

**BUSINESS PROCESS REENGINEERING  
WITH APPLICATIONS**

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MASTER OF BUSINESS ADMINISTRATION IN MANAGEMENT**

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# **BUSINESS PROCESS REENGINEERING WITH APPLICATIONS**

**Görkem İplikçiođlu Rayman**

## **ABSTRACT**

**Business Process Reengineering (BPR), which has been one of the most popular management concepts in the recent years, is investigated in this thesis. Many companies implement reengineering in order to improve their efficiencies, achieve performance improvements and they try to reinvent their organization via this new management technique.**

**A brief history of Business Process Reengineering subject is outlined in this study with the aim of understanding the conditions and the reasons of its emergence as a new management concept. Literature is reviewed to understand the subject thoroughly and to find out how this technique has been interpreted in the world. BPR is also compared with other management concepts it is in relation with such as Total Quality Management and Continuous Improvement.**

**Some companies that have implemented reengineering are analysed and their experiences are discussed. Analysis is then focused on a specific multinational computer company. This company's reengineering implementation has been analysed in detail.**

A research has been conducted in this multinational company. The findings of this research revealed that most of the employees rate reengineering as a successful initiative and they are satisfied with reengineering. The general opinions about the consequences of reengineering implementation are found out to be increased performance, motivation and customer satisfaction. In contrast to expected BPR results, the employees figured out that processes did not become simpler and workload was not reduced after BPR implementation in their company. Perceptions towards reengineering were more positive going from bottom to top levels of management.

Having analysed different companies experiences and conducted a research on a specific company, a business process reengineering methodology is proposed in this thesis. This methodology can help companies to implement their changes efficiently and effectively.

# UYGULAMALARLA YENİDEN YAPILANMA

**Görkem İplikçiođlu Rayman**

## KISA ÖZET

Bu tezde son yılların en gözde işletme kavramlarından birisi olan Yeniden Yapılanma incelenmiştir. Günümüzde pek çok şirket verimliliklerini ve performanslarını artırmak amacı ile yeniden yapılanmaya gidiyor ve organizasyonlarını bu teknik sayesinde yeniden düzenliyorlar.

Yapılan çalışma ile, Yeniden Yapılanma konusunun kısa bir tarihçesi verilerek bu işletme kavramının ortaya çıkış koşulları ve nedenleri belirtilmiştir. Konuyu tam olarak kavrayabilmek ve dünyada nasıl yorumlandığını belirlemek amacı ile Yeniden Yapılanma süreci ile ilgili yapılmış çalışmalar incelenmiştir. Söz konusu teknik ilgili olduğu Toplam Kalite Yönetimi ve Sürekli Gelişme gibi işletme kavramları ile de karşılaştırılmıştır.

Yeniden Yapılanma sürecini uygulamış olan bazı şirketler incelenerek, yaşamış oldukları deneyimler anlatılmıştır. Şirket analizleri uluslararası bir bilgisayar şirketi üzerine yoğunlaştırılmış ve bu şirketin yapılanması detayla incelenmiştir.

**Bahsi geçen çok uluslu şirkette bir araştırma yapılmıştır. Bu araştırma şirket çalışanlarının çoğunun yeniden yapılanmayı başarılı bulduklarını ve memnun olduklarını ortaya koymuştur. Çalışanların görüşlerinin Yeniden Yapılanma ile birlikte performans, motivasyon ve müşteri memnuniyetinin arttığı yönünde olduğu anlaşılmıştır. Beklenen sonuçlarının aksine, yapılanma sonrası süreçlerin daha basit olmadığı ve iş yükünün azalmadığı belirtilmiştir. Yeniden yapılanmaya karşı tutumlar yönetimin üst düzeylerine çıktıkça daha olumlu bulunmuştur.**

**Farklı şirketlerin deneyimlerinin incelenmesi ve bilgisayar şirketinde yapılan araştırma sonrasında, bu tez ile bir yeniden yapılanma yöntemi önerilmiştir. Bu yöntem şirketlerin verimli ve etkili bir şekilde değişmelerini sağlayabilir.**

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## I. INTRODUCTION

This study aims discovering business process reengineering (BPR) subject, taking an overall view of literature in the world on this subject, analyzing some companies that have implemented reengineering and focusing the analysis on a specific company which is one of the largest multinational corporations in computer industry and proposing a reengineering methodology.

First, business process reengineering in the world is investigated, concerns about how BPR was seen in the world, what stages it has passed until today and how it was implemented are analyzed.

Some companies that have implemented business process reengineering like AT&T, Texas Instruments, Ford, Chrysler... are analyzed, their experiences about business process reengineering are discussed .

The business process reengineering implementation of a large multinational corporation in the computer industry has been investigated in detail. The reasons for reengineering implementation and reengineering initiatives specific to the company are analyzed.

A research has been conducted in this company, employees are interviewed in order to measure their attitudes and satisfactions with reengineering and to figure out how they rate the success of reengineering implementation and how successful business process reengineering initiatives were rated in the company.

Finally business process reengineering methodologies developed by consultants are analysed and then a reengineering methodology is proposed by the author of this thesis.

## II. MAJOR OBJECTIVES OF THE STUDY

With this thesis, I want to enhance my knowledge on BPR (Business Process Reengineering) subject, learn what reengineering is, for what purposes it can be used, how it can be implemented in order to help companies improve their efficiency and how reengineering can change the future of the companies.

I will analyze the BPR literature in the world, and to get an overall view of the literature, I will have a look at reengineering history and understand the reasons and conditions for its emergence as a new management concept. I will briefly look at how business process reengineering was defined by the experts of the subject. Thus, I will see how Business Process Reengineering was seen and interpreted in the whole world since it has arisen as a solution for companies to improve their efficiencies. I want to understand the BPR concepts and components that will help me in the further stages of the thesis.

Another objective of this study is to analyze some companies ( like AT&T, Ford, CIGNA, Texas Instruments, Chrysler...) that implemented BPR as case studies, see the consequences of reengineering in different companies, for what reasons they have implemented reengineering, how they have implemented reengineering, how their processes changed after reengineering and whether they have succeeded or not. I will try to show these companies' reengineering experiences so that these experiences can help other companies who are planning to redesign their processes and implement reengineering.

I will then analyze a specific example : One of the largest multinational corporations of the computer industry in the world. I will investigate this company's business process reengineering implementation in detail, from the days it started until now. I will look for the reasons why the company started reengineering, how reengineering was implemented, what the reengineering initiatives consisted of, what kind of tools were used during reengineering project, how the processes changed and look for the consequences of reengineering . I will conduct interview with the company employees in Turkish subsidiary of this MNC and try to figure out the reengineering effects on the employees.

After analyzing case studies and the specific company's reengineering processes in detail, I plan to learn about implementation aspects of BPR and try to figure out how reengineering can be implemented efficiently in a company. I will analyze reengineering methodologies in literature and propose a reengineering model that can be applied in companies that need to redesign their processes and so improve the company efficiency.

### **III. LITERATURE REVIEW ON BUSINESS PROCESS REENGINEERING**

Business process reengineering (BPR) is becoming one of the fastest growing concepts in the business world today. Most of the companies take on reengineering projects in order to achieve performance improvements. They try to reinvent their organization via reengineering. This requires radical and dramatic operational and organizational transformation.

Business process reengineering is about understanding and organizing around outcomes, about how work should be performed, and about how the organization should be aligned, managed and led. BPR is about listening to customers, changing the established rules and tradition-bound culture, creating tangible value in work, generating learning and ideas, sharing knowledge and reinventing processes and management practices.

Michael Hammer, the father of reengineering, emphasized in his book "Reengineering the Corporation" that reengineering strives to break away from the old rules about how the businesses are organized and conducted. It involves recognizing and rejecting some of them and then finding imaginative new ways to accomplish work. Reengineering should be accomplished with small and cautious steps in an organization.

Business process reengineering triggers changes of many kinds, not just of the business process itself. Job designs, organizational structures, management systems - anything associated with the process - must be refashioned in an integrating way. In other words, business process reengineering is a tremendous effort that mandates change in many areas of the organization.(Hammer, 1990)

Before giving BPR definitions from the literature let's look at reengineering myths, tenets and principles.

### **3.1. The Myths of Reengineering**

Business process reengineering is highly touted, often doubted and overused. Unfortunately, reengineering has come to mean many different things and it is this inconsistency that has contributed to the misuse and misunderstanding by management consultants and public alike. It has been equated to downsizing, client/server computing, quality and several other management nostrums of the past several years. The following are the myths of reengineering from BPR literature, based on interviews and conversations with more than 200 companies and 35 reengineering initiatives (Mische & Bennis, 1996):

***1. Reengineering assumes that an organization has done all the wrong things, all along, it should obliterate everything and start over.***

Reality : Reengineering recognizes that an organization has been successful and has done a number of things correctly, but may be not perfectly. Reengineering cultivates the great things an organization has done by challenging it to do them better and most important differently. Innovation is the key to reengineering.

***2. Reengineering is information technology, systems integration, applications development, client/server and the migration away from mainframes.***

Reality : Reengineering recognizes that information technology is an enabling agent of change and is essential to any reengineering effort. However in and by itself, reengineering is not simply about information technology.

***3. Reengineering requires downsizing and personnel reductions.***

Reality : Nothing could be further from the truth. Reinventing the enterprise through reengineering is about doing things differently and more effectively, with or without existing resource levels.

***4. Reengineering means doing more work with less resources.***

Reality : Reengineering means creating greater leverage and efficiencies through process innovation, seamless and harmonious workflows and more agile organizational structures.

***5. Reengineering can fix any problem and any issue.***

Reality : Reengineering is not a short term, quick-fix management tool. Reengineering is systemic and facilitates tremendous cultural and institutional changes.

***6. Reengineering can be performed and managed by anyone.***

Reality : Reinventing the organization through reengineering requires mature business judgment, extensive and broad-based experience, a bold vision and a refined methodology.

***7. Reengineering can be sponsored by anyone in the organization.***

Reality : Reengineering is about reinventing the organization : success therefore depends on its being sponsored by the highest levels of leadership in the organization.

***8. Reengineering can occur without significant organizational change and transformation.***

Reality : Reinvention through reengineering is transformation. Reengineering creates a new organization, different organizational structures, and a new leadership mentality.

***9. Reengineering creates chaos and anxieties and can be disruptive and detrimental to the organization.***

Reality : Reengineering causes change, and change for most organizations and their managers can be excruciatingly difficult. If reengineering is not managed and performed properly, chaos and lasting scars will result.

### ***10. Reengineering is scientific.***

Reality: Reengineering is not a physical or natural science. Scientific concepts and techniques could very well find their way into a reengineering process, but they are not reinvention through reengineering.

## **3.2. The Tenets of Reengineering**

The following are the tenets of that guide all the reengineering efforts (Mische & Bennis, 1996):

***1. Increasing throughput and productivity*** : Reengineering seeks to optimize organizational practices through the creation of seamless and harmonious processes that have an uninterrupted, natural flow and velocity.

***2. Enhancing quality and shareholder value*** : Reengineering optimizes shareholder value and creates competitive advantage through innovation.

***3. Achieving quantum results*** : Reengineering is mandated with a mission and passion to achieve quantum results and strategies advantage through innovation and the radical transformation of the enterprise.

***4. Eliminating low-value work and hierarchical organization*** : Reengineering constructively interrogates work and organizations to assess value, purpose and content. Work of seemingly low shareholder and competitive value as well as responsible organizations are repositioned to provide greater contribution or eliminated.

***5. Compressing time and consolidating functionality*** : Reengineering is designed to create processes and organizations that are leaner, flatter and more adaptive. Agility and the ability to anticipate and rapidly assimilate market trends, customer needs and competitor initiatives are trademarks of the reinvented enterprise.

### **3.3. The Principles of Reengineering**

Business Process Reengineering concept has some principles, defined by its father, Michael Hammer. (Hammer, 1990) These seven principles are as follows :

#### ***1. Organize around outcomes, not tasks :***

This principle says to have one person perform all the steps in a process. Design that person's job around an objective or outcome instead of a single task.

#### ***2. Have those who use the output of the process perform the process:***

In an effort to capitalize on the benefits of specialization and scale, many organizations established specialized departments to handle specialized processes. Each department does only one type of work and is a "customer" of other groups' processes. This works but it is a slow and bureaucratic process.

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

When the people closest to the process perform it, there is little need for the overhead associated with managing it. Interfaces and liaisons can be eliminated, as can the mechanisms used to coordinate those who perform the process with those who use it. Moreover, the problem of capacity planning for the process performers is greatly reduced.

#### ***3. Subsume information-processing work into the real work that produces the information :***

The previous two principles say to compress linear processes. This principle suggests moving work from one person or department to another. Why doesn't an organization that produces information also process it? In the past, people did not have

the time or were not trusted to do both. Most companies established units to do nothing but collect and process information that other departments created. With reengineering, departments both process and produce information.

***4. Treat geographically dispersed resources as though they were centralized :***

The conflict between centralization and decentralization is a classic one. Decentralizing a resource (whether people, equipment or inventory) gives better service to those who use it, but at the cost of redundancy, bureaucracy, and missed economies of scale. Companies no longer have to make such trade-offs. They can use databases, telecommunications networks, and standardized processing systems to get the benefits of scale and coordination while maintaining the benefits of flexibility and service.

***5. Link parallel activities instead of integrating their results:***

This principle says to forge links between parallel functions and to coordinate them while their activities are in process rather than after they are completed. Communications networks, shared databases and teleconferencing can bring the independent groups so that coordination is ongoing.

***6. Put the decision point where the work is performed, and build control into the process :***

In most organizations, those who do the work are distinguished from those who monitor the work and make decisions about it. The tacit assumption is that the people actually doing the work have neither the time nor the inclination to monitor and control it and that they lack the knowledge and scope to make decisions about it. The entire hierarchical management structure is built on this assumption.

This principle suggests that the people who do the work should make the decisions and that the process itself can have built-in controls. Pyramidal management layers can therefore be compressed and the organization flattened.

Information technology can capture and process data, expert systems can to some extent supply knowledge, enabling people to make their own decisions. As the doers become self-managing and self-controlling, hierarchy - and the slowness and bureaucracy associated with it - disappears.

### ***7. Capture information once and at the source :***

This last principle is simple. When information was difficult to transmit, it made sense to collect information repeatedly. Each person, department or unit had its own requirements and forms. Companies simply had to live with the associated delays, entry errors, and costly overhead. Why do we have to live with those problems now? Today when we can collect a piece of information, we can store it in an on-line database for all who need it. Bar coding, relational databases and electronic data interchange make it easy to collect, store and transmit information.

### ***3.4. Definitions of Reengineering from Literature***

The above sections on reengineering myths, tenets and principles give an idea of what reengineering is about and what it is not about. There are a number of creative reengineering definitions in the literature. Here are some of these that are worth noting for the aims of this study :

- \* Reengineering is the process of reinventing the enterprise and cultural transformation through aggressively challenging traditional doctrines, management practices, business activities and organizational paradigms and the reinventing and redeployment of enterprisewide capital and human resources into cross-functional processes and structures to optimize competitive position, shareholder value and societal contribution. (Mische & Bennis, 1996)

- \* Radical redesign of the business processes with the use of modern information technology in order to achieve dramatic improvements in their performance. (Hammer, 1990)
- \* Reengineering, process innovation or core process redesign, is the search for and implementation of radical change in business processes to achieve breakthrough results. Its chief tool is a clean sheet of paper. (Thomas, 1993)
- \* Business Process Redesign is "the analysis and design of workflows and processes within and between organizations" (Davenport & Short 1990).
- \* Stepping back from a process in inquiry as to its overall business objective, and then effecting creative and radical change to realize orders of magnitude improvements in the way that objective is accomplished (Davenport, 1991).
- \* The rapid and radical redesign of strategic, value-added business processes - and the systems, policies, and organizational structures that support them - to optimize workflows and productivity in an organization. (Klein, 1994)
- \* The critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures. (Teng, 1994)
- \* The means by which an organization can achieve radical change in performance as measured by cost, cycle time, service and quality, by the application of a variety of tools and techniques that focus on the business as a set of related customer-oriented core business processes rather than a set of organizational functions. (Johansson, 1993)

### **3.5. Characteristics of Reengineered Business Processes and Workplace**

When a reengineering project is implemented in a company, the process flow in the company changes in such a way that several jobs are combined into one process, the steps of the processes are performed in a natural order, and the processes have multiple versions.

