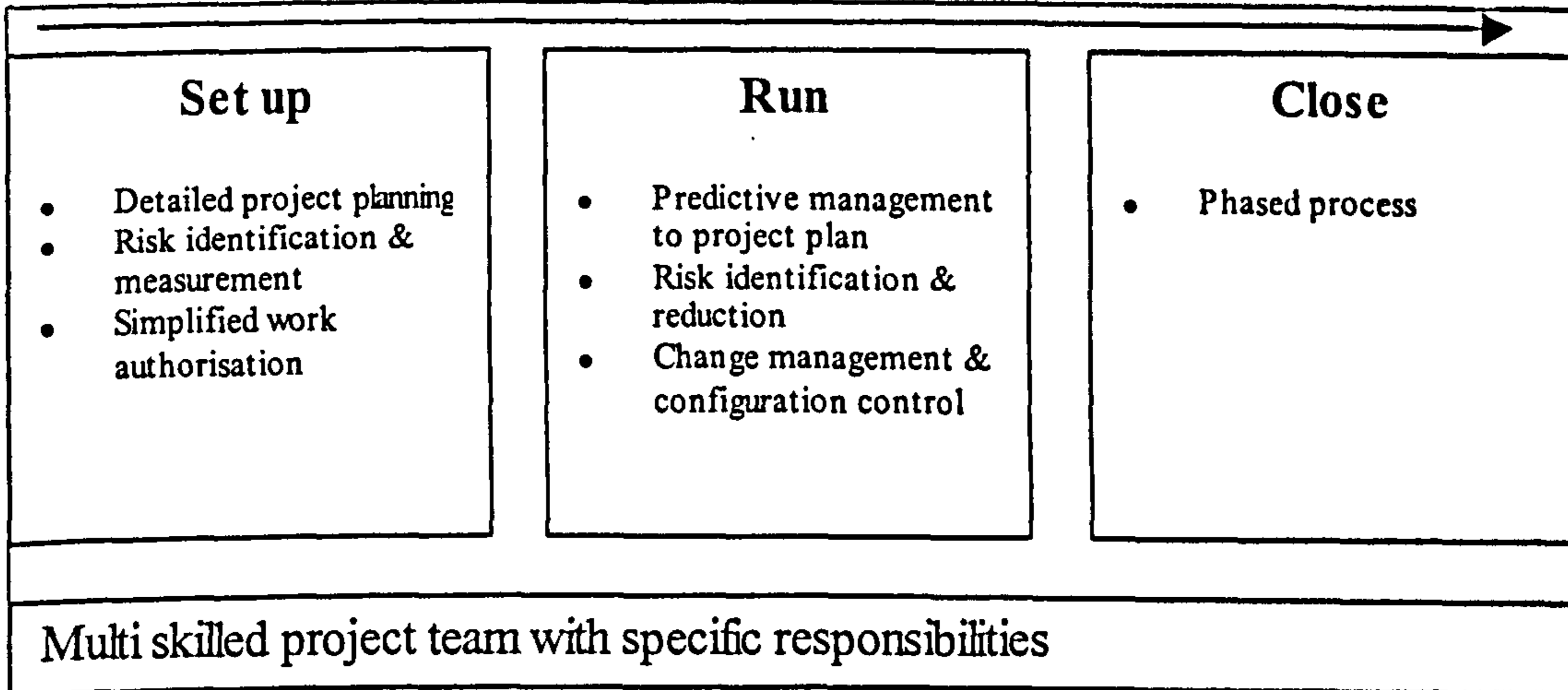


Davenport (1993) recommends determination of human, technical and IT enablers in the process innovation initiative. Seven enablers have been determined for project control process including:

- Comprehensive project plan document
- Risk management methodology
- Simplified work authorisation
- Revised change control with visibility of cumulative effect on the programme

- Readiness reviews
- Rolling re-appraisal of the project plan
- Refined estimates at completion process

Figure A19 Process Improvement Continuum



Project control is supposed to achieve reengineering objectives or targets i.e. cost efficiency, speed, and schedule adherence. Nevertheless, value added concept was split into two categories for this particular project. *Customer* value added includes all those activities, which the contractual customer would be willing to pay. *Operational* value added encompasses all those activities, which contribute company's objectives of achieving customer satisfaction at competitive cost.

The envisioned benefits of the project are short-run (profitability) as well as long-run (increased confidence in current plan and risk reduction); other positive contributors include establishment and maintenance of common objectives (avoiding nugatory effort due to difference in assumptions/interpretation of contract requirements), early warning of problems (thus early controlling action resulting in reduced consequential costs), and improved out-turn forecasting, headcount saving is estimated by 18 people. Further more increased profit, reduced risk and improved costs as shown below.

Apart from the 'hard' advantages, soft benefits such as organisational attitudes remodelled through operation of improved project control processes. Re-engineered process embeds forward thinking and project focus.

5. In-Service Fault Investigation

The company manufactures eight types of warplanes, which remain in service for many years with the customer. They need to repair, overhaul, and modify/upgrade during normal life cycle. Since the manufacturer provides after sales service and support, yet it needs to know the reasons for occurring faults. This process was designed to manage fault investigation because customers were dissatisfied with the time scale performance.

The first phase was started in October 1995 when the process was evaluated. One hundred and ten interviews were conducted with 150 personnel; eight suppliers and two customers were visited. It enabled the process evaluation team to produce 18 process maps. Envision phase was started in March 1996 and completed in May of the same year. Significant features of the process are being presented in section entitled 'management and implementation of change'.

Customers, suppliers and fault investigation teams are the major actor in the process. The process activity starts when customers request for fault investigation and ends when they receive a fault investigation report. Given that, the TO BE vision of the process has been compiled in the combined Evaluation and Envision report, it reads:

- Appoint MAD and Project Level Process Owners with responsibility for the end-to-end in-service fault investigation process.
- Introduce Concurrent Fault Investigation Teams empowered to manage and coordinate fault investigation.
- Implement common IT to support all fault investigations with EDI links to Partners, Suppliers and Customers through the Integrated Business Logistics & Support (IBLS) system.
- Provide up-front funding for fault investigations and use existing best practice cost collection.
- Offer fast track asset shipping and asset location services to Customers, where practical.

- Streamline Customer processes and interfaces with MAD.
- Establish Best Practice pro-active Supplier Management Techniques.
- Gain Partner commitment by sharing best practice.
- Use parallel processing for earliest resolution of liability issues wherever possible.
- Manage linkages effectively to maximise business benefits arising from fault investigations (BAe, 1996b).

ISFI is a very complicated process because it involves customer, supplier and partners with BAe. The company had gained success and is still improving the key objective of the process i.e. customer satisfaction.

6. Quality Assurance

This process was started in September 1995 and redesigned phase completed in October 1996. Quality director was its sponsor, supported by General Manager Quality Assurance. The principal objective was to meet customer's requirements to satisfy them via fulfilling their standards and controls. Internally, management requires assurance that policies concerning quality are being met and the organisation can and will deliver the required product quality. This is achieved through "converting uncertainty into assurance". "Operational processes are under review in connection with BPR programme, so QA needs to keep step with improvements being made to operational activities". An effective QA process will provide a competitive edge to the company. Effectiveness of the QA process is therefore the main focus for the re-engineering activity.

Eight team members were drawn from technical quality, purchasing & supply quality, CSD quality, QA (different sites) and BPR services. The team leader was from the QA central. BAe quality director and director quality assurance were the sponsors of the process. The process is "largely centred on an independent Measurement, Audit and Review cycle, based on Risk Assessment but also includes activities to support project teams and operational processes" (QA, 1996d).

Quality is “the totality of features and characteristics of a product or service that bear upon its ability to satisfy stated or implied needs...what the customer expects. Quality control refers to the operational techniques/activities that are used to fulfil requirements for quality...ensuring what we give the customer is what he is expecting. Quality assurance deals with all those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality...systems and processes designed to provide confidence. Quality improvement means continuous review of the organisation’s systems and processes to find out and implement more effective ways of working...can we find better methods of delivering the required quality” (BAe, 1996d and e). In light of these assumptions BPR team summarised quality vision as:

- Quality ownership will be shared by process owners (process capability) and process user (product/service quality).
- Quality is embedded in processes therefore a set of corrective/preventive actions is required to produce it.
- Focused on prevention not detection. It is fundamentally based on such activities as risk assessment, planning and quality engineering and fault prevention.
- It is to be done by trained, competent, empowered and accountable professional workforce.

In turn the QA vision consists of the following pillars:

- Assurance re-focused towards up-front activities: risk assessment, planning and fault investigation.
- Customer focus through project quality assurance i.e. contract review, assurance through the life cycle.
- Reduction in need for independent fault investigation.
- Deployment of professional resources which are key enablers.
- The business value of QA must be widely understood and appreciated.

The QA process level 1 map shows the key elements of the process (Figure A20).

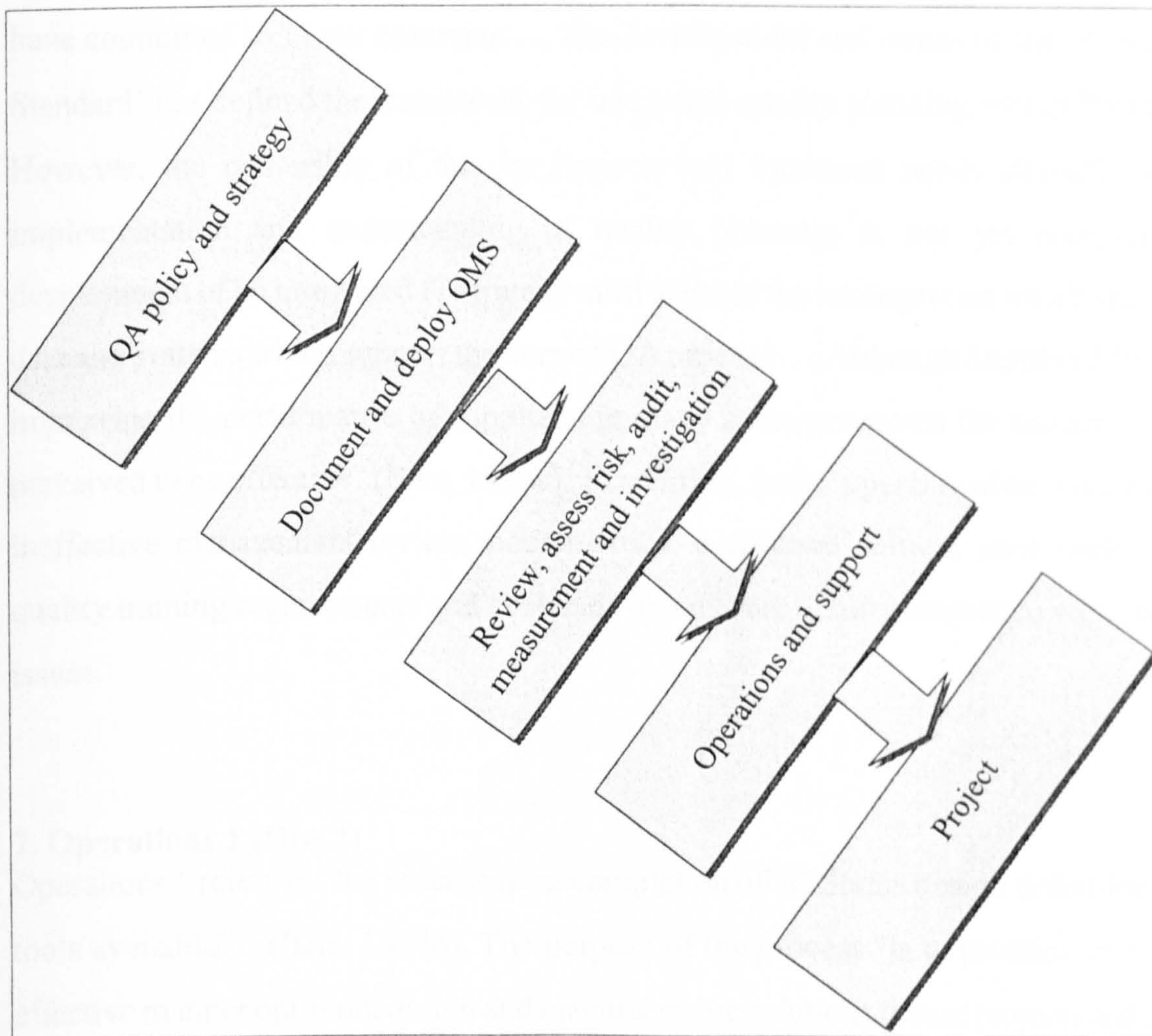


Figure A20 QA Level 1 Process

A range of issues were identified in the evaluation phase and they were targets for the redesign team. Key issues were summarised in the evaluation report, it reads:

