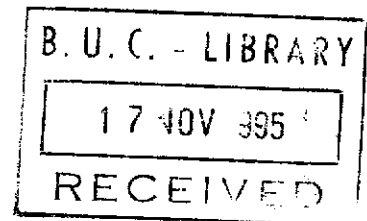


RT
151

BUSINESS PROCESS RE - ENGINEERING

"THE CASE OF MIDDLE EAST AIRLINES"

***A RESEARCH TOPIC
PRESENTED TO BUSINESS DIVISION
LEBANESE AMERICAN UNIVERSITY***



In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Business
Management

**BY
NADA Y. JAMMOUL**

JUNE, 1995

Levant

LEBANESE AMERICAN UNIVERSITY

BEIRUT - LEBANON

APPROVAL OF RESEARCH TOPIC

CANDIDATE: NADA YOUSEF JAMMOUL

DATE: JUNE 1995

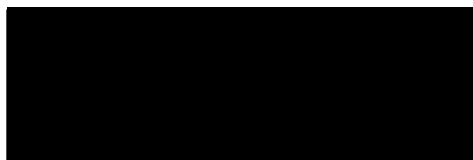
DEGREE: MASTER OF SIENCE IN BUSINESS ADMINISTRATION

TITLE OF RESEARCH: BUSINESS PROCESS RE-ENGINEERING
THE CASE OF MIDDLE EAST AIRLINES

The following professors nominated to serve as the advisors of the above candidate have approved this work

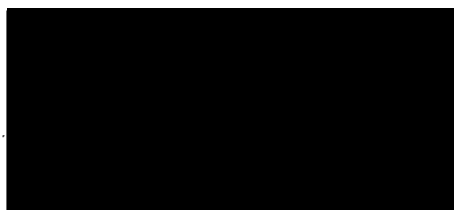
FIRST READER: Dr. HUSSIN HEJASE

SIGNATURE:



SECOND READER: Dr. ABDO BARDAWIL

SIGNATURE:



DEDICATION

*TO THOSE WHO PLANTED THE SEEDS
OF KNOWLEDGE IN ME, AND HELPED
ME GROW AND HARVEST THEM,...
TO MY PARENTS.*

ACKNOWLEDGEMENTS

The final accomplishment of this research paper would not have been possible without the help and support of my professors. I would like to thank Dr. Hijaze who was really supportive.

I would also like to thank Dr. Bardawil who gave me his time, and enlightened me with his knowledge and ideas. I hope that I was able to deliver a good outcome, up to their expectations.

I would finally like to thank my parents, my sister Rana, my brother Zein, and all my friends who encouraged me and supported me through my hard times.

I especially mention Mohamed who was kind enough to bring all the references for me from the States. I also want to thank my friends Mohd' Ali, Suha, Meerna and Samar Who helped me and supported me a lot.

Table of Contents

I- Introduction:

1.1- Overview	1
1.2- Purpose of the Study	3
1.3- Need of the Study	3
1.4- Limitations of the Study	4
1.5- Construction of the Study	4
1.6- Final Comment	5

II- Literature Review:

2.1- Forces of Change	7
2.1.1- Customers	9
2.1.2- Competition	10
2.1.3- Change	10
2.2- Techniques for change	12
2.2.1- Changing Corporate Strategies	12
2.2.2- Automation	12
2.2.3- Using Management Techniques	12
2.3- Business Process Re-engineering	14
2.3.1- Fundamental Rethinking	15
2.3.2- Radical Change	17
2.3.3- Dramatic Improvement	18
2.3.4- Business Process	19
2.4- Re-engineering Versus Other Programs	22
2.5- Controversial Issues In Re-engineering	24
2.6- Principles Of Re-engineering	28
2.7- Implementation of a Business Process Re-engineering Project	36

III- Methodology of the Study:

3.1- Basic Approach	48
3.2- Primary Data	48
3.3- Secondary Data	49
3.4- Field Observation	50
3.5- Case Study Analysis	50

IV- Case Study:

4.1- Historical Background	51
4.2- Factors of Change	52
4.2.1- Political and Economic Pressures	52
4.2.2- Competition and Changing Expectations	53
4.2.3- Org. Structure & Operational Procedures	53
4.3- Technical Supplies- Old Structures & Procedures	55
4.4- Pitfalls and Problems Of The Old System	60
4.5- The Attempt to Re-engineer	62
4.6- Benefits and Results	66
4.6.1- Time	66
4.6.2- Manpower	66
4.6.3- Reduction in Paperwork	67
4.7- Re-engineering or Not ?	69

V- Conclusion and Recommendations:

5.1- Obstacles to Re-engineering Success	75
5.2- Preconditions for BPR Success	77
5.3- Proposed Improvements	79
5.4- Recommendations	83

Chapter One

Introduction

Reports of successful results from many re-engineering efforts have been recently reported. Eastman -Kodak Inc., AT&T, Cigna RE and Hallmark, among others, report increases in productivity and reduction in staff after business re-engineering. In many of these firms, Information Technology (IT) played an important facilitating role in process redesign. As more and more firms decide to adopt Business Process Re-engineering (BPR) as the primary vehicle for organizational transformation, it becomes imperative for top executives to develop a high-level perspective on this strategic endeavor. ¹

1.1 Overview

This is an age of fundamental and accelerated changes. The decline of communism, advances in information technology, the emergence of new industrial powers and intense global competition that even futurists could not have foreseen.

To keep pace with these changes, companies are trying to “reinvent” themselves in order to be more responsive and effective and in order to survive and prosper in the new age.

These changes, reflected mainly through structured and organizational changes, are a vital necessity to any company’s survival in an increasingly competitive and dynamic business environment.

When corporate leaders decide to do something about changing competitive conditions, too often they reach to the latest fad and fix it: Excellence, Total Quality Management (TQM), Benchmarking, Just in Time, Zero Base Budgeting, The Learning Organization, Decentralization and Rightsizing. But as Jerome Want argues ²:

¹ . Teng, Grover, & Fiedler, "Business Process Reengineering: Chartering a strategic path for the information age " *California Management Review* (Spring 1994), p.9

² . J.Want " Managing Radical Change" *Journal of Business Strategy*, p.21

None of these is designed to help a business organization manage the more radical forces that are dramatically reshaping the competitive capabilities of entire industries, not just individual companies.

William R. King states that as organizations continue to transform themselves from enterprises that were designed for a world that no longer exists to organizations that fit with current and future environments, there is little choice but to re-engineer key processes.³

Thus, an increasing number of firms are using BPR, alternatively called re-engineering, to radically alter many age-old procedures in order to reduce cost and improve competitiveness.

BPR is not a process of trying to make marginal improvements. Rather it ignores how work is done and starts over, from scratch. It is a revolutionary process that challenges all the old organizational structures, work flows, job descriptions, management procedures, controls and organizational values and culture. It discards those that make business underperform and replaces them with more effective and efficient processes. In other words, "BPR is a re-invention of business processes rather than an improvement or enhancement."⁴

Analysts typically take a broad look at the organization's business objectives and procedures. They then identify old business processes to eliminate and conceive new automated ones to meet the objectives. BPR is often expected to result in extensive business re-organization and work force reduction. Depending on this approach, analysts follow a variety of activities. To re-design existing processes, they frequently develop models of the entire enterprise or large portions of it. They may also review existing information systems and in doing so, may focus on current bottlenecks in existing processes and other similar problems⁵.

The primary aim of Re-engineering is to create value or more precisely, more value by focusing on the core activities of the company. Re-engineering involves the re-definition of the company's core business processes and the manner in which it believes it can be more responsive to the market while

³ . W. King , "Process Reengineering, The strategic dimension" *Information Systems Management* (Spring 1994) p.71

⁴ . M. Rommey "Business Process Reengineering" *The CPA Journal* (October 1994), p.30

⁵ .R. Mirani & A. Iedere, "Making Promises: The Key Benefits of Proposed IS Syatems" *Journal of Systemes Management*, October16, 1993, p.17.

increasing profitability. This may involve the removal of unnecessary layers within an organization and the merging of different functions.

The key benefits derived from Re-engineering may include changing the way the organization conducts business, enabling easier access to information, good alignment with stated organizational goals, enhancing employee productivity or business efficiency, in addition to other benefits listed in Table 1 (Page 6).

1.2 Purpose of the Study

The aim of this project is to help develop an understanding of Business Process Re-engineering as an effective tool that enables today's organizations to keep pace with the turbulent changes that are affecting the environment in which they operate.

The assumption in this research is that not one company exists whose management doesn't say that it wants an organization flexible enough to adjust quickly to changing market conditions, lean enough to beat any competitor's price, innovative enough to keep its products and services technologically fresh and dedicated enough to deliver maximum quality and customer service⁶.

So if management wants companies that are lean, flexible, responsive, competitive, innovative, efficient, customer focused and profitable, they need to break away from the ineffective, antiquated ways of conducting business and completely "reinvent" the way work is done.

1.3 Need of the Study

Re-engineering has become the new corporate buzzword. It is heard in broad rooms, read in business journals and proposed by consultants as the solution to a wide array of competitive problems.

Companies, all over the world, are embracing this new management program to improve every conceivable aspect of their business. In theory BPR promises to transform these companies, fundamentally changing the way they do their work. The hard part, however, is putting theory into practice.⁷

⁶ M. Hammer & J. Champ *Reengineering the Corporation: A manifesto for Business Revolution* (NY: Harper Business, 1993), p.7

⁷ R. Manganelli & M. Klein "A Framework for Reengineering" *Management Review* (June 1994), p.10

The need for the study stems from the lack of understanding from the part of managers and corporate leaders of re-engineering concepts and principles and the lack of recent comprehensive research concerning re-engineering use and applicability in Lebanese businesses.

From this perspective arises the urge to analyze one company's experience in attempting to apply BPR to provide some insight into the benefits derived and to suggest further improvements.

1.4 Limitations of the Study

Two main limitations are faced in this study. The first limitation is that since the chosen topic "Re-engineering" is relatively new, the researcher faced the problem of lack of *long term effect* of re-engineering on the corporate wide performance of organizations adopting this management technique.

The second limitation is that the research study does not cover a range of Lebanese businesses. It rather encompasses a one-case study, that of Middle-East Airlines. This is due to the fact that very few organizations in Lebanon know about re-engineering principles and in turn very few have actually adopted and implemented a re-engineering project properly defined.

In addition, due to the specific cultural characteristics of the chosen organization and the individuality of the chosen process to re-engineer, the findings of this research may not be generalized to other companies.

1.5 Construction of the Study

The research is organized in a way to allow the reader to understand the concepts and principles of re-engineering and its applicability.

Chapter one introduces the main concepts, purpose and limitations of the study. Chapter two goes into more detail in describing the forces that had led companies to seek a more radical approach to face changes. This chapter tackles the main concepts on principles of re-engineering, it describes the various steps of the implementation of a BPR project, in addition it shows the

controversies about the subject. Chapter three discusses the procedure and methodology used in the process of data collection. Chapter four presents the findings of the case and an analysis of the data collected. Finally, chapter five concludes the study and gives some viable recommendations according to the researcher's own evaluation of the case study.

1.6 Final Comment

Although the definition and benefits of business process re-engineering are clear, that does not mean that the way to achieve these benefits is obvious. Influenced by the need for such a radical redesign, one might feel that the best way to do this would be to take a clean sheet of paper and start from scratch. However, just as one would not begin a trip into unfamiliar territories without a road map, no one can begin a re-engineering project without a methodology to show the way.

Table 1 - BPR benefits for the 50 largest projects ⁸

TOP TEN

- Change the way the organization conducts business
- Enable easier access to information
- Enable easier retrieval or delivery of information or reports
- Align well with stated organizational goals
- Enhance competitiveness or create strategic advantage
- Enhance employee productivity or business sufficiency
- Improve information or management control
- Enable organization to respond more quickly to change
- improve information for Operational control
- Improve customer relations

ALSO CONSIDERED

- Improve the accuracy or reliability of information
- Increase the flexibility of information requests
- Provide better products or serves to customers
- Speed up transactions and shorten product cycles
- Present information in more concise manner or better format
- Improve management information for strategic planning
- Save money by reducing modification or enhancement costs
- Save money by avoiding need to increase workforce
- Enable organization to catch up to competitors
- Provides the ability to perform maintenance faster
- Enhance credibility and prestige of the organization
- Provides new products or services to customer
- Save money by reducing workforce
- Help establishing useful links with other organization
- Provide greater Data Security
- Allow other applications to be developed faster
- Increase return on financial assets
- Increase the volume of information output
- Allow feasible applications to be implemented
- Save money by reducing communication costs
- Facilitate organizational adherence to Government Regulation

⁸ . Mirani & Iedere p.20

Chapter Two

Literature Review

For the last few centuries the structure, management, and performance of organizations have been shaped by a set of operational principles and procedures laid down more than two hundred years ago.

These principles were built around Adam Smith's division and specialization of labor and Taylor's "one best way" to perform a task. Many of the work flows, control mechanisms and organizational structures were geared towards efficiency and control ⁹.

The reality that organizations must confront, however, is that the old way of doing business simply does not work anymore.

The fact that the same companies no longer perform as efficiently as they used to may not be solely due to some intrinsic flaw, but rather it is because the world in which they operate has changed beyond the limits of their capacity to adjust or evolve. The principles on which they were organized were perfectly suited to the conditions of an earlier era but can stretch only so far ¹⁰.

2.1 Forces of Change

Suddenly, the world is a different place, markets have been globalized, many industries have faced deregulation, consolidation, privatization and increased regulation - all of which are just the domestic components of larger forces at work on a global scale. Political evolution has transformed long established communism to democratic societies and capitalist economies. International or pan national trading blocs have emerged. National economies have become increasingly independent. New technologies have transformed industry after industry ¹¹ (for more detail refer to exhibit 1).

⁹ .M. Hammer, "Reengineering Work: Don't Automate, Oliberate," *Harvard Business Review* (July/August 1990), .104

¹⁰ . Hammer & Champy p.11

¹¹ . Want , p. 21

Exhibit 1. External Factors Driving Change

The desire for streamlined business operations and greater efficiency have been with us for some time.

In the past, achieving these objectives was made possible through individual actions such as cost-cutting or IT investment. However, several factors have come together to encourage a more fundamental, integrated and better managed approach to planning and designing future business activity in particular:

1. Global business trends

With even the smallest firms being affected, there is a growing recognition that global business trends are forcing us to rethink the way in which we organize and compete. The most important being:

- Globalization, deregulation and liberalization of markets are enabling foreign firms - such as Nissan and Toyota - to open 'Greenfield' operations;
- Revolutionary rather than evolutionary developments in products, processes, technologies, and management thinking. (E.g. Sony with Mechtronics for camcorder production);
- A growing recognition that 'doing what we did last year but better, faster, and cheaper' is no longer a viable competitive strategy - even in what were once perceived as relatively mature sectors - such as financial services;
- Increasing competition between consortia, networks and alliances rather than between individual firms - which forces an emphasis on building distinctive capabilities and may lead to the formation of virtual corporation - that draw on the complementary competencies of each player to create commercial - but necessary legal entity - as in the case of the relationship between Novell and Oracle.
- The growing reliance on technologies - and in particular IT and the increasing awareness that the new business opportunities and commercial relationships that technology can make possible - if properly managed and exploited (e.g. First Direct and Telephone Banking).

2. Economic Trends

The worldwide recession has proved deeper and longer than many would have anticipated. The result has been increases in unemployment for people at every level in society. This in turn has had a knock-on impact on both demand and price competition for firms at every stage in the value chain. However, the expectation of a diverse set of stakeholders to maintain performance against a wide range of commercial, social and strategic measures has not diminished. For example, environmental controls in the depressed petrol chemicals industry are becoming increasingly stringent and costly to implement.

source: adapted from "The motivators for business Re-engineering" (Talwar, 1993)

In his best selling book, "Re-engineering the Corporation", Dr. Michael Hammer argues that three forces, separately and in combination are driving today's organizations deeper and deeper into unfamiliar and unexplored territories. He called these three forces the three Cs: Customers, Competition and Change ¹².

2.1.1 - CUSTOMERS

In the past, manufacturers and suppliers used to see their customers as more or less alike, demanding a standard product or service. However; these customers did not know that anything better or different was available. Across the years, most markets began to expand: New products were introduced, competitions, most of them Japanese, burst upon the market with lower prices combined with higher quality goods and improved after sale support.

On the supply side of the equation, more producers now operate around the world; on the demand side, the market has become almost saturated. Also, many product markets have matured ¹³.

Consequently, consumers wield a greater deal of power. They demand products and services designed for their unique and particular needs. "There is no longer any such notion as *the customer*, there is only *this customer*." ¹⁴

Customers - whether consumers or industrial firms expect to be treated individually. Moreover, the threat of backward integration has also helped to shift power from producers to consumers that can now do for themselves what suppliers used to do for them.

Finally, the information-rich world of today has made customers' access to huge data-bases extremely easy and rapid. This has helped them gain a new perspective and has enabled them to dictate the rules of the game.

In short, companies today have customers who know what they want, what they want to pay for it and how to get it on the terms they demand. Companies must understand that they no longer have mass buyers but individual customers where each one of them counts.

¹² . Hammer & Champy , p. 19

¹³ . *ibid* , p. 21

¹⁴ . *Ibid* , p. 19

2.1.2 - COMPETITION:

Competition used to be simple: if you can get to the market with an acceptable product or service at the best price, you can sell it. ¹⁵

Now not only competition more intense, but it is of many different kinds. Some products sell in different markets on entirely diverse competitive bases like price, quality, after sale services or support etc.

This is called "Niche competition" and it has changed the face of practically every market. Moreover, with the fall of trade barriers, the national goods are no longer protected from overseas competition.

Good performers drive the inferior out of the market, because they offer the lowest price, the highest quality and the best service. Adequate is no longer enough, companies have to keep up with the world's best in order to survive.

Existing companies are also affected by the newly established ones. Start up companies that usually have huge financial and technological and human capabilities can enter a market with the next product or service generations before existing companies have been able to make up for their development costs on the last product or service. Start-ups write new rules, review their products and services and build their own image. In short they set new competitive standards.

Finally, technology has changed the nature of competition in ways companies didn't expect, like the integration of the distribution and inventory systems of both producer and retailer in ways beneficial to both. Such matters raise customer expectations for all companies in a certain market.

2.1.3 - CHANGE

The third factor is the nature of change in itself which has become both pervasive and persistent.

Companies in different industries are faced with an accelerating need to create new products and services. First because customer demand innovation, and second because, with the globalization of the economy, competitions may enter the market with new and better products.

¹⁵ . Hammer & Champy , p. 21

The rapidity of technological change has also promoted innovation. Put dramatically, "product life cycle has gone from years to months." ¹⁶ For example a car model used to be designed to satisfy the needs of an entire human generation, but nowadays a computer product or a software package cannot be expected to last for more than 1 or 2 years at most.

Not only this, but the time available for companies to develop new products and introduce them has also diminished. In today's market, companies have to move fast or they will not be moving at all. ¹⁷

Moreover they must look in many directions at once and look for changes when and where they least expect it. Because usually it is those changes that challenge a company's survival and may even put it out of business.

Many business leaders proclaim that they understand these forces of change, however, they have rarely been able to translate that understanding into successful actions at either the corporate or industry level.

Society and its institutions are faced with a need to manage change and not merely to react to change. As Jerome. H. Want vice president and partner with Organization Strategies Inc. puts it:

To manage radical change successfully, business leaders have to do more than just recite vaguely constructed ideas about changing economic and competitive conditions. They must put focused and systematic strategies into place to fit specific change conditions . They must learn to anticipate, plan for, and manage the change that can barely be seen over the horizon. " ¹⁸ .

Companies like Motorola, Xerox, Johnson & Johnson, MCI, & 3M, have stayed at the top not because they have applied the latest bandage to their corporate wound, but because they have shown a long-term commitment to planning for and managing changing business conditions. Companies that fail to manage change will, in time be managed by change.