After the processes are redesigned, the work is performed at the place and time where it makes the most sense. The amount of checks and controls are reduced. Reconciliation is minimized and so accounting procedures are reduced. A case manager provides a single point of contact and mostly the decisions are made by the workers instead of managers.

With the implementation of reengineering, a lot of changes occur within the organization as work units change from functional departments to process teams, jobs change from simple tasks to multidimensional work, roles change as empowerment is applied and power shifts are seen, job preparation changes from training to education. Also the focus of performance measures and compensation shift from activity to results, advancement criteria change from performance to ability, values change from protective to productive, organizational structures change from hierarchical to flat and executives change from scorekeepers to leaders. (Hammer & Champy, 1993)

## IV. HISTORY OF REENGINEERING

The concept of reengineering has a long history. Process design and the scientific study of work traces its origins back to Frederick Taylor (1856 - 1915), the father of scientific management. Taylor suggested that managers use process reengineering methods to discover the best processes for performing work, and that these processes be reengineered to optimize productivity. BPR echoes the classical belief that there is one best way to conduct tasks. In Taylor's time, technology did not allow large companies to design processes in a cross-functional or cross-departmental manner. Specialization was the state-of-the-art method to improve efficiency given the technology of the time. (Lloyd 1994)

Theories of organizational structure date back to Henri Fayol (1841 - 1925), Alfred Sloan Jr. (1875 - 1966) and information and measurement systems were studied years ago by Georg Siemens (1839 - 1901). Fayol originated the concept of reengineering as to conduct the undertaking toward its objectives by seeking to derive optimum advantage from all available resources. Finally Hugo Muensterbert (1863 - 1916) was fundamental in illustrating organizational value systems (Rigby, 1993). However, the combination of emerging technological capabilities and evolving market demands has created a niche for a new kind of radical, customer driven change.

Since early 1920's, Business Process Reengineering was practiced as a formal discipline. It was then known as "Methods and Procedures Analysis", always searching for new ways of restructuring work flows and improving business organization.

Business process reengineering has been around in 1960s and 1970s also. When global manufacturers rushed to Material Requirements Planning (MRP) systems in 1960s and 1970s, they in fact reengineered their manufacturing and scheduling practices. The use of electronic data interchange (EDI) substantially reengineered the administrative,

buying, shipping and receiving practices of many retailers, carriers, manufacturers and distributors. So historically, organizations actually performed reengineering without ever calling their efforts reengineering.

After MRP was experienced, solutions to problems in organizations were sought through JIT (Just In Time), CIM (Computer Integrated Manufacturing), TQM (Total Quality Management) and time-based competition efforts. Quick-fix solutions failed, as well as downsizing and decentralization. The problems can be found by analyzing the basic infrastructures - how parts are manufactured, how information is processed and communicated and how organizations are physically and logically structured. The reason for the quick-fix failures is that they generally treat symptoms, as in the case of MRP, or miss a substantial part of the infrastructure, as in JIT. Downsizing has not worked because the pure elimination of jobs without changing the way work is performed leaves huge voids in the basic processes. (Ligus, 1994)

Process change has its origins in a variety of approaches to business improvement. Primary sources include the quality movement, industrial engineering, and sociotechnical systems. The quality movement, in promoting continuous improvement, was the most instrumental source of process thinking. Its focus on outputs and customers created the mindset necessary for reengineering to flourish.

By the mid - to late 1980s, many companies in United States and Europe had begun to realize the need for more than continuous improvement. Companies such as Xerox, IBM, Ford and Hallmark demanded more radical change in their business processes and initiated programs to achieve it. (These companies' reengineering experiences will be analyzed as case studies later on in this thesis) Reengineering has emerged in such a business practice concept as an alternative to other management concepts and practices. Toward the end of 1980s, the idea of redesigning or reengineering business processes gained popularity, particularly in information technology circles.

Business Process Reengineering came to prominence in 1990 with the publication of what are now viewed as two of the seminal papers on the subject by Micheal Hammer and Thomas Davenport. A number of alternative names have also been introduced. Some of these phrases, for example : business reengineering, imply fundamental changes in the products or services offered by the enterprise concerned. The majority of the popular terms, e.g. business process reengineering , place more emphasis on improving the way in which existing products or services are provided. Some of the phrases, e.g. business process improvement (Harrington 1991) are widely used. Others, e.g. business process analysis are more obscure. All of these phrases share a common focus on business processes, but vary in terms of approach, tools and techniques used and the scale of the changes they envision.

The term business process reengineering seems to have become the most popular available alternative. In addition, Hammer's definition of reengineering (Hammer 1990) has become largely synonymous with the term BPR.

Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed (Macintosh & Francis, 1995).

One of the most common debates about BPR concerns the extent to which this radical approach to redesign is fundamentally different from other, more established approaches to change management. It is often viewed as traditional production or industrial engineering techniques applied to the office environment. This may be true up to a point, but there are at least two unique features to the new approach. First, as Davenport notes (Davenport and Short, 1990), it is a new type of industrial engineering which is enabled by advances in information technology. Second, and perhaps more fundamental, is the technique's focus on processes not functions. (Macintosh & Francis, 1995)

There are, however, widely differing views on BPR, which may be taken as evidence that the subject area is yet to mature. It is recognized that BPR is by no means a stable entity. It is an aspect of a complex set of relations between rhetoric, repackaged techniques, new techniques, managerial fashions and the newly perceived capabilities of IT (Coombs and Hull, 1995). In particular, debates have emerged in the literature on the role and importance of IT in BPR, the actual definition of business processes and the scale and timing of BPR applications.

Some authors view IT as the central, underpinning, enabler of BPR. It is surely not a coincidence that both Hammer and Davenport have backgrounds in IT. The technologies available today - computer communication networks, databases, expert systems, etc. - do offer new choices in the organization and design of work. Many of the case studies discussed in the literature use these technologies to allow a single person to complete a task or process which would previously have involved many different people, spread across a variety of organizational functions.

A second area of debate within the BPR literature is the definition used to describe a business process and the extent to which a generic set of business processes can be developed which will fit any enterprise. Davenport describes a business process as simply a structured, measured set of activities designed to produce a specified output for a particular customer or market (Davenport, 1993). Others offer variants on this description, but the recurring theme is that a business process is a collection of tasks which produce a customer output. A more contentious issue is the description of a set of generic business processes. Some offer Porter's value chain (Porter, 1985) as a description of processes which could be integrated with the BPR approach (Partridge and Perrin, 1993). Others have surveyed the alternative sets of generic processes used by companies and consultancies, (Harvey, 1994) and (Childe 1994). At an abstract level some consensus may be achieved over a generic set of processes, but as the level of detail increases disagreements begin to surface. Since most enterprises are not concerned with abstract models but operational ones, the alternative approach is to define a set of

processes, specific to each individual enterprise, and a popular approach here is to use some form of process mapping based around the order management cycle (Shapiro 1992).

Thirdly, there is also a debate about the scale and timing of BPR applications. Hammer is unequivocal in his view that BPR must be an all or nothing proposition which cannot be meticulously planned or accomplished in small cautious steps (Hammer, 1990). For him, the changes must be radical and they must be implemented quickly. A 1993 study of 100 re-engineering projects (Hall 1993) led to the conclusion that the re-design must penetrate to the company's core, focusing on achieving fundamental change in areas such as roles and responsibilities, measurements and incentives, organizational structure, information technology, shared values, and skills. The authors recommended a clean slate approach to produce fundamental change in these areas, claiming that this would be the only way that companies could avoid the classic re-engineering pitfall of focusing on fixing the status quo. In support of Hammer's view that these radical changes must be implemented quickly, Peters espouses the view that if you don't do these things over a weekend you'll never do them (Peters, 1992).

An alternative to this view is offered by Davenport who states that most BPR implementations take 2-3 years and that while the design phase of re-engineering is quite revolutionary in terms of the changes that it envisions, the implementation is often quite evolutionary (interviewed in Watts, 1994). His argument is that because of the cost of making such radical changes most companies tend to do it fairly slowly.

It can be seen from this review of BPR's development that the subject area has yet to mature and there is still much debate on what actually constitutes BPR. It is safest to present BPR as an umbrella term covering a range of approaches which feature many common themes. It is also true to say that the literature has made broad progress in research terms from the presentation of exemplar case studies in the first instance to a variety of step-by-step guides on how to do BPR. Researchers have yet to consider fully some of the more complex issues.

In the early 1990s, the concept was being well received by business executives. Today, reengineering is becoming one of the fastest growing concepts in the business world today. It is discussed throughout business organizations, studied in universities, and proposed by consultants as the solution to world class competitiveness. In 1994 three independent studies concluded that between 75 - 85% of America's largest companies had taken reengineering projects.

With the recent developments in Information Technology (IT), business process reengineering goes hand in hand with the modern technology. During the last decade most of the organizations in the world, large or small, have invested billions of dollars in information technology, hoping their productivity would somehow increase from their investment. IT has basically automated pre-existing processes in an organization, implemented existing business rules and structures.

## V. REENGINEERING AS A MANAGEMENT CONCEPT

### 5.1. How Does BPR Differ from TQM?

Teng (1994) note that in recent years, increased attention to business processes is largely due to the TQM (Total Quality Movement). They conclude that TQM and BPR share a cross-functional orientation. Davenport observed that quality specialists tend to focus on incremental change and gradual improvement of processes, while proponents of reengineering often seek radical redesign and drastic improvement of processes.

Davenport (1993) notes that Quality management, often referred to as total quality management (TQM) or continuous improvement, refers to programs and initiatives that emphasize incremental improvement in work processes and outputs over an open-ended period of time. In contrast, Reengineering, also known as business process redesign or process innovation, refers to discrete initiatives that are intended to achieve radically redesigned and improved work processes in a bounded time frame. Contrast between the two is provided by Davenport (1993):

**Table 5.1. Process Improvement (TQM) versus Process Innovation (BPR)**

	<i>Improvement</i>	<i>Innovation</i>
<i>Level of Change</i>	Incremental	Radical
<i>Starting Point</i>	Existing Process	Clean Slate
<i>Frequency of Change</i>	One-time/Continuous	One-time
<i>Time Required</i>	Short	Long
<i>Participation</i>	Bottom-Up	Top-Down
<i>Typical Scope</i>	Narrow, within functions	Broad, cross-functional
<i>Risk</i>	Moderate	High
<i>Primary Enabler</i>	Statistical Control	Information Technology
<i>Type of Change</i>	Cultural	Cultural/Structural

Source : Davenport (1993), page 11.

## **5.2. How does BPR differ from Continuous Improvement**

Many who have already put continuous improvement programs in place wonder how reengineering is different. Reengineering and continuous improvement are to today's CEO what a driver and putter are to a golfer; they are different yet complementary. And they are both needed to win. Both reengineering and continuous improvement emphasize customer satisfaction, use performance improvement measures and problem-solving techniques, focus on business processes, use teams and teamwork, bring about changes in values and beliefs (when successful), work to drive decisions-making down to lower levels in the organization, require senior-level commitment and change management for success

There are key differences, however. Reengineering focuses on large, cross-functional processes and entire business systems. As a result, reengineering can neither be initiated nor sustained from the bottom or middle of the organization. It is driven from the very top by a leader who believes that nothing is more important than reengineering and who is willing to do whatever it takes to make it happen. The following table gives more details about the differences between reengineering and continuous improvement.

**Table 5.2. Continuous Improvement versus Reengineering**

	<i>Continuous Improvement</i>	<i>Reengineering</i>
<b>Area</b>	Pervasive	Focused
<b>Breadth</b>	Small process(es)	Large process(es)
<b>Depth</b>	Existing business process	Entire business system
<b>Effect</b>	Way of work life	Disruptive
<b>Goals</b>	Incremental (5-20%)	Awesome (at least 50%)
<b>Leadership</b>	Empowe/support	Contract/do/direct
<b>Magnitude</b>	Evolutionary	Revolutionary
<b>Method</b>	Detailed analysis	Iterative design and testing
<b>Pattern</b>	Complexity and precision	Simplicity and ambiguity
<b>Style</b>	Improve existing process	Clean-sheet redesign around results
<b>Supposition</b>	Healthy process	Flawed process
<b>Technique</b>	Identify root causes	Break rules/paradigms
<b>Technology</b>	Industrial engineering	Innovation/change management
<b>Theme</b>	Eliminate waste/variation	Information technology as a key enabler

Source : WorthingBrighton Press, 1995

### **5.3. Relation between BPR and Information Technology**

Information Technology (IT) is the most effective enabling technology for reengineering. It helps in meeting the objectives of reengineering in three ways: by providing information across fundamental levels and establishing easy communication, improving the performance of the processes itself and also by helping the reengineering effort by modeling, optimizing and assessing its consequences. The veritable richness of this single technology has led many to interpret reengineering as the application of IT to business processes.

The relationship between information technology and reengineering is often expressed from two perspectives. The first perspective approaches the use of information technology for creating automated reengineered processes, while the second views IT as a provider of change. When IT is seen merely as a supporter of automation and as a supporter of automation and as a provider of appropriate tools, its full and radically new capabilities are not recognized. IT ends up merely aiding the automation of existing processes. This has led to failed expectations. There is also another concern in the use of IT as the prime vehicle for change: many organizations found it convenient to delegate restructuring to their IT departments that do not normally possess either a total vision of the company, or the requires breadth of the business processes. These departments therefore tried to envisage a role on the basis of the tools available to them and on what that perceived of the process - and on the basis of what was actually taking place and what indeed should be the changes. This was because of the absence of cross functional teams in the IT programs and lack of adequate knowledge on the capabilities of IT as applied to specific business processes.(Davenport, 1993)

Hammer (1990) considers IT as the key enabler of BPR which he considers as "radical change." He prescribes the use of IT to challenge the assumptions inherent in the work processes that have existed since long before the advent of modern computer and communications technology. He argues that at the heart of reengineering is the notion of

"discontinuous thinking -- or recognizing and breaking away from the outdated rules and fundamental assumptions underlying operations....

Davenport & Short (1990) argue that BPR requires taking a broader view of both IT and business activity, and of the relationships between them. IT should be viewed as more than an automating or mechanizing force: to fundamentally reshape the way business is done.

Business activities should be viewed as more than a collection of individual or even functional tasks: in a process view for maximizing effectiveness. IT and BPR have recursive relationship. IT capabilities should support business processes, and business processes should be in terms of the capabilities IT can provide. Davenport & Short (1990) refer to this broadened, recursive view of IT and BPR as the new industrial engineering.

Business processes represent a new approach to coordination across the firm; IT's promise -- and its ultimate impact -- is to be the most powerful tool for reducing the costs of coordination (Davenport & Short 1990). Davenport & Short (1990) outline the following capabilities that reflect the roles that IT can play in BPR: Transactional, Geographical, Automatical, Analytical, Informational, Sequential, Knowledge Management, Tracking, and Disintermediation.