“There is poor understanding of what is meant by quality assurance, Quality Assurance, Quality Control and Quality (or process) improvement, what they comprise of, how they are inter-related, and of the roles and responsibilities of those involved ... The MAD Quality Policy and Strategy has been communicated to reflect the changing regulatory requirements ... However, the flow down of the strategy within the functions and projects have been incomplete, and there are still misunderstandings within the business on the direction being pursued and on the implementation plan ... Whilst the quality management system is ISO 9000 compliant, satisfying the customer requirement for assurance, the organisation sees it to be bureaucratic and lacking in standardisation, development, delivery, documentation and interpretation ... There is an inconsistent approach to the review and flow down of Customer contract conditions and requirement within the business. The flow down of Customer quality

requirements in particular to lower order plans is poor. Fewer people are aware of what we have committed to in our contracts ... The development and issues of the 'Project Control Standard' has defined the framework for integrated quality planning within Project control. However, the ownership of this by Projects and functions needs strengthening as the implementation and understanding of quality planning is not yet complete ... The development of an integrated IT strategy must address the inadequacies which still exist in the data and systems which support the current QA process ... Although Supplier Management is improving the performance of suppliers, in many cases processes for assuring are still not perceived to be effective" (BAe, 1996e). In addition, audit is perceived as 'non-value-added, ineffective management review, poor metrics, traditional culture, poor understanding of quality training requirements and problems in software quality assurance were also notable issues.

7. Operations 1 (Ops 1)

Operations 1 refers to "the process from completion of "C Status design definition through to tools available"." (BAe, 1994b). The purpose of the process "is to produce in a timely cost effective manner optimum design and manufacturing solutions across projects and sites" (Ibid, p. 2). It involves the design of aircraft and preparation for the inauguration of manufacturing process such as availability of necessary tools. Ops 1 has addressed a range of systems, people, structural and process issues. Discussion of all of them is beyond the scope of this sub section since they have been examined elsewhere in the thesis. However, the contribution of Ops 1 in the radical change endeavour is significant because it facilitate BAe to reinvent its manufacturing process. For example, design tools such as CATIA were introduced to enhance electronic product design.

Ops 1 addresses four objectives:

- Reducing elapsed times by 50%
- Providing a step change to improve response time to all customers
- Reducing cost and improve quality
- Adherence to schedule and specification (Ibid., p. 5).

They are sub set of BPR objectives known as 30/50/100 formula discussed in the body of the thesis. All the issues were divided into four major categories: systems (too many systems in operation, poor performance and inaccurate/unreliable timeliness of data), people (depletion of skill-base, lack of mentoring, lack of training, lack of organizational awareness, lack of flexible moment in teams,), process (systems are driving the process, multiple checking, inadequate design-to-cost models, lack of budget adherence, early exploitation of expertise and experience, poor quality of information and unproductive sub-contract work,) and structural (old organization structure, reactionary process rather than proactive and no budgets for unplanned work and under utilization of resources).). In other words these were the issues identified in the evaluation phase. Obviously they are the potential targets of the process.

The scope of the process has been determined under Supplier & Inputs to the Process and Customer & Output (SIPCO). For instance, the process includes: approved issued 'C' scheme, RAF/Mods 9Updates), specifications (updates), system specifications (updates) and process excludes: all non-design office functions other than: reprographics, production engineering interfaces and stress/weights interface (Ibid).

8. Operations 3 (Ops 3)

This process is the third in the series of three operational processes introduced. It deals with manufacturing operations of the products manufactured. The operational process Ops1 first was meant to cope with "C status design definition through to tools available", while this process will cover tools available to first article. In others words it is an assembling/manufacturing process that is aimed to create a product assembly/process from the available resources. It involves different steps necessary to create a visible and useable product. However, it may be modified to adjust parts, technology or procedures to get the desired performance. Modifications could be continued to the extent where it fulfils all the customer requirements and customer accepts it as a deliverable product.

The aim of the project is

to create a first article product & process that provides maximum benefits:

*Within the first article environment

*Within recurring manufacturing

... and continuously improve the process until such time that a first article is no longer required (BAe, 1996c).

It will be a self-describing process; digital pre-assembly will reduce the need for the proving activity. Further more, the development of the new design and engineering processes will also absolute the requirement of a first article. To do that where product and process are proved prior to manufacture, first article environment is essential "in order to provide a stable product for recurring manufacture" (Ibid.).

The process describes various steps necessary to manufacture, test and deliver to customer a first article. Technical problems are traced and fixed until the customer is satisfied and ready to accept it as a final version of the product.

9. Operations 4 (Ops 4)

The material in the section is based on the interview of the team leader of the process. Therefore, diagrams are not available.

BAe has been working together with French manufacturer Dassault since October 1996 to look at the BPR. It is a predevelopment process that is the very part of a large aircraft. The joint venture did initial design until a point where they received a definite requirement of the development contract from the customer. It follows by full development of first design/article, employ it, test it and than hopefully to get further contract to produce large number of it.

Redesign of the process was an outcome of a team from airframe design, systems engineers, and specialists in different areas, aerodynamics and cost estimation. The project team is of four full time members from each company, BAe and Dassault and similar number of support from each company. They set up six working groups with specialists as members e.g. one team consists of eight people of which two were from general areas, four were from specialists and two from each company.

The team in the BAe has been trained on BPR methods and techniques by the BPR internal

consultants. They also learned from other BPR teams working within the company and especially on other OPS projects.

At the end of Ops 4, a new process IPD will start that will integrate all the Ops processes. It is also known as Joint technology Topic 4. The order of the Ops projects is as follows: 4,2,1,3. The process will mainly be used for new aircraft however it can be used to cover any old aircraft or mid-life up-dation such as Tornado.

It was started in June 1996 where both BAe and Dassault spent three months to study existing process i.e. predevelopment phase and came together in October. The partners compare two processes, looked at the maps of both the processes and list issues identified in the current processes. Most of the issues were similar in both the companies so a list of common issues was produced. The list was the bases of envision of the new process. Both companies produce evaluation reports.

The purpose of this process was to meet the needs of the next generation of aircraft and the emphasis was on the affordability. A new generation aircraft was a need of both the countries in terms of capability. Given the limited resources of the countries and the issues identified in the evaluation, the partnership or European way was the best alternative available to both countries. To achieve affordability, the most viable way ahead was re-engineering the process jointly so that expertise and resources can be exploited together.

The process had three customers: BAe, Dassault and joint venture. The drivers for other OPS projects were affordability and cost through reduction in manpower and time-scale. However, time scale was not a major driver or constraint because the time scale between one generation of aircraft and the next varies from ten to fifteen years e.g. ten years was between Tornado and Euro fighter and may be 15-20 years between Euro fighter and the next generation aircraft. So the time is not a problem in the predevelopment process. We actually need to cover a wide range of possible products or concepts looking for different options. So in terms of IT the process do not need faster systems rather it needs a system that can cover large number of ideas at a time. One of the key questions was to identify the new technologies that would be incorporated in the new product. It requires 50% or more time to develop new technologies, in this way it looks like an R&D project. It might be done in one or both of the companies or in a

university. However it has been done in partner companies.

The new process had to satisfy the issues identified and to meet the objective. But the partners had to join the process logically so that both the companies benefit from the process and from each other. Joint venture required finding a logical way to join the development process so that both get a new process and to share the cost of doing it with the other partner. The process was also an exercise to learn from each other.

The companies confronted a number of difficulties on the way to redesigning the joint process. It is difficult to know the requirements of the customer because they have no good idea about the product. The re-designers have conducted various modeling exercises to address the question. Other complications include weapon system integration, affordability (How much the product cost?), capturing ideas about new technologies, examining various concepts, risk reduction, developing interface amongst OPS projects, negotiation of contract with Ministry of Defense and determination of major matrixes. We had to design new ways to tackle these problems e.g. to capture customer needs we have to conduct a pre-feasibility report.

Appendix B

Transcripts of interviews

Tony Ward - general

The company started the initiative in an environment when international defence market shrunk with the claps of Soviet Block and development of new markets. Central importance moved from west to Far East and Pacific Rim. World defence companies merged into bigger producer of similar products. It calls for more efficient way of production at lower cost and customer satisfaction at competitive prices. BAe wanted to become much more competitive than what she was through improved quality, low cost and customer focus.

Lot of work was done on strategic direction that what is critical to the company and how we could involve people in any change initiative and day to day business. The company started number of programmes with the support of MD as mentioned elsewhere. However, BPR was a logical step to achieve the above mentioned goals. BPR was a mechanism which could help not only improvement of performance but also implement employee strategy of involvement. In doing so they need to develop new kind of processes. BPR seemed to invent many things e.g. mission, strategy etc. So it was a logical option to be considered in order to improve performance and involve people at large scale.

The idea of BPR was put on the table by IT and personnel directors. They might have their own agendas but IT was in front because lot of BPR work came out of IT companies or IT activities. Personnel saw it as an opportunity to organisational development. It was a bit of rivalry around its success.

Top management communicated a pretty positive sense of emergency. It was not the case of going down to choose what BAe needs to do rather it was a case of much more competitiveness, responsiveness and performance. Because real opportunities were there to win to keep jobs not to loose jobs. 'We brought BPR to cut our cost instead of loosing our jobs.