¹⁶ . Hammer & Champy , p. 23

¹⁷ . Ibid , p. 23

¹⁸ . Want , p. 21

2.2 Techniques for Change

Over the years, US corporations have embraced one concept after another in an endless quest for greater efficiency and profitability and in order to keep pace with the turbulent external environment. These are mainly changing corporate strategies, automation, and using management techniques.

2.2.1 - Changing Corporate Strategies

Some people think companies could cure themselves and respond to the changing environment by changing their corporate strategies. They should sell one division, buy another, change or enlarge their market, divest from their main line of business. But this kind of thinking distracts companies from making basic changes in the real work they actually do ¹⁹.

Companies are not “asset portfolios”, they are people working together to achieve a certain goal usually inventing, making, selling and providing a certain commodity. If they are not succeeding in the businesses they are in, this may be due to the fact that their people are not inventing, making and selling as well as they should.

2.2.2 - Automation

Automation is commonly thought to be the answer to business problems. It is true that computers speed up work but automating does not get jobs done faster. Heavy investments in information technology have delivered disappointing results, mainly because companies tend to use technology to automate old ways of doing business. They basically leave the existing processes intact and use computers only to speed them up ²⁰.

But speeding up those processes cannot address their fundamental performance deficiencies and will not, therefore, achieve the desired results of change.

2.2.3 - Using Management Techniques

Still some people, including many managers blame corporate problems on management deficiencies. If companies were only managed differently and better, they would succeed in managing change.

¹⁹ . Hammer & Champy , p. 25

²⁰ . Hammer, p.104

But most of the management techniques used for the last twenty years like management by objectives, Zero-Base Budgeting, Decentralization, Restructuring, Rightsizing, Total Quality Management (TQM), Benchmarking and others have not been able to reverse the deterioration of corporate competitive performance. They have only distracted managers from the real task at hand ²¹. They have more to do with supporting today's business than with building tomorrow's industries.

For example, restructuring seldom results in fundamental business improvements. At best it buys time. One study of 16 large US companies with at least three years of restructuring experience found that while restructuring did raise a company's share price. Such improvements were almost temporary. Three years into restructuring, the share prices of the surveyed companies were on average lagging even behind index growth rates than they had been when restructuring effort began ²².

Therefore, restructuring always results in fewer employees. Restructuring also causes employee morale to plummet. What employees hear is that "people are our most important asset". What they say is that " people are the most expendable asset."

Downsizing on the other hand, always results in fewer jobs. The social costs of such staff cutting are high. "There's a tendency to reduce costs by reducing the number of people working at a company." Says Martin Medford, director of human resources at Danbury, Connecticut-based Union Carbide. "So the costs go away, but only temporarily. The work doesn't disappear. It simply overburdens the people who stay." As a result, the company winds up having to hire people back as consultants, often for more money than it was paying them originally.²³ Downsizing has destroyed lives, homes and communities in the name of efficiency and productivity. Moreover it was found out that most layoffs have been the fault of senior managers who "fell asleep at the wheel and missed the turnoff of the future."²⁴

²¹ . Hammer & Champy , p.25

²² . G. Hamel & C.K. Prahalad, "Competing for the Future" *Harvard Business Review* (July / August 1994), p.126

²³ . S. Greengard, "Reengineering: Out of The Rubble" *Personnel Journal* (December 1993), p. 48F

²⁴ . Hamel & Prahalad, p.124

Finally, Total Quality Management [TQM] requires fundamental and extensive changes in human resources management. It has an impact that goes on in the organization. This approach was proved to be beneficial.

In fact, a process-oriented quality approach, which begins with 'value' for the users and monitors the growth of costs in relation with the growth of value throughout the chain of processes, will reduce and even eliminate areas of corporate inefficiency, especially at staff levels.²⁵

However, Jerome Want argues that it is very costly, if not impossible to retool management and product practices around quality standards - especially when it is being done inside a larger corporate culture that is not quality oriented ²⁶.

2.3 Business Process Re-engineering

However, the fundamental truth, argues Samuel Greengard, is that all of the previously mentioned concepts and management techniques have dealt mostly with existing structures and processes rather than taking a step back and completely reinventing the way work is done ²⁷.

Certainly, it is not difficult to understand why many managers now think such radical surgery is needed.

Over the decades, continuous Greengard, most companies have build up layer upon layer of bureaucracy. Business processes - whether they involve manufacturing, sales, or customer services - have become complicated. The results ? Ongoing Downsizing and Restructuring without any improvements in the bottom line. ²⁸

Business process re-engineering attempts to solve that problem. It certainly is not without risk since it involves an entire change in mindset and corporate culture.

Re-engineering is basically "starting over" as Michael Hammer defines it.

²⁵ . T. Conti, *Building Total Quality* (NY: Champan & Hall, 1993), p.33

²⁶ . Want , p.24

²⁷ . Greengard, p.48

²⁸ . Ibid, p.48F

Re-engineering strives to break away from the old rules about how businesses used to be organized "it involves recognizing and rejecting some of these rules and then finding imaginative new ways to accomplish work ." ²⁹

Thus, re-engineering requires sweeping changes in management and organizational structures. It redefines the way companies use technology and human resources ³⁰.

The concept of business process re-engineering has been with us for about four years and today is one of the most popular concepts in business.

Dr. Michael Hammer is the originator and leading exponent of the concept of re-engineering. He first referred to this concept in his article : "Re-engineering work : don't automate, oliberate". in July 1990.

In his book "Re-engineering the corporation", Dr. Hammer defines Re-engineering as follows ³¹ :

The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, services and speed.

Business Re-engineering (Figure 2.1) is an approach to achieve radical improvements in customer service and business efficiency. The main challenge is to rethink and streamline the business processes and supporting architecture through which the company creates and delivers value ³².

From the previous definitions one can identify four important concepts:

2.3.1- Fundamental Rethinking

Re-engineering begins with no assumptions and no givens . " It is throwing out the old and inventing entirely new ways to do the work", argues Deana Cinelli, a research analyst in the total quality management center at the conference board in New York city ³³. Re-engineering offers the opportunity

²⁹ . Hammer, p.105

³⁰ . Greengard, p.48

³¹ . Hammer & Champy , p.32

³² . R. Talwar, "Business Re-engineering , a strategy- Driven Approach" *Long Range Planning*, 26/3 (1993), p.23

³³ . Greengard, p.48D

to re-examine the fundamentals of the business or key processes within it and then redesign from "first principles". Hence, re-engineering first determines what a company must do, the how to do it. It takes nothing for granted, it ignores what is and concentrate on what should be ³⁴.

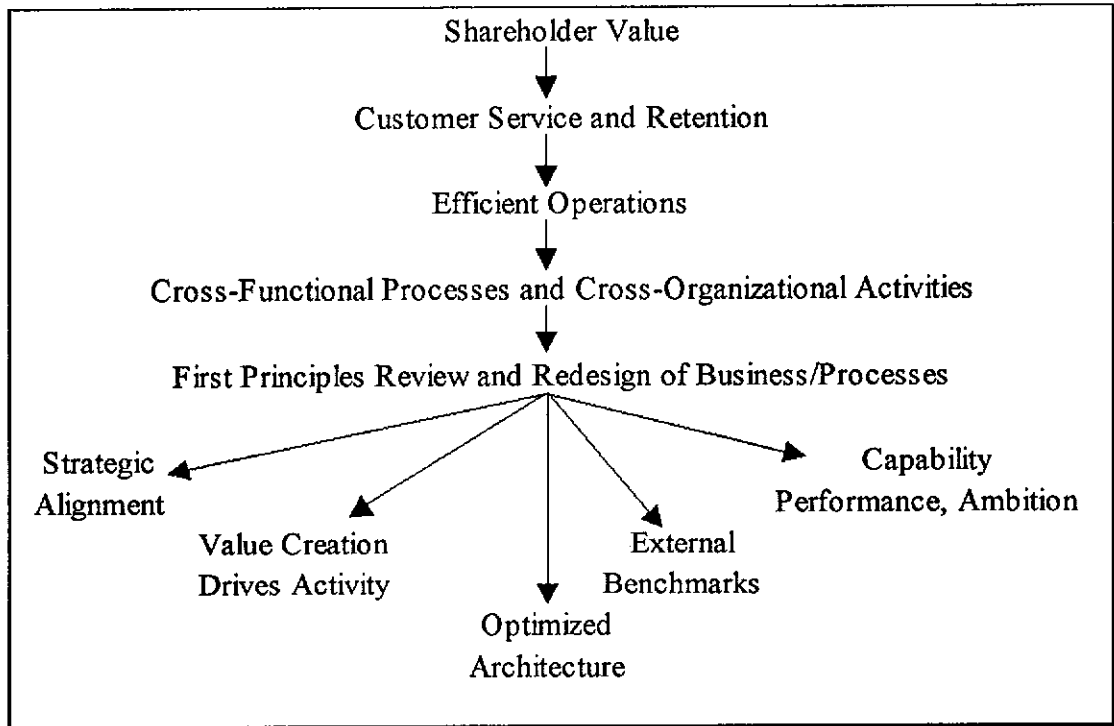


Figure 2. 1- The re-engineering approach to corporate transformation ³⁵

However, Thomas Davenport and Donna Stoddard argue that:

In practice, clean state change is rarely found. A 'blank sheet of paper' used in design usually requires a 'blank check' for implementation. 'Thinking out of the box' can lead to 'spending out of the box'. Most firms are not willing to commit resources - both money and time - to implement from a clean state of nature. ³⁶

One firm studied, for example, developed a very innovative new process design for its order management process. Management discovered that to implement the "clean state" process would require portable workstations for all salespeople, a packet radio network, new skills, and many new people. The total estimated costs to build and operate this process over seven years was \$1

³⁴ . Hammer & Champy , p.33

³⁵ . Talwar, p.23

³⁶ . T. Davenport & S. Stoddard, "Reengineering: Business Change of Mythic Proportions" *MIS Quarterly* (June 1994), p.123

billion. Although the return on this investment was conservatively estimated to be very high, managers believed the firm could not afford the investment.

Davenport and Stoddard argue that, in order to solve this problem, firms can use clean state “design” instead of clean state “implementation”. Clean state design, which involves creating a detailed vision for a process without concern for the existing environment, is not particularly expensive.

As one manager noted: “ you can design assuming a clean state, but you must implement assuming the existing state.” His firm breaks implementation into several projects, beginning with those that offer most immediate benefit.²⁸

Alternatively, designers could start with a “dirty state ”. Designs could take into account the opportunities for enabling the new process, as well as the constraints that disable it. With both design elements in mind, the design team could construct the best possible process given the enablers and the constraints.

2.3.2- Radical change:

Hammer's article and his subsequent book present re-engineering as a radical, strategy driven approach to improving business efficiency. He asserts that:

At the heart of re-engineering, is the notion of discontinuous thinking - recognizing and breaking away from the outdated rules and fundamental assumption that underlie operations. Unless we change these rules, we are nearly rearranging the deck chairs on the Titanic we cannot achieve break-through in performance by cutting fat or automating existing processes. Rather, we must challenge old assumptions and shed the old rules that made the business underperform at the first place ³⁷ .

Re-engineering is about business reinvention, not business improvement, business enhancement or business modification. It involves throwing away the old and not nearly making superficial changes or fiddling with what is already in place.

"A company must challenge all its assumptions about how each task is handled. It must not be afraid to peel back the layers and examine itself in a way it has

³⁷ . Hammer, p.107

never had to in the past" says William A. Wheeler a partner at the New York City based consulting firm of Coopers and Lybrand ³⁸.

2.3.3- Dramatic Improvement

Business process re-engineering seeks dramatic rather than incremental improvements in important measures of performance. Because its aim is to achieve quantum leaps in performance.

Re-engineering and continuous, incremental improvement seem to be at the opposite end of the improvement continuum.

The argument behind this thinking is that re-engineering with its interfunctional orientation, focuses on the "system" rather than on subunits emphasizing that only when all parts of the system function as a whole does the system really work ³⁹.

In a recent research paper requested and sponsored by Boston University's Manufacturing roundtable, a group of researchers and specialists undertook an analysis of 23 re-engineering projects from different industry sectors and types (Figure 2.2).

	Operations Reconfiguration	New Product Development	Technology Integration	Process Redesign	TOTAL
Equipment & Parts Manufacturer	2	2	1	2	7
Financial Services				2	2
High Tech Consumer Goods	4	2	2	2	6
Chemical / Pharmaceutical			1	2	3
Food Services	1				1
TOTAL	7	4	4	8	23

Figure 2.2- Industry sectors and types of re-engineering Projects ⁴⁰

³⁸ . Greengard, p.48F

³⁹ .J. Dixon & P. Arnold,"Business Process Reengineering: Improving in New Strategic Dimensions"
California Management Review, (Summer 1994), p.28

⁴⁰ . Dixon & Arnold, p.94

Researches could identify one factor that was common to all re-engineering projects and which distinguished them from incremental improvement efforts. In every case, re-engineering projects involved "changing direction". Major improvements were sought, but more important, the direction of the goal had changed. For example flexibility replaced cost reduction, and time to market superseded product performance. In other words, the set of organizational priorities had changed.

The radical nature of the change in re-engineering is embodied in the change in improvement direction - rather than the change in the business process per se. Not only people must do different things, but they must do them in an environment where the customary rules no longer apply. ⁴¹

If the improvement was in a traditional direction, the degree of improvement required would be less dramatic, and the organization's continuous improvement processes would be adequate.

However, when one applies continuous improvement techniques in a business world where the rate of change is no longer continuous, one ends up with failed improvement programs. This failure is not due to the failure of the good people trying to make these programs work, but rather it results from a world that suddenly demands breakthrough in place of incremental changes.

2.3.4- Business Process

Re-engineering basically redesigns works around processes not functions, people or structures. According to Mr. Champy co-author of "Re-engineering the corporation":

Most companies are fundamentally ineffective, work has been fragmented by task. All the marketing people are grouped in one department, and all the accounting people are grouped in another, whether or not they are working on the same project. This method is too error-prone, too expensive, too slow and it's not designed to change.

⁴¹ . Ibid, p.97

*But when companies organize their work against a business process, become much more effective."*⁴²

A process can be defined as any sequence of predefined activities executed to achieve a pre-specified type or range of outcomes or outputs.⁴³

Rohit Talwar argues that functionally based organizations do not ensure a "balanced scorecard" - little attention is given to reflecting measures of customer value and service delivery. In addition functional hierarchies can foster unhealthy competition, conflicts and barriers between parts of the organization. Staff are encouraged to focus on meeting the needs of the hierarchy and satisfying the targets on which they are measured, which may not coincide with doing what is best for the customer or shareholder.⁴⁴ Figure 2.3 shows the traditional functional view of the organization.

In contrast to functional hierarchies, process structure is a dynamic view of how the organization delivers value.

Davenport argues that a process approach to business implies a relatively heavy emphasis on improving how work is done, in contrast to a focus on which specific products or services are delivered to customers.

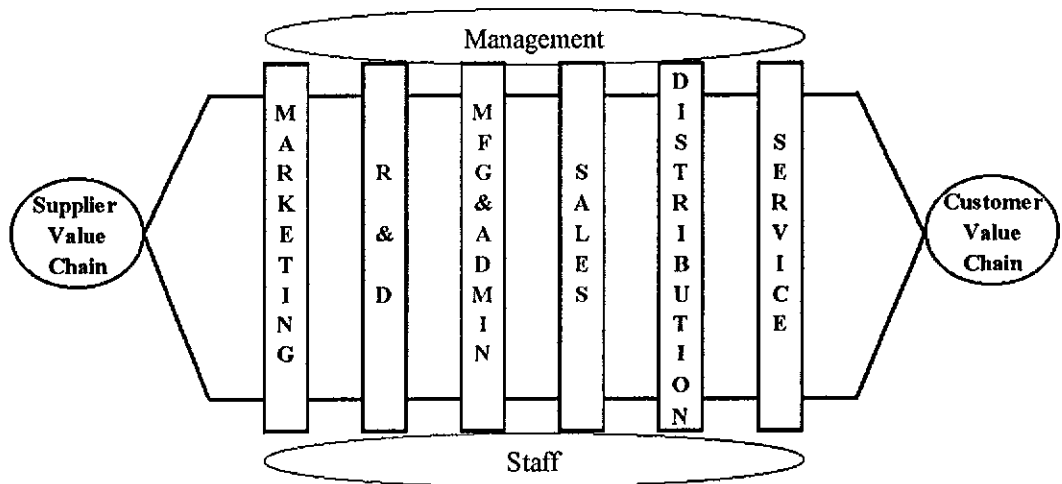


Figure 2.3- Functional View of the Organization⁴⁵

⁴² . D. Hogarty, "The Future of Middle Managers" *Management Review* (September 1993), P.51

⁴³ . Talwar, p.26

⁴⁴ . Ibid p. 29

⁴⁵ . Talwar p. 29

“Taking a process approach implies adopting the customer’s point of view” Davenport adds, “Processes are the structure by which an organization does what is necessary to produce value for its customers.”⁴⁶

Ideally, that result should satisfy the diverse set of "stakeholders" who have an interest in the process and its outcome. The first group, being those who have direct interest in the organization namely customers, management and employees. The next tier of stakeholders typically include suppliers and regulators and, finally, the third group - shareholders and analysts - who are mainly interested in the overall set of procedures that determine the organizations' fortunes.

Figure 2.4 shows the process view of the firm emphasizing the diverse groups of stakeholders.

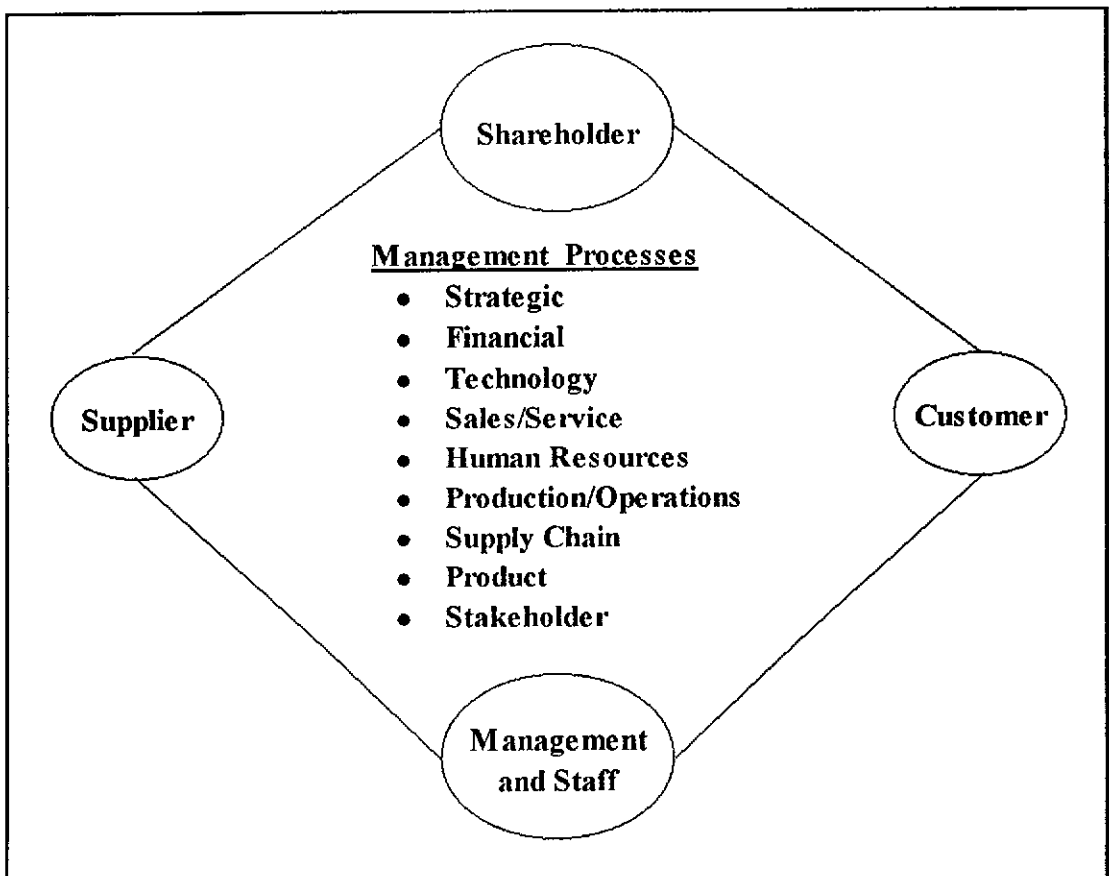


Figure 2.4- The Process View of the Firm

⁴⁶ . T. Davenport, *Process Innovation: Reengineering Work Through Information Technology* (Boston, MA: Harvard Business School Press, 1993), p.7

However, not all processes are targets for re-engineering. R. Manganelli, president and CEO of management consultant services at Gateway Management Consulting (New York), argues that re-engineering should only target those processes that are strategic and value-adding.⁴⁷

Strategic processes are the ones central to the company's definition of itself. They are its essential vehicle for achieving objectives, goals, positioning and stated strategy.

