

# Business Process Reengineering



Business Process Reengineering:  
Strategies for Occupational Health and Safety

By

Graham R. Sturdy

**CAMBRIDGE  
SCHOLARS**

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P U B L I S H I N G

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Strategies for Occupational Health and Safety,  
by Graham R. Sturdy

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# TABLE OF CONTENTS

List of Figures.....	xi
List of Tables.....	xii
Acknowledgements .....	xiii
About the Author.....	xiv
Foreword .....	xv
Professor Eamonn Murphy	
Introduction .....	xvi
Who should read this book?	
Chapter One.....	1
The Evolution of BPR	
BPR Strategies	
BPR Success and Failures	
Factors Relating to BPR Success	
Factors relating to change management systems and culture	
Committed and strong leadership	
Factors relating to organisational structure	
Factors related to BPR programme management	
Factors related to IT infrastructure	
Factors Relating to BPR Failure	
Problems in communication and organisational resistance	
Lack of organisational readiness for change	
Problems related to creating a culture for change	
Lack of training and education:	
Factors related to management support	
Ineffective BPR teams	
Factors related to organisational structure	
Problems related to goals and measures	
Inadequate focus and objectives	
Ineffective process redesign	
Problems related to BPR resources	
Unrealistic expectations	
Ineffective use of consultants	

Miscellaneous problems	
Factors related to IT infrastructure	
Improper IT integration	
Inadequate IT development	
Ineffective Reengineering of legacy IT	
Factors related to BPR programme management	
<b>Chapter Two .....</b>	<b>16</b>
<b>BPR TQM and IT</b>	
Information Technology	
Information Technology and the Value Chain	
IT Value and business alignment	
IT infrastructure	
IT Network Infrastructure	
The Key Elements of BPR	
Develop a Vision	
Establish a Responsible Team	
Prepare the Organisation for Change	
Redesign the Business Process	
Case Studies	
Summary	
<b>Chapter Three .....</b>	<b>41</b>
<b>BPR Methodologies</b>	
The Advantages of a BPR Methodology	
First Phase	
Second Phase	
Third Phase	
Fourth Phase	
Fifth Phase	
Extended Framework	
An Integrated Methodology	
IDEFØ	
Identification of a Gap in the Literature	
<b>Chapter Four .....</b>	<b>61</b>
<b>Research Methodology</b>	
Question A1: Actual and Expected Benefits	
Question A2: Levels of Improvement	
Question A3: Tools and Techniques	
Survey: O'Neill and Sohal (1998)	
Question B1: Events as Triggers to BPR	
Question B2: Goals and Objectives	
Question B3: The Effectiveness of Consultants	
Question B4: Contribution of IT	



Survey: Maria Vakola and Yacine Rezgui (2000)	
Survey: Tenant and Wu (2005)	
Question D1: Triggers for Initiating BPR	
Question D2: Goals and Objectives	
Question D3: Expectation of Change	
Question D4: Benefits Derived from BPR	
Question D5: People Issues	
Question D6: The Role of IT	
Question D7: Implementation Time Frame	
Implementation Difficulties	
Conclusions	
Chapter Five .....	81
A Practical Application of the BPR Framework	
The Situational Context for the Case Study	
Resource Constraints and Limitations	
BPR Essential Elements	
Stage 1: Planning for Reengineering	
Stage 2: Analyse the “AS-IS” Process	
Stage 3: Design the HRA “TO-BE” Process	
Hazard Rating Number	
Stage 4: Implementation of the Reengineered Process	
Stage 5: Improve Continuously	
Summary	
Chapter Six .....	109
Description of Results	
H.R.A Reports	
Serious Accident Reduction	
Practical Examples of the application of the Framework	
Contractor Control	
Conclusions	
Chapter Seven.....	127
Critical Success Factors	
Chapter Eight.....	132
Conclusions and Recommendations	
Scope for Improvement	
Accident Reporting	
Metrics	
Appendix One.....	138
Appendix Two .....	140