QA director was very experienced person with a blend of technical and personal capabilities on his credit. He run a site in Kinston and closed it successfully. He was very much experienced in change as well. He was promoted to DMC level. During the course of 1993 he was given the technical responsibility to bring the BPR in. He managed our relationship with the consultants and set up a BPR steering board at senior level consisted of some DMC (Divisional Management Committee) members from IT, personnel and finance. The rationale for the inclusion of these members was that these departments were the key enablers in the process of change. It was perceived that IT would be a key enabler, personnel will need to be there to look at our training budget and help to resolve OD (Organisational Development) and communication issues that will come out of BPR. The finance can help us to resource with costing of current or new processes and estimation of process costs. Other members of the board include directors of production, technical, customer support and purchasing.

The board used to meet every three months to review the progress and discuss other issues. At the next level we had the project management teams that were chaired by director of quality assurance. It consists of project team leaders as they grow and representations from IT, personnel and finance. Numbers of project team leaders vary from one to five according to the number of projects in progress. It is lead by a sponsor. They are meeting monthly and responsible for making sure that the project is well resourced and working according to specifications. The board also helped to monitor the quality of what is coming out of BPR projects in terms of better reports before they went to the steering board. It also helped to filter the measurements that were issues so that they can be presented to the board. The purpose was to keep informed the senior directors in a way so that they can see it in more positive sense. The purpose was to sustain sponsorship of senior managers that is the most important discriminating factor in BPR. If you have a strong sponsorship than the things will happen. Similarly it monitors accountability, resistance and resources.

The programme was started in 1993 with the help of a consulting firm called Price Water House (PWH). There were three consultants and a managing consultant in the organisation. Four or five were working during 1994 however the number was

reduced to one in the next year and we were operating independently since the end of 1995. We hired some part time local consultants who were cheaper than PWH people. In addition local people were trained in methodology in case BAe needed them but the work load did not reach the level where they could be used. 'The rate of work was far more gradual than we thought. The teams we had were enough to cope with it without external help.'

PWH was a very good organisation that has bits of species of consultants. Unfortunately the company had a bitter experience with consultants in the past, they cost lot of money and nothing used to happen. For example, BAe have experience with a company called URG, they came to one of the sites and worked with teams and try to map processes, it was not BPR but they were working with teams and tried to map processes. Six of them came in at very expensive rates. A lot seem to be happened but when they left nothing has happened. Consultants take lot of time doing indirect work with senior stakeholders rather than with team who are working on the task. They used to look at the politics, behaviours and always keep visible at very senior level. Consultants also look the nature of change and what it means to them (the senior managers). Quite simply they do it to get more business. Their procedure is to understand the whole organisation and than go down to the process. They tell more people what are they doing so that more people aware of their presence. This was one of the reasons that a number of people had suspicious about the role of consultants and the change programme.

On the contrary, PWH had got number of strengths. For example, the consultants did not do work but the teams do the work, they facilitated the teams, they gave teams a road map (process) that they could follow. They used to train teams in technology of process and facilitate the application of the change throughout the programme. They were very much experienced in change. They declare from the beginning that they believe that the process and what they do is transferable into the organisation. 'They gave time to our people when we can replace them (the consultants). I was brought in 1994 with the objective that the dependence on the consultants must be minimised. Because of this objective in mind we had only one consultant in the first half of 1995. We need this person in manufacturing expertise in addition to BPR. Thereafter we operate independently.'

PWH conducted a number of workshops with DMC to tell them:

- They took them through to BPR as a process and what it was.
- They ask them to brain storm the major processes in the division and go through the assessment that what was critical (which processes were critical) and where BAe can perform better.

The DMC members came through that they are comfortable to piloting three projects. The purpose of each of them was:

- How we deal with our customer by handling the ordering or Spares & Repairs (S&R) not the manufacture of the spares. How did we get to customer and how did he pay us? It was customer focused.
- If we receive an order say 20 Hawks, how do we say that it is a project. How do we manage that project? How do we set up control of project? This was really a management focused process. How do we deal with our suppliers and how do we purchase things?
- How do we respond to an order? How do we deal with our spares? It was suppliers focused process.

They chose these three projects because they saw them as part of the core of the business. They had the view that BPR could better be employed in service and management areas than in manufacturing areas. Thus the BPR was designed to handle paper work with a five years perspective because the company thought that the programme would take five years to complete.

The three pilot projects include Spares & Repairs (S&R), Project Control (PC), and Purchasing. They were launched with six weeks interval over the fourth quarter of 1993. S&R got through envision by the end of that year. Purchasing and PC in their own time came to envision in 1994. When S&R had reported at the end of 1993, the Managing Director (MD) sanctioned the roll out of BPR process to the wider range of projects. So in the beginning of 1994, he asked the operational process owners (design and manufacture of an aeroplane) to sit down and say how

they would apply BPR to their processes. They conducted a three months study concentrating at following key questions:

- What the processes were
- What current improvement initiatives were going on

Research was conducted and reported back in the spring saying yes that BPR could be applied to the operational processes. The process of design and manufacturing was split up into a series of small chunks called Ops 1 (Operation 1), Ops 2, Ops 3, and Ops 4. These programmes were started with three months interval and were consist of four stages of design and manufacture of an aeroplane. Technically the whole process was divided into four stages:

- Concept (Mostly paper work)
- C scheme (Certain level of design of the product)
- Tools available (Machine are in place to manufacture certain tools)
- First article (That the vehicle can be manufactured and production of first prototype). The objective to re-engineer this phase was to reduce the number of first articles.

Ops processes were part of a mega operational process, so after successful launch managers felt that processes must be linked. Integrated view was necessary to gain the synergistic outcome of the effort. In 1995 a lot of work was done to integrate the processes, to bring Ops1 and Ops2 together into one seamless process. The arguments in support of integration were rich; for instance, the people in S&R have the view that if our IPL/IPC (Illustrated Product List/Illustrated Product Code) were better and more available we can do our job lot better. As a result a team was given responsibility to look at IPL/IPC process. The PC people had the view that if our bids were prepared better our job would be much more easier than now. A good quality bid can also increase profit. These suggestions prompted two other BPR projects.

In 1995 we started to look at some of the support processes in the business instead of co-activities again e.g. Quality Assurance, works engineering. The purpose was to build the infrastructure, manage energy on the site and make sure that basic services are in place. In this way we used to have 3/4 projects at a time in progress at different level of maturity. The objective was to support our product life cycle (PLC) at various levels of design and development. PLC consists of eleven integrated steps:

1. Create proposal
2. Negotiate the contract
3. Get the contract
4. Authorise work
5. Define the product
6. Design in more detail
7. Propose production
8. Handle the product in the organisation
9. Built the aeroplane
10. Deliver it
11. Support the customer

S&R was the first pilot project. The objective of the process was to deal with a hell of paper work. For instance S&R was handling 75000 orders, was serving 30 customers, and dealing in 17 products. The cost of the process was £8 million that was mostly related with human resources. It was using a bit of IT where 400 people were working on it or were supporting it. The manufacturing time was 126 weeks and orders processing time was 19-126 weeks. It means two and a half year was needed to manufacture a spare and similar amount of time for delivering it. So it takes five years to reach a spare to the doors of customers. If a customer orders a spare at the beginning of the war he will receive it after five years - at the end of the war (more detailed vision of the process is in appendix 5A).

The ratio of non-value-added activities (NVA) was so high in the S&R process that we managers proclaimed, 'my god so much time in NVA, we must have done something for it.' However, it is three times faster than before, reduced cost by £3

million, turnover time is only 1/3 of the original, value added increased by factor of ten, it takes half the number of staff now. We focused on particular suppliers and realised them that it is a joint problem. It is not you who are on fault but it may be us, so change can benefit both the sides simultaneously.

In the Project Control it was more than the impact of the process on the eventual cost of the whole process, it was an issue of not whether we have the best process, the main thing was that the process was followed. The process itself was good but was not followed by the staff, so the issue was implementation.

There are no short cuts to do the job but the process must be fully followed/applied. The issue was to set up a project and manage it. Training, support and experience are available to support it. The quality of control on the project must be much higher than the present to make it efficient.

As a part of reengineering, it was decided that best practice companies (BPC) should be visited in order to know the leading examples of the processes concerned. In connection with S&R process the company came to know that BPCs have got a single process owner whereas we were doing it in individual functions such as purchasing, finance and technical. The process owner had the responsibility to order the goods and sent them out. So rather than lot of functional involvement on the bits of the process one guy was in control of the whole process. Secondly we had primarily people operating things in a single function. The BPCs have multi-functional teams sat together e.g. finance, supply, contract etc. There was a lot of paper work involved in processing a customer order and it used to take days. The BPCs process an order overnight, they translate the order to a supply source (our own factory or other supplier) overnight and without any paperwork - paperless. We have similar procedure for answering customer queries, if a customer has a problem, he rings to somebody, he replies 'I will get back to you', than he makes a search for the person who can answer it or where is it. On the contrary the BPCs the customer dialogues into one of the systems. Because we have lot of IT systems e.g. finance, purchasing, suppliers, customer support, people had to transcribe data between the systems which is obviously time consuming and complicated. The BPCs had one IT system.

There was a big gulf between BAe and BPCs. We discovered this by visiting number of BPCs in the country and in the USA. The teams did not find whole of that at a single company, they found bit of things in different companies. The visiting teams were asked to identify the process and find the company where that process is kept as a core business and is a distinguishing process in the market place. For example Direct Insurance company was studied for its order handling and customer interface process as well as their ability to respond to an order. The process was so efficient that the company was enable to capture market share in double figures within a year.

The visiting teams did conduct any formal research studies but they took help from consultants and research literature such as Harvard Business Review. We encouraged teams to identify low models in the similar process. A number of teams visited racing car manufacturers because racing cars are not as complicated as our products are. On the contrary we are very high technology company that is why it takes years to implement change whereas in low technology companies like racing cars, can implement change within two weeks. The teams also visited companies bit like ours e.g. McDouglos.

Role of management

The role of management is very important in the implementation of change. First task of senior management is to demonstrate commitment and promote strong sponsorship on the one hand. On the other hand to prove difficult stakeholders or the middle managers who are initially resisting some of the change to come through. Middle management particularly in the early projects when there was no much awareness that what BPR is and when there was probably feelings of insecurity about the future of jobs, there was pocket of resistance in the middle management. People may say 'I may loose my job as a result of BPR'. The word BPR was synonymous for 'Buzzword for Preparation of Redundancy'. There was a fair amount of resistance in the envision phase when the principles of new processes were designed. People are worried about their jobs, they have the view that if this vision is implemented than it might abolish my job, they used to say 'where is my job, it might not be there' because we are taking people from the functions to the team. People spent years and years to build the job (in fact power)

and working for it but one day they are told that your job is no more. So all the powers gone abruptly. It is pretty understandable that people resist to defend themselves - their power, prestige and eventually their jobs.

The role of management has to be positive. However, we have to accept the resistance from middle managers but well come support and sponsorship from senior managers.

We encouraged team to share the ideas of the new process to those stakeholders (especially those which are being effected by the change) as soon as possible. They will take time to work with the ideas so when it comes to tantalising the vision they hopefully to say something is new. It also helps to set up divisional teams to monitor the progress.