Teng (1994) argue that the way related functions participate in a process -- i.e., the functional coupling of a process -- can be differentiated along two dimensions: degree of mediation and degree of collaboration. They define the Degree of Mediation of the process as the extent of sequential flow of input and output among participating functions. They define the Degree of Collaboration of the process is the extent of information exchange and mutual adjustment among functions when participating in the same process. In their framework, information technology is instrumental in Reducing the Degree of Mediation and Enhancing the Degree of Collaboration. Also, innovative uses of IT would inevitably lead many firms to develop new, coordination-intensive structures,

enabling them to coordinate their activities in ways that were not possible before. Such coordination-intensive structures may raise the organization's capabilities and responsiveness, leading to potential strategic advantages.

#### **5.4. The Role of the Information Systems Function in BPR**

Although, BPR has its roots in IT management, it is primarily a Business Initiative that has broad consequences in terms of satisfying the needs of customers and the firm's other constituents (Davenport & Stoddard, 1994). The IS (Information Systems) group may need to play a behind-the-scenes advocacy role, convincing senior management of the power offered by IT and process redesign. It would also need to incorporate the skills of process measurement, analysis, and redesign.

Real benefits to the business occur when IS becomes involved with more fundamental changes to the business processes themselves. Michael Hammer notes that "IS can not play a leadership role. But there is a very important role, an active role, that IS sometimes plays, what I call the catalytic role". The technology must support fundamental changes to the underlying processes and not simply be applied to the old, inefficient processes.(Hoffman, 1994)

New options in outsourcing can be used very effectively to help facilitate an IS reengineering effort. The key difference in these options, compared to the traditional approach of outsourcing the complete IS function, is the utilization of a mix of internal and external resources. Two outsourcing approaches which can support reengineering are transitional outsourcing and partnering.

## **5.5. BPR and Human Resources**

One of the visible consequences of reengineering is a large reduction of the workforce. This is because of elimination of unnecessary tasks within the old processes.

There are two major concerns about the impact of reengineering on human resource management (Arunachalam & Subramanian, 1995). The first relates to professionally preparing the workers for the change, and the second, concerns the problem of reducing the size of the work force.

Hammer and Champy recognize the importance of the human resources when they state “companies are not asset portfolios, but people working together to invent, sell and provide service.” (Ettore, 1995) However they fail to demonstrate how to reengineering the human resource in conjunction with reengineering processes.

Although Hammer and Champy provide a long list of why reengineering fails, nowhere do they include the prerequisite that no reengineering effort will succeed without first reeducating and retraining the people who will ultimately work with the new process. According to Meg Wheatley, “If you’re going to move information and responsibility down to local level, then the key question is how can you be sure that people behave appropriately? You need to make sure that everyone is playing by the same rule book.” (Brown, 1994)

CSC Index identifies two principle obstacles to BPR are fear among employees that their jobs are endangered and that years of experience will account for nothing. To overcome these apprehensions, managers must constantly communicate their plans and expectations. (Cone, 1994)

Although companies which are seeking to reengineering may work on revamping the performance appraisal system to support new values, this can be problematic. When bonuses are linked to profits or even the performance of team, this may lead to a situation where the individual is judged on factors beyond his or her control.

## **VI. CASE STUDIES FROM VARIOUS COMPANIES**

### **6.1. AT&T Corporation**

AT&T upper management started restructuring its Business Customer Care division in 1994 - a decision that will eventually reach out and touch 4,000 employees. Customer Care division deals entirely with the business segment of the marketplace - from mom and pop shops to multinational corporations. The division handles all aspects of customer support, including maintenance and billing. Previously customers had to talk with billing people in the billing center, then ordering people in the ordering center, then care people in the maintenance center. Now, the division is trying to integrate these requests so that one employee can deal with everything. (Bouvet, 1996)

The information-gathering stage of the effort started in 1994. AT&T organized a team to create a BPR plan and benchmarked other successful customer care organizations. In the process, employees who had been accountable largely to their bosses have been "re-educated" to respond directly to the customer.

AT&T had three major goals in mind when starting reengineering. First, to improve customer service; second, to provide better and more enriched jobs for the people in help centers, and third to reduce costs.

These three goals have not proved to be mutually exclusive. They have been able to improve service, reduce costs and create better jobs for people by making them more highly skilled.

For AT&T, the journey has begun in 1996. The 400 early adapters in business customer care are only the shock troops of what eventually will result in the whole-scale reengineering of 4,000 employees in the division. Throughout 1996, the company plans

to convert at last 3,000 of the 4,000 employees in the department. The entire division should be fully reengineered by the end of 1997, say officials.

In February 1996, AT&T reported that more than 700 employees have been sent through the process. AT&T assigned 30 to 50 employees per week to training throughout the year. And, under pro-BPR Chairman Robert Allen, the effort has spread to other customer service divisions.

The high-tech solution to customer care has not only resulted in one call fits all. It has also resulted in enhanced capabilities for the company to electronically monitor the efficiency of workers. This has proven a boon to the human resources division of AT&T. (Bouvet, 1996)

## **6.2. Caterpillar**

The re-engineering of Caterpillar, a giant in the earth moving machinery was triggered by a billion dollars loss in 1984, after three year run of record profits from 1981 (Hooker, 1993). In the past, Caterpillar's expansion and profits came with the introduction of new products and was essentially growth driven: the company's products increased from a modest five to a record three hundred in 1985. But the Japanese competition eroded the profits first by offering quality products at lower costs and later by the opening of a number of centers for distribution and service in U.S.

Caterpillar met this challenge by a radical restructuring of the entire company that included all its business processes. Caterpillar's strategy can be rationalized under three broad headings: downsizing the vast and widespread business empire; investments in new technologies, both for manufacturing and for increased and efficient communication, and implementing the new business process to replace the old function-based structures (Arunachalam & Subramanian, 1995).

The first stage was a painful process and Caterpillar tried to implement that fast to minimize demoralization. This involved a closure of nine plants and laying off 28,000 workers in four years. By 1993, there was a further reduction of 10,000 workers. Caterpillar's operation was comprised of 36 manufacturing plants, 7 product engineering design control centers, and 22 parts distribution centers located in 10 countries. To manage restructuring effectively, the structure was first reorganized to include only 13 product centers and 4 service centers distributed worldwide.

Caterpillar's strategy was an emphasis on technology as an integral part of its work and the workplace and so invested about \$1.8 billion in plant modernization and introduction of new technologies both in manufacturing and in information technology systems. The new manufacturing systems included, for instance, computerized flame-cutters, unmanned cranes and other process innovations that reduced the time to fill orders from 20 to 8 days, inventories by 50 percent and manufacturing space by 21 percent. The IT systems included integrated shared-data management systems to facilitate communication among cross-functional teams and a global communication network that linked the service centers effectively.

Using computers, Caterpillar developed a number of analytical techniques that effectively reduced the costly and time consuming physical testing and also shifted the testing phase during the early stages of development when costs would be lower. For instance, a full scale fatigue testing is expensive both in cost and in time and could take anywhere between 6 to 8 months, and the test had to wait until the models were ready. By resorting to analytical techniques, Caterpillar was able to reduce the number of full scale tests from 45 in 1980 to 3 in 1993. The costs have also reduced with analytical techniques costing less than 50% of the full scale testing. Caterpillar has also introduced "virtual reality" to solve some of the ergonomic problems in the cabin compartments, such as visibility, ease in the use of controls, and other user driven requirements.

Caterpillar used concurrent engineering as its main theme in restructuring and identified six critical success factors (CSF) for its reengineering. These included the

creation of a concurrent environment, free flow of information among teams, implementation of an electronic master for products and processes, changes in policies and procedures, predictive cost methods, and management of cultural change and team dynamics.

The shared electronic data system facilitated increased communication among cross-functional team members even though they were not co-located. The team members were fully empowered and were encouraged to arrive at decisions that involved various functional elements through consensus.

A major test for this approach was to reduce the time involved in designing and manufacturing a new product from the then period of about seven years, to about twenty months. The success can be assessed from the fact that in 1994, Caterpillar reduced this period to a thirty nine month cycle. Another test is the number of changes introduced in the new product initiative. Changes when introduced in the initial stages are not very costly, but become very expensive in the final stages. That is also the period when a large number of changes are forced into the design; for instance, in the last three months of development, every change costs, on an average, about 1,000 dollars and the development team had to deal with about three hundred changes. With the new concurrent engineering initiative, these changes have reduced significantly.

A major component of reengineering is training, and Caterpillar took a major initiative in integrating its suppliers as allies in the CPPD program. By educating its suppliers in quality improvement methods as a part of its Quality Initiative and by organizing formal and structured seminars that were customized to the needs of suppliers Caterpillar extended its restructuring to its supplier base as well. With a similar initiative, it also instituted dealer training to improve its customer services. By structuring their reengineering initiative to center around technologies and by encouraging a total team connectivity through IT, Caterpillar has been able to provide a unique American example which learned its first restructuring lessons , at least initially, from Japan.

### **6.3. Chrysler Corporation**

Chrysler was about to go bankruptcy in 1970's after a well publicized government bail. Then made a turnaround mainly fueled by sales, the marketing strategies and the fortuitous demands for its mini vans. All these took place without major changes in the structure or the functioning of the company. In spite of these changes, the component based approach to automobile design and manufacture, still required a 4.5 year cycle. More, it was burdened was with too many car designs and no ownership of the models within the firm. To understand its problems, Chrysler undertook an eighteen month study, first by benchmarking Honda's development cycles, Mitsubishi's strategies through the diamond-star collaboration and later, the successful Jeep operations of the newly acquired American Motors. (Arunachalam & Subramanian, 1995)

Learning from these bench-marking experiments, Chrysler embarked on a creative-destruction process by instituting dramatic cultural changes that destroyed the functional silos-based vertical organization and creating a re-engineered workplace. This workplace, centered around the four cross functional platform teams for large cars, small cars, mini vans and Jeep vehicles and trucks. The objective was further sharpened to address only the American market, a market that was lost to the Japanese and its US rivals, especially the Ford.

The results of the re-engineering efforts were beginning to show in 1992. In 37 months from design, Chrysler had in production the LH series of cars using the platform team organization. This was done with 740 people as opposed to 1400 previously for similar size cars. The engine development time for a 3.5 liter option was reduced from 240 weeks to 187 weeks (Gardner 1994). Chrysler then embarked on a development of a compact car, Neon as a direct competition to the Japanese imports. Chrysler developed Neon on its own, without any foreign collaborator-- a first for an American car company in the small car category. The car was in production in 31 months. It is reported that the

next generation LH car would take only 24 months. In 1994, Chrysler was adjudged as the lowest cost producer of cars in the world.(Taylor 1994).

One of the corner stones of Chrysler's reengineering program is the 1.5 billion dollar Technology Center at Dearborn, Michigan. Chrysler used this center to perform its first cross functional team experiment for the sports car Viper, with a goal to reduce the design-to-production time to 36 months. With this experience, Chrysler Technology Center (CTC) became the hub of Chrysler's new re-engineered corporation. The layout and architecture of the Center's building was designed with the objectives of breaking functional barriers by increased face-to-face contact of the members working in product platform teams and by the inclusion of in-house manufacturing and testing facilities, similar to those in the production plants. The building was organized by a floor per product platform, with a common manufacturing facility at the ground floor. The layout plan for the floor corresponding to each platform is identical. Thus, for every person responsible for a functional task in a platform, his/her counterparts in other platforms were spatially located, either exactly above or below, in their corresponding platforms (Gardner1993). The workplace design catered to this unique arrangement. A major objective of reengineering was to encourage and maximize communication between the team members from all functional specializations. This was achieved by them sharing the same floor and through the existence of technical clubs. Other common needs across platforms were met by the setting up of three centers--for scientific testing, data and information integration and technology and management.

In effecting this radical cultural change, Chrysler encouraged the teams to challenge the system and try out new ideas without fear of failure. In the new environment, Chrysler empowered the process teams to undertake simultaneous development, delay decisions until the last, identify critical paths and eliminate non-work elements in the processes. The implementation strategies included benchmarking, re-delegation of decisions to appropriate levels and requiring that all decisions at the interfaces be made by consensus. (Arunachalam & Subramanian, 1995)

Following the Japanese model, Chrysler insisted that its suppliers were co-located, allowed to participate from the start of the design and were also provided with the parts requirements right from the layout. While designing the LH series, Chrysler reduced the number of suppliers to a mere 200, from a previous 600-700, and the total supplier base from a few thousand vendors to less than 1500. To maintain continuous communication with the suppliers, for improving product quality and cost, the purchasing department instituted a program with suppliers for cost reduction ideas. Chrysler, thus realized over \$400 million as permanent annualized savings.

With the overall changes in the structure and operation of the company, to reduce cost, it is also necessary to reengineer all the local processes. Chrysler, for instance, reduced the number of steps in its approval process for artistic, media and research and reduced the approval time from 6-8 weeks to 2 weeks (Serafin, 1993).

Chrysler has been steadily introducing information technology even before the completion of radical restructuring. It first began by implementing an integrated information system for sales, supply and design with a parts distribution scheme, that allows a dealer to enter a part request on a computer that automatically forwarded it to the corporate computer. The depot computer received these orders and turned them into work assignment directly to each workstation. Directed by a personal computer, individual workers fill 16 orders simultaneously, by picking parts from three horizontal conveyors and a sorting station.

For design and analysis, Chrysler is extensively using CAD/CAM systems that are integrated not only within the company but also with the outside suppliers as well. A combination of super computers, mainframes and, workstations provide the computing environment to perform a range of design analysis activities including finite-element analysis, aerodynamic and impact simulation programs, assist and test NC programs, solid modeling and aerodynamic analysis (Mills, 1987).

Chrysler integrated its IT in manufacturing with advice and assistance from Caterpillar and Boeing. Some innovations in this area include an automated storage and retrieval system to handle vehicle bodies in sequence and just-in-time at two plants that produced Dodge Dakota pickup. For the LH series cars, the Bramalea assembly plant in Canada installed a mono rail system with diagnostic equipment that tracks with cars, greatly increasing quality and flexibility (Auguston, 1989). It has also provided computer based diagnostics systems to its service dealers to help remedy problems in the first attempt itself.

Radical cultural changes require that work-force also adjust to changes in the workplace and the process. While designing and producing Neon, Chrysler extended its retraining program to over 200 assembly workers, three years before production , to educate them on empowerment. As the demands for training grew, Chrysler contracted external firms to run structured training programs for its workers in newly automated assembly plants . Recently, it has also expanded the training program to include its suppliers and dealers, using some of the newly available IT training aids.

In the characterization of Womack and Jones(1994), Chrysler is moving towards a lean enterprise that incorporates all aspects of re-engineering from the lowest level, where the number of steps in the process are reduced, to creating a radically new process by the clever use of information technology. It is a holistic process that Chrysler has embarked on and this has clearly produced dividends, with record profits in 1994. The strategy of combining empowerment through training, delegation of decisions and open and rapid communication flow between concerned parties in design--both horizontally and vertically--has indeed worked. In the words of the CTC director, "We did not just imitate the Japanese, but brought it to a high polish" (Moskal, 1994).

#### **6.4. CIGNA Corporation**

CIGNA Corporation's experiences in business reengineering began in 1989. CIGNA is a leading provider of insurance and related financial services throughout the United States and the world. Between 1989 and 1993, CIGNA completed over 20 reengineering initiatives, saving more than \$100 million. Each \$1 invested in reengineering has ultimately brought \$2-3 in returned benefits. Operating expenses reduced by 42%, cycle times improved by 100%, customer satisfaction up by 50%, quality improvements of 75%. (Caron, 1994)

CIGNA's reengineering started small -in a pilot project in a vulnerable division of the company. The pilot was a success - a quick hit. Learning was used to escalate from this quick hit to reengineering, the knowledge gained from this experience was transferred into larger and more complex parts of the organization. CIGNA's reengineering successes have also required a willingness to allow failure and learn from failures. Only about 50% of the reengineering efforts bring the type of benefits expected initially. Repeated trials are often necessary.