Appendix Three .....	151
Appendix Four .....	157
Appendix Five .....	158
Appendix Six .....	162
Appendix Seven .....	166
References .....	204
Postscript .....	215
Index .....	216

# LIST OF FIGURES

Figure 1: Useful Scales of Analysis .....	4
Figure 2: A Summary of Success and Failure Factors.....	15
Figure 3: Transforming the Process.....	18
Figure 4: Michael Porter's Value Chain.....	24
Figure 5: Modelling and Decision Making.....	26
Figure 6: Three Phase BPR Model.....	32
Figure 7: A Generic Model of BPR.....	43
Figure 8: Six-phase Comprehensive Reengineering Plan.....	44
Figure 9: Extended Framework .....	48
Figure 10: IDEF0 ICOMs.....	51
Figure 11: BPR IDEF0 Model.....	54
Figure 12: The Sturdy BPR Matrix .....	56
Figure 13: Benefits from BPR.....	63
Figure 14: Levels of Improvement.....	64
Figure 15: Importance of Tools and Techniques.....	65
Figure 16: BPR Triggers .....	66
Figure 17: Extent Goals and Objectives included in BPR.....	67
Figure 18: Effectiveness of Consultants.....	68
Figure 19: Number of Stages.....	69
Figure 20: Triggers for Initiating BPR.....	71
Figure 21: Goals and Objectives for BPR .....	72
Figure 22: Expectation of Change in Business Processes.....	73
Figure 23: Organisational Issues .....	74
Figure 24: People Issues.....	75
Figure 25: Implementation Time.....	76
Figure 26: The EHS Departmental Structure of the Company.....	81
Figure 27: The Essential Elements of Implementing the BPR Framework .....	88
Figure 28: Identified commencement position within the Sturdy BPR Matrix .....	90
Figure 29: Performance along the OH&S Continuum.....	92
Figure 30: High Level Plan .....	93
Figure 31: HRA SWOT Analysis.....	96
Figure 32: HRA "AS-IS" Process .....	97
Figure 33: "TO-BE" Process .....	100
Figure 34: The Gating Process of the HRA Application .....	107
Figure 35: H.R.A. Active Submissions .....	114
Figure 36: H.R.A. Distribution.....	116
Figure 37: H.R.A. Frequency of Distribution.....	117
Figure 38: Serious Incident Index .....	119
Figure 39: OH&S Metrics Spider-web .....	135

# LIST OF TABLES

Table 1: TQM and BPR Approaches.....	17
Table 2: Lean and Buffered system comparisons.....	20
Table 3: Eastern and American Philosophies .....	21
Table 4: Methodologies # 1 and 2 .....	48
Table 5: Methodologies # 3, 4 and 5 .....	49
Table 6: Matrix Evaluation Tool.....	94
Table 7: HRN Rating Number.....	101
Table 8: Active HRA Submissions.....	113

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To all of the above, and to everyone else who shared the journey with me, I would like to borrow a few lines from Patrick Kavanagh:

*On a quiet street where old ghosts meet  
I tripped lightly along the ledge  
Of a deep ravine where can be seen  
The worth of passion's pledge*



## ABOUT THE AUTHOR

Born in Dublin Ireland, Graham Sturdy is an MSc honours graduate in Technology Management from the National University of Ireland Galway (NUIG) having originally graduated from the University of Limerick in Computer Engineering. Graham has considerable experience in process and technology management, having worked both in Cambridge Massachusetts and Nice, France on advanced technology programmes.

This book is based largely on Graham Sturdy's hands-on experience as both a production and process engineer, and also as a research fellow at the Enterprise Research Centre based at the University of Limerick, Ireland.

Graham has two sons and is currently working in Brussels as a Research Consultant.