Employees are the heart of change, you must treat them with great respect; they will reward you every day with their courage and bright ideas. Employees can be divided into two groups: members of the full time reams, and the people working in the process. Full time members vary from six to twelve depend upon the size of the process. People working for the process range from 125/30 to several thousands. For instance Ops1, 2, and 3 processes employ 4000 people. The people in the team are the sub set of the people working in the process. The employees to outside the process are also crucial source of understanding of process, how the process works, how much the process is effective now, what currently constrained it and more important how the process can be improved.

Our (the internal consultants) job is to give them maximum support to in actually conducting their analysis in the process.

Helping them to engage the staff with the management team in order to envision, helping them I in difficult time, defining their vision and articulating it.

In the envision phase we encouraged teams to run workshops with as many people as they can to understand where the process could be improved in the positive sense. So it is anything over and above evaluate phase (because some understanding was already gained in the evaluate phase). In both the phases we encouraged teams not to produce a news letter, an information pack to hand over in

order to communicate people but go on the road and present it. We also recommend them that if it is possible to engage everybody in the process in order to hear their analysis in the first hand and than understand their views in the second phase. In doing so if you will miss something, when you get to implementation they will set you back months. Mr Tony heard the comments of employees they said 'we came to your site your smart boss did not let we go, we dependent on you'. When this is the case you really have to start again because you have to learn the process again.

So the employees are important in terms of information they give you about the process, and source of new idea inspiration and also crucial eventually in the implementation. They make sure all the way through that they had been communicated comprehensively what the analyses are and what the process is? They have the opportunity to stand up and ask such key questions as:
What does this change mean to me?

The major question used to be how many jobs will go and how little mismanagement you can do this. It shows that people are concerned with jobs, they fear management may sack us. At the team level, people are revolved around their ego. For instance, hostile team members say 'two years ago nobody listen to me because that was my idea why I listen to you. You are only flesh and blood so what is difference between you and me?'

Early issues and how did we manage them

'We felt very strongly that we have senior level commitment particularly from MD who extremely supported it and the change would not be happened without his help.' He demonstrated his support by attending the workshops with the staff. In addition, in the first project, MD and DMC members used to come down and launched the workshops.

We felt in the beginning that we are suffering from initiality. It is because the company had tried a number of change initiatives but non of them worked. We perceived the danger that the company or the staff would think this should another such effort. For example we had experience with continuous quality improvement

(CQI), TQM and everyday improvement etc. A lot of training sessions were held right from the top. Hundreds of training courses were delivered, hundreds of facilitators were trained and lots of ideas were generated. But nothing was happened. We had a couple of attempts to empower the workforce (managers and employees) by series of workshops and communication exercises. Again nothing tangible happened instead the action slowly drained away.

We started a lot of other change programmes which were assessed for headcount change such as personal appraisal and management by performance (MBP). Under MBP the manager sets his own objectives, review them at the end of the year and assess how did he perform. It was not started well because we did not train staff well in the appraisal techniques and we did not get buy in from the union. So we have to renounce it. Similarly, a new personnel director started a large scale training programme with the aim to make basic changes in the human resources but no encouraging results came out. Therefore, we were worried that people will say it is just another mystery. Hence we deliberately launched BPR with low profile and silently. There was no big article in the company magazine, there was no video, there was no big announcement, we just started quietly.

Learning from the change

The first think we learnt is the need of strong sponsorship and sustaining it. Secondly, it is very difficult to get from ideas to action. In envision phase we came up with lot of ideas for a process but it look harder to put the ideas into action that is why nothing was happening. We realise quite later in fact that when we came up with the vision and went to review it with middle managers and senior managers. They say yes that was a good idea but that was not enough you need to tell them how did we implement it. Who is going to implement it and when? What are the resources? If they are not agree than it is very hard to go back to senior stakeholders and say look you cannot say that because we completed vision activity on your behalf. Thus we have to make sure that all the stakeholders brought into it and everyone agreed about change. Secondly, we learnt that creating the readiness to change is necessary. Thirdly, You need to tell everybody that where you are going to start it. Which project, which department, which part of the business, where you are going to play first, who are the team, who is

deploying them and who is the team leader? You need to put all the names in place and the sponsor fully involved in it and supportive of it. When all these things are in place than you can say we start implementation. If you miss even one of those, forget it. Thirdly, in some cases, it seemed that the project completed its envision phase and was in empower stage but it did not. Fourthly, in evaluation phase when the process is identified its strengths and weaknesses are found people working in the process are very supportive to tell process improvement teams how does the process work. But people want to know the details of the process. I think it is a part of our culture that we have to have lot of details to convince people. People are very conservative to believe something even you tell them hundred times. We have to go right to the bottom of a problem and come up again, we can not really say yes. The conventional behaviour makes very difficult to think radically, to think out of box. That is why we have to conduct some creativity exercises to help them to think more laterally. It might be one of the reasons for us to feel that it is risky to initiate a change programme.

Planning

Planning is a long process starting in the middle of the year with a high level agenda in order to discuss operational objectives, targets and some of the achievements together. It is cascaded down to the middle management of the projects and major functions of the organisation. The plan is split up into business plan and profit plan. Major messages from the previous year (s) are incorporated in the document. We restore the major messages from the past in terms of how did we perform that year and how to get next year. It gives an overview of what is important to do this year. Management teams than produce detailed operational plans for their concerned areas.

Strategic business plans are made for whole BAe and for Military Aircraft Division. The plan is again made for defence group of companies and commercial group of companies. We produce very high level targets in defence perspective, it includes profit targets and market share targets. The results are published for defence group and commercial group rather than for MAD or any other division.

Partnership

We have to start a joint venture with SAAB and Gripen to bring more heavy weight fighter into our product portfolio. The purpose was to gain effectiveness, efficiency and improve the quality of products and response to customer. That meant we needed to focus on what we did rather than growing in new markets. This was one of the reasons that the company wanted to concentrate on progress rather than breaking into new markets. We had a couple of attempts to break into many new markets. For instance, we tried to break into information systems which were major information networks supporting our business. We also tried software markets in order to develop them for our requirements. It did not work well.

We started business planning with the view that the company should have a mission and to concentrate on cost, technology, customer support and quality. More and more people were involved gradually in the process of planning. We came to the view as a heart of the overall strategy that people are the most important resource. Anything cannot be delivered without the people in the organisation. We should work very hard to empower them to increase the speed and process of change. The people should be given an opportunity to personally develop themselves and in fact plan their own career.

Despite above efforts we failed to get further orders from Royal Airforce for Tornados. As a consequence no further Tornados were to be manufactured so there was a major gap between the work load available and future amount of requirements. In addition there was further down turn in the marketplace. Therefore the downsizing was the only feasible solution and we had to make hard decisions to remove about 5000 jobs and close down two historic sites. One was in Preston which was our production centre, and the other in Kingston. Lot of people were moved to other sites.

All of the above was done to tell the staff the feelings of direction that we are going to the period of instability and insecurity. We talked about business planning, mission and critical success factors (CSFs) to tell the people where we want to go.

We have received similar messages from the other processes.

The company was prepared to put full time team. It is difficult to choose a team out of 15000 people.

The change team was asked 'here is the process, there is the boundary of it, there are the people who represent the functions. So go and reengineer it.' The teams were given the targets to cut cost, reduce lead time and adherence to schedule. The overall purpose was to improve the performance at affordable cost so that the customers satisfy. Individual targets for the project was set by the teams concerned.

Weekly communication system is in operation through fax.

The steering board met every three months.

Project management can be changed by ...

Team leaders meeting to exchange their experiences and progress.

Operational Efficiency Improvement (OEI) board effectively subsumed BPR steering board and IT strategy board which was also a DMC level board. Both were merged into OEI project board that looks at overall step change in the business.

Although Dynamics and Royal Ordinance has done some change work and a bit of reengineering in manufacturing and production but BPR has been done in MAD.

Martin Keye - Ops 4

I am leading a joint team with Dassault, the French aircraft manufacturer. We have been working together since October 1996 to look at the BPR. It is a predevelopment process that is the very part of a large aircraft. We did initial

design until a point where we received a definite requirement of the development contract from the customer. It follows by full development of first design, employ it, test it and then hopefully to get further contract to produce large number of it.

Our team is of four full time people from each company, BAe and Dassault and similar number of support from each company. At the end of Ops 4, a new process IPD will start that will integrate all the Ops process. It is also known as Joint technology Topic 4. The order of the Ops projects are as follows, 4,2,1,3. The process will mainly be used for new aircraft however it can be used to cover any old aircraft or mid-life up-dation such as Tornado.

We started in June 1996 where both BAe and Dassault spent three months to study existing process i.e. predevelopment phase and came together in October. We compare two processes and looked at the maps of both the processes. We list issues identified in the current processes. Most of them were similar so we produce a list of common issues which were the bases of the envision of the new process. Both companies produce evaluation reports.

The purpose of this process was to meet the needs of the next generation of aircraft and the emphasis was on the affordability. A new generation aircraft was a need of both the countries in terms of the capability. Given the limited resources of the countries and the issues identified in the evaluation, the partnership or European way was the best alternative available to both countries. To achieve affordability, the best way ahead was re-engineering the process jointly so that expertise and resources can be exploited together.

The process had three customers: BAe, Dassault and joint venture. The drivers for other OPS projects were affordability and cost through reduction in manpower and time-scale. However, time scale was not a major driver or constraint because the time scale between one generation of aircraft and the next varies from ten to fifteen years e.g. ten years was between Tornado and Euro fighter and may be 15-20 years between Euro fighter and the next generation aircraft. So the time is not a problem in the predevelopment process. We actually need to cover a wide range of possible products or concepts looking for different options. So in terms of IT we do not need faster systems rather we need a system that can cover large number of ideas at

a time. One of the key questions was to identify the new technologies which would be incorporated in the new product. It requires 50% or more time to develop new technologies, in this way it looks like an R&D project. It might be done in one or both of the companies or in a university.

The new process had to satisfy the issues identified and to meet the objective. But we had to join the process logically so that both the companies benefit from the process and from each other. We need to find a logical way to join the development process so that we both get a new process and to share the cost of doing it with the other partner. The process was also an exercise to learn from each other.

We confronted a number of difficulties on the way to redesigning the joint process. It is difficult to know the requirements of the customer because they have no good idea about the product. We have conducted various modelling exercises to address the question. Other complications include weapon system integration, affordability (How much the product cost?), capturing ideas about new technologies, examining various concepts, risk reduction, developing interface amongst OPS projects, negotiation of contract with Ministry of Defence and determination of major matrixes. We had to design new ways to tackle these problems e.g. to capture customer needs we have to conduct a pre-feasibility report.

Redesign of the process was an outcome of a team from airframe design, systems engineers, specialists in different areas, aerodynamics and cost estimation. We set up six working groups with specialists as members e.g. my team consists of eight people of which two were from general areas, four were from specialists were specialists and two from each company.

We have been trained on BPR methods and techniques by the BPR internal consultants. We also learned from other BPR teams working the company and specially on other OPS projects.

There was a general message here that whenever you start BPR projects these always be pointing upstream.

ALI Dormer

The IPL/IPC process was started in 1994; we begin with standard BPR tools and techniques. A process improvement team of nine members was formed which were taken from different departments e.g. technical, engineers, finance, personnel, customer support, commercial and purchasing. They were working in different organisations (departments) hence all of them belong to a unique culture. The first task of the team was to identify and scope the process including the number of people working in the process and the resources occupied within three months time period.