Value adding activities are those process that add something of importance to the customer - a product or service that a customer needs, wants and is willing to pay for.

2.4- Re-engineering Versus Other Programs

From our analysis of the concepts behind re-engineering one can notice that Business Process Re-engineering differs from other improvement programs in several ways. First, re-engineering seeks dramatic rather than incremental improvement in important measures of performance. Second, the qualitative nature of re-engineering differs from that of other programs as shown in (figure 2.5).

	Re-engineering	Rightsizing	Restructuring	T Q M	Automation
Assumptions Questioned	Fundamental	Staffing	Reporting Relationships	Customer Wants & Needs	Technology Applications
Scope of Change	Radical	Staffing, Job Responsibilities	Organization	Bottom-up	Systems
Orientation	Processes	Functional	Functional	Processes	Procedures
Improvement Goals	Dramatic	Incremental	Incremental	Incremental	Incremental

Figure 2.5- Re-engineering versus Other programs⁴⁸

⁴⁷ . Manganelli & Klein, p.12

⁴⁸ . Manganelli & Klein, p.15

BPR, is not just automation, although it often uses information technology in creative and innovative ways, nor it is reorganization, although it almost always requires organizational change. BPR is not just downsizing, although it usually improves productivity. Also it is not just another quality control program, although it focuses on customer satisfaction and the processes that support it ⁴⁹.

Rather re-engineering, as identified by Theodore Kinni, is a collection of previously existing business processes and ideas that have been combined together in a way that yields a return that is greater than the sum of its parts, in other words in a new synthesis.⁵⁰

First, BPR seeks breakthroughs in important measures of performance, rather than incremental improvements. Second, BPR pursues multifaceted improvement goals - including quality, cost, flexibility, speed, accuracy and customer satisfaction - concurrently, while the other programs focus on fewer goals or trade-off among them. ⁵¹

To accomplish these results, BPR adopts a process perspective of the business, while the other programs retain functional or organizational perspectives.

At the same time however, Kinni argues ⁵²:

Re-engineering in and of itself does not represent a dramatic breakthrough in management thinking, rather it represents an incremental refinement of process improvement methodology that draws very heavily on previous thinking.

In conclusion, Business Process Re-engineering is a balanced approach that may contain elements of traditional improvement programs. It involves a willingness to rethink how work should be done, even to totally reinvent it if that should be proven necessary.

⁴⁹ . Ibid, p.16

⁵⁰ . T. Kinni, "The reengineering Rage" *Industry Week*, February, 7, 1994, p.12

⁵¹ . M. Klein, " The Most Fatal Reengineering Mistakes", *Information Strategy: The Executive's Journal*, (Summer 1994), p.22

⁵² . Kinni, p.12

2.5 Controversial Issues in Re-engineering

Business Process Re-engineering has become the program of choice for achieving business improvements in the 1990s.

In the most recent survey American manufacturers by Grant Thornton Consulting Firm, 95% of the nation's mid-sized industrial companies claim to have re-engineered at least part of their operations, and 30% say they have re-engineered the entire business in the last three years. ⁵³

Entire industries seem to be undergoing radical process re-engineering and most of the Fortune 500's firms are regularly pumping out press releases proclaiming major process overhauls.

However, re-engineering is often misunderstood. "Everybody is calling everything re-engineering," says William Wheeler.

Exhibit 2(b) shows the answers to the question "What is BPR ?" given by the same executive surveyed in exhibit 2(a).

While 88% said they were doing re-engineering, fewer than half (49%) could successfully define BPR as process redesign. ⁵⁴

Moreover, it is estimated that 4 out of 5 re-engineering projects are ultimately unsuccessful or fail to give desired results.

The main reasons for failure of BPR projects can be summarized as follows:

1. Size of the Organization :

A survey conducted by Gateway Management Consulting Firm, specialized in re-engineering, found that large companies (those that have annual revenues exceeding \$1 billion) are most likely candidates for re-engineering. ⁵⁵

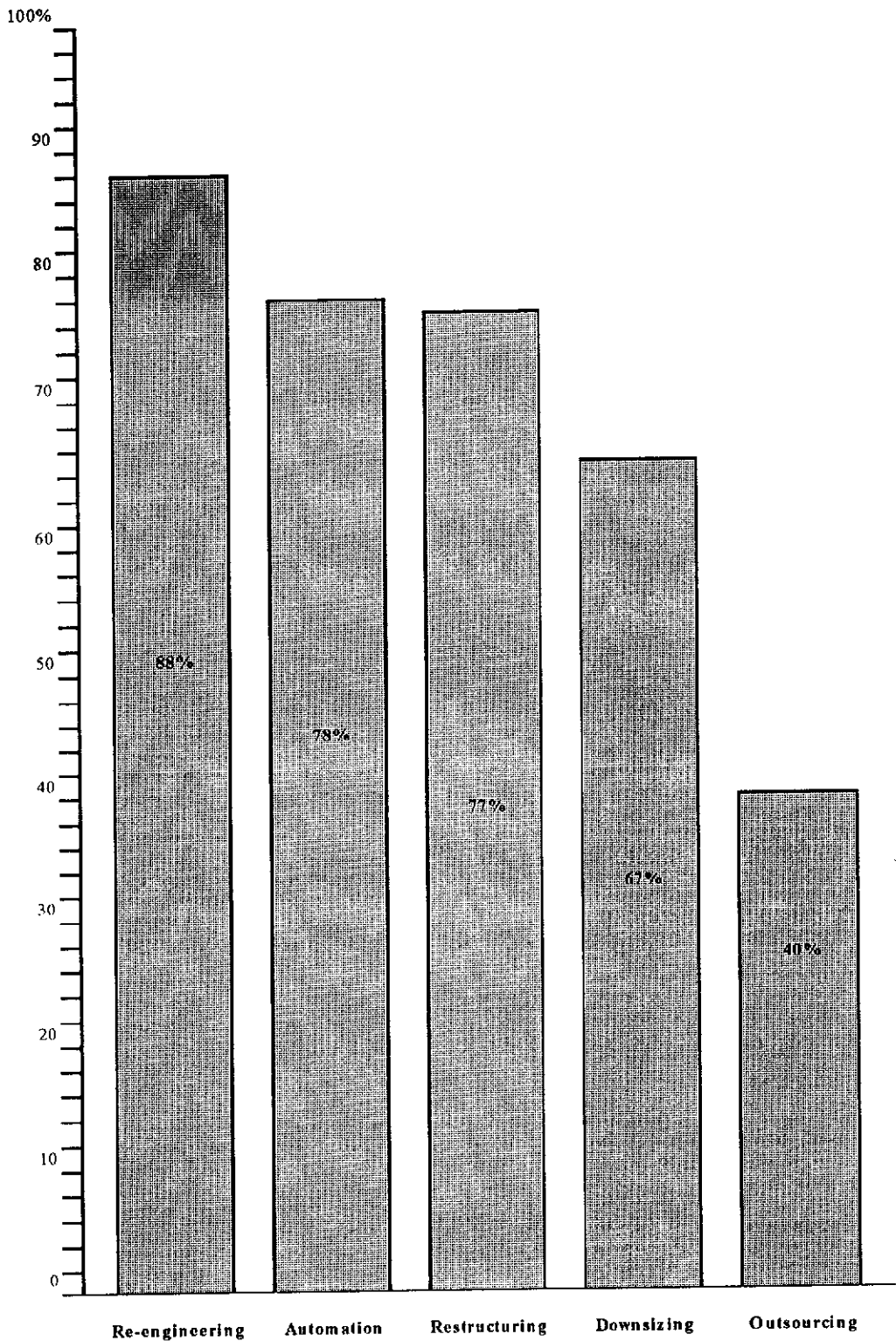
The key devil in large organizations is the fragmentation of work. Moreover, re-engineering usually requires heavy investments in IT which small companies may not be able to support.

⁵³ . Ibid, p.11

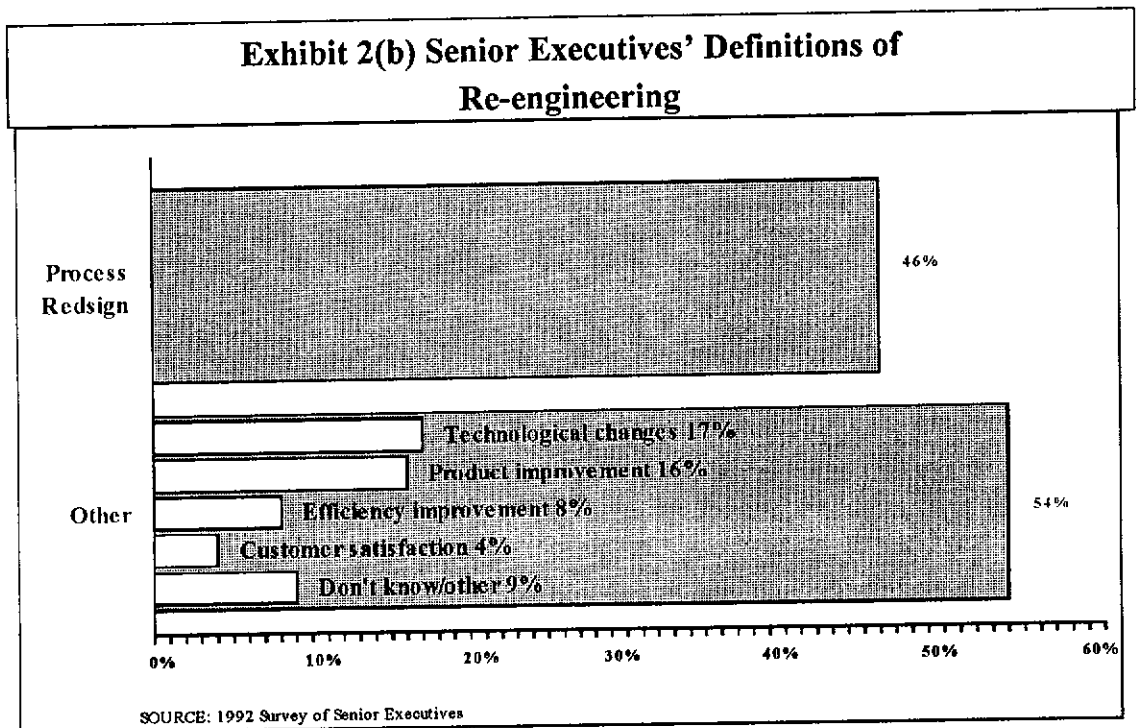
⁵⁴ . Klein, p.21

⁵⁵ . Greengard, p.48F

Exhibit 2(a) Initiative Taken by Senior Executives for Achieving Strategic Goals 1989-1991



SOURCE: 1992 Survey of Senior Executives



Still, Hammer argues : “Small companies should be aware of re-engineering for several reasons.” First most small firms do not want to stay small, so they must guard about the mistakes of the past as they grow. Second, small companies need to be aware of what their larger competitors or larger customers are up to.

2. Domain of Applicability:

Mark M. Klein, managing director of Gateway consulting services, argues that:

BPR is applicable to the operational level of a business - not the strategic or even the tactical. It can show you how to do things right, but only in a limited way, what are the right things to do. BPR will not identify the markets you should be in or products you should develop, but it can give effective processes for making those decisions. ⁵⁶

In fact, Davenport and Sotddard argue that no cases of success were noted where organizations attempted to re-engineer their whole business at once.

⁵⁶ . Klein, p.24

The primary reason for failure, they add, is that the organizations try to change all processes at once and often at a time when markets , products and organizational structures were also changing dramatically.

The managers were simply unable to devote sufficient attention to all these initiatives. The most successful organizations identify which processes need most attention and attempt to make changes in those first, while preparing the rest of the organization for changes that may subsequently occur.⁵⁷

3. Selection of the Right Processes:

Klein argues that “you cannot re-engineer an organization, you can only re-engineer its processes.”⁵⁸

In fact, one of the main ways that BPR improves performance is by reducing or eliminating the errors and inefficiencies that inevitably arise when processes cross organizational boundaries. when the scope that is chosen for a BPR project is one that includes only part of a process, the opportunity for success is diminished.

Not all processes are equal in importance or in their contribution to organizational goals. That is why successful BPR should focus on strategic, value-added processes.

Finally, in the research undertaken by Javenpaa and Stoddard in 1993 with a sample of 200 companies with re-engineering initiative, it was found that most of the firms under investigation believed that no single approach to organizational change, including re-engineering is appropriate for all circumstances.

Many companies have a portfolio of approaches to cope with change including re-engineering, continuous improvement, incremental approaches, and restructuring techniques.⁵⁹

In the future, it is expected that firms will routinely assemble a customized approach to operational change. They will assess their need for change and the current environment and then combine tools from the various traditional approaches, e.g. root cause analysis from quality, process value analysis from focused improvement approaches and IT ennoblement from re-engineering.

⁵⁷ . Davenport & Stoddard, p.126

⁵⁸ . Klein, p.26

⁵⁹ . Davenport & Stoddard, p.124

2.6 Principles of Re-engineering

Creating new rules tailored to the modern environment ultimately requires a new conceptualization of the business process.

In Re-engineering, it is argued that in order to meet the contemporary demands of quality, service, flexibility and low cost, processes must be kept simple ⁶⁰.

This need for simplicity, has enormous consequences on how processes are designed and organizations are shaped. Most successful re-engineering initiatives share certain basic ingredients. These lie at the heart of the change and are examined below:

- Hammer's principles: In his original article, Hammer articulated a set of principles that characterized most Re-engineering projects. See (Figure 1.6).

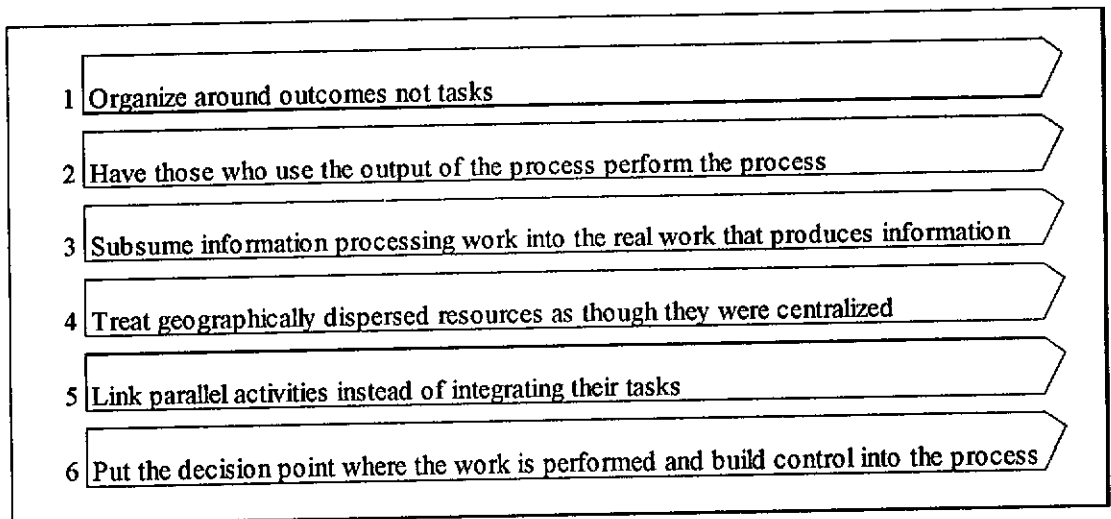


Figure 1.6 - Hammer's six principles of re-engineering ⁶¹

These principles will be examined next in detail to see how they relate to the work place:

⁶⁰ . Hammer & Champy , p.51

⁶¹ . Talwar, p.28

2.6.1- Organize Around Processes and Outcomes, Not Tasks and Departments

Many organizations divide up work among different people. This approach often results in errors and delays as documents wait for hours or days at each desktop to be processed.

In a re-engineered system, one person is given the responsibility for an entire process. Each person's job is designed around an outcome such as a finished component or a completed process, rather than on the basis of the tasks necessary to produce the finished component or complete the process. Often this results in a company replacing functional departments, such as manufacturing and marketing, with interdisciplinary teams that concentrate on completing a particular process.

Typically, a case worker-based process operates ten times faster than the assembly line version that it replaces.⁶²

For example, IBM credit corporation, as reported by Hammer, used to have five distinct steps in its credit approval process. Formatting the request to someone to check the customer's credit, then to someone to determine the interest rate and so forth until all five steps were completed. The entire process consumed six days on average, although it sometimes took as long as two weeks. From the sales representatives point of view, this turnaround was too long, since it gave the customer six days to find another source of financing, to be seduced by another computer dealer or simply, to call the whole deal off.

IBM credit re-engineered the process and now has one individual called a "deal structurer" who processes an application from beginning to end. The deal structurer uses a computer system that contains all the information needed for a normal application and calls on a small group of specialists when complexities arise.

As a result IBM credit slashed its six days turnaround to four hours, a 90% reduction in cycle time. At the same time, the number of deals that it handles has increased a hundred fold.⁶³

⁶² . Hammer & Champy, p.52

⁶³ . Hammer & Champy p. 36

2.6.2 - Have Output Users Perform the Process:

Traditionally, organizations were divided into separate departments each one performing a specific task. Each department does its work and passes its product off to someone else. As a result, each department is a customer of another department. For example, accounting does only accounting, designers do only designs and salespersons do only sales. If for example the Accounting department needs ten pencils, it goes to the purchasing department which finds vendors, negotiate price, places the order, inspects the goods and pays the invoice and eventually accountants get their pencils.

This process works, but it is slow and expensive. One company ran a controlled experiment and learned that it expended over \$100 in internal costs to buy a \$3 worth of batteries. It also discovered that 35% of its purchase orders were for less than \$ 500. ⁶⁴

Now that computer based data and expertise are more readily available, departments, units and individuals can do more for themselves. Opportunities exist to re-engineer processes so that the individuals who need the result of a process can do it themselves. ⁶⁵

In the previous example, the company decided to off-load the responsibility for purchasing goods into the process customers, in other words, the accountants - as well as everyone else - now buy their own pencils. Purchasing has negotiated the prices and given the other departments a list of approved vendors. Each operating unit has a credit card with a \$500 credit limit. At the end of each month, the tape of all credit card transactions is run against the company's general ledger so that the accountants' budget gets charged for their pencils.

As a result, the requesters receive their products faster and the company spends far less than \$ 100 on the processing costs. Moreover, interfaces and license can be eliminated, as can the mechanisms used to coordinate those who perform the process with those who use it. ⁶⁶

2.6.3 - Have Those Who Produce Information Process It.