His publications include *Developing a Manufacturable Process for the Deposition of Thick Polysilicon Films for Micro Machined Devices*. [Sturdy 2000] and *Statistical Process Control on Passivation Schemes for VLSI Technology* [Sturdy et al 1996].

## FOREWORD

In this book, Graham provides a well-researched and comprehensive resource for understanding and implementing Business Process Reengineering and is an invaluable read for all practitioners of the subject and for those wishing to learn more about BPR. Graham has placed particular emphasis on the importance of the OH&S function within the commercial environment. Graham provides specific and practical guidance on implementing BPR strategies that he has formulated along with a number of academic practitioners and industry experts. Importantly, Graham demonstrates how these initiatives can be implemented in a real-world environment and in accordance with stated business objectives so as to achieve positive and productive change.

The advantages of a newly-developed business tool known as the Sturdy BPR Matrix are carefully considered as is guidance on the implementation of BPR in any situational context. The book contains an extensive bibliography reflecting the author's extensive research and depth of knowledge of the subject.

I thoroughly recommend this comprehensive study of BPR. It is well-researched and explores the wide range of research literature that is available on this subject in a manner that is both practical and comprehensive.

*Professor Eamonn Murphy, Enterprise Research Centre, U.L.*

# INTRODUCTION

Business Process Reengineering (BPR) is a useful tool that has been adopted by and hailed as one of the current major drivers of change within many organisations. Although, many organisations have achieved dramatic success through the implementation of BPR, in other situations this has not always been the case. If the reasons for the implementation of BPR are not clearly understood, or if the necessary resources are not put in place to support the full implementation of the scope of the programme, then this can lead to the path of failure. Other reasons for the failure of BPR can be due to the fact that; senior management does not always have a clear vision of what the BPR effort intends to achieve, or how to gauge or monitor the success of the programme objectives.

The case study within the book demonstrates the successful application of BPR through the implementation of the “Integration Definition for Functional Modelling” (IDEFØ) methodology. A significant decision taken at the start of the programme was to implement as much of it as possible through the use of Information Technology (IT). The decision to use IT to enable critical aspects of the programme resulted in all of the key deliverables being brought in on time, with a constrained amount of resources being available to the programme.

Within this book, the author develops a new tool, “*The Sturdy BPR Matrix*”, which assists in identifying the position of a process within the “process deliverable continuum”, and contrasts this against the level of BPR change that can be applied within a given situation. The application of this tool can then inform the decision-making process with regard to whether or not BPR should be employed in any given circumstance.

## **Who should read this book?**

This book is the result of the authors experience in a number of diverse fields, and it tells the story of how the underlying theory in relation to Business Process Reengineering (BPR) can be applied in a very practical way in obtaining certification to OHSAS 18001, a Health and Safety



standard. The book should therefore, be of interest to the following readers:

- Undergraduate or Masters level students of process management or management change; who wish to gain a fuller understanding of the academic writings, research and concepts which underline the methodology.
- Managers and supervisors who either have an interest in BPR, or who may be intending to apply BPR within their own organisations, and who wish to gain a fuller understanding of the methodology, and to also to observe a practical instance of its application.
- Professionals who have an interest in Occupational Health and Safety and in particular Hazard Risk Assessment who want to gain a fuller understanding of the implications and application of HRA within the workplace.
- Engineers and technicians who have an interest in process modelling, and wish to see how this technique can be used in the implementation of a BPR programme.