Reengineering was refocused from excellence in operational business processes to enabling new business growth. Along the way reengineering has begun to become part of the way that CIGNA employees and managers think. To CIGNA BPR means "breakthrough innovation focused on customer needs" (Caron 1994). It is a vehicle to realign strategy, operations and systems to deliver significantly increased financial results.

Caron (1994) argue that the real life story of BPR at CIGNA represents a contrast to the general prescriptions of "radical" "all-or-nothing" organizational transformation. At CIGNA, BPR started out as an experimental pilot. The knowledge from the success of this initiative was disseminated for implementing other BPR projects. The BPR initiative was sustained "from the bottom up, with learning transferred "across.'" At CIGNA, the

prerequisite for BPR success was a corporate environment that promotes learning, especially learning from failure. Although, the process was initiated from the top, the ownership was moved down to the people who actually had to implement the changes and were affected by those changes. The BPR effort took into consideration the differences in management cultures in different countries. The BPR initiative started at the operational levels and was later moved to "higher forms" (strategic) of reengineering over time.

### **6.5. Ford**

In the early 1980's, when the American automotive industry was in a depression, Ford's top management put accounts payable - along with many other departments - under the microscope in search of ways to cut costs. Accounts payable in North America alone employed more than 500 people. Management thought that by rationalizing processes and installing new computer systems, it could reduce the headcount by some 20%. (Hammer, 1990)

Ford was enthusiastic about its plan to tighten accounts payable - until it looked at Mazda. While Ford was aspiring to a 400 person department, Mazda's accounts payable organization consisted of a total of 5 people. The difference in absolute numbers was astounding, and even after adjusting for Mazda's smaller size, Ford figured that its accounts payable organization was five times the size it should be.

Ford managers ratcheted up their goal: accounts payable would perform with not just a hundred but many hundreds fewer clerks. It then set out to achieve it. First, managers analyzed the existing system. Under this system the accounting department had to match 14 data items between the receipt record, the purchase order and the invoice before it could issue payment to the vendor.

Ford made a radical change and achieved dramatic improvement. The new approach requires matching only three items. The matching is done automatically, and the computer prepares the check, which accounts payable sends to the vendor.

When Ford has instituted this new process, Ford has achieved a 75% reduction in headcount, not the 20% it would have gotten with a conventional program.

## **6.6. GTO Inc.**

GTO Inc. is a small company which manufactures automatic gate openers based in Tallahassee, Florida. When the founder died suddenly, the company was in the type of dire straits that would appear to have made it an ideal candidate for reengineering: GTO was losing money on a monthly basis, it lacked a line of credit and suppliers shipped only on a COD basis. Employees were required to work 24 hour shifts to fill important orders and the salesmen were reduced to writing up minuscule orders to supplement their incomes. The new CEO, Chuck Mitchell, adopted "...a strategy made up of small gestures rather than sweeping moves." These gestures consisted of creating an atmosphere of trust and optimism among GTO's harassed employees; by listening to and adopting their suggestions, improving their health and disability insurance, and when things started to turn around, increasing their pay and distributing bonuses from a profit sharing plan. The salesman were put on salary with incentives. Acts such as fixing the leaky roof, allowing ten minute breaks, and keeping the coffee machine stocked convinced the employees that that Mitchell was "genuine." The following year, GTO witnessed a cultural and company turnaround. Net profits moved from being in the red to nearly \$500,000. This was accomplished by a 9% increase in gross sales along with a 33% decrease in total operating and administrative costs. Employee turnover decreased equally dramatically. As employees began to seek outside education and were promoted from within, the number of returned goods fell.

GTO's dramatic turnaround was a result of many small steps which could be said to foster precisely the "culture of incrementalism" that Hammer and Champy warn against. The focus was on human resources rather than on processes. (Hamel 1994)

### **6.7. Hughes Aircraft Co.**

Hughes Aircraft Co., owned by General Motors, is a major defense contractor working on projects related to aerospace and electronics. When there was a downward trend in defense contracts, Hughes restructured its core competencies to identify a niche in the civilian market and chose satellite-based digital TV. Hughes assessed that it had all the necessary technologies for this venture such as digital data compression, coding and decoding of signals. Even though Hughes could have sourced many of the necessary technologies and components for the system from in-house, it chose outside vendors because of the cost advantages a civilian producer would have over its own divisions (Arunachalam & Subramanian, 1995).

Hughes thus formed a collaboration with an antenna and TV company RCA-Thomson as its exclusive supplier for decoding boxes and small satellite dishes. It also entered into a contract with Sony for manufacturing digital video tape machines for which Hughes did not have the expertise. These machines were still under trickle production at Sony, but the demand for these machines in numbers accelerated their production and brought their costs down. Further contracts with film distributors such as Walt Disney ensured that there would be programs for its 175 channels. Starting this project in 1990, Hughes Aircraft has shipped 700,000 systems valued at \$ 750 million in just four years. Hughes estimates that by the end of this decade, there would be 10 million sets with a revenue of \$ 4 billion and an operating profit of about \$ 1 billion.

This initiative by Hughes has all the ingredients of reengineering. The company assessed its core competence as satellite based systems and not as defense manufacturing and clearly assessed the process boundaries where it was competent. Instead of using its

own divisions that would have driven up the costs and reduced the output, it chose at its principal collaborator a company that had all the necessary expertise in manufacturing antennas and decoders for the civilian market. Similar collaborations with Sony, Walt Disney and Parent Studio programs ensured excellent quality transmission and rich program options to choose from. This has proved to be a unique example of the company achieving its competitive advantage over cable networks that are still handicapped by limited program options and mediocre quality of images and a lone satellite based rival, Primestar, that also did not have a large repertoire of programs or digital imaging. Since, eventually this service would be taken over by a terrestrial optical fiber cable network (because of the quality and range of options available to the consumer), it was essential that a satellite based digital TV be made available as quickly as possible. With a subscription of \$30 per month, Hughes has already enlisted 500,000 subscribers. If Hughes had not taken this initiative and restructured its business process for the civilian market, it would have joined the ranks of other defense manufacturers, waiting to bid for infrequent contracts from the Pentagon.

### **6.8. Mutual Benefit Life**

Mutual Benefit Life is an insurance company in U.S. which has reengineered its processing of insurance applications. Before reengineering MBL handled customer applications as its competitors did. The long, multistep process involved credit checking, quoting, rating, underwriting and so on. An application would have to go through as many as 30 discrete steps, spanning 5 departments and involving 19 people. At the very best, MBL could process an application in 24 hours, but more typical turnarounds ranged from 5 to 25 days and most of the time was spent for passing the information from one department to the next. (Hammer, 1990)

The president of MBL, intent on improving customer service, decided that this nonsense had to stop and demanded a 60% improvement in productivity. MBL swept away existing job definitions and departmental boundaries and created a new position

called a case manager. Case managers have total responsibility for an application from the time it is received to the time a policy is issued. They are able to perform all the tasks associated with an insurance application because they are supported by powerful PC based workstations that run an expert system and connect to a range of automated systems on a mainframe.

Empowering individuals to process entire applications has had a tremendous impact on operations. MBL can now complete an application in as little as four hours and an average turnaround takes only two to five days. The company has eliminated 100 field office positions, and case managers can handle more than twice the volume of new applications the company previously could process.

### **6.9. *Star Vault, Inc.***

BPR is often used by companies on the brink of disaster to cut costs and return to profitability. The danger is that during this process the company may slash its capacity for future growth. The example of "Star Vault, Inc.", a mid-sized entertainment company illustrates this conundrum. After BPR, Star Vault returned to short-term profitability by sacrificing its internal production capability to create new products.

Senior management soon discovered that the company's library was becoming overexposed and competition for the most attractive product acquisitions more intense. Star Vault was forced to reevaluate its strategic direction. It opted to focus on niche markets. "Instead of simply improving the processes, the company eliminated non-value-added expenses, and evaluated which organizational elements were relevant to the strategy... As a result, the company now has the opportunity to sustain and increase its market share." (Berman 1994)

### **6.10. Texas Instruments Inc.**

Texas Instruments, the Dallas-based maker of semiconductors and information and defense systems has successfully used reengineering to redesign the material procurement process for its defense systems business. This reengineering implementation helped TI win the US Department of Commerce Malcolm Baldrige Quality award. (Moad, 1993)

In 1988, Texas Instruments decided to start redesigning key business processes, it wanted quick results. One project, for example involved reducing product development cycle time in TI's commercial semiconductor business. TI wanted to cut by 50% the time it took to respond to a customer's requirement for customized semiconductors. And TI wanted to do it in less than a year.

There was just one problem. After setting early reengineering goals and assembling teams that included IS, TI discovered that systems analysts and developers often couldn't make the adjustment to reengineering quickly enough. As a result, some projects suffered when it took IS too long to roll out new applications that were a central part of reengineering.

The toughest adjustment for developers to make was to begin thinking and working toward creating systems to support new business processes rather than doing what they were used to doing: automating the existing way of doing business.

Many analysts and developers at TI were used to creating applications for a single, narrow functional department such as purchasing or shipping. In reengineering, however IS was suddenly asked to deliver applications that could support newly redesigned business processes that could span several departments.

Some IS responded by resisting the changes. Some reverted to their old style of work. "You can have the best ideas, but if implementation takes too long, support is going to erode and you are going to be in trouble" says Szygenda, who was responsible for reengineering at TI. (Moad, 1993)

The answer for IS was "to change the culture " by reorganizing IS to support reengineered processes. TI reorganized IS staff into what it calls centers of excellence. Rather than focusing on supporting a single functional department or specializing in a single technology or platform, these centers now do reengineering on a project by project basis.

Texas Instruments also invested heavily in training for IS workers. Besides creating classes that focused on new technologies, TI started internally marketing the benefits of reengineering to all concerned. It even started a newsletter to tout reengineering and highlight the role of IS.

In addition, TI has focused extensively on "change management" techniques to better support reengineering. Change management means, among other things, adjusting the way workers are evaluated and rewarded to get them to support changes.

TI has since improved its reengineering success rate to about 80%. A big part of the reason is that IS people now understand that they are expected to help create new business process, not just automate what is already there.

## **VII. A SPECIFIC BPR CASE STUDY**

In this chapter, the reengineering implementations of a multinational corporation will be analyzed. This information has been gathered by interviews with the company people and from the company homepages on Internet. This company is one of the biggest companies in the computer industry. The name of the company will not be revealed and it will be called MCC (in short for Multinational Computer Company) in the following sections.

### ***7.1. Why MCC was Reengineered ?***

In 1993 MCC was not looking like a winner as being one of the greatest companies of the world. The profitability was in decline. Cash flow was negative, cost / expense levels were far too high, much higher than those of the competitors.

MCC was neither looking at satisfying the needs of their customers, nor paying enough attention to the competitors. The employees were concerned with their internal measurement system. How was this product, this feature, pricing action or whatever was going to affect the business unit, site, department or themselves? They were more worried about that than they were about what the impact might be on the customer. They were more worried about that than about what even the competitors were doing to them in the marketplace.

At the same time, MCC was feeling the impact of changing and increasing competitive pressures as the consulting, systems integration, managed operations and telecommunications segments of the industry began to expand rapidly.

And MCC customers were changing, too. Before the changes in the industry, MCC products' prices were much more expensive than other products. MCC customers knew this, but they had the comfortability that they have the most reliable and the qualified product in the world. There was "MCC loyalty" in the eyes of the customers.

Beginning with 1993 and the changes in the computer industry, the customers also changed and began to demand ever-lower prices for increasingly powerful and sophisticated products. It was not simply a matter of loyalty any more. They were talking value : plain and simple. MCC had some wonderful products of course. Too often, though, they were getting beaten to the marketplace by leaner, hungrier competitors. Perhaps the competitors' products were not as perfect as MCC's , but that did not matter much if MCC's was still on the drawing board or just moving to beta test while the others were getting bought. Having product available when customers want to buy something is a prerequisite for survival in business.

Besides wanting value for their money and insisting on a product to be sold, the increasingly empowered customers were also nagging about "ease of doing business" and "technology integration". They actually wanted to make it easy for them to buy hardware, software and services from MCC - and they wanted the things that they bought from MCC to work with the things they bought from other companies. On both counts, these were not trivial changes for MCC, since MCC was widely regarded as one of the least user friendly organizations and they had trouble getting their own products to work with each other- let alone work with the competitors' products.

So in 1993, MCC was like a "corporate dinosaur" as told by MCC employees. One reorganization was following the other without fixing the root causes of inefficiency fast enough for the company to keep pace with competition. And the customers refused to pay a premium for products and services just because they carried the MCC name. The processes, organizational functions, infrastructures and corporate culture needed a radical, fundamental and a companywide rethinking and redesign to attain dramatic improvements in the capability to create and provide value to customers.

## **7.2. MCC's Reengineering Implementation**

MCC's reengineering efforts began in 1993. The plan was to spend 18 months in design and 18 months in deployment. Reengineering Teams were formed for the processes to be redesigned. MCC Chairman told Reengineering Leaders that reengineering is critical to successful implementation of MCC principles and strategy; the units will be hit by multiple reengineering efforts and every MCC employee must work with the leaders to focus on the processes fit together, and take end to end views; anticipate issues and problems, focus on them and make them known; solve rather than bury or ignore problems; allow for customization, but never compromise the goal of standard worldwide processes.

Initial focus of reengineering was on expense and cost reduction. With the realization that expense and cost reduction initiatives could only take MCC so far, they focused their attention on process reengineering to improve operating capabilities significantly, to provide greater value to customers and to become more competitive in the market place. Reengineering in MCC is not primarily about reducing cost. It is about how MCC employees interact with customers and themselves. They must reduce their time-to-market; improve how a bill looks; fix how to configure systems and produce competitive solutions.

## **7.3. MCC Reengineering Initiatives**

There are 10 corporate reengineering teams at work in MCC and many ongoing activities aimed at streamlining subprocesses throughout the company. The reengineering initiatives were begun, primarily along functional (not organizational) lines -- Customer Relationship Management, Integrated Product Development (Hardware and Software), Production, Fulfillment, Finance, Information Technologies, Human Resources, Non-production Procurement, Site Services / Operations. The following projects represent the efforts that will transform the way MCC delivers product and customer satisfaction.

### **7.3.1. Customer Relationship Management**

Customer relationships are at the core of MCC's business. Any company would cease to exist without customers, so it is not surprising that all of MCC reengineering efforts, in one way or another, all support improving customer relationships. All reengineering initiatives are ultimately about customer relationships and winning in the marketplace. This is about executing quickly and effectively, as a team.

The following questions were examined in depth with customer relationship management reengineering implementation: How does MCC improve? Work harder? Do more of what they have been doing? Should they change what they are doing? How they are doing some things? When and where they do other things? MCC employees knew that they must improve. But how did they really make it work?

Customer Relationship Management (CRM) is a worldwide process reengineering initiative aimed at improving customer satisfaction and reducing marketing and services costs associated with customer relationship activities.

The purpose of CRM is to reshape the sales and services processes executed by MCC's customer contact personnel (employees and business partners and the staffs that support them) through execution of common worldwide processes supported by common tools, standards and management system.

#### **7.3.1.1. Historical Perspective**

How did MCC get to where it is now? Like an all too familiar pattern in industry, some of their strengths evolved into burdensome and unhealthy habits. For example, MCC proudly provided customers with "yes" answers. Capable MCC could do it, this was a strength and marketing advantage.

However, by doing everything for anybody they found themselves saying "yes" but not being able to follow through on the rest of the expectations like delivering on schedule, for a value-based price, with reliability, etc.