This principle suggests moving work from one person or department to another.

Most companies established units to do nothing but collect and process information that other departments created. This arrangement reflects

⁶⁴ . Ibid, p.56

⁶⁵ . Hammer, p.109

⁶⁶ . Ibid, p.110

the old rule about specialization of labor and the belief that people at lower organizational levels are incapable of acting on information they generate.

For example, Hammer reports, Ford's acquisition process was conventional. It began with the purchasing department sending a purchase order to the vendor, with a copy going to the accounts payable. When the vendor shipped the goods, the receiving department used to prepare a multicopy receiving report, sending a copy to the accounts payable. The vendor, meanwhile, sent accounts payable an invoice.

More than 500 people worked in accounts payable matching the different data items on the three documents and trying to reconcile the mismatches. Payments were delayed, vendors were unhappy and the process was time consuming.

Ford's new accounts payable process looked radically different: purchasing agents enter their purchase orders into an on-line database and forward an electronic copy to the sender. Vendors ship the goods but send no invoice when goods arrive, the receiving clerk enters three items of data into the system: part number, unit of measure and supplier code. The computer matches the receiving information with the outstanding order data. If they do not match, the goods are returned. If they match, the goods are accepted and the computer sends an electronic funds transfer payment to the vendor (see the diagrams, "Fords Accounts Payable process" for illustration of the old and new accounts payable processes [Exhibit 3(a) & 3(b)]).

When it has instituted this new process, Ford has achieved a 75% reduction in head counts. And since there are no discrepancies between the financial records and the physical records, material control is simpler and financial information is more accurate.⁶⁷

2.6.4 - Centralize and Disperse Data:

To achieve economies of scale and eliminate redundant resources, companies centralize operations. To provide better service to their customers, companies decentralize operations.

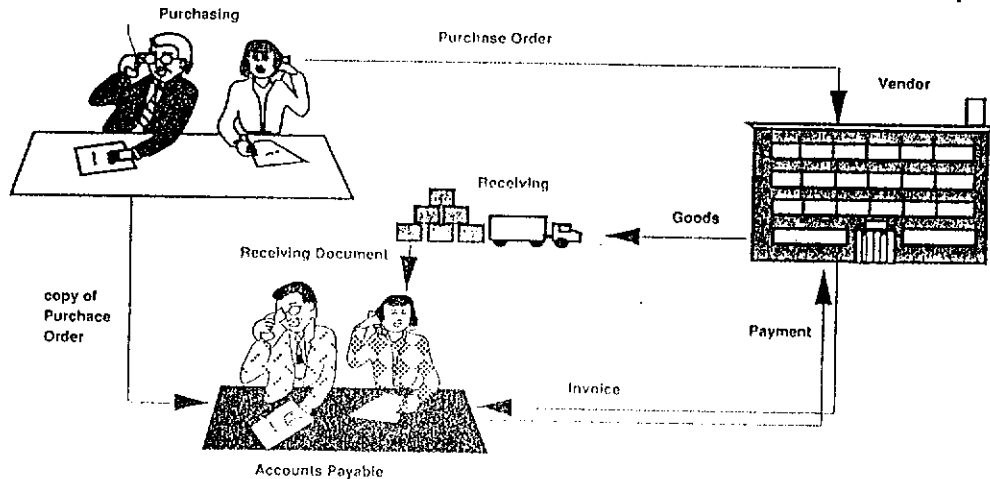
Companies that have re-engineered their processes no longer have to make trade off between centralization and decentralization. They have the ability to confine the advantages of the two approaches in the same process.

⁶⁷ . Hammer, p.106

Exhibit 3(a) - Re-engineering The Accounts Payable Process At Ford: Reducing Degree of Mediation Through IT

BEFORE

A number of paper documents were processed sequentially by 3 functions who participate in the process indirectly with a work force of 500 clerks to perform many intermediate steps:



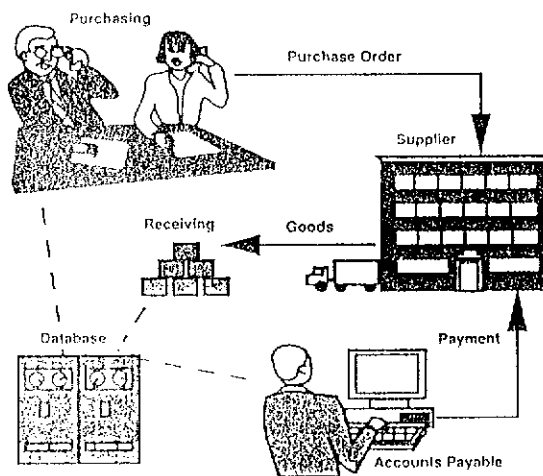
- The purchasing function issues a purchase order to the supplier and sends a copy to the accounts payable function.
- Upon arrival of purchased goods, the inventory function sends a copy of the receiving document to the payable function.
- When the invoice from the supplier arrives in the mail, the payable function matches it against the purchase order and the receiving document before issuing payment to the supplier.
- Much efforts are needed to resolve frequent discrepancies between the documents, and a total of 14 data items must be checked in the process.

* Adapted from M. Hammer, "Reengineering Work: Don't Automate, Obliterate," *Harvard Business Review* (July/August 1990)

Exhibit 3(b) - Re-engineering The Accounts Payable Process At Ford: Reducing Degree of Mediation Through IT (continued)

AFTER

With a work force of only 125, the 3 functions participate in the process directly by accessing a shared data base, eliminating many intermediate steps and sequential flow of paper documents:



- The purchase order is entered into the shared data base by the purchasing function.
- Upon receiving goods, the inventory function accesses the data base. If a match is found, the goods are shipped and the status of the order in the data base is updated. Otherwise, the goods are returned to the sender.
- The payable function routinely access the data base to prepare payment checks for orders that have changed status, and invoices from suppliers are eliminated.
- Matching and discrepancy resolution of paper documents are no longer needed, and only 3 data items need to be checked in the process.

With current technology, telecommunications networks enable companies to operate as though their individual units were fully autonomous, while corporate - wide databases permit them to enjoy the economies of scale that centralization creates.

At Hewlett Packard, for instance, each of the more than 50 manufacturing units had its own separate purchasing department. This arrangement provided excellent responsiveness and service to the plants. However, HP could not take advantages of its extensive buying power to negotiate quantity discounts.

HP re-engineered its system and introduced a cooperate purchasing department. This department developed and maintained a shared database of approved vendors. Each plant continued to meet its unique needs by making its purchases from the approved vendors. However, the corporate office tracked the purchase of all 50 plants and used the data to negotiate quantity discounts and resolve problems with vendors. The result was a significant lower cost of goods purchased, a 50% reduction in lead time, a 75% reduction in failure rates and a 150% improvement in on-time deliveries.⁶⁸

2.6.5 - Integrate Parallel Activities:

The new principle says to forge links between parallel functions and to coordinate them while their activities are in process rather than after they are completed ⁶⁹. Product development typically operates this way .

For example, Chrysler had many different teams, each working on the design of different parts for a new car.

One team worked on the engine, another on the frame, etc. Unfortunately, the teams did not communicate well. At the integration and testing phase they found the components did not fit together properly and had to be redesigned at considerable expense.

Chrysler re-engineered its product development and put people from each area on the team in charge of a particular automobile. Chrysler was able to reduce its product development costs significantly and reduce costly redesigns ⁷⁰.

⁶⁸ . Rommey , p.31

⁶⁹ . Hammer, p. 111

⁷⁰ . Rommey , p.32

2.6.6 - Empower Workers and Use Built in Controls:

In most organizations, those who do the work are distinguished from those who monitor the work and make decisions about it. Accountants, auditors, and supervisors check, record, and monitor work. Managers handle any exceptions.

The new principle suggests that work should be vertically compressed this means that at the points, in a certain process, where workers used to have to go up the managerial hierarchy for an answer, they now make their own decisions. Instead of separating decision making from real work, decision-making becomes part of the work workers themselves now do the portion of a job that, formally, managers performed ⁷¹.

At Mutual Benefit Life (MBL), approving an insurance application required 30 different steps performed by 13 people in five different departments, and took up to 25 days. The re-engineered system eliminated several layers of managers. MBL now assigns all applications to a case manager who has the power to approve the application. Once managers are supported by an expert system of specialists, they can call on for help when necessary. Case managers now handle more than twice the volume of new applications, allowing the company to eliminate 100 field positions. The average turnaround for a new application is now two to five days.⁷²

The managerial role has changed from one of controller and supervisor to one of supporter and facilitator.

Another kind of non-value adding work that gets minimized in re-engineered processes is checking and control; or, to put it more precisely, re-engineered processes use controls only to the extent that they make economic sense.

Many organizations fail to recognize the costs associated with strict control. It takes time and labor to do the checking; in certain cases, it may take more time and effort to do the checking than to do the actual work.

Instead of tightly checking work as it is performed, re-engineered processes often have aggregate or deferred controls. These control systems will, by design tolerate modest and limited abuse, by delaying the point at which abuse is detected or by examining patterns in an

⁷¹ . Hammer & Champy , p.53

⁷² . Rommey , p.32

aggregate manner. However, the re-engineered control systems will compensate for possible increase in abuse by dramatically lowering the costs and other encumbrances associated with the control itself ⁷³.

2.7 Implementation of A Business Process Re-engineering Project

Having examined the concepts and principles of Business Re-engineering, one should now examine how these can be pulled together in practice.

Companies have devised methodologies and tools to facilitate well disciplined and organized ways of structuring, assessing and resolving the issues that BPR projects raise.

Methodologies refer to systematic approaches to conducting a re-engineering project. An effective methodology is like a road map. It helps in selecting destination and then find the best way to get there. ⁷⁴

According to Rohit Talwar, implementation of most BPR projects, typically involve six key steps (Figure 2.7) ⁷⁵:

- 1- Building the vision of the re-engineered organization
- 2- Planning how the vision will be realized
- 3- Analyzing the correct structure and processes
- 4- Redesigning the "Business Architecture"
- 5- Implementing the redesigned organization and processes
- 6- Measuring the benefits and sharing the learning

2.7.1- Vision Definition:

At this stage (Figure 2.8), the aim is to ensure a clear focus on the products and services, competencies and processes around which the business is to be built. Here, the company's management communicates a sense of the kind of organization the company needs to become. It describes how the company is going to operate and outlines the kind of results it must achieve.

⁷³ . Hammer & Champy , p.58

⁷⁴ . M. Klein, "Reengineering Methodologies And Tools, A Prescription For Enhancing Success" *Information Systems Management* (Spring 1994), p.30

⁷⁵ . Talwar, p.31

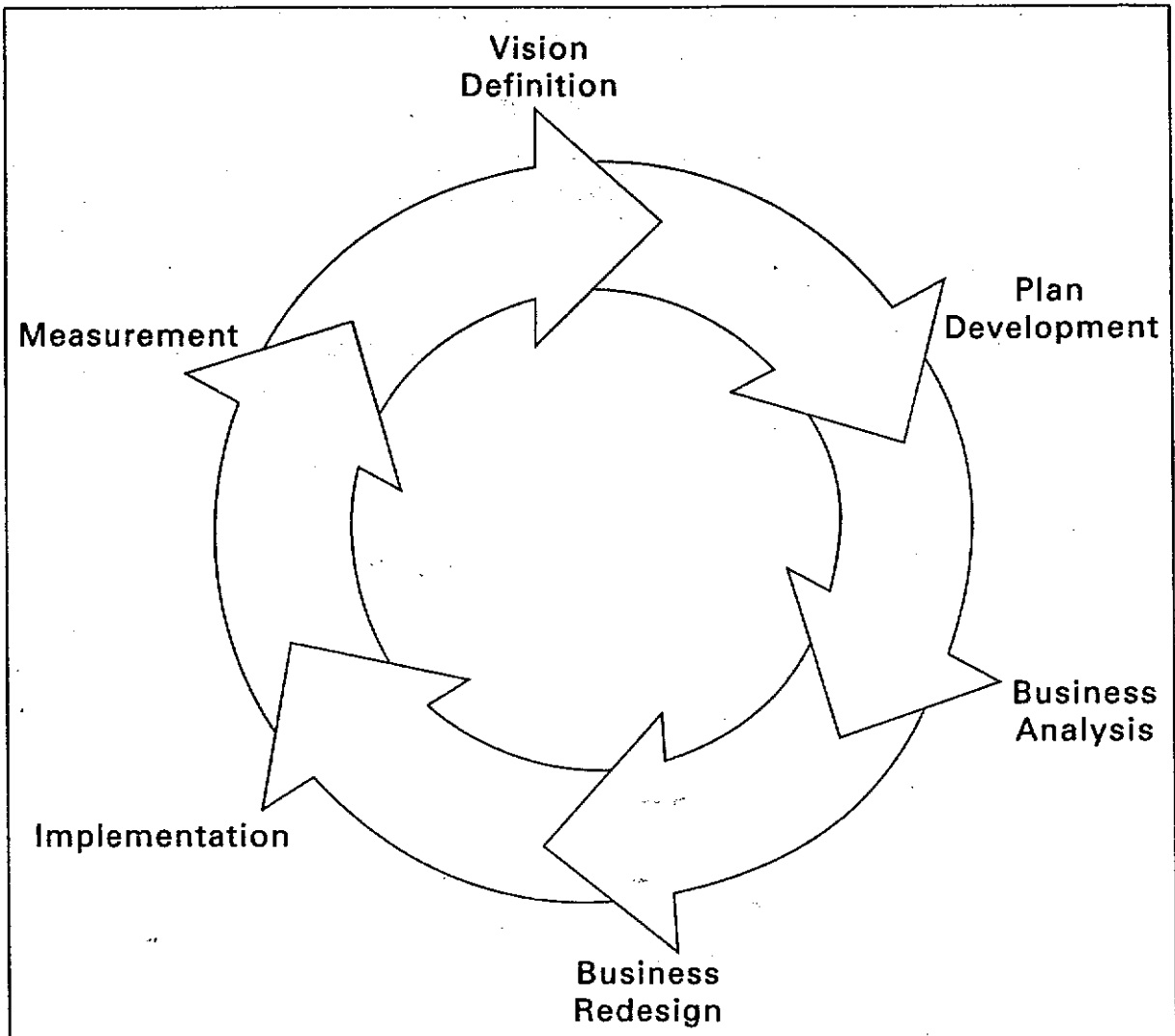


Figure 2.7- Six key steps in the re-engineering process ⁷⁶

Of particular importance is the assessment of current and future profitability of products and services. Companies must decide whether there are particular segments of the market which they cannot serve profitably or whether there are specific products which have become “loss leaders” and assess the cost of pulling out.

The risk analysis and readiness change aspects of this stage involve mainly the identification of value adding activities and the selection of candidate processes to re-engineer.

⁷⁶ . Ibid, p.32

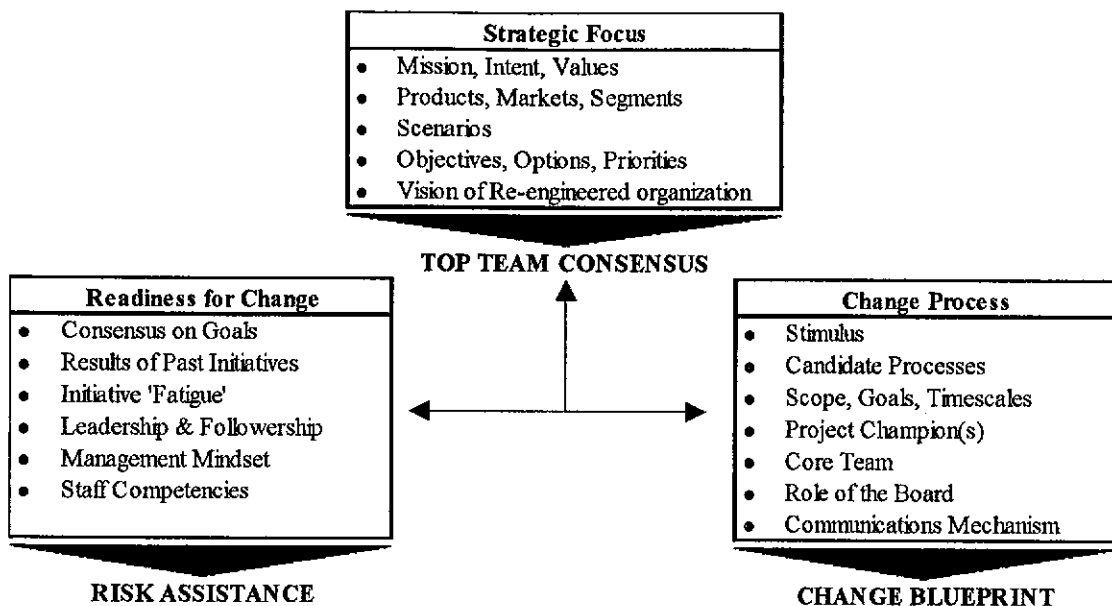


Figure 2.8- Building a vision of the re-engineered organization ⁷⁷

One approach of assessing process capability is to rank its performance against the needs of both customers and shareholders (Figure 2.9).

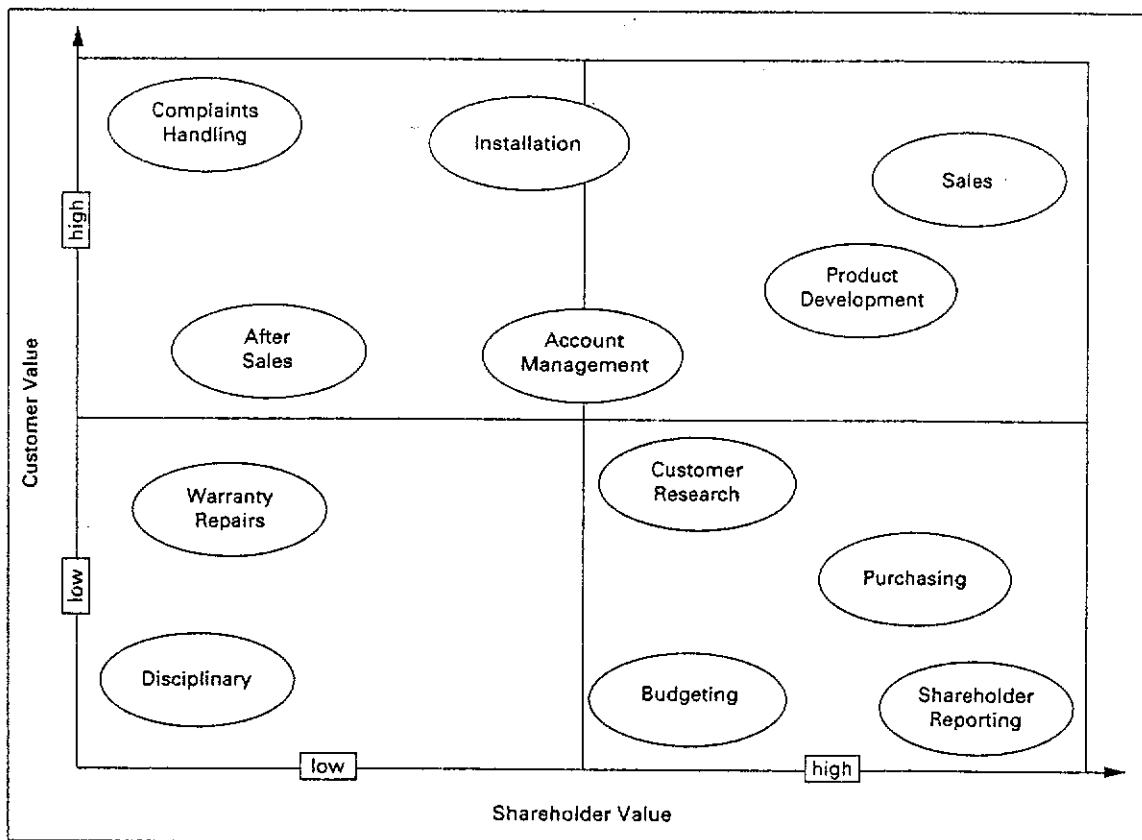


Figure 2.9- Assessing the value of a process - an example ⁷⁸

⁷⁷ . Ibid, p.32

⁷⁸ . Ibid, p.33

For example, customer research provides a high value for the shareholder, but a low value for the customer, since the latter only notices the final result. By the same token, product development provides high value for both the shareholder and the customer, it is beneficial to both.