# CHAPTER ONE

## THE EVOLUTION OF BPR

This first chapter looks at the evolution of BPR and the strategies which have been developed to ensure a successful outcome when using the methodology, along with a number of success and failure mechanisms. The concept of reengineering traces its roots back to management theories developed in the early 19th century. The purpose of reengineering is to; *“make all your processes the best-in class”* Fredrick Taylor suggested as far back as the 1860’s. Taylor revolutionised the workplace with his ideas on work organisation. He believed that the same principles that were so successful for solving technical problems could also be utilised to structure jobs performed by individuals. Taylor proposed that managers could discover the best process of performing work and reengineering to an extent echoes the classical belief that there is one *“best way”* to conduct tasks. In Taylor’s time, technology did not allow large companies to design processes in a cross-functional or cross-dimensional manner, specialisation was the *“state of the art”* method to improve efficiency given the technological situation pertaining at that time. The principles that Taylor developed became known as scientific management. Scientific management has had a long-lasting effect on organisational structures in terms of the job content of workers, the patterns of their interactions with technology, and their roles and relationships with one another and with management. It was in the early 1900’s that Henri Fayol, the French industrialist and administrator developed these ideas further and essentially developed the concept of reengineering. In his writings, Fayol stated that the role and elements of management, should be concerned with; *“The process of conducting an undertaking towards an objective by seeking to derive optimum advantage from all available resources”* Deming (1986), has also stated that over 90 per cent of the possibilities for quality improvement belong to the system or process.

The concept of business process improvement has encouraged businesses to consider company-wide processes, rather than focus on production processes only, which according to Harrington (1991) for an average

product accounts for less than 10 per cent of the product value. In the early 1990s, leading business process reengineering experts Hammer and Champy coined the phrase, “*Business Reengineering*”. Hammer and Champy (1993) define business reengineering as; “*The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed*” In his research, Thomas Davenport (1993) coined the phrase “*process innovation*”. By examining a number of organisations that were engaged in the process of redesigning processes, he was able to gather information on methods and practices, which led to the successful implementation of process innovation. He concluded that classical reengineering repeats the same mistakes as the classical approach to management by separating the design of work from its execution.

These approaches to reengineering share a number of core activities and address the concept of how businesses perform the redesign of strategic processes. Therefore, as processes represent the key aspects of these management philosophies, a new term, Business Process Reengineering, or BPR was created to represent a range of activities concerned with the improvement of processes. BPR by definition radically departs from other popular business practices like Total Quality Management, Lean Production, Downsizing, or Continuous Improvement. BPR according to Talwar (1993) is “*the ability to rethink, restructure and streamline the business structures, process, methods of working management systems and external relationships through which we create and deliver value*”. Attaran and Wood (1999) commented that “*the overall theme of BPR is the quest for improvement through quick and substantial gains in the organisational performance*”. Although, there is an element of commonality in all of these definitions, there are some key differences between them: Hammer and Champy emphasise cost, quality, service and speed; Davenport placed emphasis on the analysis and design of work-flows; Talwar places the emphasis on the ability to restructure the business process; while Attaran and Wood place the emphasis on organisational performance. BPR combines analysis and modelling of business processes with advanced information technologies. Grover (1993) has identified the following as common features of BPR programmes.

- Involves the radical redesign of business processes
- Typically employs Information Technology as an enabler of new business processes
- Attempts to achieve organisational level strategic outcomes

- Tends to be inter-functional in its efforts

Taking into consideration and combining these different perspectives, the author proposes a more holistic definition of BPR, which is:

*“BPR is the fundamental rethinking and radical redesign of business processes and the analysis and design of workflows to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed to achieve substantial gains in the overall organisational performance”*

This definition places more emphasise on the design of workflows before the commencement of any reengineering programme, and to ensure that the BPR programme is focused more on improved overall organisational performance, rather than any one particular element or measure of performance.