The team conducted fifty interviews of 3-4 hours each. A process map was drawn as a result of these interviews. The process was communicated with the people who were doing the job in the process through a series of workshops. In addition, a number of visits were made to the other companies who were doing similar change programmes in the same sector such as McDonald Douglas and in different sectors such as printing and newspaper manufacturers. The views of suppliers and customers were also solicited through personal contact (interviews) with them. The process was documented in order to get the approval of management. The future vision of the process was presented to management through a series of presentations. There were some difficulties on the part of management to understand the impacts of change. However, the board of directors was convinced to change the process after a long debate with the process improvement team and gave the green signal to go ahead.

The process was to be completed within eighteen months with a view to reduce cost by 30%, cycle time by 50% and improve the schedule adherence to 100%. Financial and non-financial requirements were estimated and the cost benefit analysis was made in an attempt to persuade management and demonstrate the tangible benefits of the initiative. The areas of change were split down into individual products and various managers were appointed in order to implement their area of change. Main objective was to change people, infrastructure and IT system. According to Ali 'we were adopting the principle that do not change the process only but also change people, infrastructure and IT.'

Although the time frame for implementation was only eighteen months, the process was not implemented even after three years. It was partly because the senior manager were busy and were unable to devote their full attention to the change. Expectations of the customers and suppliers were continuously changing. In other words the requirements of the customer and suppliers were.

Continuously changing. Although trade union was involved in the process of change nevertheless they were opposing re-skilling of those employees whose job were disappearing or changing. Part of the problem was their fear of redundancy. Obviously the effectiveness of the process necessitates reduction in work force. But the reduction was made slowly through natural wastage such as retirements. No one was forcefully removed from his job.

Managers are more sensitive to their careers; their support to a change initiative is not only essential but also crucial to the success. If a manager feels that he is winning than he persuades others to support the change and vice versa. Management support also depends upon the need or emergency for a change - the real reasons for change. In this context in BAe, there was a perception that the company is doing very well so why change. Moreover, there was no additional financial benefits offered to do the job; people were persuaded to work in a new change initiative. Improved methods of and job satisfaction/enrichment was the visible motivator, lot of them were happy because their jobs were improved.

Role of IT

Like most of the BPR projects IT was an enabler in the process. A new system was introduced to support the process which made the job much easier than the old. Although IT is an expensive choice but arrangement of finance is not a main issue. The important issue is to train people to operate the IT systems. Sometimes re-skilling requires certain pre-qualification which everybody do not possess. It restricts the process of training; the people who do not want to learn pressurise management through union.

Learning

We learned that top management support is necessary for a change initiative. You can not try and fail and stop it. You have to keep trying. Although it is difficult to keep people aware that how the change is affecting them or will affect them. The change process takes very high proportion of time. People involved in the change must be continuously informed; what is happening or what is to happen and how the changes will effect them. Change culture must be created so that the people must be ready for change. The improvement teams must be selected within the organisation because external people do not know much about our organisation and it is difficult for them to work as a member of team. Change did not happen overnight it rolls down like a snowball.

How can we use this experience to introduce a similar change in the future

Basically the fundamentals for a change initiative are still there; some of the important points to introduce a similar change are as follows:

- Backing of senior managers
- Develop a clear vision
- Create a change readiness culture
- Clearly understand what the change agents

Outcome

Although it is difficult to prove success yet there are some indications of improvements in the performance. For instance, we reduce cost by 20% and cycle time by 10% (we are 10% quicker than before now). The improvement is still in progress because the people are being trained and re-skilled. Training and re-skilling strengthened the impacts of change. However, it takes longer time than the envisioned. There are problems of measurement of outcome. One reason was the change of magnitude of re-engineering during the programme, the company embarked on a much bigger change than the one we started. Therefore, the outcome may not be proportionate with the original amount of change. There is a difference between what we want to achieve and what did we actually achieve. If we try to change 10%, we may do only 5%; similarly if we expect 50% improvement we may achieve 20-30%.

There should be some financial incentives to the participants in order to keep them motivated for the initiative.

Peter Tower

The approach the company uses to discharge its business. The first step is to look into the existing processes, mark them and measure them. It includes the amount of material, money and the efforts involved. It follows by development of a detailed picture of the whole process and the way the company operates. In that it is by itself is a very interesting step because very often, certainly in our case there was no overall view of the processes people were working for. Although there is quite clear knowledge of fundamental processes within an individual department or functional group, but how their function work compared to other processes was not understood. With this very approach (BPR) you analyse processes and matrices, which gives you clues and how to improve them.

The analysis also enables non-value-added (NVA) activities and where these can be eliminated as summarised by Hammer and Champy in BPR classic, 'Do not automate obliterate'. Under this approach the process can be made efficient by cutting out non-value-added activities instead of automating them. BPR advocates radical solution, by modifying business processes where cutting out non-value-added activities can be an initial step. Another useful step could be together information and issues, which the operators associate with those processes. Where they consider are the bottlenecks and what makes their jobs hard to. This information can be used to find solutions. The solution should be based on radical approach instead of deleting only NVA. Another approach can be to find out completely different way to do the job. It comes down to those processes, which require improvement in performance. This is the subject of AS IS or evaluation phase. Secondly, to develop the vision of processes, the inspiration comes from outside the company. It comes both from those organisations, which involve in a similar activity or completely different activity. For example, we went to talk to people at Kingston hospital because they came through a big change initiative. They were looking into putting teams together to improve things, although their processes as a NHS unit were completely different from ours. They were supposed to run a hospital to delivery healthcare, whereas we design and manufacture Polly

Peck's Berkeley experienced Dane farmhouse we're addressing initials from there in the sweep at courses can be chain i.e. expedience Fein from a severe dressing they show was plane. However, some of the techniques they were using were also useful for us.

In this way a process can be changed by expedience gained from elsewhere and addressing the issues from the existing processes. And it is all about looking into how this is workable in our particular environment to make the difference.

Here we have to see reaction of the people involved. How they will respond in their day to day work? Whether they change their working culture and so on. Similarly, once a process is developed how then we have to access how the organisation delivers that process.

Achievements.

Lot of messages have been understood at senior level of management and increasingly understood at lower levels. Coincidentally there are lot of new trends emerged within the company e.g. team working and support for the radical change. Cultural change is in progress, because it would take several years to fully realise the cultural change. One reason for cultural change to happen is the impact of other initiatives that are/were under way.

Although there are lot of NVA activities in the but we found that eliminating all NVA activities is almost impossible. Rather we concentrate on the radical solutions to redesign whole process. Redesign of process through radical approach is a combination of process and work organisation. Here purpose is to develop an integrated work organisation because individual parts can not deliver an integrated product or process.

Process and organisation are not mutually exclusive rather are complementary. It has been experienced that it was extremely difficult integrated process when the organisational division did not mean to work together towards integrated process. We need to change equally organisation and the processes involved to achieve the full gain. Some successful techniques were used in the past individually but not

institutionalised. What we're trying to do is to make things common practice rather than individual attempts.

On the way to synchronise existing business and change, some pilot projects were selected at high level and pilots were introduced before roll out at project level i.e. roll out change gradually. Migration from an old to a new process is a stable rather than an abrupt action.

Strategy

The company was trying to prove success of an idea through testing a pilot in order to implement it as a common practice. The strategy was to introduce small or large pilots where we are allowed to select areas where the new idea was applicable and than that area. . Success of pilot was a signal to make large-scale changes. We certainly did not and would not apply big bang approach. Our approach is a low risk but large-scale change, which require investment in technology, training and infrastructure.

IPD can not be applied to certain projects because they might be in a stage of their life cycle where application of new ideas can damage final results or functioning of that project.

IT

In connection with the role of IT, the Organisation needs a diversified role of IT in BPR. We need different dimensions of the same information. Therefore, technology has to address diversified requirements of the change. So it is necessary to provide support of information availability. For this, IT has to address two main issues: product modelling and information sharing. Purpose is to facilitate the above activities in order to speed up the process of modelling information sharing.

Problems encountered.

We encountered a number of issues during the change process. Team members came from different departments where each department is specialised in uncertain areas. There was challenge of common language when they were put together in a BPR team despite they receive training in business process re-engineering tools

and techniques. People had different IT capability, some teams were more IT literate than others. Less literate teams have to train again in order to assume new responsibility. Some times people were impatient regarding implementation of change in their areas. They were hearing about the programme but nothing was happening to the extent of their department or section because their segment has to be involved in turn.

Reaction of people.

When the respondent was asked whether people were happy with initiative, he replied, yes and no. Yes because there is a great deal of pride and commitment about what we have achieved and or achieving. People are happy to work with more people instead of working in small groups/teams. Many of us like to work in BPR capacity; especially those who like to work in relatively structured way. Things are getting bigger and organised now. However, many do not like to work in a structured way and they want to see faster change rather than moving slowly.

Challenging work

It is a challenging work in terms of working and communicating with different people as well as influencing other. It is more than thinking creatively, is creating ideas with a view to implement them.

Some people left the team because they were experiencing different type of work environment which was difficult for the to do. However they were not dissatisfied.

Training

When the respondent was asked, basically you are an engineer. What training did you receive to do BPR work? He said, we received specific training in the BPR techniques, mainly in evaluation of the process and design of solutions in light of evaluation of a process. We experienced that envision face is much more to do.

Future career prospects

As a result of my involvement in BPR, I have got wide appreciation of the processes the company follows and why she follows. How they come together? So in future whatever job I will do BPR experience helps to do things easily which makes me faster and more valuable for the company.

I am confident in terms of actual processes and their technical aspects as well as management approach, business issues, company's performance and how practical the processes are. Most important is my ability, knowledge and satisfaction I have enjoyed as a member of BPR team. In short my technical and management capability increased because of working for BPR. When he was asked, do you like engineering or management role in future, he replied both.

Distinguishing feature of BPR.

It is a large-scale change program where more people work involved, more complex processes were addressed than elsewhere and pure manufacturing approach was adopted.

People issues.

The more people you involve the better, although it slows down the pace of change. It is easier to arrive at a vision but very difficult to communicate it to people. Given that we involved representative sample instead of thousands of people. The key to success is to invest good people's time rather than high quantity.

What the company should be now?

Continued to roll out the change because we were lucky to receive investments to do the job. But that investment requires obtaining results over number of years. Therefore, it is essential to continue the initiative to realize the promises made at the time of inception.

Summary

The aim of the programme is large-scale improvements in performance by focusing on business processes. Because BPR is a process focused approach, which starts to look into the existing processes and the way the company operates. Evaluation phase of methodology involves examination of existing processes. Here change agents identify the areas involved non-value-added (NVA) activities and

where they can be eliminated. Change agents also identify the bottleneck in the processes and suggest solution to tackle them.

Redesigning strategy is not only deleting or eliminating NVA activities but also to look at completely different way to address process problems. These different ways or radical solutions can be borrowed from others in the industry or outside. We went to Kingston hospital, which was a different type of industry in search of radical solution. We learnt that the techniques they are applying are also useful for us.