A weighted ranking of performance against key criteria set by the organization can be used to determine the individual value scores.

The resulting value index (Figure 2.10), can then be compared to the cost of the process ownership to determine the appropriate treatment for each process in the re engineering exercise .

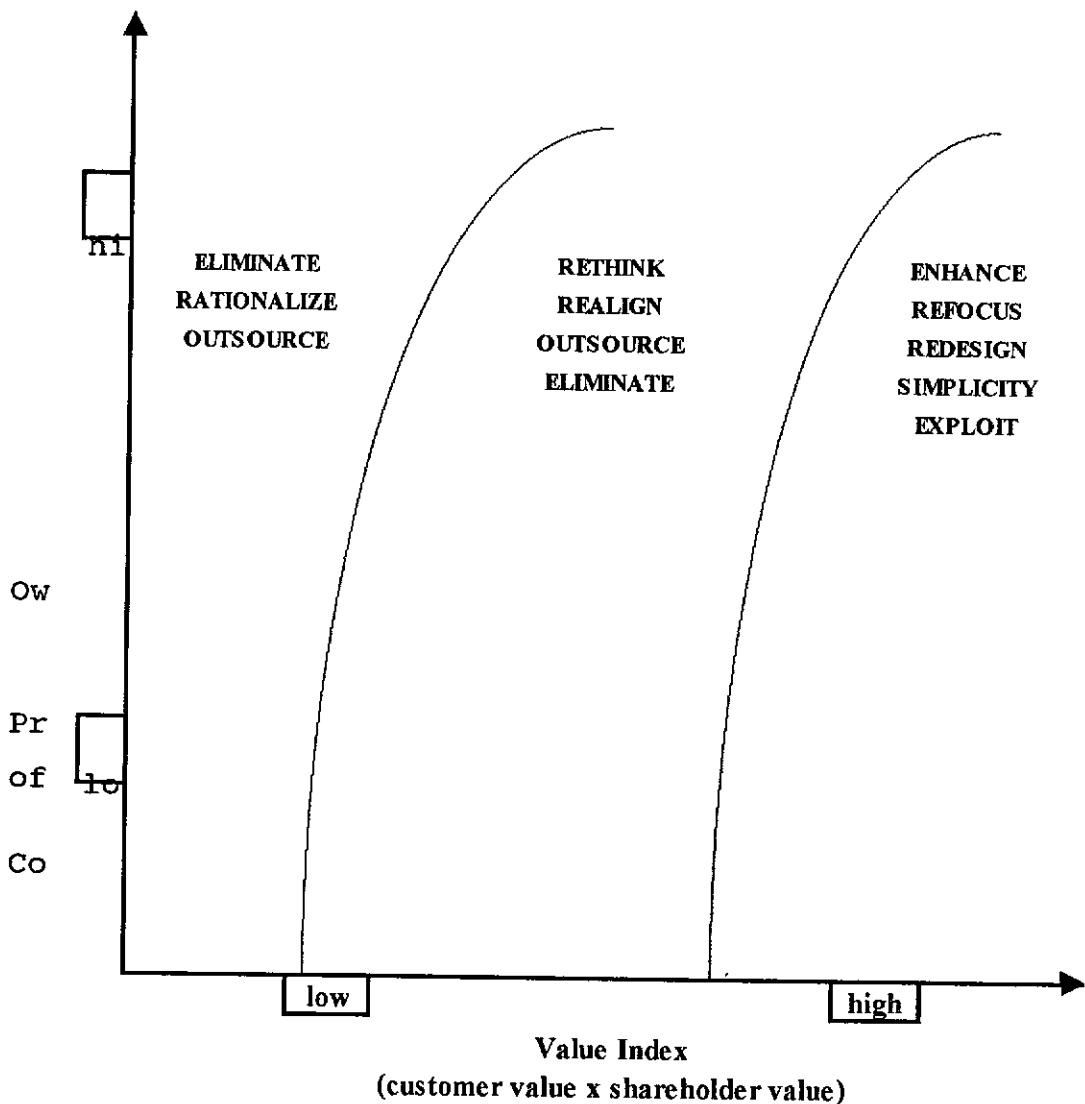


Figure 2.10 - Comparing value and cost

For example, if a certain process provides high value for the shareholder and low value for the customer, such as customer research identified above, it falls in the middle region of the graph. According to the cost of process ownership, the company has the option to either Rethink and Realign, or to Outsource and Eliminate.

Experience suggests that those which fall in the central region are typically the ones which benefit most from re-engineering⁷⁹.

2.7.2- Plan development

The success of any BPR project is closely determined by the quality of the overall plan . The wide ranging nature of the exercise means that those managing it must have a good understanding of the System or Business model . This covers a wide range of procedures, such as identifying the procedure for changing salaries and bonuses, and modifying organizational design.

The aspect that requires further discussion at this stage is the notion planning incremental performance improvement (Figure 2.11).

This relates to the notion the balanced scorecard. Rohlit Talwar reports that Experience suggests that those who have tried to re-engineer often fail if they focus all their attention on one area alone, such as technology or even staff capability.

Similarly, organizations which choose a balanced approach then sets targets far beyond the sights of those involved, have found the exercise failing.⁸⁰

The problems are generally the absence of an internal reference point and the lack of belief in the organizational ability to achieve such dramatic improvements .

So, companies need to clearly define their objectives first, and then adopt a balanced approach that satisfies the needs of all processes involved in the Re-engineering.

⁷⁹ .Talwar, p.33

⁸⁰ .Ibid, p. 34

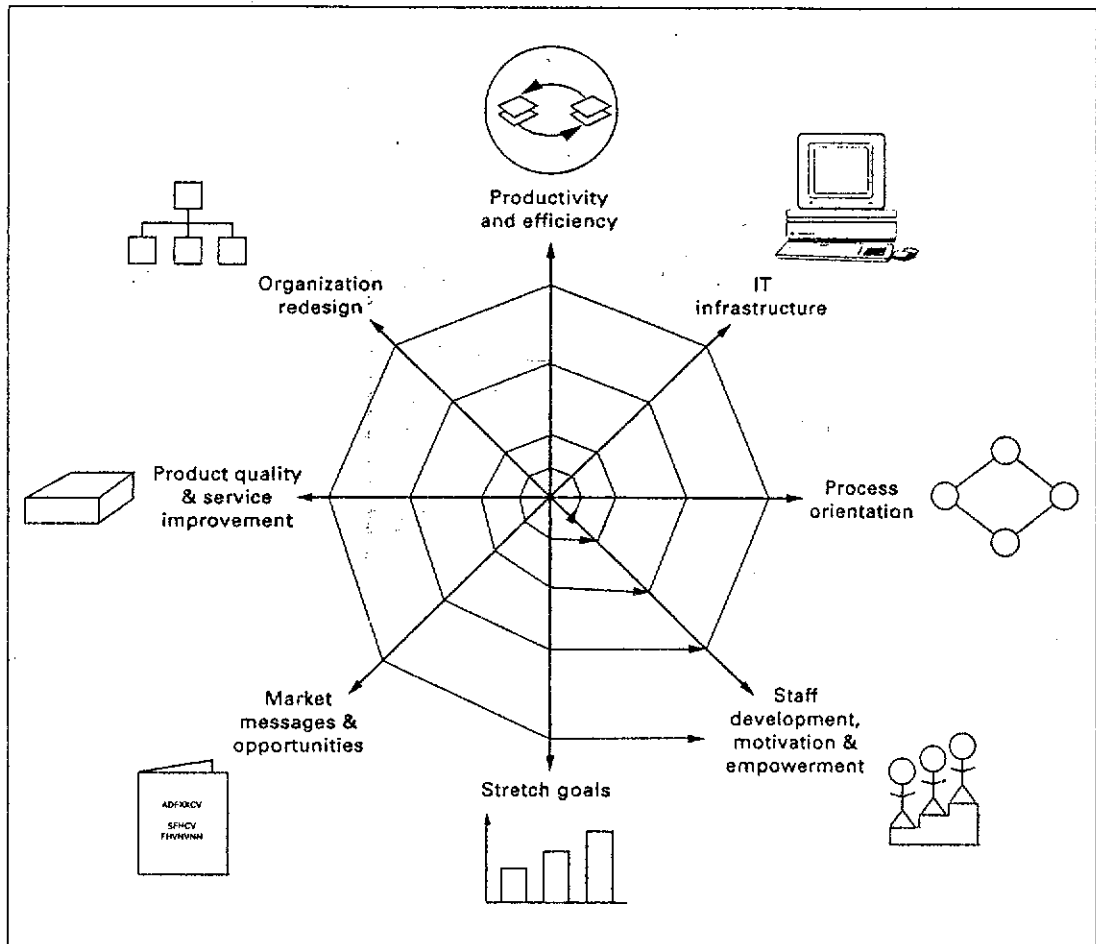


Figure 2.11- Planning incremental improvements ⁸¹

2.7.3- Business Analysis

At this stage, the organization needs to question the assumptions around which the existing business processes were built. The objective of business analysis is to understand and build a high level model of the business as currently structured by ⁸²:

- Analyzing customer requirements
- Modeling target processes
- Assessing organizational issues
- Reviewing IT infrastructure
- Identifying candidates for improvement, elimination, outsourcing, and redesign
- Consolidating the re-engineering options

⁸¹ . Talwar, p.35

⁸² . Ibid, p.34

The analysis phase questions why a business entity such as a process or structure exists. It draws a model of Entity's Relationships and Re-examine process linkages. The next process involves questioning how much of a process the customer sees and what value is added by each process.

The aim of justifying and specifying the objective and outcomes of each process is to avoid doing things just because "we always have done, eliminate duplication of effort and remove wasteful and non-value adding activities."⁸³

The key benefits derived from analyzing and understanding the organization's current operation and process include⁸⁴:

- defining a baseline model of existing processes with which the organization can plan and test future changes
- identifying candidates for improvement
- spotting current and potential problems
- identifying improvements that can be made immediately by the process owner
- building consensus on the steps in problems of the current process
- confirming interfaces to other functions, processes and organizations
- creating the stimulus for change

A variety of tools and techniques exist to support the modeling phase. These start with simple and easily understood techniques such as simple flow charts and spread sheets. They then increase in complexity and the amount of training required to include integrated computer aided software engineering (ICASE) such as Texas Instruments' IEF, Knowledge Ware's IEW, and S/Cubed DAISYS.⁸⁵

Considerable care needs to be exercised in the selection and use of these tools since the process charting notation must be easily understood and applied by users.

⁸³ . Talwar, p.34

⁸⁴ . Ibid, pp.34-35

⁸⁵ . Klein, p.32

2.7.4- Business Redesign

The redesign stage is usually the most difficult part of the whole initiative. The objective is to create and cost the design for the re-engineered business (Figure 2.12).

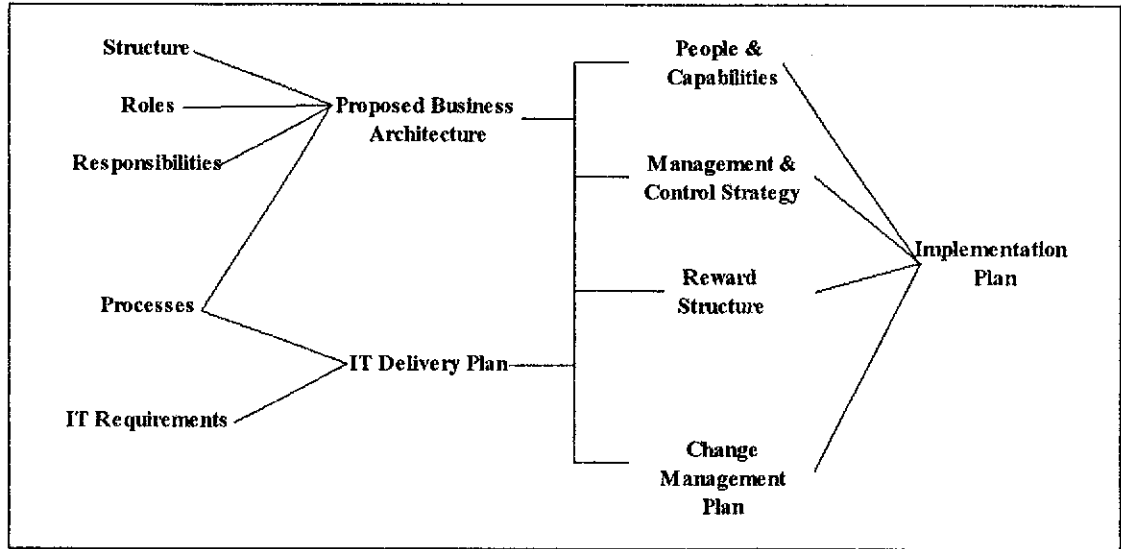


Figure 2.12- Designing the re-engineered business ⁸⁶

Thomas Davenport, author of “Process Innovation” identified the design stage as follows ⁸⁷ :

The design activity is largely a matter of having a group of intelligent, creative people review the information collected in earlier phases of the initiative and synthesize it into a new process.

It is particularly important that key process stakeholders feel their interests are represented during this phase. Stakeholders who should participate on the team during the design phase include heads of key functions intersected by the process, key general managers with operational responsibilities for the process, suppliers of important change resources (e.g. the IT, human resource and financial functions), and process customers and supplies, both internal and external. ⁸⁸

⁸⁶ . Talwar, p. 37

⁸⁷ . Davenport, p.153

⁸⁸ . Ibid, p.153

Design innovation, best accomplished in a series of workshops and brainstorming, is an effective means of surfacing creative process design.⁸⁹

Brainstorming can be defined as “Any group facilitation technique or practice that encourages participation from all group members, regardless of their role and relationships within the organization .”⁹⁰

Emphasis during brainstorming sessions should be on creativity and idea generation, and non-judgmental atmosphere is necessary. The objective is to allow participants the freedom to come up with a range of options of how the business process and supporting architecture should be structured, taking as input the process vision, change enabler and benchmark knowledge developed in the earlier phases of process innovation.

Brainstorming sessions usually produce a number of design alternatives, which must be submitted to feasibility analysis to evaluate their relative benefits, costs, risks and time frames. The new design and current state must be compared in terms of structure, technology and organization to fully understand the implication of each alternative. The results of these analysis provide the basis for selecting the optimum design.⁹¹

2.7.5- Implementation

The implementation plan typically needs to address three key areas⁹² :

- Changes affecting parts of the current structure that will remain largely unchanged.
- Putting in place those elements of the structure that have undergone substantial change.
- Identifying changes to be made in future rounds or re-engineering

This stage also requires a phase of bedding in and refinement. The objectives of which are as follows :

⁸⁹ . Davenport, p.154

⁹⁰ . Ibid, p.156

⁹¹ . Ibid, p.156

⁹² . Talwar, p.37

- Assessing the initial performance of the new architecture
- Making initial refinements
- Initiating a continuous review process

Firms and organizations today tend to be structured in a way that is against the successful implementation of their new process designs. Most organizational structures are based either on function or product, with little or no process orientation.⁹³

In general, firms need to adopt more process-based organizational structures in order to successfully manage and implement new processes. Then instead of cutting across the organization, process responsibilities will be a key focus of the organization.

Thomas Davenport argues that⁹⁴: “A process-based organizational structure is a structure built around how work is done rather than around specific skills.”

A number of organizational theorists have argued that organizations need to reduce their level of hierarchy and adopt action based rather than formal structures. A process based structure combines an action orientation with some degree of formal structure.⁹⁵

The main concern, however, is that such organizational changes might constitute too much change all at once. So companies can begin their process innovation initiatives with Shadow process organizations, and then slowly migrate towards a full process-based structure.⁹⁶

2.7.6- Measuring Performance Gains

A rigorous assessment of the results of re-engineering is vital (Figure 2.13). Measuring against a balanced scorecard of both hard and soft measures is essential.

⁹³ . Davenport, p.159

⁹⁴ . Ibid, p.161

⁹⁵ . Eccles & Nohira, *Beyond The Hype: Rediscovering The Essence of Management* (Boston: Harvard Business School Press, 1992), p.164

⁹⁶ . Davenport, p.162

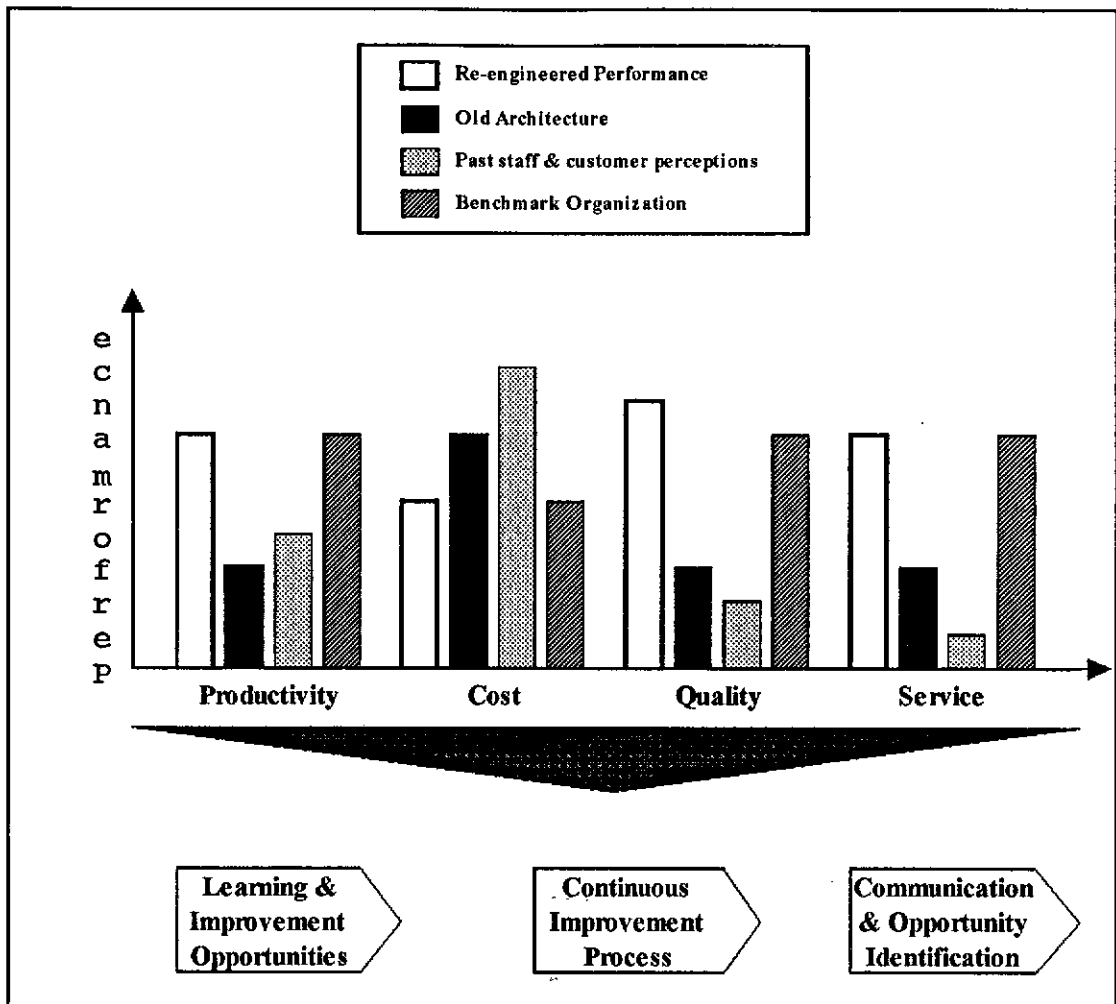


Figure 2.13- Measuring Performance Gains ⁹⁷

The objectives of measuring performance gains are to ⁹⁸:

- identify and share the learning on what worked and what could be improved
- help process owners create a continuous improvement process to support ongoing refinement
- communicate the overall results and encourage others to spot further opportunities to be addressed in subsequent rounds of re-engineering

To support their re-engineering efforts, companies must be prepared to adopt new measures of performance and eliminate old ones. The objective should be to identify measures consistent with the goals of the re-engineering effort and the strategy behind it. ⁹⁹

⁹⁷ . Talwar, p.38

⁹⁸ . Ibid, p.37

⁹⁹ . Dixon & Arnold, p.102

Performance measurement plays an important role throughout the re-engineering process.