## **BPR Strategies**

While many academics advocate the necessity of BPR, not all of them agree on the same approach. Hammer's intervention strategy, which he has referred to as the “*neutron bomb*” approach to business improvement “*We'll leave the walls standing and we'll nuke everything on the inside*”, is a sentiment that expresses one aspect of a wide spectrum of opinion regarding the most appropriate BPR strategies for an organisation to adapt. Hammer, for example, states that firms can only hope to achieve radical performance improvements using Business Process Reengineering methods which strive to “*break away from the old rules about how we organise and conduct business*”. He asserts that reengineering cannot be accomplished in small or cautious steps, but must be viewed as an “*all-or-nothing*” proposition. Hammer and Champy went on to proclaim that the classical organisational theory of Fayol and others “*to be obsolete*”. Mintzberg (1990), has also been somewhat critical of some of these earlier approaches; describing some of classical functions of management as “*folklore*”. There is an element of disagreement, between those who favour a more considered incremental approach, and those who prefer “*root-and-branch*” radicalism where BPR improvement is concerned. Figure 1 illustrates, that what can be achieved by the radical changes proposed by Hammer, can also be equally well obtained by more incremental change as advocated by Harrington and Davenport (1993). For example, Gant (1992) sees BPR as simply “*the redesign of processes to take advantage of the enormous potential of information technology*”.

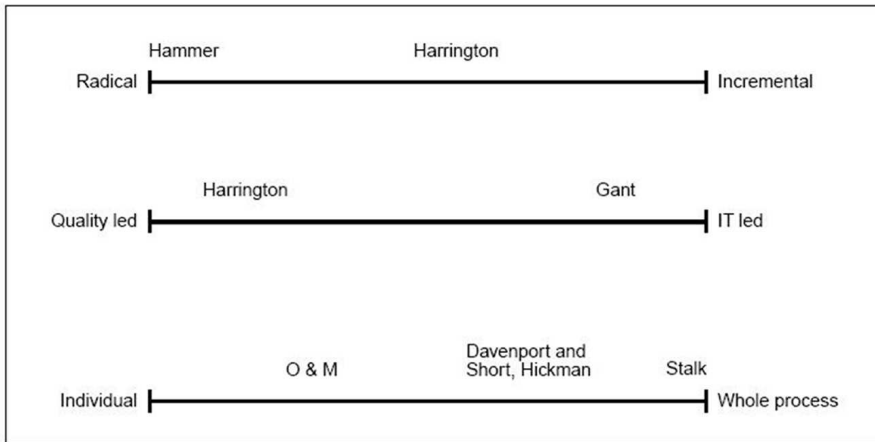


Figure 1: Useful Scales of Analysis

This process-focused approach tends to identify BPR with traditional systems analysis and design and software engineering. It first concentrates on identifying the business processes, then on analysing and reengineering each process. On the other hand, the ideas on the subject put forward by Harrington (1992) may be said to reflect the more incremental, quality-oriented and less IT-dominated end of the BPR spectrum. He defines the concept of business process improvement as a “*systematic methodology developed to help an organisation make significant advances in the way in which its business processes operate*”. The author notes that, as of this time, there is no agreement on BPR terminology within the broader business process community. Various scholars and academics have described different approaches known as “Business Process Reengineering”, “Business Process Redesign”, “Business Process Management”, “Business Process Improvement” and “Core Process Re-design”. These approaches have different characteristics in terms of the degree of change, whether it is intended to be radical or incremental, along with the scope of the intended change and the focus of attention.

The approach advocated by Hammer, should really only be undertaken when all other possible approaches have been considered and eliminated as not being a practical solution under current circumstances. This approach is usually adopted when a company is in a crisis situation, and BPR represents a last throw of the dice in order to ensure survival. In a number of these cases, BPR programmes tend to fail as the circumstances

that have brought the company to the critical point of a drastic and fundamental rethinking of the redesign of operations, can often mean that the company has already reached the point of no return in terms of business survival. Even if, the company does survive, the resources spent on an extensive reengineering programme may stunt the capacity of the organisation for future growth.

It can be the case that incremental change can result in a dramatic change over a period of time. This type of change can be achieved without the tag of BPR being applied to it, yet the end results can be equally dramatic. This does not mean that BPR should not be considered as a viable alternative approach to incremental change, but the business context in which it is undertaken should not be a dominant factor in the consideration of its implementation. In this regard, the incremental approaches proposed by Harrington and Davenport (1993) have a higher probability of success, as the pressure of the business context has less relevance. According to Alter (1994) *“having BPR repeatedly at the top of the list of management issues in annual surveys of critical information systems reflects executives’ failure to implement properly or acquire the benefits of BPR”*. This broad range of opinions expressed here, may create a level of apprehension in anyone considering, or contemplating the implementation of BPR, as there is much divergence of opinion among the academic community as to the best approach as well as, among the business community.