We were establishing redesigning vision using existing process issues and issues observed in other companies. It should be kept in mind that BPR not only addresses process matters but also organisational and people issues.

BPR came from IT therefore you can not envision any BPR initiative, which does not involve IT.

So far as the achievements are concerned we are in the process of achieving BPR objectives. For example we feel some cultural changes in the workplace e.g. working in teams. As a result of change, most of the projects are using Integrated Product Development (IPD) vision, despite IPD was started at a very small scale but things are being done at large scale now. BPR gave us an integrated view of organisation i.e. holistic image. However, it would take several years to realise the full benefits of the initiative. We have to change organisation and processes together and the changes are to be made a common practice rather than doing something individually i.e. to institutionalise the change. In this way people have to operate within the new culture e.g.:

Behave differently

Use different technology

Follow different processes

BPR is a risky project because it involves lot of money, resources and infrastructure. It is risky because the scale of change is large, requires investment and training people in order to assume new jobs. Many people cannot absorb in the new culture. Similarly risk also involves in the project management. If a new vision is applied in a certain project and it does not work than it would damage the project and as a consequence would effect whole organisation.

There are several issues, which need to be addressed:

Availability of information

Product modeling

Common language

Involvement of people is a necessity but it slows down the process of change, however, investment in people eventually pays back.

Denis Armstrong

PWH methodology is good in theory but when you come to application of the techniques, it is much more difficult to implement it. It is important to use right methodology because a wrong methodology is harmful for the success of BPR initiative.

We learned a number of messages during the course of change. For instance sponsorship of senior managers is fundamental and commitment of staff at all levels of management is essential. Management must provide enough resources – human and non-human – to show her support and enthusiasm for the programme. People are the real resources of an organisation, their development is back bone in any change endeavour, the same is true for radical change. One aspect of human resource development is to work in teams. We learned that using teams in process

based change promotes the culture required in reengineering efforts. As a result of these measures organisation can create process thinking mindsets and we have done it.

Management felt a series of difficulties while introducing BPR. Perseverance was very prominent on the list of problems encountered. Secondly, buy-in from top management is not impossible but motivating them to sponsor and finance a new venture requires clear implementation path and positive outcome of the project. Similarly involving people at different levels of management is hard without showing them the benefits of the programme and protection of their job in the new structure. They agree to step in a change when they are sure about the success of it and their role in the hierarchy. Another problem is the existence of a common language among team participants because people come from different functional departments with different level of education and experience. They take time to learn a common language in order to communicate effectively in the team environment.

When he was asked, how do you use this experience to implement similar change in BAe or in another organisation. He said, 'I do not believe that the BPR can be implemented in another organisation as has been carried out in here'. For instance, we have developed process, which cross the boundaries of customer and contractors.

BPR is a mechanism for change, the change is all about understanding where you are and where you want to be. BPR is a model of organisation which has got people, infrastructure, skills, techniques and systems. It is quite powerful organisational model anyway. It shows the way to make the organisation more effective, efficient way to run the organisation and how to shape it. It has the concept and in fact techniques to shape the entire organisation. It begins by understanding processes in order to make appropriate changes.

The main features of BPR in BAe range from high level sponsorship i.e. DMC level. We have used an organised change methodology borrowed from the external consultants and tailored with our resources and requirements. However, it took longer than the expected time scale envisioned at the out set. Finally our change initiative is a classical example of BPR in the industry.

He described the meaning of effective and efficiency of a project and classify ten BPR projects according the criteria.

Dave Edmondson

Most of the projects started under the banner of BPR are in the implementation phase now. Implementation is underway without involvement of BPR department. So the work of our

department is reducing and the BPR banner is fading away. I can call it IPD group or Joint Technology Team (JTT) rather than BPR department. JTT uses some BPR method but they were not particularly identified as BPR methods. Original BPR team is trying to merge with a group called strategic policy to improve business activities, which may use some of BPR methods. BPR is gradually run under regular management team these days rather than special teams devoted for this purpose.

One of our initiative's interesting aspects was establishment of industrial partnership with our customers or partners. We found ourselves working with various sorts of partners such as NASA or our customer i.e. RAF. We have a joint venture with SAAB. In this way we worked with people outside the company, which enabled us to work much more organised and strategic basis. The company also worked closely with suppliers and established a working relationship and in fact a sort of partnership with them. Preferred Suppliers Scheme was inaugurated to empower suppliers and facilitate supply of material and parts. The supplier management team looks at the performance of individual suppliers in order to improve their performance and help them to develop value added processes.

Side B

PANAVIA is the company which represents three companies who make Tornado: BAe, Dassault and ALINIA. In this company three manufacturers face three customer.

When he was asked about the achievement of BPR objectives by different projects. He replied, 'yes some of them certainly have but many of them still not.' For example, different way to work was accepted especially IPD is well accepted as a way of working. Other objectives such as reducing the time scale and reducing cost still are not. We cannot say that we reduced cost by 20%. At project level, S&R achieved its objectives as expected and IPL/IPC achieved some but some still not. Some projects take lot longer than expected to get the benefits. However their message is well accepted and implementation was done well. The company feels better off as a result of change and considers it as a worthwhile exercise. Many things stem out of the change such as the change showed people a totally different approach to do things. The attitude towards what the process is and what process improvement is, well understood. It helped to shape the current attitude and ideas.

Appendix C
Indicative questionnaire for interviews

Discussion Questions

- * You said in last meeting that AB had started re engineering to concentrate on its core business. Could you tell me why does the company want to concentrate on core business?
- * What were the goals of each of the processes?
- * What were the other reasons for this initiative?
- * Re engineering was started in December 1993, when three processes were chosen to reengineer. Would you like to briefly explain how these three processes were changed?
- * Did change process start simultaneously upon all processes?
- * What was the role of :
 - Management
 - Employees
 - Consultants
 - Organisational structure
- * What problem (s) did you perceive at this early stage of re engineering?
- * What was the company's advantage at that time which facilitate the project?
- ✓ * Did the company create new position to oversee the project?
- * Which new equipment was obtain to support those processes?
- *What were the performance measurement criteria?
- * Did the processes change or innovate new processes?
- * What results were attained?
- * Was the re engineering only alternative to resolve the problem?
- * What lesson did re engineering team learn?
- * What was the duration of each of the project?
- * Where were the focus of the initiative:
 - a) Cost
 - b) Performance
- * What were the special needs of the team?
- * What were the impacts of this success on the jobs and work place?

Appendix D
Schedule of interviews

Schedule of Interviews in BAe

Who	When	Why
Ross Bradley, Director OEI	As arranged by D J Edmondson	Focus on change
Ian White, Sponsor Customer Support	“	Role of customer support in change
Marria Harwood, Director IT	“	Contribution of IT in BPR
Tony Ward, Head BPR Services	“	General discussion on the performance of BPR
Danis Armstrong, BPR Service Manager	“	General discussion about BPR and QA
Steve Eddleston, Head Spares & Repairs Process	“	Performance of Spares & Repairs

In addition, BPR reports of Engineering Service BPR, JTT4 and some issues of FASTRACK need to be consulted.

LIST OF PERSONNEL FOR INTERVIEWS

1. Director Process Implementation (Mr Kevin Garrity)
2. Director Personnel (Paul Sedgewick/Karen Donnelly)
3. Director IBLS (Paul Murphy)
4. Sponsor Bid Preparation (Chris Boardman)
5. Director Quality Management (Alan Millican)
6. Director OEI (Ross Bradley)
7. Sponsor Customer Support (Ian White)
8. Director IT (Maria Harwood)
9. Project Team Leaders:

Doug Goodwin	Ops2
Ali Dormer	IPL/IPC
Steve Eddleston	Spares & Repairs
Ian McKay	Quality Assurance
Eric Whiteside	Works Service
Ian Horsefall	In Service Fault Investigation
Martin Kaye	Ops4

Appendix E

Documents consulted and interviews conducted

APPENDIX E

INTERVIEWS CONDUCTED AND DOCUMENTS CONSULTED

Table of Interviews conducted and documents consulted

<i>Source of data</i>				
	<i>Evaluation report</i>	<i>Envision report</i>	<i>Interviews</i>	<i>Presentation</i>
Projects				
S&R	√			√
IPC/IPL	√	√	√	
Procurement	√	√		
PC		√		√
ISFI	√		√	
QA	√	√	√	
OPS 1	√			
OPS 3	√			
OPS 4				√
General BPR			√	√
IPD			√	√

Appendix F
Correspondence between BAe personnel and the
university of Salford/researcher

The University of Salford Salford M5 4WT England
Telephone direct line 0161 745 5025 mobile 0802 246 585
Facsimile 0161 745 5559
E-mail a.t.wood-harper@mcs.salford.ac.uk
Professor A Trevor Wood-Harper MA PhD MBCS
Director



19 June 1996

Mr A O Ward
Head of Business Process Reengineering
British Aerospace Defence
Military Aircraft Division
Warton Aerodrome
Warton
Preston
Lancashire
PR4 1AX

Dear Mr Ward

This letter is to introduce Mr Javed Iqbal who is currently a PhD student working in the area of Business Process Reengineering within our Information Systems Research Centre at Salford University.

As we discussed in February, he is now coming to help you with your work. We would very appreciate it if you would provide him with the necessary facilities to conduct his research.

I am most grateful for your help in this matter.

With best wishes,

Yours sincerely

PP. Professor Trevor Wood-Harper

From: Self <Single-user mode>
To: J.Iqbal@mcs.salford.ac.uk
Subject: British Aerospace
Send reply to: p.spedding@ucsalf.ac.uk
Date sent: Thu, 16 May 1996 14:46:14

Javed,

Below is the email I sent you some weeks ago.
I hope it will now be useful to you.

Best wishes, Paul Spedding

#####

Sorry about the delay. The person I wished to speak to at BAe (Ian MacKay) has had a car accident, but is now back at work. He suggested that you should contact his BPR colleague Dennis Armstrong (direct telephone 01772 855135) to arrange a meeting if possible. Ian has outlined the situation to D Armstrong.

Best wishes, Paul

cc:Mail for: A.T.Wood-Harper

Subject: BPR

From: J.Iqbal at MCS-Staff 13/2/96 4:20 pm

To: A.T.Wood-Harper at MCS-Mac

Mr Tony Ward
Head of the Business Process Reengineering (BPR)
British Aerospace

Date: February 13, 1996

Dear Mr Ward

I am writing to you in connection with your BPR initiative. Current research findings in this field show that business knowledge as well as IT know-how is considered an advantage in the design and implementation of a radical change project.

We have a number of researchers working on BPR projects within the Information Systems Research Centre, here at the university of Salford. We are seeking help for one of our researcher with a background in business and IT. He is pursuing a doctorate in the institute and wishes to conduct a case study in your organisation on a number of different aspects of your project.

I would be very grateful to you if you could accommodate him to work within your BPR team in order to complete his research project. He will work with you for as long as the project lasts but not more than one year at the most.

The abstract of his doctoral research project together with his C.V. are herewith attached.

With best regards.