The back office operations that evolved to meet non-selective "yes" mind set became ever-present obstacles to customers' satisfaction. And when customers are not satisfied, it is hard to imagine employees or shareholders being content.

The front office operations could not meet the basic expectations of even simple requests with high predictability. In essence, the system became unstable, with such a wide range of variation that piecemeal efforts to improve would be foolhardy tampering. Unless the system was changed to re-frame the structural underpinnings of how they did business, hard work would be inconsequential. And who wants to work hard doing the wrong things very well? So, what were the right things they need to do, and how were they going to do them?

MCC employees knew what those right things looked like because the customers kept telling them, and the employees affirmed this with their comments, as well.

The seven Customer Imperatives were constant reminders of what was needed to do: Fulfilling Commitments; Ease of Doing Business; Cost and Price; Understanding the Customer; Responsiveness and Accessibility; Communication; and Competence.

MCC has begun to address these needs. To meet customer requirements, they needed the system capability to anticipate their needs and respond to requests with integrity. This was true for Sales and Services, Manufacturing and Development or any other function within MCC.

### 7.3.1.2. CRM Processes

Customer Relationship Management (CRM) provides valid and valuable recommendations to the customers. A respectful declining of an opportunity enhances customer relations more than a “yes”; without integrity. MCC could not continue the tradition of always saying “yes”.

MCC manages relationship with and delivers value to its customers through CRM processes. They are *Market Management* for analyzing the market place, selecting profitable segments, investing to get solutions available; *Relationship Management* for planning and executing business relationship with one or a group of customers or potential customers; *Opportunity Management* for capturing, selecting, tracking business opportunities; *Customer Satisfaction Management* for capturing, understanding and acting on customer feedback and complaints; *Skills Management* for assessing and planning skills as well as deploying resources; *Offering Information* for spreading information on available offerings and solutions; *Solution Design Delivery* for designing proposals and fulfilling contractual commitments; *Business Partner Management* for selecting and appointing MCC Business Partners; *Supplier Management* for managing procurement from suppliers; *Information Management* for providing information to support process execution and continuous improvement as well as business information.

Market management and the front office customer interface CRM areas are important in shifting the market base. Selected markets and selected solutions focus efforts more effectively.

Market Management identifies the segment plans and strategies that support the six corporate strategic imperatives. Relationship Management uses the input from Market Management to develop demand/opportunity generation activities. Relationship Management also includes myriad activities that support customer needs, such as sharing

information, identifying opportunities, responding to requests, and managing contacts, commitments and expectations.

Offering Information makes available all the information about hardware, software, services, and solutions for serving customer needs.

Opportunity Management evaluates the relative attractiveness of opportunities according to marketing plans and the ability to deliver and achieve customer satisfaction. Recognizing the need for simplification and streamlining, improvements are being made here.

This area also has a significant impact on the Solution Design and Delivery (SDD) functions. SDD responds to opportunities to define possible solutions, create a proposal, build, test and deliver the solution, and generate a contract and bill.

Skills Management is vital for meeting customer needs. While input for the kinds of skills comes from many sources, including marketing functions, the outputs are most important. MCC must deliver of the right skills at the right time to the right place at the right cost.

Information Management provides data access, supporting an information warehouse. Supplier Management builds partnerships with suppliers who support and enhance MCC efforts. Business Partner Management handles the development of mutually beneficial relationships that enhance customer satisfaction.

### **7.3.1.3. Deployment of CRM Reengineering**

Customer Relationship Management Reengineering has three fundamental objectives as eliminating or reducing low-value work, focusing on targeted segments, and proactively participating in creating the marketplace.

One improvement that addresses these objectives is the Customer Call Center. It provides an efficient single-point-of-entry method to streamline processes and implement best practices for responding to customer questions and support requirements. Traditionally, these tasks have consumed valuable resources that could have been used for generating targeted business. The Customer Call Centers minimize this drain.

Consider what a telephone company would be like if there were no phone operators. Imagine incoming calls being diverted to a variety of people with many other jobs. Sure, they could eventually help customers place a call or locate a phone number, but imagine what phone service would cost, and the interference with the employees' primary responsibilities. Efficient Customer Call Centers with operators who can handle or direct the broad range of calls with speed, appropriateness, and thorough knowledge can free others to do the intense sales and field work necessary to achieve MCC goals.

CRM approach is critical. MCC has tended to be reactive, simply responding to customers' inquiries. They must capitalize on potential opportunities, nurturing the shift in customers' mind sets. They need to emphasize anticipation rather than hindsight. They need to leverage the information they are collecting as part of the common processes. By synthesizing this information into meaningful knowledge accessible as customer profile data with histories, buying behaviors, anticipated expansion and system needs, etc., to position MCC proactively. This capability is enabled by the Information Warehouse and underlying I/T infrastructure.

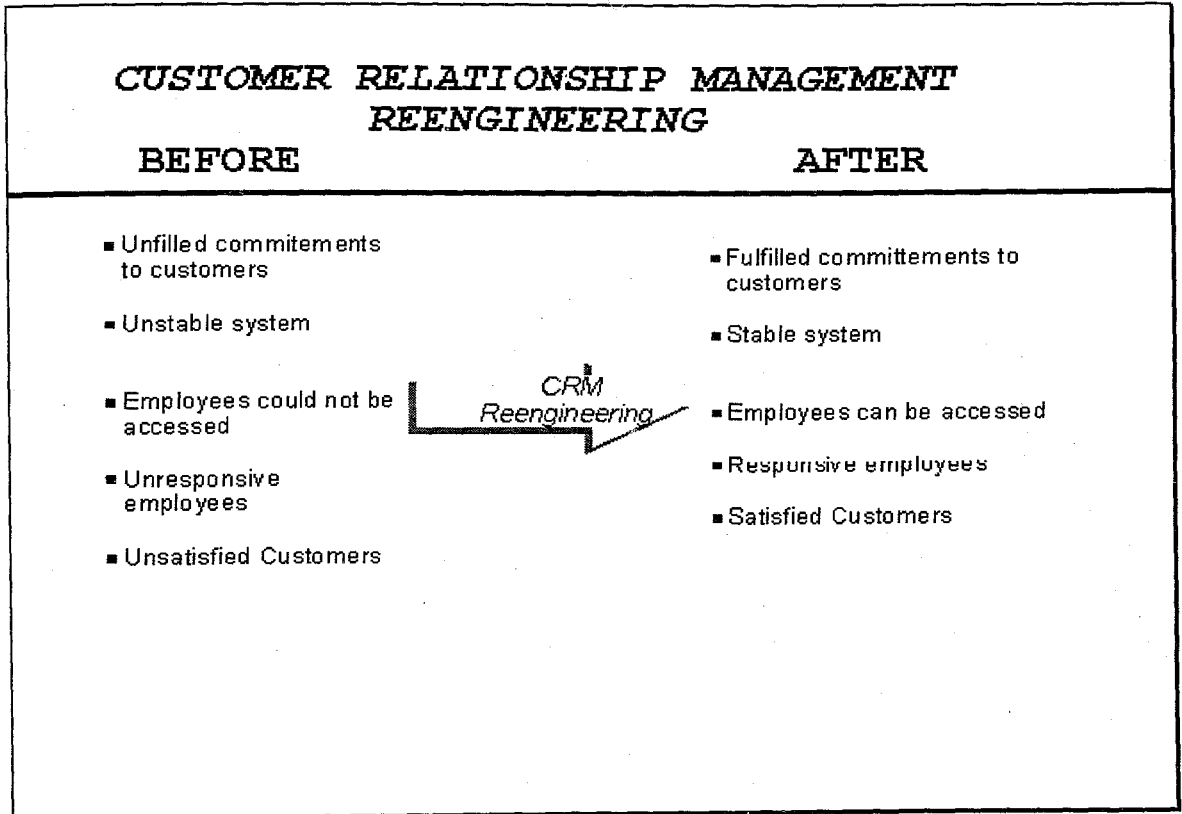
The field force has experienced significant reductions. A much larger proportion of the remaining group is mobile, and this is a significant environmental change. Being office-less much of the time, the conversational camaraderie that supported employees is less frequent or even nonexistent.

And then there is the tight interrelationship between Sales and Services. Some wonderful teamwork and collaboration are occurring there. Likewise, the Human Resources support for skills management is an important factor in smoothing the transition process.

Orchestrating the complexity of interfaces is much like the challenge facing a group of musicians. In some cases a conductor leads the orchestra. Being able to follow well is a very valuable skill within this type of team. There are other times when a group of musicians decides to jam -- play music together, but with improvisation and opportunities for different members to shift the melody from time to time. But the rules are always clear. The process is clear, even when fluid, or going with the flow. Leadership and "followership"; are both important.

The below figure depicts the situations before and after the deployment of Customer Relationship Management reengineering :

**Figure 7.1. Customer Relationship Management Reengineering**



CRM processes are still deployed globally. While MCC continues to build and deploy needed enhancements, the main focus is to manage their business via process and to use the data generated by the processes for making decisions.

The new work flow that came with the CRM Reengineering Initiative can be seen in Appendix .

### **7.3.2. Integrated Product Development**

Integrated Product Development (IPD) framework is an approach to providing effective overall business management.

The goal of reengineering in integrative product development is to bring the right products to the right market in less time and at lower cost. This requires that MCC should make better customer focused decisions on what to build, kill poor projects earlier in the development cycle, eliminate all redundancies in process and product, focus the resources on the best projects to allow them to come to the market sooner and leverage the worldwide capabilities vertically (across product tiers) and horizontally ( across businesses).

Hardware development and software development have embarked on a joint initiative called Integrated Product Development (IPD). IPD was developed through extensive benchmarking of competitors' best practices. These practices were validated through relationships with professional societies, academia and consultants. During deployment of IPD, pilot teams were coached not only on the process but also on the attitudes needed to excel when they put IPD into practice. Two levels of management teams were formed in MCC for IPD Reengineering, both of which are cross-functional: The Integrated Product Management Teams, or IPMTs, which make the investment and new product decisions, and the Product Development Teams, or PDTs, which execute those decisions.

#### **7.3.2.1. Hardware Development**

MCC was developing and manufacturing more than 70 completely different subsystems to bring its products to the market. "We can not win this way " said the leader of MCC's Hardware Development Reengineering (HDR) project. With corporate

executive committee support team of hardware division senior managers and about 150 engineers set out in 1994 to change the way MCC's products are developed.

Three aggressive goals were set : cut time to market to 12 months or less for platforms and integrated offerings; reduce development expenses; and design products that provide customer and shareholder value.

After extensive technological and financial benchmarking, HDR team evolved a tactical and strategic model that cut across products and processes. The tactic was to cut duplication and reduce immediate expenses. The strategy was to integrate product development and devise common architectures and building blocks to use across products.

By transforming the way MCC servers and clients are developed and organized; the HDR team figured it could speed time to market, eliminate redundancies, improve efficiencies and reduce cost.

The result of Hardware Development Reengineering is reduced complexity, lower inventory, less development and manufacturing expense, and lower product cost.

#### **7.3.2.1.1. Historical Perspective**

To understand why MCC is reengineering hardware development, it helps to look at MCC practices versus the industry. Best-in-class practice weeds out a substantial number of ideas before ever entering the concept phase. Still early in the game, when the project enters the specification and planning phase, they're down to 57 percent, and stay pretty close to that number by the time those products are released for market. In other words, losers are identified and killed early so that R&D dollars aren't wasted.

Even after specification and planning, MCC is still at 64 percent and holds on to every one of those projects until market release. At worst, MCC is hanging on to 80 percent of development ideas all the way through testing and evaluation, then killing more than half of those in the launch phase, because of eleventh-hour marketing and production input, or because funding ran out, or because of unmet dependencies on development of vertical technologies. MCC still managed to make more products than it could sell, products that missed the market; and products that didn't work together. And it took longer to do it -- up to five years, compared to best-in-class of 12 months or less.

#### **7.3.2.1.2. Outputs /Changes /New Process**

The guiding principles are to promote MCC's Strategic vision and strategic imperatives. Managing and leveraging cooperation across business areas and ensuring consistent direction with strategic Planning, Technology Planning, and Architectures will optimize MCC's vertical and horizontal strengths. A focus on market segmentation in responding to customer needs will result in higher customer satisfaction through reduction in the complexity of MCC's offerings; minimized overlap and internal competition in the same markets; empower worldwide customer focused cross-functional teams:

The Integrated Product Management Teams (IPMTs) concentrate on specific brands or business segments with worldwide responsibility for all elements of the marketing mix and are the decision-making bodies for their portfolio investments. They are accountable to senior management for the performance of their portfolio. Measurements are expense, market share, reuse, customer satisfaction, and attainment of strategic and financial goals. They are responsible for allocating resources from their functional area. They resolve issues raised by the Product Development Teams (PDTs), and they improve focus on the customer.

The PDTs are led by a certified project manager. They are responsible for planning, justification, and development of individual product offerings from concept through general availability (GA). They are accountable to the IPMTs and senior management for the performance of their product schedule, cost, quality, and functionality.

The teams follow a structured, disciplined process. Four major checkpoints are used to force timely decisions regarding concept, plan, announcement, and product end-of-life. In addition, the IPMT and PDT sign a contract with each other to deliver on time with the funding needed.

### **7.3.2.2. Software Development**

MCC is one of the largest software developers in the world. The innovation and excellence of MCC comes at a high cost. MCC products are expensive to build and distribute, not easy to fit together, and often miss the market. It is taking too long to decide what to build, it's taking twice as long as the industry average to get them built.

Restructuring efforts helped MCC to reduce expense-to-revenue ratio in 1995. The plan for 1996 was to reach 20 percent expense-to-revenue by continuing to improve efficiencies, but without reengineering MCC cannot achieve the goals of revenue growth and 100 percent customer satisfaction.

To understand MCC software development more readily, it may be helpful to consider an analogy. Imagine for a moment that you are at a race track, similar to the Indianapolis 500. MCC is calling its race track the "Devstar 500," where it will be challenging competitors to get the best products around the development track in a race to the finish line. MCC's new vehicle is the Integrated Product Development Process. A lot of research has been done to find the best parts for the vehicle. Almost everything that

went into it has been successful for the competitors, but none of the competition has used all of these best-in-class components in combination.

MCC is confident that it will come out the winner for many reasons: They have test driven the vehicle in many locations under a broad variety of conditions. So they know their vehicle can win on any type of racetrack: soft, hard, or a combination of the two. Their driver, the Project Manager, is responsible to the vehicle owners and has signed contracts with them to meet specific goals. She is well trained and licensed to drive this state-of-the-art vehicle.

The steering wheel is called Project Management. It is a thorough and well-designed process for keeping the vehicle on track. The gauges on the instrument panel are unique to this vehicle. No competitor has as many, backed with as much data. She calls the gauges her Project Manager's Workbench. Her pit crew, or Development Team, keeps the vehicle running smoothly. Under the direction of the driver and the crew chief, they have the special skills to design, implement, and launch the vehicle and to keep it well maintained. The owners are counting on them to produce the winning vehicle. The driver and the pit crew chief call themselves the Product Development Team (PDT). They lead the activities of the development team to ensure that the contract with the owners is fulfilled. They also pay close attention to what keeps the fans happy. Because their skills are cross-functional, they are able to understand and contribute to all aspects of the vehicle, the race, the track, and so on. Therefore, they can make better, faster decisions.

The owners are the Integrated Product Management Team. The IPMT has a number of investments in their portfolio and keep their binoculars zoomed in on their investment choices. They use a process called Portfolio Management to help them make their investment choices for their sponsor, MCC, and give the checkered flag to the winning products in their portfolio.

The PDT positions the vehicle using Customer Appeals, a process for understanding customer and competitive priorities, which aids them in their decision making.