## **BPR Success and Failures**

BPR has great potential for increasing productivity through reduced process time and cost, improved quality, and greater customer satisfaction, but it often requires a fundamental organisational change to accompany it. As a result, the implementation process can be complex, and needs to be checked against several success and failure factors to ensure successful implementation, as well as to avoid implementation pitfalls. Al-Mashari and Zairi (1999) have analysed the literature on both the *“soft and hard factors”* that cause success and failure in relation to BPR. The factors listed below are a distillation from journal articles and empirical research in relation to the implementation of BPR which have been categorised into a number of subgroups representing various dimensions of change. These dimensions are:

- Change management
- Management competency and support

- Organisational structure
- Project planning and management
- IT infrastructure

## **Factors Relating to BPR Success**

The ability of management to be adaptable and to be able to manage change is considered by many researchers to be a crucial component of any BPR effort. Carr (1993) states that, *“change management, which involves all human and social-related changes and cultural adjustment techniques is required by management to facilitate the insertion of newly-designed processes and structures into working practice and to deal effectively with resistance”*. Zairi and Sinclair (1995) place emphasis on the revision of reward systems, creating a culture for change and stimulating receptivity of the organisation to change. Commitment and leadership in the upper echelons of management are often cited as the most important factors of a successful BPR programme. Hammer and Champy (1993) note that, *“sufficient authority and knowledge, and proper communication with all parts in the change process, are important in dealing with organisational resistance during BPR implementation”*.

### ***Factors relating to change management systems and culture***

The management of change is an essential skill to facilitate the insertion of newly-designed processes and structures into working practices, and to deal effectively with resistance. This is considered by many researchers to be a crucial component of any BPR effort. This is further emphasised by Zairi and Sinclair (1995) who state that, *“Revision of reward systems, communication, empowerment, people involvement, training and education, creating a culture for change, and stimulating receptivity of the organisation to change are the most important factors related to change management and establishing a culture of performance measures”*.

### ***Committed and strong leadership***

The commitment and leadership of management are often cited as the most important factors resulting in a successful outcome of a BPR programme. Carr and Johansson (1995) make the point that leadership *“must provide a clear vision of the future”*. This vision must be clearly communicated to a wide range of employees who, then become involved and motivated rather than directly guided. Other leadership traits and



characteristics that are cited and considered to be important in the literature are:

- Leadership has to be effective, strong and visible
- It requires creative thinking and understanding
- There must be commitment to and support for the BPR effort
- The support from senior management must be constant throughout the lifetime of the BPR programme

### ***Factors relating to organisational structure***

BPR creates new processes that define jobs and responsibilities across the existing organisational functions. This results in a clear need to create a new organisational structure which determines how BPR teams are going to look, how human resources are integrated, and how the new jobs and responsibilities are going to be formalised. The organisation must therefore, have the ability to create the new organisational structures without disrupting or destabilising the existing manufacturing capabilities. This requirement for the organisation to have the ability to create new organisational teams and structures forms a key element of the case study in section 5.

### ***Factors related to BPR programme management***

Zairi and Sinclair (1995) comment that, “*successful BPR implementation is highly dependent on an effective BPR management programme which should include adequate strategic alignment and effective planning and project management techniques*”. These techniques should identify a methodology for external orientation and learning, making effective use of consultants in building a process vision, which integrates BPR with other improvement techniques, and ensures adequate identification of the BPR value.