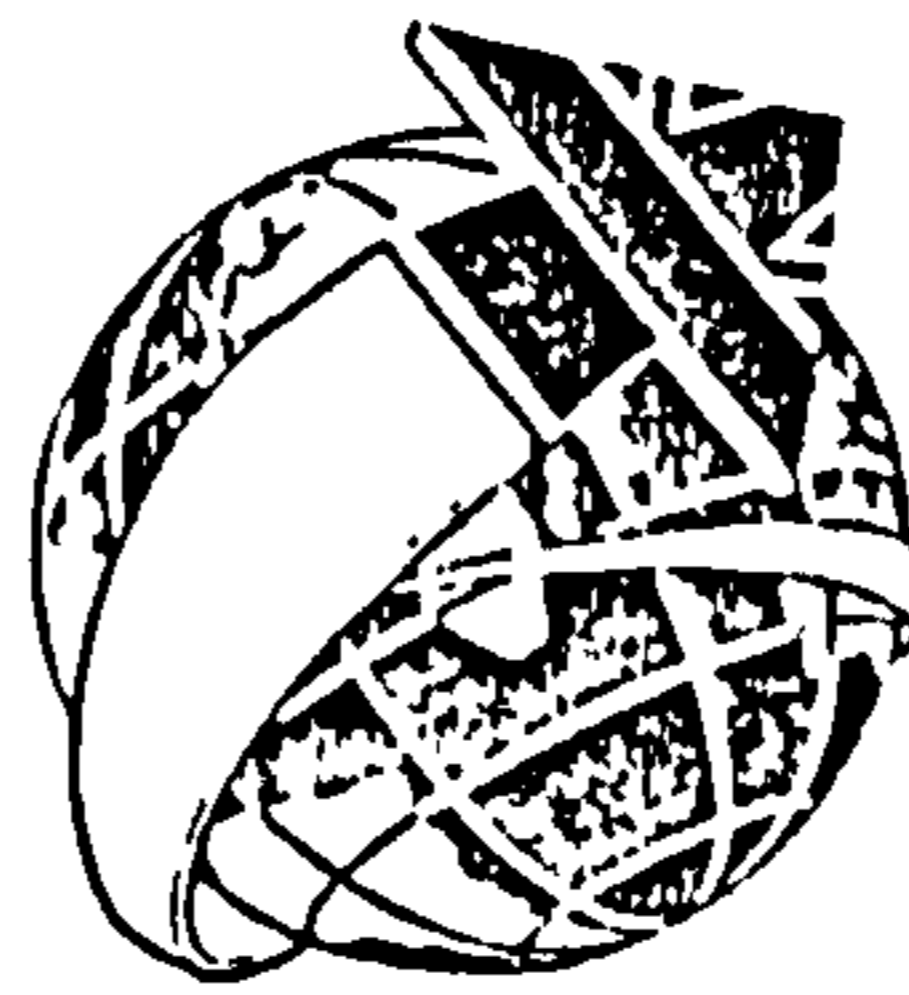
Yours sincerely

Professor A.T.Wood Harper

DJE/TLR/DJEDISK/0219.SAM

16th May, 1997.

Mr. R. Wood
Department of MCS,
Newton Building,
The University of Salford,
Salford.
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BRITISH AEROSPACE
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MILITARY AIRCRAFT

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Dear Mr. Wood,

JAVED IQBAL - PhD THESIS

When we met at the University last Friday, I promised that I would give you a short statement on what BAe (Military Aircraft) expect to get out of the PhD work being done by Javed Iqbal using BAe as field research. As I said at the time, the statement is both short and general.

"By examining the way the BPR programme has been conducted within BAe (MA), identify the lessons to be learned for future large scale change programmes within the company".

How this general aim is met is largely for Javed to determine within the guidance of his University tutorial support. The remainder of my comments are therefore just a personal expectation of what seems a sensible way of taking things forward. This would be:-

- To identify from his completed analysis of our BPR projects, the significant features of our BPR work in BAe.
 - ▶ initial use of external consultants and their imported methodology
 - ▶ avoidance of IT as a change driver
 - ▶ breaking down the overall business process into several major chunks (and the consequent re-integration problems)
 - ▶ the absence of genuinely new ways of working, in favour of adapting imported ideas
- To further understand the effectiveness of these features of our approach by discussion with stakeholders
- To make comparisons with the approaches of other companies undertaking radical performance improvement, and their effectiveness
- To conduct a literature search of other academic findings on this topic
- To present his conclusions to the company by way of a short presentation and document and to the University in a more extensive thesis

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The work within the company will need to be completed as efficiently as possible since the BPR work is now winding down. In doing this Javed will need to strike a balance between instigating meetings himself and observing our security requirements. It would probably be useful to see some outline programme for the remainder of his work.

I hope these comments are useful.

Yours sincerely

A handwritten signature in black ink, appearing to read 'D. J. Edmondson', with a long horizontal flourish extending to the right.

D. J. Edmondson
BPR Services Manager

Copy for information

Mr. A. O. Ward



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Javed,

Thank you for your revised questionnaires, I have taken the liberty of correcting some minor mistakes probably caused by my poor handwriting earlier. I have kept a copy of the questionnaires with your letter.

If there are specific ~~open~~ actions which you want to try to do before you visit again, I suggest that you agree with him exactly what these actions are.

I hope that your wife's health has improved - please give her our best wishes.

Mr Edwards

Appendix G

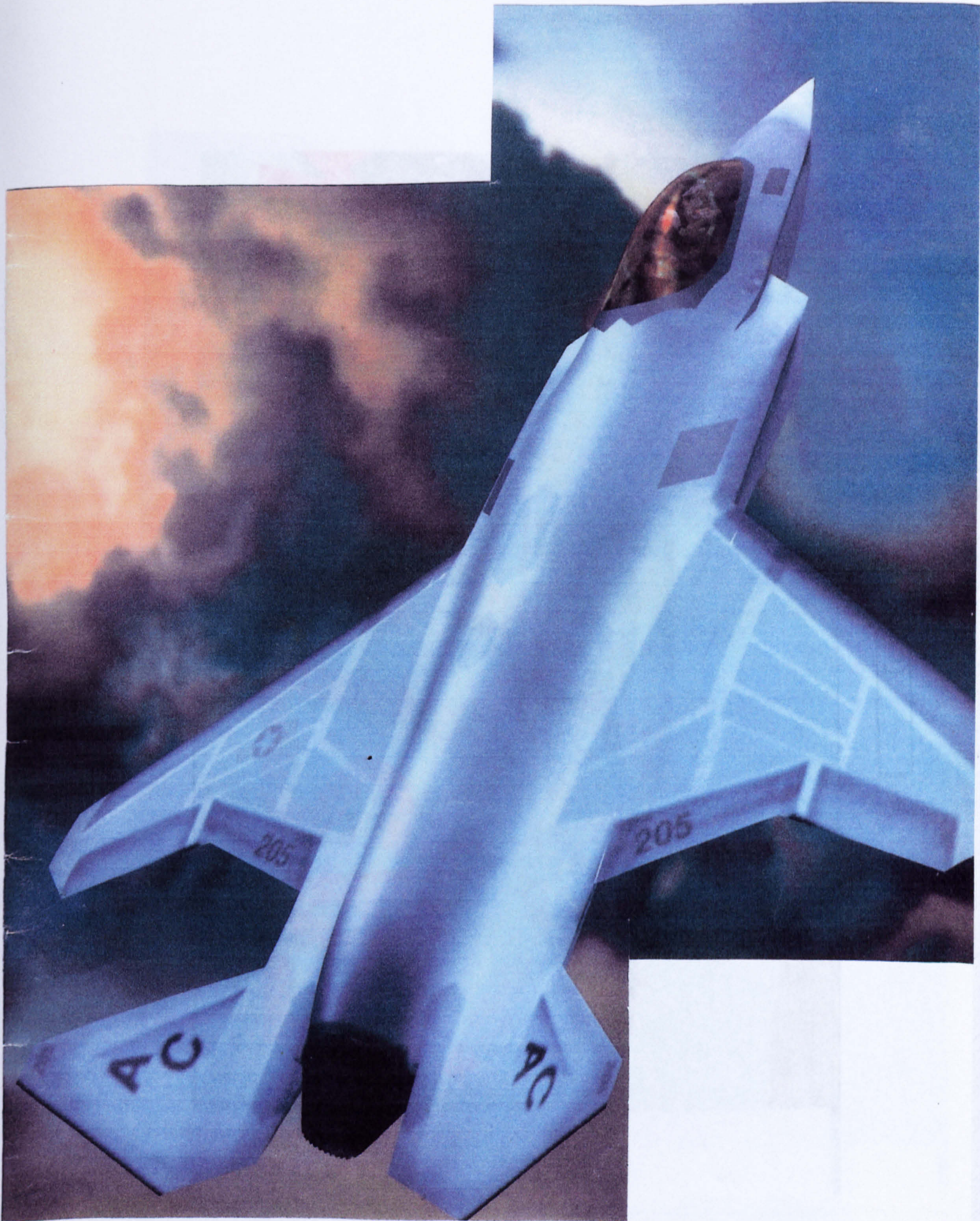
Images of aircrafts manufactured in the company



Eurofighter

Lift off for DA!