Two types of measurement issues are identified; those relating to *organizational performance* and those involving the *project team effectiveness*.

Definition of measures for the new priorities provides common direction for both the design and the implementation of the projects. These measures need not be complex or unique. As long as they are consistent with the new priorities established for the project, simple measures are adequate.¹⁰⁰

Measuring organizational performance can be achieved through *Benchmarking*, this technique involves comparing one company's performance to other companies, notably to *world class performers*.

On the other hand, measurement of project team performance is more problematic. The reason is that it is difficult to objectively measure team performance and to tie it to the reward system.

¹⁰⁰ , Dixon & Arnold, p.102

Chapter Three

Methodology of the Study

Since very few companies in Lebanon actually know about or apply re-engineering, it is impossible to conduct a research study in order to analyze the outcome of a sample of re-engineering projects. The researcher has tried to focus on one-case study, that of Middle East Airlines. The reason for choosing this organization is that it is the only company in Lebanon which have attempted to adopt re-engineering principles. Moreover, the size and complexity of its operations may allow the proper implementation of a re-engineering project.

3.1 Basic Approach

This research study is a descriptive one based on presenting information from several sources, in addition to a case study. Several methods have been used in the process of data collection. For purpose of this study, the data has been collected and acquired from three sources: primary sources, secondary sources, and field observation.

Evaluation of the data gathered is based on three criteria:

1. Referring to the body of literature as a guide regarding the re-engineering concepts, principles, and implementation.
2. Comparison between what is stated, whether in secondary or primary data, and what is actually being done.
3. Determining consistent patterns and summarizing the appropriate details revealed in the research.

3.2 Primary Data

Primary data used in the case study was collected in the following manner:

- Structured interviews were conducted with higher-level management - assistant vice president and above - in order to gather information about current challenges facing MEA and the objectives of the re-engineering project.
- Interviews with managers and partners at Ernst & Young - Beirut, consulting firm which has presented the re-engineering proposal for MEA, were conducted. The aim of these interviews was to obtain a broader perspective about the approach used in the re-engineering process.
- Interviews with managers at the technical supplies department (subject of this case study) in order to get sufficient information about the problem faced in the old system and the improvements brought about after the new system was implemented.

3.3 Secondary Data

Several academic books, magazines, periodicals, and reports were required in order to accomplish this research project. Secondary data is used for three main reasons:

1. To collect relevant information that allows the researcher to explore in detail and analyze the re-engineering concepts, principles and implementation stages.
2. To provide the researcher with guidelines for conducting the research.
3. To aid in backing up the research findings and suggested improvements.

In addition to the secondary data cited above, few case studies were adopted from literature in order to support the re-engineering principles. Moreover, internal publications and procedure manuals were used in order to gather data about MEA's history and operational procedures.

All sources of secondary data are provided in footnotes and at the end of the research in the bibliography.

3.4 Field Observation

Field observation is very helpful in the process of data collection. In this specific case study, field observation helped the researcher identify problems which were not revealed in the interviews due to interviewee bias. In addition, it helped identify the bottlenecks and pitfalls of the system.

3.5 Case Study Analysis

The primary advantage of the case study is that an entire organization or, in this case, department can be investigated in depth and with meticulous attention to detail. This enables the researcher to carefully study the order of events as they occur or to concentrate on identifying the relationships among functions, individuals or entities.¹⁰¹

The purpose of the case study is to obtain information from a certain situation to enable the researcher to test the applicability of proposed concepts in a real business atmosphere.

¹⁰¹ . W.Zikmund, *Business Research Methods* p.88

Chapter Four

Case Study

Middle East Airlines is today fighting to regain the leading position it had in the region before the war . It is believed that there is a continued role for MEA in the regional and international air transportation market, but the Company will not have the chance to fill this role unless it acts quickly and decisively in implementing an effective recovery plan.

4.1 Historical Background

MEA was founded during the month of May 1945 by Saeb Salam, the legal heirs of Salim Ali Salam and Mr. Fawzi Al-Hoss. It started as a private venture with an initial capital of one million Lebanese pounds. Its first flight was on the 20th of November 1945, and first regular services began in January 1945 using three De Havilland Rapides.

The success of steady expansion of MEA during its first three years of operation attracted the attention of a number of major world airlines interested in cooperating with an airline in the Middle East. Negotiations between MEA and Pan American World Airways resulted in an agreement in 1949 whereby MEA was transformed from a private to a joint stock company, with a capital of one and quarter million Lebanese pounds.

In January 1955, the association with Pan American was terminated by mutual consent. A month later, discussions were opened with British overseas airways, leading to an agreement, in March of that year by which MEA becomes an associate of BOAC; the latter acquired 38.74% of MEA's shares.

In 1961, negotiations with BOAC led to an agreement whereby BOAC sold all its MEA shares to Lebanese shareholders. MEA reached an important landmark in its history in January 1962 when it carried its millionth passenger and declared a net profit of LL. 2,109,940 .

In 1963, negotiations between Middle East Airlines and Air Liban led to a merger of staff, routes and services. Air France, associates of Air Liban acquired 30% of MEA's shares and two seats on the MEA board.

The war which ravaged Lebanon from 1975 till 1991 and which led to prolonged closures of Beirut International Airport inflicted MEA with great losses in people, aircraft, capital, and opportunities. The marketing policy was shifted to concentrate on leasing aircraft. Yet, despite these circumstances, MEA was able to survive during that period.

4.2 Factors of Change

Whilst MEA remained static in its effort to achieve its main mission at the time, namely that of survival, the rest of the industry moved on. The international and regional scenery has changed as a result of deregulation, globalization, and lifting of barriers.

MEA is currently facing some of the greatest challenges it has ever encountered:

- low level of traffic
- increased competition leading to a continuous fall in airline prices and consequently low yield.
- pressure to cut costs whilst improving customer service
- pressure to make the best use of the available revenue
- Uneconomic, albeit safe aircraft fleet in need of replacement / modernization
- business processes in need of modernization
- outdated communication and information technology
- scarce financial resources to address the above issues

In addition to the above mentioned challenges, the following factors affected MEA's performance:

4.2.1. Political and Economic Pressures

Lebanon has recently been facing a turbulent political environment. Factors like prospects of peace with Israel, change of government, and nearness

of residential elections enhance the political uncertainty which affects every facet of an organization's normal operations.

On the other hand, economic pressures are more serious and more difficult to cope with. Inflation, rising unemployment, interest rates and other factors affect the company's performance. Finally, because MEA is partly owned by the government, it is more seriously affected by political and economic pressures.

4.2.2. Competition and Changing Customers' Expectations

An increasing number of foreign carriers are operating into Beirut, competing fiercely for a large share of the market which, until two years ago, was almost solely served by MEA. For example, Air France, KLM, Olympic and recently British Airways, compete with MEA by offering better service at lower prices and taking connections to USA and South America. Also, Emirates and Gulf Air fiercely compete with MEA over gulf traffic by offering better product quality, convenient time and direct connections to the Far East.

At the same time, customers needs and expectations have become more sophisticated. They demand more punctuality and convenience. They expect to be treated individually and require more on-board and after-flight services.

4.2.3. Organizational Structure and Operational Procedures

The company employs approximately 4,000 staff organized in five major departments. Exhibit 1 shows the major departments and the key responsibilities of each department. MEA's existing organizational structure and operational procedures were laid down more than 30 years ago. MEA's organizational structure is a classical bureaucratic one mainly characterized by the following:

- a - Specification and divisional positioning of labor
- b - Rigid, hierarchical positioning of personnel
- c - System of abstract rules and regulations
- d - Impersonal relationships

Functional departmentalization which involves organizing work into “related bundles of skill” is most abundant. Operational rules and procedures are very clear and are primarily designed to ensure maximum control and minimum probability of occurrence of fraud or abuse to the system.

However, the existing structure and organizational procedures are no longer responsive to the increasingly competitive and dynamic business environment. Technology has changed every fact of this environment, making the old procedures, if not completely obsolete, at least not responsive to the diverse needs of “stakeholders” who require more timeliness and punctuality in information supplied to them.

This is why MEA found itself in a situation where it needs to change and to change dramatically in order to survive and be able to win back its position as a leader of the airline industry in the Middle East.

The first serious attempt to cure the situation began in mid 1993. MEA management found that the company is now in a critical situation which threatens its very existence. MEA has not made profit since 1979. Accumulated losses up to December 31st, 1994 reached around U.S. \$ 200 million . Liquidity problems are more pressing. Moreover, in a recent study undertaken by a foreign consulting firm, it was found that, for operating its present network, MEA was overstaffed by around 10 %.

The objective of any project is to determine how can MEA best position itself to meet the challenges with which it is faced and to implement the changes necessary to facilitate the conclusions.

It is expected that this objective will be met in two phases:

Phase 1: A diagnostic feasibility study which will determine the viable strategic options most suited to achieving the long-term aims of MEA.

Action will be focused on:

- assessing the current operations
- assessing the market and demand
- developing a business strategy

- determining investment
- determining the optimum business processes and the best organization configuration
- determining the viability of diversification and the strategy that should be adopted

Phase 2: Implementation, which will ensure that the steps required to implement the selected strategic options are defined in more detail and are carried out.

Proposals from international consulting firms were obtained. However, due to reasons related to the shareholders, implementation of various steps of this project were frozen up to date.

According to Ernst & Young consultants, in order for MEA to become more competitive and achieve its goal of modernization, it must “Create Value”. Value creation is a complex process which is comprised of numerous elements including profit and cash flow improvement and rationalization of capital structure. This process is simplified in figure 4.1.¹⁰²

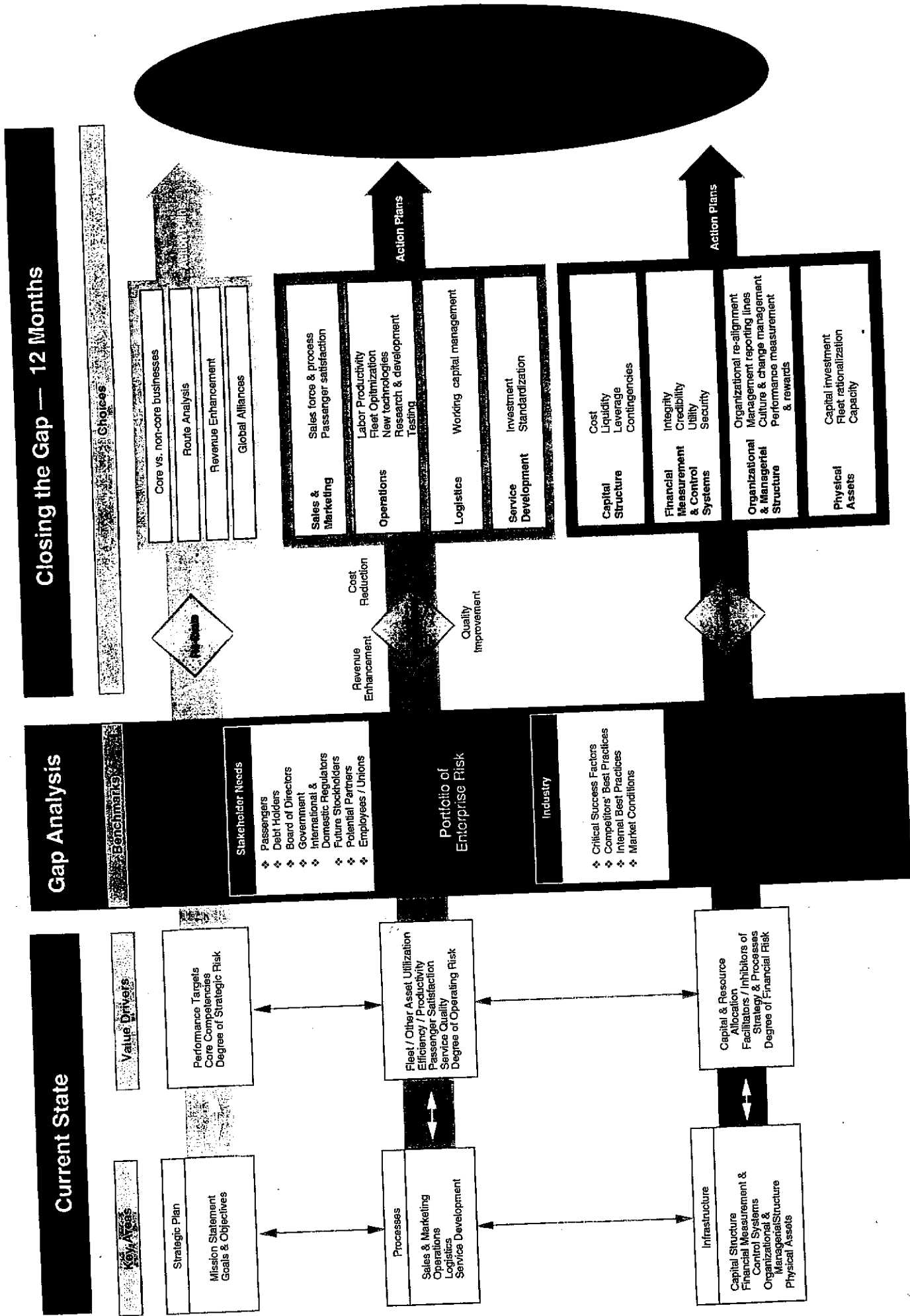
For the purpose of this study, the researcher will focus on the “Technical Supplies” department, mainly because it is one of the few departments where actual change was implemented and where tangible improvements could be observed and measured.

4.3 Technical Supplies - Old Structures and Procedures

The technical supplies section in the engineering and maintenance department handles all the requirements pertaining to the acquisition and availability of technical equipment and materials. All aspects of such requirements are tackled, namely purchasing, shipping, storage, inventory control, and disposal.

The technical supplies stock is constituted of around 100,000 different line items. These items can be classified into the following categories :

¹⁰² .special E & Y report



1. *Rotatables* : which are parts capable of an infinite number of reuses.
2. *Repairables*: which are items recoverable through varying degrees of repair, but only for a limited number of re-uses.
3. *Consumables*: are parts that are not re-usable upon removal in an unserviceable condition.
4. *Insurance items*: which are spares for which there is no routine demand, but are held as a precaution against delay.
5. *Raw materials and supplies*: which generally require a certain degree of fabrication before use.

The organizational chart (exhibit 2) defines the various sections that perform these functions with the manpower allocated to them.

The function of each of the main sections in the technical supplies department namely stores, inventory control, and purchasing will now be examined in more detail in an attempt to analyze their inter-relationships.

4.3.1. Stores :

The stores and spares shipment section is composed of two main sub-sections:

1. Shipping Section : this section handles the receipt of all spares, raw materials and aircraft / ground equipment from various sources. It controls and follows up shipments in addition to providing the various departments and outstations with spare parts needed. It is divided into three units:

- a - Receipt Unit : responsible for the receipt of spares and equipment from manufacturers, suppliers, overhaul agencies, etc.
- b - Dispatch Unit : responsible for the shipping of spares out of base.
- c - Coordinating unit: handles registry and statistical work in addition to all correspondence necessitated by shipment of spares.

2. Store Section : store is used to house the company's bonded spares and material, and complies in all respects with the requirements of the regulatory bodies, i.e. Directory of Civil Aviation (DCA), Civil Aviation Affairs (CAA), and Bureau Veritas. It is divided into the following units:

- a - Main Stores : where the bulk of company's spares are stored.
- b - Production Sub-Stores : the function of which is to provide for the requirements of the hangars.
- c - Work-shop Sub-Stores : the function of which is to provide for the requirement of the component work-shops.
- d - GTS Sub-Stores : function of which is to provide for ground equipment maintenance or overhaul.

In the old system, a store location index was prepared and maintained. This index showed details of the part, including any interchangeable or superseding part numbers and bin location details.

Upon receipt of goods into stock, the binning clerk will check the appropriate index, locate the place and enter bin location details on the Goods Received (GR) or Store Credit Note (SCN).

In case of a new item, the clerk had to open a new bin location after getting appropriate authorization and passing through many formalities.

On the other hand, when the stores clerk receives a store requisition, he will have to check the "Authorized by" signature, determine the location of the part on the stores index and write it on the requisition. He will then draw the part and deliver it to the requester and fill in necessary details on the requisition form.

4.3.2. Inventory Control:

The inventory control section has the following functions:

- a - Sorting, posting and checking of documents associated with the receipt and issue of consumable items.
- b - Controlling float of repairable/rotatable items.
- c - Pricing of receipt and issue documents.
- d - Inventory deficiency investigation.
- e - Computer liaison and statistics.
- f - Filing of receipts and issue documents.

The inventory control section was mainly organized to form the following subsections:

1. **Inventory Records:** responsible mainly for posting receipts and issues of spares on stock cards and to update stock balance. This procedure was done manually and documents were then sent to the Data Processing Center (DPS) for action on the computer (using the batch file system).
2. **Material Pricing:** responsible for checking the correctness of prices shown on invoices by consulting price lists, raising price variations and raising cash payment vouchers (CPVs) to effect settlement of invoices to suppliers.
3. **Computer Liaison and Statistics:** responsible mainly for channeling all documents that were processed and actioned to the DPC for further updating on the computer, verification of computer transactions, production of statistical reports and maintaining a proper filing system of all documents and computer returns.

It is worth noting here that the old batch system employed, involved the use of complex coding system using passive and variable data with many digits. In addition to the huge number of formalities which need to be filled in order to process any transaction.

4.3.3. Purchasing:

Acquisition of spare parts is effected in one or more of the following processes:

1. *Initial Provisioning:* which covers the purchase of spare parts expected to be required to service the fleet during the first years of operation. It is mainly an anticipation of requirements guided mainly by manufacturer's recommendations, overhaul life, average failure, provision's experience and other factors.
2. *Follow-up Provisioning:* which covers purchase of spares that are likely to be used more as the equipment is aging.
3. *Stock Replenishment:* which is the continual process of purchasing spares to keep stock at a level adequate to cover maintenance and overhaul requirements.

The decision of purchasing any item is guided by the “order point” first, which is determined by three factors:

- a - manufacturer’s lead time
- b - average monthly consumption
- c - safety cushion

Second, it is guided by the “order quantity”, which is the most economical quantity to be placed on order at one time, which takes into consideration the cost of ordering, storage or carrying cost, interest on capital and minimum order quantity.

The purchasing section is made up of two sub-sections:

1. Aviation Purchasing: which is made up of five buying groups and one progress and expedite group. This section studies the various aircraft systems, and determines the order of parts needed. The progress group is responsible for routine follow-up, closing and routing of invoices related to purchase orders raised.

2. Non-aviation Purchasing: which is made up of one buying group who handles all purchases of non-aviation materials.

Purchase orders used to prepared manually after initial preparation and checking of the Provisional Demands Note (PDN) and the Stock Urge Docket (SUD). The purchasing used to take a lot of time and involved many formalities, consultations and approvals of many persons.