### ***Factors related to IT infrastructure***

Brancheau *et al* (1996) make the point that “*factors related to IT infrastructure have been increasingly considered by many researchers and practitioners as a vital component of successful BPR efforts*”. IT function competency and effective use of software tools have been proposed as the most important factors that contribute to the success of BPR. These include:

- Building an effective IT infrastructure
- Adequate IT infrastructure investment
- Adequate measurement of IT infrastructure effectiveness
- Proper IT integration
- Effective Reengineering of legacy IT

Kettinger *et al* (1997) go on to state that: “*BPR and IT infrastructure strategies which are both derived from organisational strategy need to be in effective alignment to ensure the success of the BPR initiative*”. While, McDonald and Earl (1995) adopt the stance that: “*IT can best enhance an organisation's position by supporting a business-thrust strategy which should be clear and detailed*”. Top management should be involved in strategy formulation, as well as providing a commitment for the whole process of redesign, while the IT manager should be responsible for designing and implementing the IT strategy. The degree of alignment between the BPR strategy and the IT infrastructure strategy is indicated by including the identification of information resource needs in the BPR strategy. Alignment is also achieved by the active involvement of management in the process of IT infrastructure planning, and IT managers in business planning, and also by the degree of synchronisation in formulating the two strategies.

## **Factors Relating to BPR Failure**

### ***Problems in communication and organisational resistance***

Communication and commitment building are particularly important aspects of BPR, and the ease with which management can communicate through all levels of the organisation during a BPR effort, will have a significant bearing on the success of the programme. It involves communicating and translating the ideas and vision of management, which must then be translated into the attitudes and behaviours of those impacted by the programme. It is necessary to ensure, that the communication effort starts well in advance of the commencement of the BPR programme. Davenport (1993) makes the point that; “*inadequate communication between BPR teams and other personnel relating to the need for change and the hiding of uncertainties in communication can result in a lack of motivation and reward*”. Talwar (1993) also points out that; “*organisational resistance can result from inadequate communication between BPR teams and other personnel relating to the need for change*” which can result in a lack of motivation and reward. Coupled with this, worries about job loss

and security combined with a sense of loss of control and position, particularly within middle management can result in resistance to change. Grover *et al* (1995) make the point that; *“lack of organisational readiness can result when demand for change exceeds the capacity of the company to absorb it and the need for change management is not realised”*. Line managers may not be receptive to change, due to a lack of determination for radical change, and also through a lack of cross-functional co-operation. Underestimating the human side of BPR is cited by many authors as one of the key failure mechanisms which prevent successful implementation.

Within the Case Study in Chapter 5, the company experienced a degree of resistance to the implementation of BPR. A level of this resistance emanated from within the non-manufacturing and support areas of operations. Within a number of these support areas; practices had been established over time which personnel within these areas had become comfortable with, and they were therefore, somewhat reticent about any proposed changes that would impact on established practices. Employees usually resist change, particularly that which is perceived as self-damaging. Possible anxiety over job losses brought about by BPR can be due to poor communication, According to Kiely (1995) *“employees’ fear drives out optimism”*. Lack of optimism within the organisation can damage reengineering programmes. Changing an organisational culture is clearly a difficult endeavour, because within many organisations, after many years of operation, the culture becomes deeply embedded in the everyday working lives of employees. As a result, reengineering can represent a serious challenge, because of the need to bring about the required cultural shift along with the required change in the business process.

### ***Lack of organisational readiness for change***

It can be the case, that the need to understand, how management thinks, is not understood or realised, and along with this, line managers may not be receptive to change due to a lack of determination, courage and skills for radical change, and also because of a lack of cross-functional co-operation.

### ***Problems related to creating a culture for change***

Underestimating the human side of BPR is cited by many authors as one of the key failure mechanisms which prevent successful implementation. Below are a number of relevant academic articles which relate to this aspect of reengineering.