Gruppen



Gripen

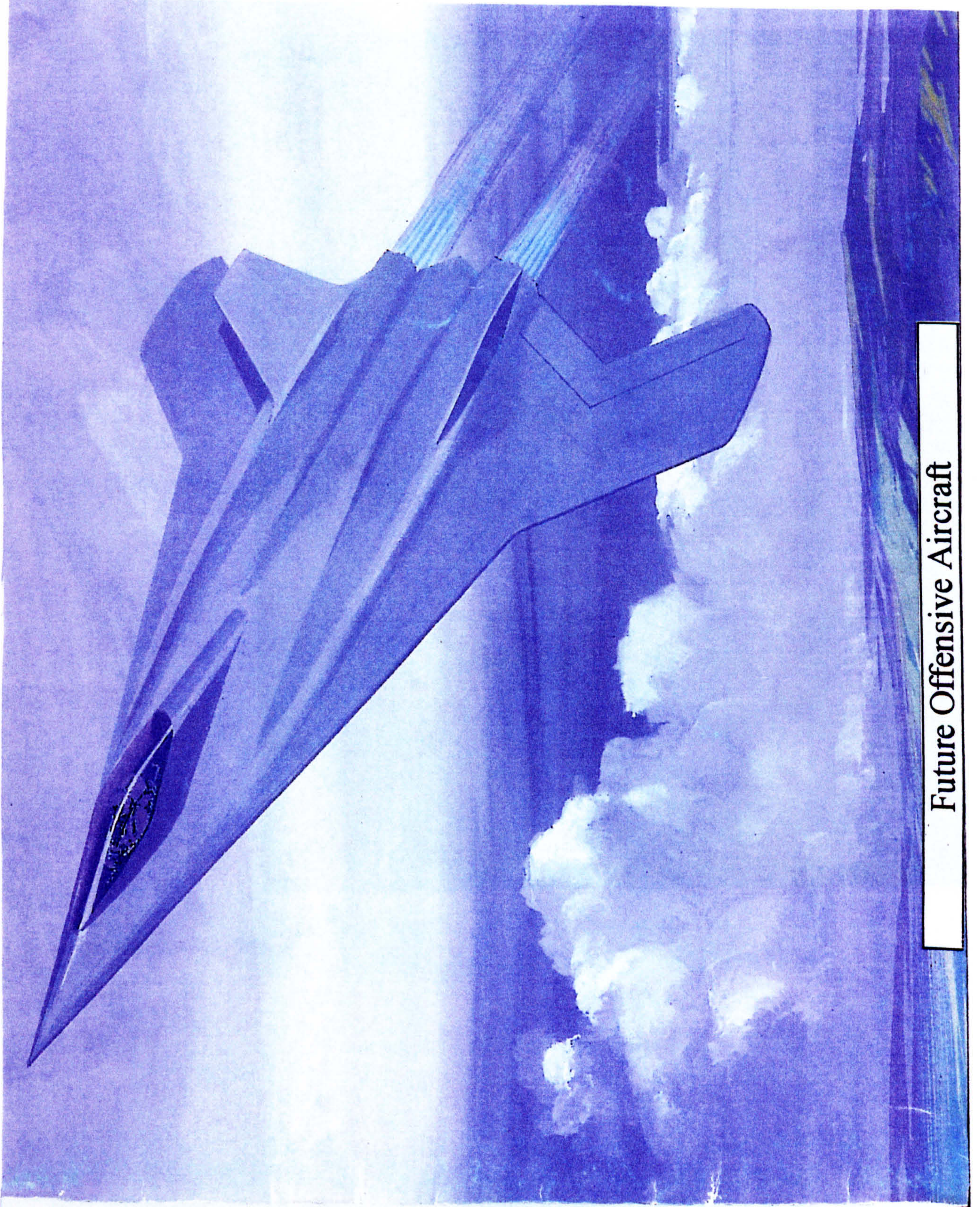
FASTTRAC

1 AUGUST 1

THE MAGAZINE FOR MILITARY AIRCRAFT DIVISION PEOPLE



Tornado



Future Offensive Aircraft



Taking off - Tornado



● Taking off -
leaving a cloud of
grass cuttings

Harrier TMK10 Rough Ground Trials



Hawk

Comparison of BAc and Pilkington radical change



First flight with the two-seater JAS 39B Gripen. April 29, 1996. Pilots: Clas Jensen and Ola Rignall



Taking off - Tornado

Appendix H
Comparison of BAe and Pilkington radical change

Appendix H

Comparison of Pilkington And BAe Change Initiatives

The quality of BAe initiative can be determined by comparing it with other similar change drives. Principal tools for comparison are performance and change strategy. The yardstick against which the comparative analysis will be made is the work of pioneers in re-engineering such as Hammer & Champy (1993), Hammer & Stanton (1995), Hammer (1996), and Davenport (1993), Scott Mortin (1991) etc. The input for the analysis is secondary data, which may or may not be complete/true exposure of the reality.

Pilkington has been selected for the comparison with the BAe initiative because it is manufacturing and distributing defence related products. Therefore, there are many similarities between the two programmes. The reasons for these similarities are two folds: the first is that the both are in the common industry and the second, the both have introduced the same sort of change initiatives. However, there are number of differences between the two programmes; the reasons of the discrepancy may be:

*Pilkington started BPR to drag out the company from losses and make it a competitive force for the future whereas BAe started it to maintain leadership in Europe and expand the range of co-operation to suppliers, partners and customers world wide.

*BAe initiative is a large-scale programme whereas Pilkington programme is relatively a small initiative.

*BAe use BPR as an end to the future of the organisation where as Pilkington use it as a means to an end i.e. to implement CIM.

*BAe commenced the initiative with processes in order to processize the business; Pilkington cautiously introduce the process philosophy. The later is more aggressive and represents true picture of what is called Hammerism; the former is seems to be a marriage of old and the new systems. Table H1 outlines key characteristics of BAe and Pilkington initiatives

Table H1 Comparative analysis of BAe and Pilkington Change initiatives

Comparative Parameters	BAe	Pilkington
Triggers for change	*Competition *Shrinking market size (Unfreezing of East-West relations, Competitive purchasing policies in the UK)	*Competition *Shrinking market size (Unfreezing of East-West relations, Competitive purchasing policies in the UK)
Problems/issues addressed	Refer to table 3	*Bureaucracy *Uncommercial approach *Financial losses *Over employed *Not delivering orders on time *Lack of planning and an unintegrated approach/schedulling
Benefits	Refer to table 4	*Improved liquidity saved £15m *Stock & WIP value dropped by 230% *Addedd value per £ of employee cost rose to 122% *Sales per employee went up by 186% *Reduction in lead time by 114% *Delivery to schedule rose from 10 to 97% *Stock turn over rose from 2.3 to 9 *WIP orders dropped from 9000 to 900 *Purchasing on time rose from 60% to 90% *Design changes dropped by 43%
Alternatives available to tackle the issues		*Strategic alliance to reach market *Re-engineering
Competitive edge	*Technology *High quality products *Employees	*Technology *High quality products
Future vision	*Competitive *Meet customer requirements *	*Nimble *Responsive *Ultra-efficient in its operations
Objective	Refer to table 1	*Bring cultural revolution

		<ul style="list-style-type: none"> *Process based organisation *Implement Computer-Integrated-Manufacturing (CIM) *Cutting cost *Operational effectiveness *Stock & lead time reduction *Elimination of manual production support *Promote better communication
Adoption of BPR	*Phased approach	*Phased approach
External Involvement	Independent consultants	Independent consultants
Redundancies	<ul style="list-style-type: none"> *Yes, but no layoffs *Others were redeployed 	<ul style="list-style-type: none"> *Some layoffs *Others were encouraged to stay
Personnel strategy	Refer to table 13, 15, 16 and 22	<ul style="list-style-type: none"> *Number of staff reduced to 5 from 30 in personnel department *The personnel's function is internal consultancy *Team leader took the responsibility of personnel functions *Planning to introduce one grade managers ie single ladder management in future *Specialist are at higher level than their managers *Flexitime and 4 ½ day week in practice *Foster world-class performance *Introduce best practice policies *Establish sound employee relations *Initiate training & education programmes *Develop improved reward schemes *Create better working conditions *Identify core skills and competencies

Core parts of business (some times called re-engineering components)	<ul style="list-style-type: none"> *Processes *Infrastructure *IT systems *Technology *Organisation *People 	<ul style="list-style-type: none"> *Systems *People *Processes
Co-ordination instruments	<ul style="list-style-type: none"> *MRPII *Master scheduling *Quality Management Systems 	<ul style="list-style-type: none"> *Material Resource Planning (MRPII) *Master scheduling
Teams	Refer to table 9	<ul style="list-style-type: none"> *Team based production *Teams have their own specialist staff
Team functions	Refer to table 9	<ul style="list-style-type: none"> *Design *Development *Production *After sale care *Integration of manufacturing & engineering
Team composition	Refer to table 9	*Upto 20 members; more can be included
Contents of training & education	Refer to table 13	<ul style="list-style-type: none"> *Teamworking, working as team leader or member *Manufacturing management *Labour & personnel issues *Acquisition of new skills both technical and managerial
Performance monitoring	?	<ul style="list-style-type: none"> *Daily *Reviwed weekly
Quality Management System	*QA & QC	*QM
Culture	Refer to table 23	<ul style="list-style-type: none"> *Created egalitrian, participative environment *Open administration, director to clerical staff work in the same area *One dinning room for all *Production and assembly sections include rest areas that also serve as team meetings points
Development of process control		<ul style="list-style-type: none"> *Right first time process control *Reorganisation of support functions *Rethinking the role of

		functions and specialits
Management strategy	*Team based structure will be supported by functions	*All functions will work as internal consultants
Outsourcing	*IT	*Outsourced all non-core activities such as: Catering, security, document archiving, facility management of computer systems & printing of technical manual
Reward & recognition	Limited to learning new skills, team working and job protection	*Recognize and reward core skills *Competency driven grade structure links to succession planning & performance related- pay *Grading and reward system is based on a point system involving peer group comparisons which has been developed in-house
Motivation/satisfaction (What novel sources of satisfaction/motivation are in use?)		*Personal rewards & drivers linked to teaming model *Novel sources: acquisition of new skills, success in team context, pride in the project & project success
Industrial relations		*Initial large scale cuts in job did not sour relations with unions *Cooperation between unions and the company *Unions were extensively counseled and educated about job losses and organisation problems
Management style	*Participative	*Egalitarian, participative
Involvement	*Large scale at all levels	*Large scale at all levels
Communication	*Strong emphasis on communication	*Strong emphasis on communication
Change model	Make changes in *Management systems *Values *Structure *Processes in order to gain profitability, productivity and employee	*Fuse the VISION, STRATEGY and ACTION PLAN (VSA) in order to create a viable, understandable and attractive basis for moving the company forward

	satisfaction	*Everybody must know and participate in how the VSA fuse together *Understanding and ownership of the VSA, people will not change their behaviour
Guiding principles for change (input)	*Best practice *Employees, customer, partners & suppliers ideas *Consultant's methodology	*Best practice *Consultant's ideas
Previous initiative	TQM/Down Sizing	Traditional style
Initiators	Top management	Top management
Performance measurement criteria	*Customer satisfaction *Employees satisfaction *	*Customer satisfaction *Employees satisfaction
Methodology	It consists of four phases *Evaluation *Envision *Empower *Excel	Not available
Stages of radical change	* Process improvement * Automation * Process simplification * Process reengineering * Business reengineering	*Co-ordination *Process control *Process improvement *System integration
Principal issues to be resolved		*How to retain single ladder managers? *What will be the impact on managers while moving them to sideways or down the organisation?

*There will be a second table which will summarise the findings of the above table.

*Goals and objectives are used as interchangeable.

Learning from the BPR experience

The following four points have been traced from the analysis of learning of the re-engineering drive:

1. What does the company want to achieve?

*Implement CIM

*Improve performance

2. It will do so by

*Introduction of flat management structure

*Participative management style

3. It requires:

*Strong communication

*Training and education

*Appropriate reward structure

4. The company can achieve 1-3 above by

*Developing a clear strategy and vision

*Concentrating on processes

Development of strategy clearly states priorities and objectives to keep the initiative on the right direction. Cultural change suggested an intensive role of senior managers who communicate the goals and urgency of change. A new reward system outlines the individual characteristics of a team based performance measurement and monitoring mechanism. It emphasises broadening individual skills and knowledge in order to fit in a well defined structure. All working methods are integrated to produce a coordinated synergic effect. Table 32a and b compares learning of both the organisations in radical change context.

Table 32a Comparison of learning points

BAe	Pilkington
Strategy driven initiative	Strategy driven initiative
Concentration on processes	Concentration on processes
Need of strong communication with everyone involved	Need of strong communication with everyone involved
Changing employees behaviour by training & education	Changing employees behaviour by training & education
Flat structure and participative management suits radical change	Flat structure and egalitarian participative management suits radical change
Destination is almost achieved	The destination is still ahead
Concentration on internal performance and quality of produce	Concentration on financial performance
Determine process scope at the outset and clarify/teach it to the stakeholders or those who are involved	