4.4 Pitfalls and Problems of the Old System

The described functional divisions and their related operational procedures involved a huge number of details. They were designed primarily to ensure maximum control and to allow minimum errors to occur.

However, many difficulties and disadvantages were encountered in this system. They can be summarized as follows:

1. High Lead Time:

Because of the length of the processes involved and the lack of automation, the lapse time between the execution of any two processes was considerably high. For example, the lapse time between receiving a store issue and the updating of stock records was two weeks. Moreover, another two weeks were involved between the identification of a need to purchase and the eventual placing of a purchase order. So, one month was needed in order to complete the whole cycle. That is before taking into account the time needed in order to receive the parts from the supplier.

2. Lack of Automation:

The old inventory system was completely manual. So, in order to execute a simple task, a substantial amount of time and manpower were needed. For example, identification of stock items at reorder level was done as follows: after updating the stock cards for each inventory movement. The cards of the moving items are put in a vertical position in their respective trays.

The next day, the technical engineer would pass and inspect all vertical cards. He checks if they are at or near reorder level, fill in required forms, and pass them on for purchasing department to action the purchase. The procedure used to consume a lot of time and effort especially that the person involved has to check thousands of stock cards on a daily basis.

3. Massive Number of Paperwork:

In the old system, a great time was spent on manually filling in paperwork. At least 45 different forms were used in the whole cycle. Several secretaries and typists were needed to fill these forms and to file them in a manner to facilitate timely retrieval .

Moreover, since these forms needed approval of senior staff, they always stay piled up on someone's desk awaiting approval or further processing.

4. Large Number of Staff:

In order to operate such a complicated and lengthy system, a large number of personnel were needed, whether at the senior or clerical level. Total manpower allocated to the technical supplies department was 106 staff members (Table 4.1). Staff and related benefit costs were quite high.

ESTABLISHMENT HEAD COUNT

Department: Technical SuppliesSection : AllCost Code : 830-835/6

	Grade	Position	Actual			Proposed	
			Est.08	Strength	Var. 08	Est.09	Dif.09-08
T E C N I C A L	Executive	AVP,VP,SVP,EVP					
	U,V	Mgrs. ,Sr.Mgrs.	1	1		1	
	T	Asst.Mgrs.	5	6	-1		-5
	S	Supt., Sr. Secn.Insprs.	4	2	2	7	3
	Y	Group Spec./Engrs.					
	X	Engrs,Planners,Spec	15	14	1	14	-1
	R	Supvrs,Secn.Insprs	17	16	1	11	-6
	P	C/Hands,Bay Engrs					
	O	Progress Chasers					
	O	Operators	4		4		-4
			46	39	7	33	-13
C L E R I C A L	H	Asst.Mgrs.					
	G	Superintendents					
	F	Sr. Supervisors					
	E	Supervisors					
	D	Officers		1	1	2	2
	C/D/E	Clerk/typist , Secretaries	5	3	-2	3	-2
	C	Clerks	39	25	-14	34	-5
			44	29	-15	39	-5
	B	Semi Skilled	4	4		2	-2
	A	Messenger,Runner					
	A	Cleaner,Porter,Driver	12	4	-8	12	
			16	8	-8	14	-2
			106	76	-16	86	-20

**ENGINEERING
TECHNICAL MANUAL**

Table 4.1- Manpower allocation

5. High Overheads and Need for Large Investments:

Because the lapse time between the identification of the need for purchase and the placing of an order, a cushion of one month is always kept for emergency cases. Keeping such a cushion requires larger investments for stock purchase (considering also the opportunity cost of investing these funds into other activities). In addition, storage and maintenance costs are increased and more storage area is needed.

6. Mismatches of Information and Lack of Timely Data:

Due to lack of automation, the system is vulnerable to human errors. Mismatches of information occurred frequently namely between stock cards, accounting records, and computer batch files. In addition to frequent discrepancies between the records and the actual physical count.

A second pitfall is the inability of the system to produce timely reports that are needed in order to budget and analyze consumption and calculate economic reorder level, turnover per item, etc.

The lack of such information makes managers base their decisions on old and often not accurate data. This may cost a lot of money and sometimes may have disastrous consequences. For instance, consider the case where an engineer fails to depict a certain item which is at reorder level. If this item is needed on an aircraft and the stock is zero, one solution is to order it on an AOG (Aircraft on Ground) basis which usually costs between 50 to 80% more than a normal purchase. In more severe situations, the lack of a certain part could stop an aircraft from flying costing millions of dollars of wasted revenues.

4.5 The Attempt to Re-engineer

Due to the problems and disadvantages cited in the preceding paragraph, MEA's management decided to re-engineer the system.

The first step in this process is to decide what must be done and to set the performance goals which are to be achieved.

The objectives and goals of innovation, as cited by Mr. Hassan Mourtada, manager / Technical Supplies, can be summarized as follows:

1. Reduce overhead costs mainly those associated with storage.
2. Reduce inventory level by 20%. The objective is to maintain a minimum safety level of inventory by purchasing the right quantity at the right time and reducing the cushion required.
3. Cutting on manpower. This can be achieved through automation and the use of information technology.
4. Reduce lapse time and improve on delivery.
5. Provide managers and decisions makes with accurate timely data in order to facilitate and improve the decision making process.

It was decided that the most pressing need from which immediate benefits can be derived is obviously to automate the system.

Although re-engineering concepts do not agree that automation per se can bring about "radical change". Yet due to the fact that the old system was completely manual and way behind modern technology, automation could constitute the first stage or the "short-term improvement" (STI) of the re-engineering process.

MEA purchased the software from Pakistanian Airlines (PIA). The system named COPICS (communication oriented protection information and control system) was originally purchased from IBM. PIA developed it to meet its specific needs.

COPICS which is written under COBOL provides output users with information on three levels:

1. Inventory Account
2. Bill of material
3. Purchasing and receiving

The system operates under a newly purchased mainframe IBM ES/9000; ESA system (enterprise system architecture).

This mainframe has 2 CPUs each of which can accommodate 1024 terminal or other output devices.

Training on the new system was made between Lebanon and Pakistan. The system was declared operational on November 1993.

The first step required in order for the system to give efficient results is to input the correct data. So, management decided to physically count all item in the stock, compare discrepancies and finally, input correct quantity, cost, and bin location into the computer.

Between November 1993, and end of 1994 around 90,000 line items were counted (90% coverage).

The second, and very important step is to make people understand, accept and use the system.

Getting people to accept the idea that their jobs will undergo radical change is not a war won in a single battle. It is an educational and communication campaign that runs from re-engineering's start to its finish. This job requires a lot of patience and time.¹⁰³

"The most serious problem we faced" argues Mr. Mourtada, "is people's resistance to change." For 20 years or more, workers have used the old system. Although the procedures may be complicated, yet because work was fragmented, workers understood their task by heart and knew just perfectly how to execute it. Changing this was quite difficult.

"They put in front of me a machine I don't even know how to put it on and they told me I should work on it", argues one assistant manager in the department.

Inspite of the training provided, workers continued to use the old system. So, management decided to give them one month to start using the new system. Most workers did not respond. Another notice was given, yet with no effective response.

So, at the end argues Mr. Mourtada "I decided to take the risk." He put all manual stock cards in a box, sealed it and sent it to the warehouse. Workers found no other solution but to use the computer system.

Today, after almost 18 months of operations, all workers use their computers, they are happy about the system, but most of all they are happy about what they were able to achieve they reached a stage where they can work "within" the system, and interact with it, and not just "use" the system.

¹⁰³ . Hammer & Champy ,p.148

4.6 Benefits and Results

So, what are the benefits derived from applying the new system ?

Because the new system has not changed much of the procedures employed or work processes, it is not a pure re-engineering project; although it brought about substantial improvement in three main dimensions: time, manpower and paperwork.

Figure 4.2 shows the functional processes in the inventory system. The notes show the benefits derived on the three dimensions cited :

4.6.1. Time

The new system brought about substantial reduction in lapse time, of course in areas that were most affected .

For example, inquiring about a bin location used to take at least 5 minutes. In the new system, it takes 30 seconds at most. The clerk has to just type the part number. So it is a 5 minutes saving per transaction.

If the average number of transaction per day is 200, saving per day is : $5\text{min} * 200 = 1000$ minutes saving, almost equal to 16.6 hours or 2 working days which is equivalent to saving 2 clerks.

Also pricing and updating inventory records which used to take 2 weeks now takes 24 hours. Posting to the inventory records is done at the end of each day and cost accounts (aircraft jobs) get immediately charged.

As a total, the cycle was reduced form one month to one week which constitutes a 75% reduction in time.

4.6.2. Manpower

In the store function, no manpower reduction was noted because getting the parts, or binning them still involves manual work. On the other hand, in the inventory control section, manpower reductions were noted especially that the functions of sorting, pricing, posting and filing of inventory records were eliminated through the use of computers.

In the purchasing section also, small reductions were noted especially in the typists and secretaries since purchase orders which used to be typed can be now directly from the computer.

As noted in figure 4.2 a 20% reduction in staff was observed.

It can be argued that further reduction in manpower can be achieved. There are however some obstacles which hinder MEA from doing effective manpower reductions which are:

1. Political and cultural reasons which keep MEA from doing necessary lay-offs.
2. Inability, at the present stage to bring new, more experienced and computer literate staff.

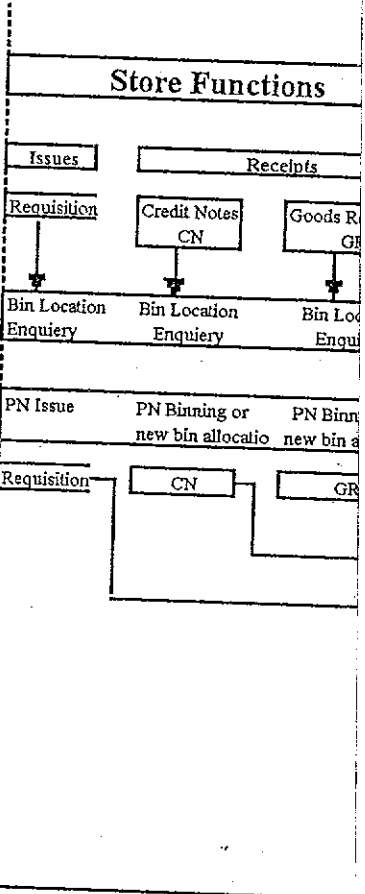
4.6.3. Reduction in Paperwork

Although no effective change in the processes was brought up yet, the number of formalities involved was substantially reduced.

For example, forms related to bin location, index update and those covering pricing and batch posting were depleted. Stock cards are now computerized. Moreover, forms related to purchasing, like SUDs and Purchase orders, are not used anymore and purchase orders are generated by the computer.

Another benefit derived here is that the need to match different sets of documents gets reduced. For example, the stock keeper no longer has to prepare a receipt voucher for goods received and prepare individual receipts for each item to compare quantity, part number and specification to the P.O. and the supplier's invoice. In the new system he just enters details to the P.O. and when goods are received, he checks the part number and enters the actual quantity received. Individual receipt vouchers can be typed, and discrepancy reports can be generated.

Ultimately, the new system brought about immediate tangible benefits in all three dimensions referred to above. In addition, and most important, the new system gives the ability to generate timely reports needed for decision making.



Staff	Not implemented
Time Factor	5 minute saving per transaction
Formalities	No change due to internal aviation regulations (evidence of conform

For example, an “Alert Report” is printed every week. This report gives indication on all items at or near reorder level. In addition to “Nil Reports” (items which have zero quantity) which can be generated daily.

In short, the system has the ability to provide managers with data on various dimensions. This data can be used for both internal budgetary control and for decision making purposes. This helps managers to:

- Reduce investment on purchases by buying the most essential parts at the most economical quantity
- Compare purchases with consumption
- Analyze situation of over purchasing and detect possible abuse or mismanagement of the system
- Optimize work by giving managers the possibility to detect and correct errors on time in addition to comparing actual results with the budget.

4.7. Re-engineering or not ?

The fundamental question which still needs to be answered is, “Can we label the change or Improvement Process which has affected the functions and processes of the technical supplies department in MEA as a re-engineering project properly defined ? ”

To be able to answer this question, one needs to analyze what was actually done and try to fit to the re-engineering concepts and principles described in chapter II, to see whether they apply or not.

First, one cannot say that the project involved a “Fundamental Rethinking”. Designing have not started from a “clean state of nature”. In fact, the old processes remained mostly unchanged. As shown in figure 4.2, the functional processes stayed basically the same the only difference is that now they are automated.

MEA mainly attempted to automate existing processes using computer technology to speed up the information flows and task performance. As shown previously, automation consists of providing workers with on-line computer terminals into which they could type the results of their individual efforts. Work is still done in the same way and sequence it used to be, but instead of

filling up forms manually, information is typed and processed directly on the terminals.

Automation and information technology (IT), at large, play a critical role in business re-engineering, but one that is easily miscast. Modern state of the art IT is part of a re-engineering effort, an *essential enabler* since it permits companies to re-engineer business processes.

However, Hammer argues ¹⁰⁴:

“ . . . merely throwing computers at an existing business problem does not cause it to be re-engineered. In fact, the misuse of technology can block re-engineering altogether by reinforcing old ways of thinking and old behavior patterns.”

Second, and most important, is that the project did not focus on business processes. The very heart of re-engineering stems from the fact it is mainly a process and not a function which should undergo change.

A re-engineering project normally begins with a survey of the process landscape to identify processes that are candidates for innovation. This step is an important prerequisite for successful process change. In MEA, processes were not changed. In fact, old processes were not even mapped out and studied carefully in order to identify which processes are obsolete or need change, which are the ones that “add value” to stakeholders and finally which are the company’s processes that are most susceptible to successful redesign.

Third, if we try to fit the implementation stages of this project to the six implementation steps identified by Rohlit Tolwar and referred to in Chapter 2, we realize that the project did not go about in the same manner identified in these stages.

1. Vision Definition: According to the matrix shown in Figure 2.9, page 38, the purchasing and inventory control processes which are the subjects of change provide a high value for the shareholder but a low value for the customer. This is because the customer does not derive immediate benefits

¹⁰⁴ . Hammer & Champy, p.83

from say speeding up the purchasing process since what he eventually sees and puts value on is the final outcome. He demands punctuality and good service.

The process fits in the middle region in Figure 2.10, page 39 The company can either rethink and realign this process or out-source and eliminate it.

2. Plan Development: The main pitfall here, is that the company merely used Automation in order to improve its IT infrastructure .

MEA has not used a balanced scorecard, in fact it has not tried to improve process orientation or organization design for example. Moreover, due to reasons discussed earlier, it did not develop and empower its staff sufficiently.

3. Business Analysis: Business analysis, per se, was not performed. The reason is because the company did not map and set a model of value added processes and eliminated unnecessary activities.

Hammer argues that existing processes, even if they are the source of a company's business problems, are nonetheless familiar; the organization is comfortable with them. The infrastructure to support them is already in place. Improving them seems so much easier and more sensible than throwing them out and starting all over. However, such incrementalization would only lead to failed or unsuccessful re-engineering projects. ¹⁰⁵

So, it goes the same manner that the redesign and implementation stages took only existing processes into consideration. Without going a step further and re-design the way work is done.

Fourth, unlike what re-engineering concepts preach, the project attempted to bring about marginal rather than dramatic improvement of results. It is true that major improvement were intended, because old processes remained virtually unchanged, only marginal or incremental improvements can be achieved.

Hammer argues that marginal improvements could further complicate the current process, making it subsequently more difficult to figure out how things really work. Even worse, making additional investments of time and capital into an existing process only discourage management from dumping that process down the road.

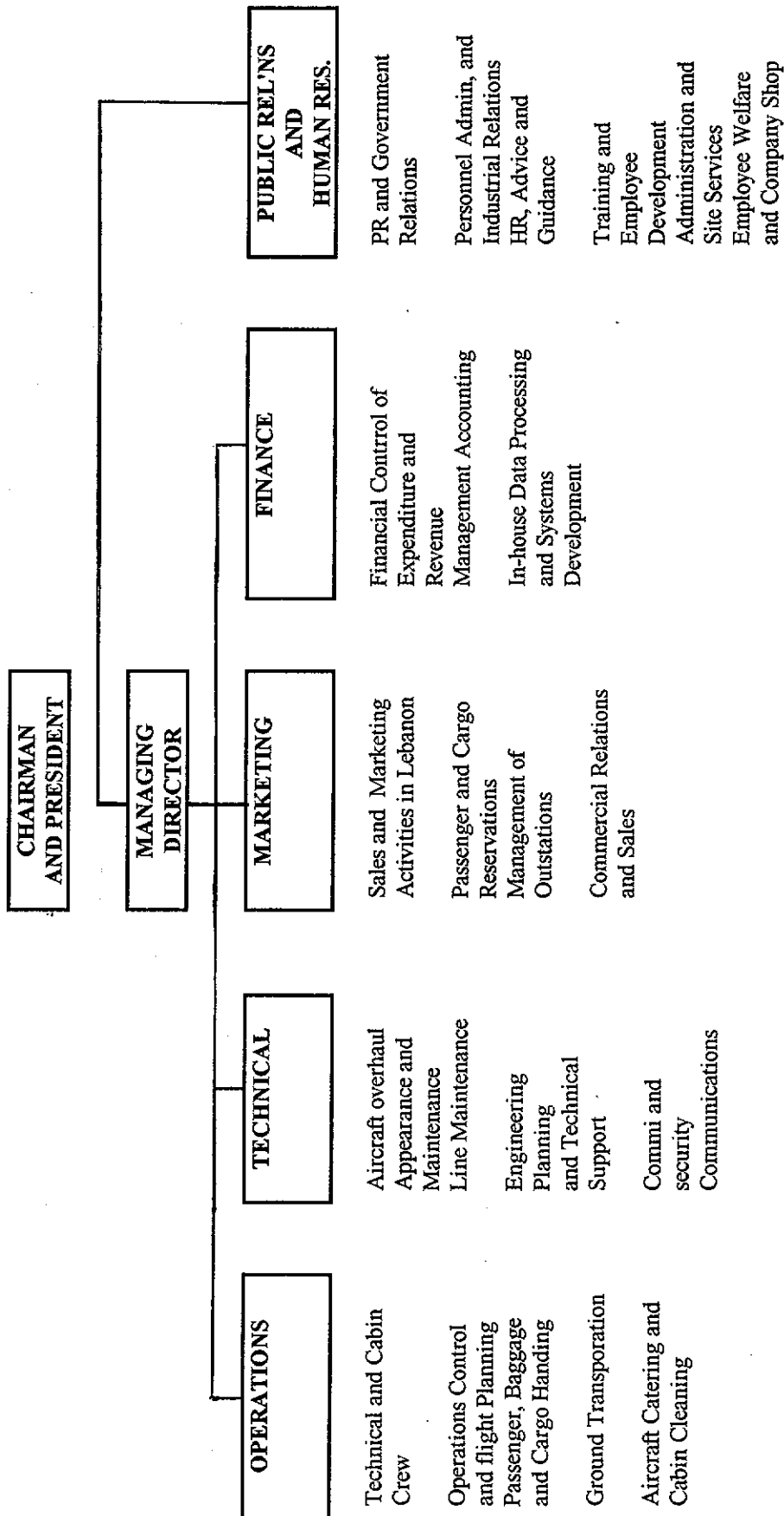
¹⁰⁵ . Hammer & Champy , p.202

Finally, to answer the fundamental question asked earlier concerning whether this project is a re-engineering project or not, one could come to the following conclusion:

Eventhough, as discussed earlier, the project does not fit the re-engineering concepts per se, it was able to bring about important and tangible improvement within a relatively short period of time. Of course, automation has helped to speed up work dramatically - but that is because comparison is done on the basis of a system, the procedures of which were laid down more than 20 years ago, and which have mostly become obsolete.