- Is Reengineering A Fad?, Donlon *et al* (1996)
- The Trouble with Reengineering, Thomas (1994)
- Has Reengineering had its 15 Minutes of Fame? Henderson and Venkatraman (1993)
- Business Process Reengineering RIP, Mumford and Hendricks (1996)

Other aspects which can lead to failure are:

- Not considering existing management systems and organisational culture
- A lack of trust between management and employees combined with an ignorance of others values
- Underestimating the role of politics in BPR
- Animosity toward and by IT and human resources specialists

### ***Lack of training and education***

Grover *et al* (1995) make the point that; “*a lack of appropriate training for those affected by BPR*” as well as a lack of understanding of BPR and the absence of theory, as further possible failure mechanisms.

### ***Factors related to management support***

Bashein *et al* (1994) make the point that problems can arise due to; “*a lack of top management attention and support and also due to lack of sustained management commitment and leadership*”. Lack of support from line managers coupled with a “*Do it to me*” attitude have also been noted within the literature as areas of concern. Any BPR programme that does not have the full support of senior management will struggle to attain its goals. The full support and sponsorship of senior management or “*champion*” within senior management is critical to success, and also having the wrong sponsor will serve to have a detrimental impact on the successful outcome of a BPR programme.

### ***Ineffective BPR teams***

The ability of an organisation to have the flexibility to create the types of teams required for the successful implementation of a BPR programme is another extremely important factor. The inability to create cross-functional project teams and difficulty in finding suitable team members can give rise to serious problems. The inability of an organisation to create flexible, hierarchical structures can also be problematic with people thinking solely in terms of their own immediate working group. Conflicts can also occur between BPR teams and the persons within them who have functional responsibilities, which can lead to unclear definition of job roles. Other reasons cited for ineffective BPR teams are:

- Lack of IT staff credibility and involvement in Reengineering teams
- Inadequate communication among members
- Lack of training for BPR teams
- Lack of authority given to BPR teams
- Inadequate team skills

### ***Factors related to organisational structure***

According to Davenport (1993) “*The inability of an organisation to create flexible hierarchical structures can also be problematic with people thinking solely in terms of their own immediate working group*”. Conflicts can also occur between BPR teams and the persons within them who have functional responsibilities, which can lead to unclear definition of job roles.

### ***Problems related to goals and measures***

Problems relating to goals and measures can be due to a lack of clear performance objectives and milestones for a BPR programme which has poorly defined needs, which can result in a difficulty in establishing performance goals. Other reasons cited are:

- Difficulty in measuring BPR project performance
- Using only quantifiable and easy measures
- Spending too much time in analysing existing processes

### ***Inadequate focus and objectives***

Problems relating to goals and measures can be due to a lack of clear performance objectives and milestones, along with poorly defined needs, which can result in a difficulty in establishing performance goals. Bashein *et al* (1994) state that “*There must be a clear strategic focus and efforts must be made to avoid too narrow a technical focus and also to avoid a cost-cutting focus*”. Other reasons cited are:

- A focus on planning rather than on doing and using reengineering to avoid making hard decisions
- Old patterns of automating existing processes without redesign
- Short-term view and quick fix mentality

### ***Ineffective process redesign***

According to Hammer and Champy, issues can arise due to missing BPR process elements, and also due to a lack of understanding and orientation and who exactly are the programme owners, along with:

- Inadequate determination of scope of change
- Inadequate focus on core processes
- Narrowly defined processes

### ***Problems related to BPR resources***

Before embarking on any BPR programme, it is very necessary to ensure that all the necessary resources required will be available to the programme; while Bashein *et al* (1994) further state that “*programme failure can occur due to a lack of required resources for BPR efforts and undertaking BPR without the provision of adequate or sound financial resources*”. Another difficulty can be the failure to understand the total financial impact of BPR, and also difficulty in forecasting human, financial, and other resources.

### ***Unrealistic expectations***

According to Bashein *et al* (1994), expecting BPR to solve all organisational problems combined with unrealistic expectations of what BPR can deliver, is yet another mechanism that can lead to failure within BPR programmes.