On the track, there are a number of markers the vehicles need to pass developing product requirements and concept, developing product definition and project plan, developing and verifying product, qualifying and certifying product, ramping up and launching and manage life cycle.

At certain decision checkpoints, (DCPs), the IPMTs and PDTs will be determining if the vehicle is still positioned properly in meeting the owners' goals, the customer requirements, and outpacing the competition. If not, they will decide on some mid-race adjustments to increase the chances of success. Or, if necessary, remove their vehicle from the race, rather than waste any more resources on it.

#### **7.3.2.2.1. Historical Perspective**

In software development, MCC has had too many vehicles on the track. Not only dollars, but also people have been spread thin, often working on more than one vehicle at a time. The method of managing the process was to periodically bring together the owners, crew chiefs, and, sometimes the crew, for huge status meetings, spending a lot of time just to see whether they were on track.

Despite these huge status meetings, there were many problems. To bring the problems closer to home, consider these scenarios: A major product announcement is delayed for six months because the four key contributors fail to communicate regarding their respective development roles. The newest release of an operating system fails to meet the requirements of its intended application software. Development of a new product segment is completed on schedule, but the fulfillment process is not geared up for production. Expense estimates for final integration testing of a new system double

because extra people must be assigned to compensate for schedule delays. Each of these situations has a common denominator -- lack or failure of project management.

Project management in MCC existed before, but it was not a formalized or consistent process. In many situations, project managers were assigned on an ad hoc basis with little or no guidance on how to pursue their tasks. This caused them to spend a great deal of time identifying and defining the processes by which they managed their projects. Largely, this has been by trial and error. Mistakes can be costly in terms of time and money.

As well as many of its competitors, MCC has recognized the need for an explicit professional position of project manager. They have also recognized the need to support the project managers with the tools and information to drive the process more quickly and accurately. Although managers have had information available to them right along, it differs from project to project, site to site. Project Manager's Workbench will allow project managers consistent access to an automated database of integrated information and tools to access that information for decision making.

#### **7.3.2.2.2. Outputs /Changes /New Process**

Traditionally, within MCC, project management has been seen as the simple functions of scheduling, tracking, and controlling. It is actually much broader, also encompassing cross-functional team building and management, risk assessment and management, resource allocation, milestone planning, change management, expense estimating and tracking, team communication and reporting.

Project management is more than just naming project managers or sending people to training. Project management must be an integrated, essential contributor to the development process. It cannot be seen as a separate, optional discipline, but the expected way of doing business in the development community. The process for project

management in the development divisions can also serve as a pattern for similar roles throughout the corporation.

Integrated Product Development is a team-based process model that provides the framework for managing all development efforts within MCC's hardware and software development communities. Project management will bring about the implementation of that model. Trained project managers will bring the model to life and make it work.

To be truly effective, project management activities must be performed by both the IPMT and PDT. These activities within IPD also include PDT formation, facilitation, and management, contract management (where applicable), change control, Activity-Based Costing analysis, evaluation, management, and control of product assumptions and communications within the PDT and between the PDT and IPMT.

The PDT is a cross-functional team of technical and subject matter experts who provide liaison with their own units within the division. The PDT leader may come from any of the communities which make up the PDT. That individual is designated the project manager for the product development effort.

To enable the process changes and culture shifts that will support institutionalized project management, MCC has a plan that addresses six major activities:

Establishing a project manager career path. Project management is a professional discipline, and requires position descriptions, established salary levels, and some definition of career path in order to attract capable people as project managers. There are three possible levels for the project manager position, depending on: PDT size, scope, and importance; leadership ability; experience; and education. The highest level Project Manager will be required to pursue professional certification from the Project Management Institute.

Creating executive support. Project management requires time, adherence to process, and knowledgeable, informed use of its tools and techniques. It requires encouragement to change to a new way of doing business. Often project managers need support to overcome obstacles and to obtain resources necessary to accomplish projects. Each of these is a challenge for the IPMTs who must assist project managers. Senior executives also need to understand and make available the appropriate staffing levels.

Enhancing the project management and IPD processes. Although the IPD model is very sound, MCC has identified four areas relating to project management that will need to be revised periodically to reflect the current needs and experience of MCC project managers, as well as emerging best practices across the industry: responsibilities, tools, and project interrelationships, guidance on creating, building, and managing teams, expense management and financial information, sample report formats and what information should be conveyed, to whom, and how often, developing guidance and providing access to project management tools.

Providing training and education. Individuals and teams need to be educated not only in project management techniques, practices, and tools, but in their importance to the implementation of IPD. Establishing a Project Management Center of Competency (CoC). Experienced MCC project managers will rotate through this (virtual) Center of Competency on temporary assignment. Their role will be to provide mentoring and assistance to MCC project managers worldwide, either on-site or by means of a "help desk." They will also consolidate "lessons learned", coordinate and manage education and training programs, review project management implementation and maintain and improve processes and tools

### **7.3.2.2.3. Software Delivery**

Traditionally, MCC has delivered software products through physical media -- tapes and diskettes. Not only was using the mail or an express delivery carrier slow and/or expensive, but packages often got lost on loading docks or elsewhere.

MCC was able to service software through telephone hookups, but that was limited because of the high cost. Today, the company has successful pilots in two different arenas:

Satellite Service and Product Delivery enables MCC to send both products and fixes to customers via a satellite network. MCC provides largest customers with a satellite receiver, and is able to meet their needs within 24 to 48 hours after receiving their request. This compares to 7 to 12 days by mail. There is an initial cost of about \$800 for the satellite receiver, but that pays for itself in a short time. Sending a tape by service delivery costs \$50, compared to 50 cents by satellite. MCC expected to have 1,000 customers using the satellite receivers by year-end 1996. The limitation is that the Hughes Satellite Network is for the United States only, although they are looking at expanding their service to Europe.

Internet Distribution Services are a good option for smaller customers. Some of competitors are also using the Internet for delivery. Again, MCC is limited to the United States, but in this case it's because of the cost of linking up overseas.

### **7.3.2.4. Benefits Attainable**

Employees will experience more success as they develop state-of-the-art skills. They won't see their hard work scrapped because they'll be developing products that

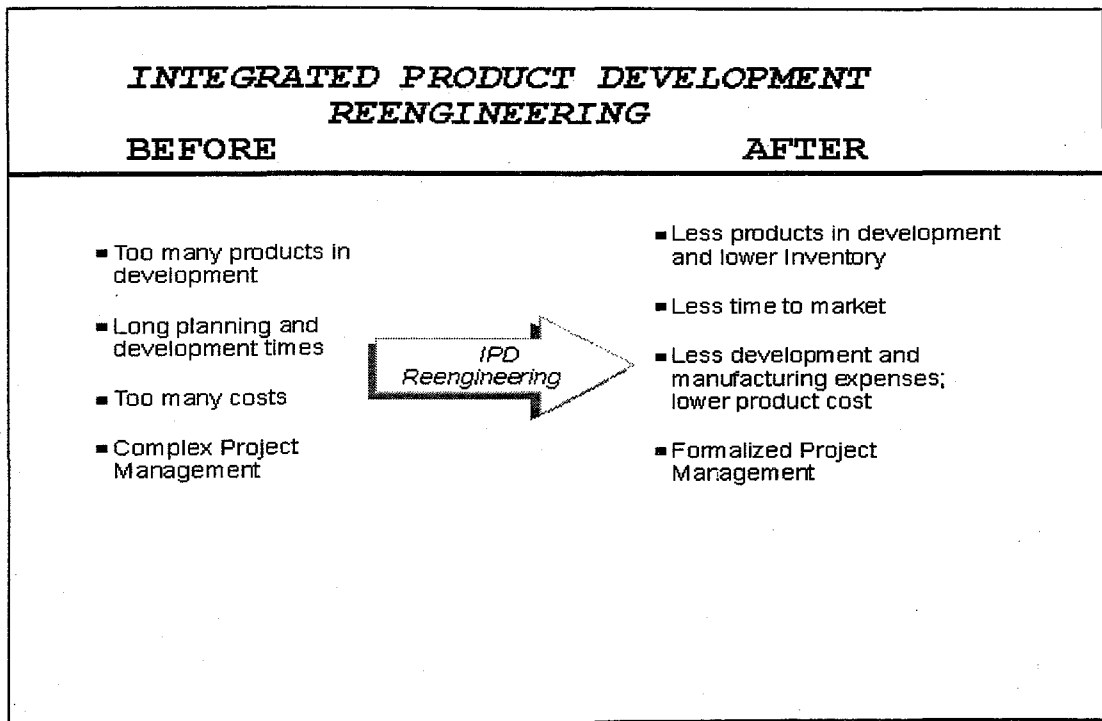
customers want to buy. They'll be on winning teams that bring competitively priced products to market quicker.

Customers will see the positive results of the reengineering efforts through enhanced responsiveness to their wants and needs, better price/performance, improved ease-of-use, and better interoperability.

Shareholders will see marked improvement in profits, revenues, and cash flow.

The following figure depicts the situations before and after the deployment of Integrated Product Development reengineering:

**Figure 7.2. Integrated Product Development Reengineering**



IPD is all about effectiveness: marketplace effectiveness, business effectiveness and team effectiveness. IPD enables MCC to win in the marketplace by effectively

selecting market segments, establishing their brand promise, defining the right products and managing investment priorities.

With IPD, MCC employees can execute their business effectively by making rapid fact based decisions, utilizing open access to data, delivering on brand promise and leading the marketplace in timeliness, quality and innovation.

Finally IPD allows MCC employees to team effectively by operating as cross functional teams with shared goals and by organizing to deploy skills rapidly and effectively, while attracting and retaining key skills.

The new work flow that came with the Integrated Product Development Reengineering can be seen in Appendix.

### **7.3.3. Production**

Production reengineering effort focuses on improving the speed and the reliability of MCC as a supplier of products to customers while efficiently using assets to return greater value to shareholders. To do this, MCC must have consistent processes; from getting materials to manufacturing, from suppliers to delivery to the customers.

The Make-Market Cycle is the set of core processes that begins with customer orders and ends with delivering to customers what they want, when they want it. It is here where ideas turn into reality, where those great designs in software and hardware take shape, get assembled and are sent to the thousands of customers worldwide. Because the Make-Market Cycle includes so many activities and people, MCC has an opportunity to contribute greatly to increasing responsiveness to customers while reducing costs.

The task is not easy, nor simple, nor without risk. Due to lack of integration and inefficient linkages, the company as a whole could stall, falter, and get left behind in the highly competitive marketplace.

MCC has an opportunity to leverage its size, to realize a worldwide economy of scale through commonality and sharing of ideas, resources and skills. MCC has a choice to move forward with firm resolve, to take giant steps, together, to leap to a new level of performance or else be left out of the markets in which to compete.

These production reengineering initiatives, collectively and over time, will produce an entirely new level of capability that can return MCC to the industry leadership that is desired.

The goal of production reengineering is to integrate MCC's supply chain by maximizing common procedures and reducing the number of physical transfers from material acquisition to manufacturing to distribution. Studies are underway to streamline

plants, system packaging, and configuration centers in order to shorten production cycle times, reduce inventory and increase responsiveness to customer delivery requests.

### **7.3.3.1. Historical Perspective**

MCC has done some extensive benchmarking to determine how competitive it is. Compared to competition, the company is in the middle of the pack in many key performance areas. But there's trouble with being in the middle, with being average. The company can miss how quickly the competition is moving. In some areas, it are losing ground due to inability to change and improve fast enough.

Obviously, MCC must improve in the areas causing the greatest dissatisfaction to customers. Yet the average is not where the company wants to stay either. These worldwide reengineering changes to the Make-Market Cycle are designed to move MCC from average to among the front of the pack.

Overall, the worldwide production and distribution of the broad range of MCC products, services and systems has grown into quite a patchwork of localized and specialized processes, systems and facilities. This patchwork has created barriers in the order to assembly to billing cycle.

The average time from order to delivery takes 44 days when the target is from two to 12 days, with the greatest focus on two-day delivery. To reach targets of two to 12 days, MCC must recognize that the system itself is broken. MCC cannot make incremental improvements, but must reinvent this whole process.

For many customers' orders, a commitment date cannot be made until the order is validated. To do this, the company relies on 30 different configurator processes around the world, supported by some of the oldest applications known to mankind. Often,

multiple efforts are required to ensure the order can be built, adding days to order acceptance time, and usually creating some degree of difficulty in manufacturing.

In order to give customers an accurate order commitment, MCC must also know the impact to available schedules. While there is some level of real-time scheduling in the European operations, the rest of the world must wait days after order acceptance to make a scheduling commitment. In addition, the company tend to schedule based on ship date, with estimates calculated by hand for actual transit times. The company has trouble determining actual delivery.

Customers don't care when MCC ships, they want to know when they will receive their orders. Yet the processes today keep MCC from providing this basic level of customer responsiveness.

So MCC has an order and, after spending days to validate it and figure out a schedule, it must have available parts. Hopefully, someone has done a good job forecasting the demand so the company has enough supply. This process is one of toughest areas, as demand and supply planning is only accurate about 15 percent of the time. This planning process consumes from 45 to 60 days before internal MCC component commitment is obtained. Not exactly what you might call responsive.

By relying on demand forecasts which push products into the supply chain, the company often experiences substantial supply shortages on exciting products and excess, obsolete inventories on others. There are reasons for this. Marketing & Sales forecasts are more often designed to cover revenue projections than assess potential demand. These forecasts suffer from adjustments with each geography adding their own spin, risk coverage, and processes. And, in the end, it is just plain difficult to predict the future. Yet demand planning feeds supply planning.

Supply planning also suffers from a mix of central systems, extensive management oversight and local control. Each manufacturing site does its own supply

plan. The full cycle takes from 60 to 75 days to provide confirmation of supply commitments back to the geographies. A recent blind survey of suppliers found that MCC was ranked lowest out of 119 competitors for demand/supply forecasting.

The entire replenishment process needs rapid improvement. In some cases, it takes from four to six months to get parts. What makes this process aggravating is that, out of 100 parts needed to assemble a product, 99 will have to wait until receipt of the final part. Since assembly may only take 30 to 60 minutes, there is tremendous inventory waiting time. MCC will be changing this replenishment area both to plan better and execute correctly using a inventory pull system.

In the past, contracting with suppliers has been fragmented and it's easy to see why. A focus on divisional performance created a focus on divisional processes and systems, erecting barriers to cross-divisional and worldwide coordination. While this has been understandable, there has been a price to pay for independence and uniqueness.

Until the advent of the MCC Commodity Councils, where cross-functional managers leverage purchasing power for selected commodities, results when negotiating for commodity pricing have been ineffective at best. MCC has paid more in the past for commodities than necessary. The recent successes of the Commodity Councils have been eye-opening. They reveal the benefits and savings available in worldwide coordination.

Additional opportunities await in building strategic partnerships with key suppliers and providing more consistency in direction and decision-making to the supply community. The tradition of redesigning common parts for new systems has also expanded sourcing and engineering workloads, unnecessarily.

Inventory turns have seen improvement over 1994, moving to 4.3 in 1995. The company must continue on this path to reach the target of 6.0 inventory turns across all groups of production, in-field, and service parts.

Also, inventory assets are managed wherever the asset resides. MCC needs a way to coordinate and optimize customer responsiveness needs against inventory levels and location across organizational lines between marketing and manufacturing.

In addition to the order cycle and materials management processes, opportunities exist within manufacturing structures as well. MCC has built full-service capability, dedicated by platform and mix, across many different geographies. Each location has its own indirect support, customized processes, and information technologies (IT) applications. While this made good sense in the past, the question is, can MCC afford this and does this arrangement best serve current and future customer needs? The plan for fulfillment centers offers a pathway to change traditional manufacturing locations into lean facilities, with common processes and applications, located near markets. Operation will be designed for low cost and fast response.