In order to cope with the dramatic change affecting the external and internal environment, further steps must be taken. At this stage, MEA must be willing to "rethink" and re-map its business processes.

EXHIBIT 1: MAJOR DEPARTMENTS AND KEY RESPONSIBILITIES



Chapter Five

Conclusion and Recommendations

5.1 Obstacles to Re-engineering Success

A re-engineering effort, triggers changes of many kinds. Job designs, organizational structures, management systems - everything associated with the process must be refashioned in an order to maintain a coherent business system diamond. (figure 5.1)

Hammer argues that re-engineering a company's business processes ultimately changes practically everything about the company, because all the aspects - people, jobs, managers and values - are linked together. These represent the four points of the business system diamond.¹⁰⁶

The business system diamond

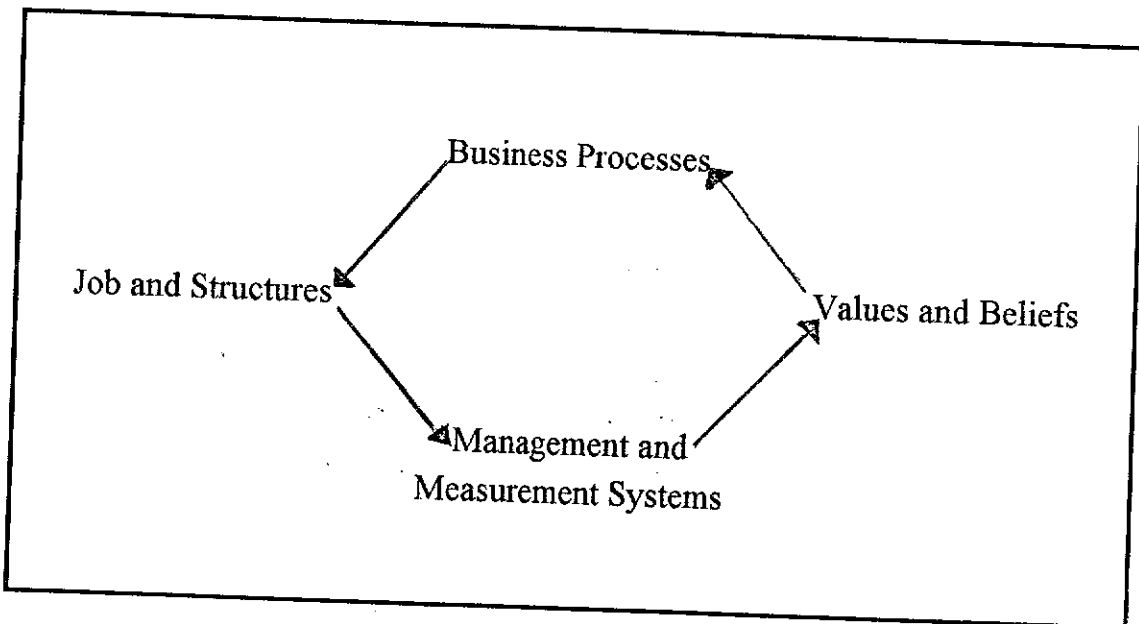


Figure 5.1- The Business System Diamond

¹⁰⁶ . Hammer & Champy p.80

The linkages are key to understand the process. The top point of the business system diamond, process, determines the second point, jobs and structure. And the way in which work is performed determines the nature of people's jobs and how people who perform these jobs are grouped and organized.

The fragmented processes found in traditional companies lead to narrowly specialized jobs and organizations based on functional departments. Integrated processes give rise to multidimensional jobs that are best organized into process teams.

So Processes, not organizations, are the objects of re-engineering. Companies don't re-engineer their sales or manufacturing departments, they re-engineer the work that the people in those department do .¹⁰⁷

Surviving in today's world demands strong executive leadership, an intense focus on customers and their needs, and superior process design and execution. Hammer argues that "Re-engineering is one of the tools companies must process and know how to use to acquire those perquisites to success .¹⁰⁸

But Re-engineering promises no miracle cure. It offers no quick, simple and painless fix. On the contrary, it entails difficult, strenuous work. It requires that people running companies and working in them change how they think as well as what they do. It requires that companies replace the old practices with entirely new ones. Doing so is not easy. It cannot be accomplished with just motivational lectures or a three days training programs¹⁰⁹ .

Since 1990, Business Re-engineering has become senior managers' program of choice for achieving strategic goal. Some surveys show that as many as 88% of large corporations are involved in BPR projects.

However high failure rates are noted. Consultants publicly estimate that as many as 50% to 70% of BPR projects fail ¹¹⁰. Among the biggest obstacles that re-engineering project face are:

¹⁰⁷ . Hammer & Champy p.117

¹⁰⁸ . *ibid* p214

¹⁰⁹ . *ibid* p.215

¹¹⁰ . *ibid* p.201

- *Lack of sustained management commitment and leadership.*

Management commitment must be sustained through out the project, leadership must focus on empowering employees, because they, ultimately are the source of dramatic improvements.

- *Unrealistic scope and expectations .*

Misperceptions and misunderstandings about BPR are very common. Senior executives' expectations may not be realistic, they may want concrete evidence of success within few months, for example, when the design phase alone may take one year.

- *Resistance to change.*

BPR is said to cause great resistance every where in the organization. Most resistance is reported to come from middle managers, because major lay off are occurring in middle management ranks.

5.2 Preconditions for BPR success :

B. Bashein, M. Lynne Markus and P. Riley undertook a research on more than 60 re-engineering consultants from approximately 40 consulting firms. The objective of the study was to identify the general preconditions for BPR success and failure. The BPR consultants interviewed mentioned the following positive preconditions which should be present in any BPR project¹¹¹.

1. Senior management commitment and sponsorship

It was found that the probability of BPR success is significantly higher when all senior executives in an organization are totally and visibly committed to the re-engineering effort.

2. Realistic expectation

Consultants believe that companies with executives who understand the problems and opportunities and set realistic BPR goals and objectives have a higher chance for success.

¹¹¹ . B. Bashein, M. Markus, & P Riley, " Preconditions For BPR Success, and How to Prevent Failures" *Information Systems Managment* (Spring 1994), p.9

3. Empowered and collaborative workers

Empowered team members are needed during a project to identify and redesign business processes. Collaborative team members are needed after a project to carry out the redesigned business processes on an ongoing basis.

4. Strategic context of growth and expansion

BPR projects that are viewed by managers and employees in terms of growth and expansion, rather in terms of downsizing and cost cutting have a higher chance for success because they generate more enthusiasm and less resistance.

5. Shared vision

Successful BPR project require a clear vision of how the organization will meet strategic goals of the business process in question. This vision must be shared and communicated to all levels of the organization.

6. Sound management processes

Companies that begin with basically sound management processes have a higher chance of succeeding at re-engineering.

Management processes - which include strategic planning, capital budgeting, financing and IT investing etc. - must be effective in order to achieve and sustain results from re-engineering operational processes.

7. Appropriate people participating full time

Re-engineering is more successful if the members selected to represent each functional area are dedicated to the re-engineering effort on a full time basis. A team redesigning a business process should include members both internal and external to that process. Insiders help define the current steps and identify the value added activities. Outsiders especially customers and suppliers, bring creativity and a fresh perspective to the redesign effort.

8. Sufficient budget

To achieve break-through improvements, a company needs to create an adequate budget and to be willing to invest in new information technologies.

Despite the opportunities for failure and the high risks involved, Re-engineering is a high reward endeavor Hammer argues that:

"Organizations that approach re-engineering with understanding, commitment and strong executive leadership will succeed at it. The pay off of successful re-engineering are spectacular for the individual company, for its managers and its employees..."¹¹².

The widespread interest in re-engineering as a process that helps organizations establish and move along new performance improvement trajectories points to a need for managers to consider strategy at a higher level than the functional orientation that has been the focus for so long. The interdisciplinary, broad process improvement model is at the business unit level of strategy development and implementation.

Today's intensely competitive environment, the dramatic advance of information technology and the recognition of the need for total organizational commitment produce an unprecedented opportunity: the opportunity to develop new business-level strategy and to almost simultaneously link functional strategies.

Re-engineering translates the new improvement trajectory directly into action and the need for "interfunctional linkages in business strategy" is eliminated because strategy is developed across functions right from the start so the firm can function as a whole rather than as the sum of its parts¹¹³.

5.3 - Proposed Improvements to Re-engineering The Inventory Control and Purchasing Process at MEA

Think about the ways in which people apply computer techniques. They feed what they already know onto a computer and then send graphs, reports and memos everywhere. The problem is that people frequently focus too much on information acquisition instead of on decision making itself and business process redesign.

In response to the fact that the huge investment in information technology, has had little impact on product, business are being re-engineered. Information technology is used to redesign business processes, with the proposed result

¹¹² Hammer & Champy p.213

¹¹³ Dixon & Arnold p.107

bringing dramatic improvements in performance. Re-engineering business process is accomplished by eliminating redundant processes and producing more efficient and effective units for the organization.¹¹⁴

Davenport argues that :

*Process innovation is meaningful only if it improves a business in ways that are consistent with its strategy. In fact, process innovation is impossible - or at least only accidental - unless the lens of process analysis is focused on particularly strategic part of the business, with particular strategic objectives in mind.*¹¹⁵

The central strategy of Middle East Airline, is to regain its role in the region and achieve its goal of modernization.

At this stage, the key issue is to restore long term profitability. Profit improvement can come from three primary actions :

- i. revenue enhancement
- ii. cost reduction
- iii. cessation of unprofitable activities

While MEA must focus on all these three areas, it can achieve the most immediate benefit from significant cost reductions.

Tying this to the inventory control and purchasing processes, one comes to the conclusion that significant cost reduction whether in terms of overheads or manpower must be done.

Looking back to the benefits and results cited in chapter 4, and to figure 4.2, one cannot deny the fact that significant improvements and cost reductions were achieved. Yet, in order to meet the overall objectives, further steps need to be implemented.

Companies like MEA seeking improvements in performance measures must redesign their existing business processes.

¹¹⁴ . S. Wang. "OO Modeling Of Business Processes, Object- Oriented Systems Analysis"*Information Systems Managment* (Spring 1994), p.36

¹¹⁵ . Davenport p.117

In a typical organization, business processes evolve over time and their legitimacy and procedural rationality are seldom questioned. There is no assurance that people involved in a particular business process fully understand how the related functions participate in that process.

James Feng and Varun Grover argue that in order to succeed in re-engineering efforts, certain characteristics of a business process must be altered. These characteristics pertain to how different functions are coupled to each other and orchestrated -functional coupling- to produce common process outcome.

The functional coupling of a process can be differentiated along two dimensions: degree of mediation and degree of collaboration ¹¹⁶.

5.3.1- Degree of Mediation:

Many functions are involved in a typical business process. Each particularly has inputs and outputs. These outputs would either directly facilitate the process outcome or serve as inputs to other participating functions. This input-output relationship may involve the actual transfer of a physical object. For example, delivering parts after the receipt of the requisition form. Or it could be the issuance of a document by one function to authorize certain action in another decision, like the issuance of alert of nil report in order to initiate a purchase.

The extent of such sequential flow of input and output among the participating functions in a business process constitutes the degree of mediation of the process. In MEA the degree of mediation is quite high. For example, a simple store requisition involves many intermediate steps and sequential flow of paper documents; it first passes through layers of management approvals then to the stores to bin the location and deliver the parts required then to the inventory control to update inventory records and ultimately to finance to update the parallel accounting records.

¹¹⁶ . Teng, Grover, & Fiedler, p.12

5.3.2- Degree of Collaboration:

The second dimension of business processes is related to the degree of collaboration between functions through information exchange and mutual adjustments when participating in the same process. The frequency and intensity of information exchange between two functions can range from none (completely insulated) to extensive (highly collaborative).

In MEA collaboration between functions was very low. In certain cases, (inventory control, finance interaction) complete insulation was observed. Although the degree of collaboration was substantially enhanced through automation, yet further improvements can be implemented.

Today's increasingly uncertain environment has rendered standardized rules and procedures too inflexible, and the penalty for an isolated function is the possibility that its output would be unsatisfactory or even useless to other functions in the process.

To meet this challenge, the functional coupling pattern of many traditional processes must be modified and even radically altered among the participating functions. The applications of IT greatly facilitates this change ¹¹⁷.

In MEA, achieving dramatic improvements through effective functional coupling can be proven very beneficial. However, the researcher is faced with two main constraints:

1. Impossibility at the current stage to do necessary lay-offs and recruit new staff.
2. Implementation requires heavy investments in IT which may not be possible currently (due to liquidity problems).

For the purpose of this paper, the researcher will disregard these constraints because ultimately succeeding at re-engineering requires a sufficient budget and necessitate quick action.

¹¹⁷ . Teng, Grover, & Fiedler, p.14

5.4 Recommendations

The proposed new improvements to the system can be summarized as follows:

5.4.1- Store Function:

Ideally, requisition of materials should be generated directly from the department concerned and connected to the computer. In the stores section through an on-line system . However, some operational constants hinder the implementation of this step. In fact, the regulatory authorities like DCA, ACC... and others require that information must be traceable back to birth meaning that all documents related to parts used and installed on a certain aircraft must be clearly authorized and kept in files for a certain period of time.

Concerning the binning part, bar codes can be used to identify spare parts. This would help reduce the probability of punching errors and reduce on manpower. Moreover, since the handling of the issues and receipt is done separately by two groups of workers, one could think of integrating them so that any material movement either issues or receipt can be handled by one person.

Finally, the ultimate in costs and manpower reduction could be achieved through the use of Robots so that when a requisition or a GR is received, the bin location is identified and an electronic signal is given to a robot which goes, picks the material required, or puts the goods received in their place. However, this requires heavy investments and change in stores infrastructure.

5.4.2- Inventory Control function:

The most important step to be done here and which must in our opinion be implemented in the second phase of the innovation process is to eliminate the bottleneck which exists between the updating of inventory and finance records. Recording of the inventory movements in the finance section is still done manually. So, reports and entries get piled up. In fact, the material control section (in the finance department) is usually in a delay of six to eight months relative to the inventory control section.

Therefore, automating the finance section and using an on-line computer system so that inventory movements get immediately updated in the accounting records is crucial and very important to be implemented as soon as possible.

5.4.3- Purchasing Function:

The ultimate in cost and time reduction can be achieved here through the use of shared data bases with the major suppliers. In this manner, P.O can be directly sent to suppliers through computer networks so that immediate response can be get on availability of parts, delivery date and shipment details.

The shared data bases allow MEA to have rich and accurate information exchange with suppliers and allow it to use electronic data interface and payment systems.

Moreover, MEA must break down bureaucratic structures. The typical military-style command structure of decision making and communications must be replaced by an open system that promotes feedback, innovation, and communication in all directions and at all levels. This can only be achieved by flattening the current organizational structure. The technical supplies currently encompasses eight management layers. Reducing these layers is a vital step to succeed in re-engineering. This can be successful only if people are given the power to make decision and are given more responsibilities.

Finally, MEA consider moving to Just-In-Time (JIT) inventory practice. In fact, many companies attempting to better coordinate the procurement and delivery of goods from suppliers along the entire chain industry are turning to (JIT) practices. A survey of twenty one suppliers revealed that successful implementation of JIT achieved radical improvements in lead time, defect rate and inventory reduction ¹¹⁸.

In conclusion, Re-engineering is not really new, it incorporates many of the tenets of good management already recognized as successful performance improvement programs. The need for management commitment and the need for appropriate training are examples of not-so-new concepts that are critical to re-engineering success. But what is new is the recognition that the new improvement trajectories call for new models for improvement. Initiating the movement in a new direction is what re-engineering is all about, and its success is dependent upon very active and directive leadership and a project orientation that focuses energy and changes direction ¹¹⁹.

¹¹⁸ . Davenport, p.237

¹¹⁹ . Dixon & Arnold. p.107

Davenport argues that in spite of the risks faced on implementing Business Process Re-engineering, there are important reasons for throwing caution to the winds and launching a major initiative. Re-engineering is here to stay. In fact, there have been enough success to indicate its feasibility and potential ¹²⁰.

Ultimately, Re-engineering is not a fad. Despite the rhetorical aspect of discussions about the topic, few would question the performance of its foundation. The value of viewing a business cross-functionally, through the eyes of customers, is not a fad. The notion of radical improvement of business activity is beyond fashion. The idea that information technology and human factors can enable organizational change is not new.

Davenport adds that:

*Re-engineering will be a concern for good managers for many years. The best thing to do is to try it because not to do so "... is to forgo not only an opportunity for competitive advantage, but even the ability to remain viable."*¹²¹

¹²⁰ . Davenport, p.306

¹²¹ . Ibid, p.307

BIBLIOGRAPHY

- Bashein, Barbara., Markus, Lynne., and Riley, Patricia. "Preconditions For BPR Success and how to prevent Failures". *Information Systems Management* (Spring 1994).
- Brown Hogarty, Donna. "The Future of Middle Managers". *Management Review* (September 1993): 82-9.
- Davenport, Thomas. *Process Innovation: Reengineering Work through Information Technology*. Boston, MA: Harvard Business School Press, 1993.
- Davenport, Thomas., and Stoddard, Donna. "Reengineering: Business Change of Mythic proportions ?". *MIS Quarterly* (June 1994).
- Dixon, Rodd., Arnolod, Peter., and Heineke, Janelle. "Business Process Reengineering: Improving in New Strategic Directions." *California Management Review* (Summer 1994).
- Greengard, Samuel. "Reengineering: Out of the Rubble." *Personnel Journal* (December 1993).
- Hall, Gene., Rosenthal, Jim., and Wade, Judy. "How to Make Reengineering Really Work." *Harvard Business Rview* (November-December 1993).
- Hamel, Gray, and Prahalad, C.K., "Competing for the Future". *Harvard Business Review* (July- August 1994).
- Hammer, Micheal., and Champy, James. *Reengineering the Corporation: A Manifesto for Business Revolution*. New York, NY: Harper Business Press, 1993.
- Hammer, Micheal. "Reengineering Work: Don't Automate, Oliberate". *Harvard Business Review* (July-August 1990).
- King, William. "Process Reengineering: The Strategic Dimensions." *Information Systems Management* (Spring 1994).

- Kinni, Theodore B. "The Reengineering Rage: Powerful new improvement process or Pet Rock." *Industry Week* (February 7, 1994).
- Klein, Mark. "Reengineering Methodologies And Tools: A Prescription for Enhancing Success." *Information Systems Management* (Spring 1994).
- Klein, Mark. "The Most Fatal Reengineering Mistakes." *Information Strategy: The Executive's Journal*. (Summer 1994).
- Manganelli, Raymond, and Klein, Mark. "A Framework for Reengineering" *Management Review* (June 1994).
- Mirani, Rajesh., and Lederer, Albert. "Making Promises: The Key Benefits of Proposed IS Systems." *Journal of Systems Management* (October 16, 1993).
- Romme, Marshall. "Business Process Re-engineering." *The CPA Journal* (October 1994).
- Special Ernst & Young Report. "Proposal to serve MEA" . (June 1994).
- Talwar, Rohit. "Business Re-engineering: A Strategy-driven Approach." *Long Range Planning* (April 1993): 26-6.
- Teng, James., Grover, Varun., and Fiedler, Kirk. "Business Process Reengineering: Charting a Strategic Path for the Information Age." *California Management Review* (Spring 1994).
- Wang, Shounhong. "OO Modeling of Business Processes: Object-Oriented Systems Analysis" *Information Systems Management* (Spring 1994).
- Want, Jerome.H., "Managing Radical Change". *Journal Of Business Strategy*.
- Zikmund, William. *Business Research Methods*. Orlando, Florida: The Dryden Press, 1991.