Distribution has seen early attention and significant change. The past approach relied on more than 72 system packaging centers and consolidation centers managed by more than 60 different groups in the organization. This complexity has been reduced tremendously with the creation of a single logistics organization that has taken responsibility for worldwide distribution. Savings in standardized contracts alone contributed more than \$30 million in 1995.

The shipping infrastructure created buffer inventories where final product was held in the centers until time of customer delivery date. This added excess carrying costs and provided fertile ground for obsolescence.

Finally, there is an expectation, based on countless experiences, that MCC billing will always have some type of error, and multiple efforts will be required for every billing transaction.

That describes many of the difficulties. Of course, MCC is doing some things right. The company has talented people, some strong capabilities, solid product offerings

in much of portfolio and a committed work ethic. If MCC wants to be in the lead, the company must be able to achieve the ability to identify a commitment date and delivery date at time of order, 98 percent commitment to customer requirements, meaning that MCC is able to say yes 98 percent of the time to customers' first request dates, fulfillment within two to 12 days of order date, 100 percent on-time delivery, inventory turns greater than 6.0 and purchasing economies of scale exceeding industry averages by 1-3 percent.

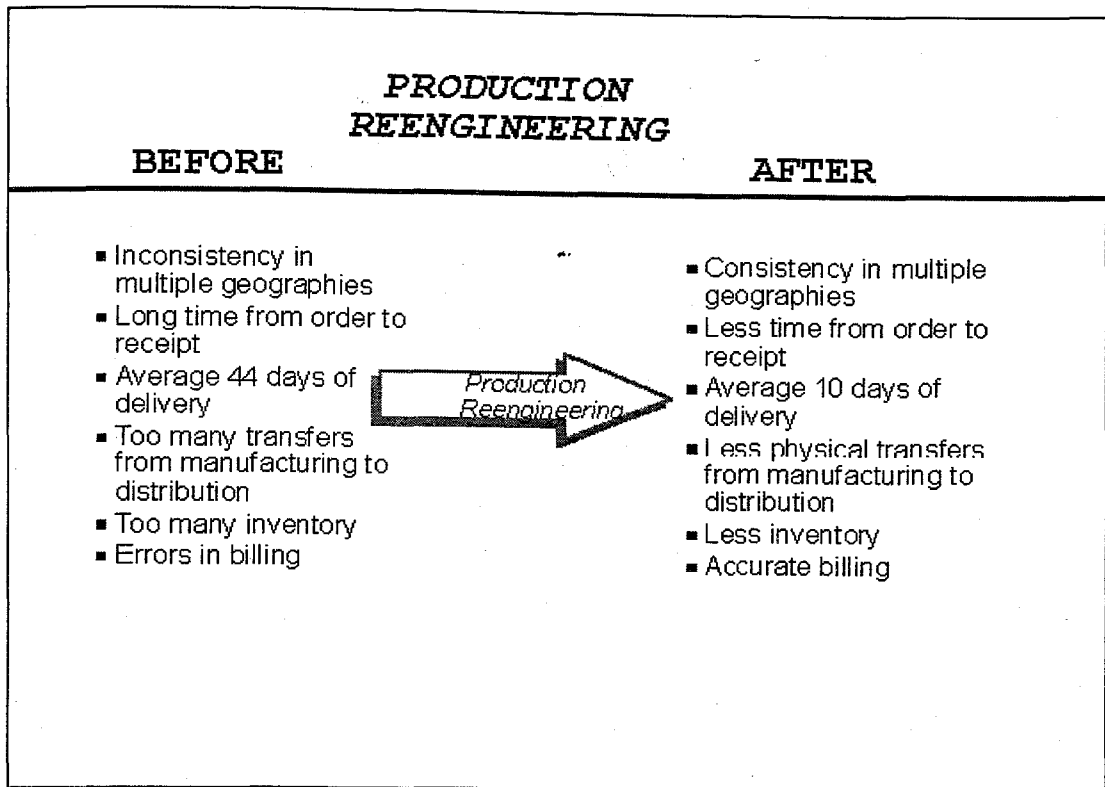
It's clear that major changes are needed to reach such goals of responsiveness and cost efficiencies. The main barriers in production occur because MCC lacks an integrated process across all organizational and geographic boundaries -- a process that focuses on customer and shareholder value and reinforces targeted goals.

### **7.3.3.2. The New Way**

The reengineering of production and distribution processes follows the fundamental approach of creating common connections along the entire process for consistency of operations -- whether someone is in Fishkill, Wangeratta or Bordeaux. The Make-Market Cycle relies upon the Integrated Supply Chain (ISC) and four activities attached to the ISC are Materials Acquisition, Manufacturing Structures, Distribution Structures and Fulfillment support. If one area falters, then it becomes extremely difficult for other systems to operate efficiently.

There are a number of key projects for the Production Reengineering initiative as Demand & Supply Planning, Real-Time Scheduler, Configurator -- MCC Solutions Manager, Replenishment, Material Acquisition, including Commodity Councils, Asset management, Manufacturing Structures, including Fulfillment Centers, Distribution/Delivery Structures.

The following figure depicts the situations before and after the implementation of Production Reengineering:

**Figure 7.3. Production Reengineering**

### 7.3.3.3. Customer Benefits

The customer will see changes ranging from incremental to incredible, as a result of reengineering. A customer will know, at the time the order is placed, the complete level of products, components, and accessories needed for the order, and how soon delivery can be expected (the goal is that 98 percent of deliveries will occur by the date requested by the customer). This will be a big change over current processes.

An even bigger change will be the substantial decrease in time from order to receipt of the products, since the company is targeting a five times improvement. Perhaps the most telling change from the customer's viewpoint will be the accurate billing that

originates with the order configuration. It will no longer be customary to struggle with invoicing.

All of these new realities for the customer will be clear signals that MCC has undergone fundamental revitalization of the ordering and production systems. Customers will be able to say that MCC can provide what they want, when they want it, and where they want it, rather than what they say today.

Customers will also get something else that they have been asking for: a consistent way to work with MCC around the world. These common systems and changes will provide customers with a consistent way to do business with MCC in multiple geographies.

The new work flow that came with the Production Reengineering can be seen in Appendix .

### **7.3.4. Solution Design & Delivery for Fulfillment**

Customers are ultimately the focus of MCC's reengineering efforts. Solution Design and Delivery (SDD) for Fulfillment provides the core methodology to improve customer relationships and the processes essential for improving corporate functioning.

SDD for Fulfillment (Fulfillment for short) is the critical set of order, schedule, delivery and payment systems that will connect Sales and Service with Manufacturing and Development. Customers will be able to select fully-configured products, receive a firm price, schedule an order, and obtain a commitment for delivery all at one time, based on a single transaction. In addition, customers will have confidence that invoices will match orders.

The objective is to deliver a reengineered worldwide fulfillment capability. Fulfillment is a transaction process and includes configuration and validation, pricing, ordering, scheduling, invoicing, billing, collection, returns and contract management. The goal is to improve transaction cycle time, accuracy and competitiveness of order management processes.

The transition to a fully integrated organizational system places key responsibility on the SDD functions. Three reengineering projects address the critical linkages. They are SDD for Fulfillment, Integrated Solution Manager (ISM) and Real-Time Scheduling/Gateway.

SDD for Fulfillment provides a core competency of customer fulfillment that achieves a competitive advantage through global operational excellence utilizing common processes across all channels, all products and services.

What this means is there will be one core systems application process. SAP was selected as the system for handling fulfillment, and the necessary ancillary functions. SAP

is the core transaction engine for fulfillment supported by common worldwide applications for worldwide scheduling and solution configuration. Ultimately, with one common worldwide process, SAP will be the link which unifies and aligns all the core processes. SAP includes the capabilities of product selection, pricing, ordering, scheduling, financing, credit and collection information, delivery, transaction settlement and customer profile data.

The Integrated Solutions Manager (ISM) provides configurator support and day of announce support for hardware and software products and includes a common worldwide product reference for software. The key component is a common configurator -- a translator for describing in parts language; everything contained within a given solution.

Real Time Scheduling / Gateway provides application selection and migration plans for linking order fulfillment to Integrated Supply Chain functions. It provides ability to commit to solution availability and delivery schedules.

Each of these reengineering efforts is moving on the path towards full global integration.

#### **7.3.4.1. Historical Perspective**

The fulfillment process is a linchpin in MCC's core processes. This process has not been functioning well. It has become less competitive and less affordable.

MCC has a breadth of product offerings unmatched by competition, but that also means the company currently has hundreds of complex product offerings with varying software terms and conditions. There are tens of thousands of complex product configurations, with more than 350,000 software feature codes, and more than 50,000 hardware options.

There are approximately 132 MCC fulfillment processes, giving tremendous channel opportunities and proliferation. There are more than 30 configurators, all hard-coded and unable to talk to one another, and more than 25 fulfillment systems. There are more manufacturing systems than the manufacturing locations.

This level of complexity, supported by unconnected systems, helps to achieve some of the lowest levels of customer responsiveness in history and in comparison to competitors.

Feedback from customers says that MCC responds with complex, limited, delayed and inconsistent information. Multiple points of contact, follow-up, and ongoing assistance derail satisfaction. Pricing is complex and often negotiated. Reliability in delivery is so varied that delivery schedules are virtually meaningless. Committed delivery dates are accurate from 15 to 80 percent of the time, and, until recently, when a customer did receive an accurate commit date, shipments were still late another 20 percent of the time. This level of performance is only overshadowed by invoicing process, which is wrong so often that employees assume that an invoice must be checked and adjusted several times before going to the customer.

Not surprisingly, MCC employees and partners feel similar frustration. In addition, MCC is hampered by the need for manual solution design and delivery support to provide international support services. Tools are not standardized, and the methods are far from friendly. Global Services involve particularly complex dimensions, making a single solution virtually impossible.

The ability to provide solution validation is fractionalized. Batch processing and other barriers to real time data make it embarrassing for employees trying to serve customers with timely assistance. Even if service is effective, chances are good that it used more time and resources than necessary.

Needless to say, MCC shareholders aren't pleased when MCC has been spending approximately four times as much money on fulfillment as the competitors. It's hard to imagine processes becoming so complex and convoluted, and yet it evolved with the best of intentions, and with great dedication.

Each of the unique MCC solutions was built to handle the needs of a particular geography, manufacturing area, set of products, or even special conditions or situations.

Currently, order entry is performed by administrative personnel, then turned over to data entry personnel for order processing. This type of structure is functional (sometimes called the silo, or over-the-wall approach) with major steps being performed by different personnel in the process.

#### **7.3.4.2. The New Way**

The Integrated Solutions Manager (ISM) is built around a purchased product, SalesBUILDER. It enables the configuration of all products represented in SalesBUILDER's modeling syntax and will support all internal and external users and customers.

Gone will be the need for market representatives to check and recheck to make certain an order passed the current configurator programs. And no longer will the factory have to wade through "not buildable" orders, as the system will create a fully configured order at time of entry that will be buildable in manufacturing terms, not just marketing terms.

Marketing representatives will have greater convenience and flexibility as the configurator capability moves to laptop via dial-up, so orders may be created on site at the customer's location.

For MCC operations, the common configurator brings great value. After development of a stable process, configuration development and maintenance and I/T operations costs are expected to be reduced by 60 percent, based on 1994 actuals. New product cycle time should be two times faster than that required for the current batch of configurators. Preparation for announcements should be reduced from a high of 13 to 17 weeks to a more flexible 4 to 7 weeks.

The ISM will support a single configurator for all geographies, with worldwide product models developed by the responsible product labs. Support for both marketing nomenclature and manufacturing build information will ensure day of announcement support.

Likewise, when Real-Time Scheduling / Gateway Rel is implemented (beginning in 1997), employees will perform many roles. They will capture the initial information, place the order, and process the order. This multifaceted skill set will require a different work perspective -- and more holistic thinking. By focusing on process integrity, a common methodology for meeting customer expectations for responsiveness, reliability and flexibility, all stakeholders will benefit. MCC employees will notice significant changes. Roles and responsibilities, and the way work is organized are changing.

More control will be in the hands of the employee. With a single point of entry; and one common process for all channels, employees will have access, and resources to respond appropriately. This streamlining will require fewer people. One individual will perform various roles throughout the transaction, providing greater opportunity for personal growth and development, as well as satisfaction in participating more fully in building customer satisfaction. A concurrent benefit is improving individual employability.

### 7.3.4.3. Changing To The New Process

The expectations are clear, but the transition will not be a simple shift. Current legacy systems are still in operation. MCC can't close up shop until full implementation is feasible. Thus, some concurrent systems may continue for a while, as less efficient modes fade over time.

The bridges required for this migration process vary considerably. Some bridges are purely technical. With a design architecture for fulfillment that is easy and flexible, even customers will be able to perform any step of the process they choose to do themselves. In some cases, business partners are beginning to do this now. This design point was used to force simplification and innovation in thinking. It also responds to growing customer base which values speed, autonomy and simplification. They want direct access -- not just to complete transactions -- but to improve their intellectual capital, their ability to anticipate future customer needs and adjust their business processes accordingly.

Consider a partner, like Sears, placing all their own orders, simultaneously accessing pricing, credit, and payment functions, and completing all their transactions with their own people. And imagine that in doing this they also input valuable customer profile data which can be used by MCC (and maybe even Sears) in research and development, sales and marketing, accessible worldwide to all corporate arms.

Single point of entry, and one process for all channels, creates a whole series of possibilities down the road.

Let's focus on a single transaction which can be completed in one interaction. It will provide the capability for a customer to perform solution design, select a product and configuration, obtain a delivery date, a price, select a shipping method, financing

alternative and perform settlement within one interaction. This is particularly important for the "off-the-rack" customers who know what they want.

Since off-the-rack customers are expected to become approximately 25 percent of the business, and streamlining to one interaction will be the norm, pricing can no longer be an iterative process. A best-offer, competitive price the first time must become standard.

MCC's commitment to delivery, during the single interface, should be reliably achieved. It is estimated that a 24-hour to two-week delivery capability will be realized. Recognizing the tight linkage of Off the Rack to the Integrated Supply Chain and the Customer Relationship processes raises other issues.

MCC customers are all over the world. The ability to leverage the international presence, broad product line and scale can be a key differentiator. The capability to initiate a transaction from any country for delivery and settlement in another country is essential.

MCC's order entry to install cycle time should improve to two to 12 days, instead of the current average of 44 days.

Drawing on the benefits of rapid delivery, international support, and MCC as a reliable supplier, solution design and delivery will be an integral part of regaining a market leadership position. MCC should achieve a competitive advantage, outpacing the competition with a broader array of products and offerings available through this process internationally. There are no guarantees.

#### 7.3.4.4. Deployment

SDD for Fulfillment is slated to be deployed by March 1997. As with any launch process, a ramp-up deployment involves continual feedback loops for refinement and modification. There will always be some variation among geographies, but the core processes and applications must and will be consistent.

The reengineered Solution Design and Delivery for Fulfillment process is the foundation of a new core competence for MCC, grounded in the value principle of operational excellence and customer service. It is the single most critical process that provides the mechanism for delivering products and services to customers through linkage with the Customer Relationship processes and the Integrated Supply Chain.

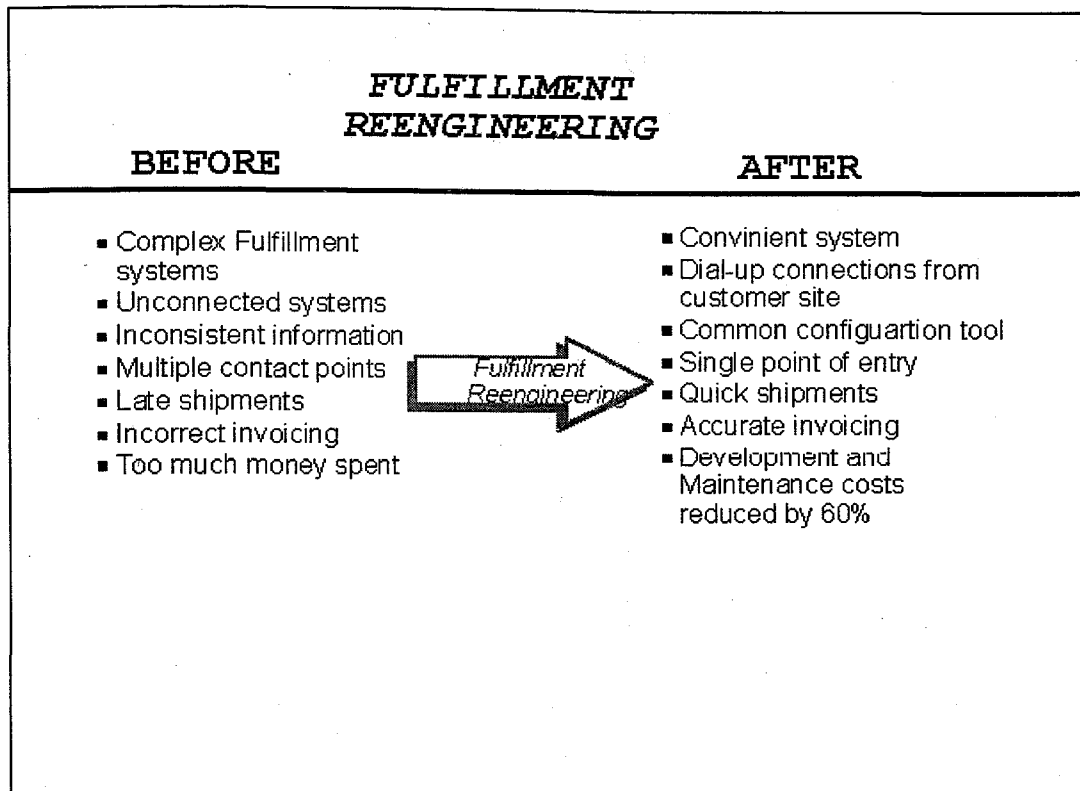
MCC has restructured to form a kind of matrix organization. Doing so should shift, perhaps subtly, some concepts of ownership. Historically, there have been ownership issues -- where one group maintained and one group developed. Now there is an independent worldwide team, reporting to a single senior executive. Territoriality should not be as functional as before.

Geographical territory continues to raise questions. Globalization is multifaceted. A single, consistent application implemented the same way globally will not eliminate the many interfaces which must be managed. Communicating across cultures is complex and messy by nature. Having common processes and a supportive infrastructure can be especially helpful in this environment. MCC is not there yet.

Systems will migrate in phases, supported by the capability of revisions to SAP. The early releases will have only simple part numbers. With subsequent SAP releases, greater complexity in offerings will be provided.

The following figure depicts the situations before and after the deployment of Fulfillment Reengineering :

**Figure 7.4. Fulfillment Reengineering**



The new work flow that came with the Solution Design and Delivery for Fulfillment Reengineering can be seen in Appendix.

### **7.3.5. Finance**

The Finance Reengineering Initiative is focused on providing relevant business information and insightful recommendations to executives, management and employees. In today's competitive environment it is critical that the information be timely, accurate and provided with world-class efficiency.

Timely means that people have the information when they need it to make decisions or take action. Accurate means information must be high quality and be the right information for business use. This means there must be consistency in, and access to, information worldwide. Efficiency at world-class levels means spending far less resources than MCC currently does to provide financial information -- 1.3 percent of revenue, rather than 2.9 percent -- more than a 50 percent reduction.

To get the speed, accuracy and efficiency required, MCC has undertaken three critical projects: Improve consistency and availability of data through the Data Warehouse and an Executive Information System and global standards for data definition, improve operations and processes by implementing industry best practices; consolidate data centers and converge software applications worldwide, and upgrade to new applications, end user technology, and tools.

MCC has made significant gains in each of these areas, but still has a way to go. The competition is constantly improving, and the customer expectations are getting higher.

### 7.3.5.1. Historical Perspective

In early 1994, the worldwide financial organizations had a lot of people working very hard, but MCC was not getting the results needed. In March of 1994, an external benchmark study was conducted and a small corporate reengineering team was put in place. This study compared MCC's financial process to a composite of 400 other companies. The comparison included productivity and expenses to revenue comparisons, and a view of process best practices.

The study confirmed that MCC had some very inefficient processes, and had to improve efficiency significantly, while expanding the amount, quality and speed of the business information provided. For example:

MCC's financial expense was \$1.8 billion while the benchmark average was \$.9 billion or half of MCC's. The first quartile, or world class, was \$.7 billion. MCC's accounting closing cycle took 25 days, compared to the benchmark average of 5.1 days. World class was less than three days.

MCC's budgeting cycle took 180 days, compared to the benchmark average of 112 days. World class was less than 100 days.

In the area of customer billings, MCC sends out two invoices for every check received. This not only impacts MCC's efficiency, but the efficiency of customers as well.

The benchmarking study made it clear MCC was not performing efficiently. It showed that the problems cut across all aspects of the financial function and that there is a direct impact on the customers. The need to improve was clear. The next step was to determine how to improve.

It was concluded that there were three fundamental or root causes of poor performance in the financial function: Data itself -- MCC had a difficult time getting and consolidating data because there is no consistency in the definitions of data, nor what data is required across all the units to manage the MCC company. Financial Systems -- The financial systems were old. MCC had 108 variations of six core applications, running in 67 separate data centers. There was no consistency or integration across the centers or applications.

The benchmark study identified 27 basic processes that encompass what 15,000 people are trying to do. MCC needed to assess the effectiveness of these processes and make improvements.

At that point, a clear picture of what was wrong and how MCC was going to approach it was seen. It was taking longer time than required, using more people, and costing more money to perform the financial function by a significant margin. To be a world-class, worldwide company, MCC had significant improvements to make. For MCC to be competitive, the company had to be better, faster and more efficient.

To make the improvements needed MCC changed many of the practices and procedures, develop new and improved systems, and standardize the systems, business processes and approaches worldwide with finance reengineering initiative.

### 7.3.5.2. Outputs /Changes /New Process

There are three major aspects to the improvement of the financial function: improving financial systems, enhancing the availability of financial data, and improving basic processes.

Improvement in the area of financial systems means consolidating operations and centralizing applications. As mentioned above, MCC started with 108 separate applications running in 67 locations around the world. The goal was to reduce the number of locations to five and the number of applications to six. This meant that most applications (Ledger, Assets, Payable, Receivable, Intercompany, Financing, Pricing, Business Data Warehouse and Measurement) would be done the same way around the world. Other (Cost Accounting, Tax, External Reporting, Treasury, Planning) would be common, but tailored to local needs. Some areas (Payroll and Benefits) were difficult to standardize.

The benefits of the consolidated operations and applications are clear. The streamlined system will be much faster, require less money to operate, allow for consolidation and communication on a worldwide basis and leverage the worldwide investment in development and support. External customers will get faster response and more accurate information from proposals to invoices. Internal customers will get information faster, less expensively and more accurately to help in planning, decision making and evaluations of all aspects of the business. Stockholders and investors will get accurate information and improved return on investment (ROI) due to reduced cost and improved efficiency.

In the area of financial data, MCC will have globally consistent accounting data definitions. This will enable them to have a common repository for accounting information that is called the "Financial Information Warehouse". When the Warehouse is in place, it will be linked with the Business Measurement System and Executive

Information System to provide relevant global data to industries, product units and services organizations.

The combination of the Financial Data Warehouse and the Executive Information System will provide executives with timely information that has not been available in the past. They will be able to get at detailed information quickly and identify trends and root causes faster. Executives will have access to financial reports, product and service participation, customer satisfaction, human resource and business volume information worldwide. Ultimately, this will lead to better decisions, increased customer satisfaction and better performance.

The consistency of data and the new converged applications will make it possible to develop standardized reports and information unique to the individual operating unit and customer situation. This can be provided to line executives in an annotated fashion, on line.

The Financial Information Warehouse will also have a significant impact on today's planning environment. In the past, planning has involved many unique systems, large amounts of manual effort and inconsistent formats across business units. This made it difficult to reconcile information across dimensions such as country, product, industry, etc. The new consolidated system and consistent data will streamline this process and improve accuracy. Better planning will lead to improved business performance.

To improve the 27 processes that were identified in the financial benchmarking study, eight Financial Process Teams were formed in June of 1994. These teams used a broad, high-level approach to understand the fundamental process flow. They developed an hypothesis about cause and effect, analyzed the information and then submitted their conclusions for executive review. The teams then developed recommendations, and have been implementing the proposed improvements.

In simple terms, these teams found that complexity drives problems. This meant that efforts to improve financial processes needed to parallel the efforts in financial systems and financial data. This imposed a wide range of changes, such as reducing the number of accounts used at sites; reducing 1200 assets codes to 150 in the United States; company-wide presentation and analysis standards; simplified documentation requirements; implementing worldwide standard chart of accounts; and reducing the number of plan targeted items to six. All of these changes have been implemented within Finance.

Some of the process improvements identified are more complex. They include reducing 26 site applications to a single common site and implementing a cost and logistics system, called SAP, for hardware cost accounting -- while converting to a standardized cost accounting method. Consolidation of 18 ledgers into one worldwide format is another example.

These and many other changes will reduce the complexity of the processes, allowing them to operate faster, better and more efficiently. The three major projects related to financial reengineering -- streamlined financial system, consistent financial data and improved financial processes -- will result in making financial function world class in terms of speed, accuracy and efficiency. These benefits will produce a major change in culture that will be difficult for all of MCC employees to deal with. Standardization and commonization means that specific units will not have their own unique systems any longer. Perhaps the biggest change of all will be in having to give up the way used to do it, for the new common or best practices way of doing it.

#### **7.3.5.3. Deployment**

Significant progress has already been made in the deployment of these initiatives. In Financial Systems, the number of separate applications has been reduced from 108 to 56. The number of processing locations has been reduced from 67 to 36. That means MCC is half way to its goal of five locations and six applications. The next quantum leap

on this journey is linked to the implementation of SAP, and the implementation of the Information Technology initiative.

An excellent example of how this is working is related to the six U.S. Sales territories. The focus has been on improving consistency between units and this has resulted in a significant reduction in the workload in each of the centers. Six centers have been consolidated into one center that serves all units. This has produced dramatic improvements in speed, accuracy and efficiency.

The Financial Information Warehouse was fully on-line by March, 1996. The Business Measurement Information System went on line in December, 1995. Sales volume data is being reviewed weekly at corporate headquarters.

In the area of financial processes, more than 70 process improvements have been implemented. A new, common planning tool was implemented worldwide in the second quarter of 1996. Other initiatives, such as SAP, will enable further improvements in 1997.

Good progress is being made against targets set from the benchmark findings. Financial expense/revenue has been reduced from 2.9 percent to 2 percent. MCC units worldwide have committed to be at 1.5 percent in 1996. The closing cycle has been reduced from 25 days to 7 days. A process has been defined and implemented to cut the budget cycle in half.

Aside from SAP, the primary issues of deployment revolve around people, rather than technology, software, etc. The major design issues have been resolved and most of the easy fixes have been implemented. The reengineering process is now being turned over to the operating units and local operating staffs.

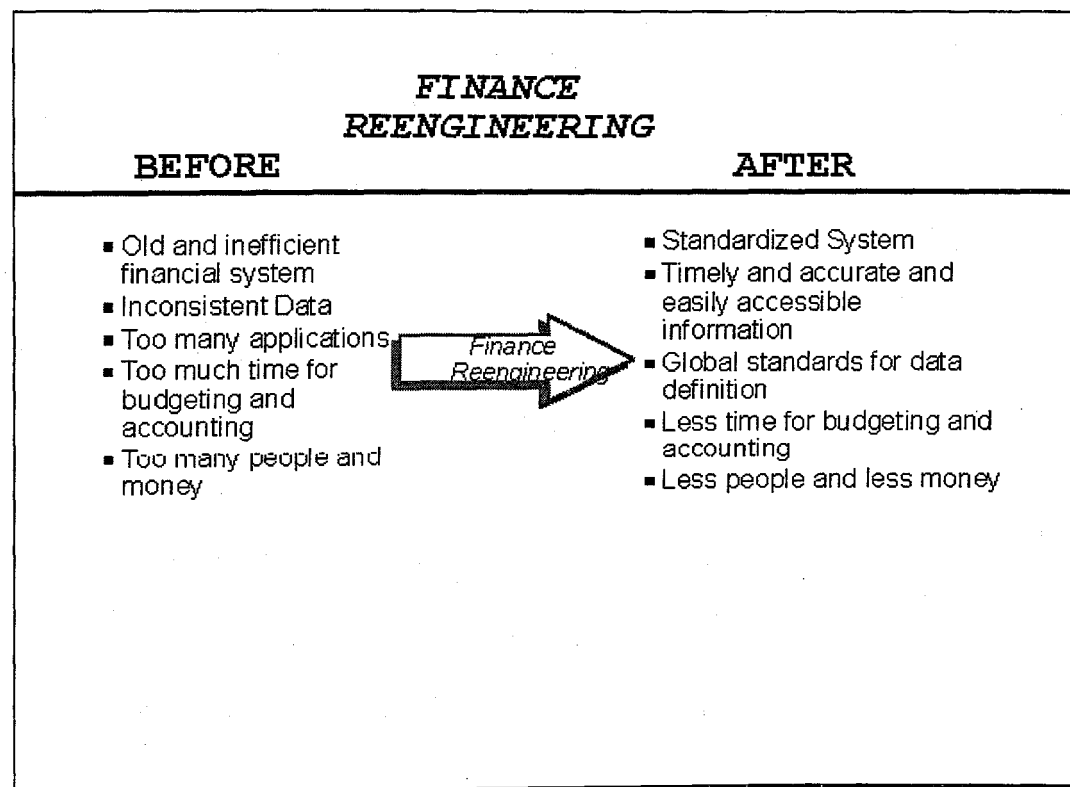
The chief financial officers (CFOs) in the operating units have responsibility for implementing the new processes and procedures. They must be able to communicate the changes, the impacts they will have, and how the changes can be used to the benefit of the

line organization. In simple terms, the CFOs must implement the new processes: focus on how to make it work; communicate the changes in a positive business framework to all their staff members; explain the business reasons for the actions; explain and demonstrate the benefits to others -- finance and non-finance; address line management problems and concerns; implement new systems and make them operational rapidly; promote the new initiatives wherever appropriate; help others learn how to champion the changes; learn the critical dependencies with other initiatives and work together to solve any problems.

Line managers are the customers of the improved capabilities in the area of financial information. They will be getting more information and better information than ever before. This information will be accurate, timely, accessible and easier to use for decision making.

The following figure depicts the situations before and after the implementation of Finance Reengineering :

**Figure 7.5. Finance Reengineering**



The new work flow that came with the Finance Reengineering can be seen in Appendix.

### **7.3.6. Information Technologies**

Information Technologies' reengineering initiatives consist of three major projects to enable Sales & Service, Manufacturing & Development and the Support Groups to reach their potential.

#### **7.3.6.1. Historical Perspective**

As late as 1992, MCC had redundancy in infrastructure, applications and critical databases. For instance, the company had 155 locally managed Data Centers around the world and duplicate voice/data networks managed at site level.

One of the principles of MCC is to win in the marketplace. To win in the marketplace means satisfying customer needs. One of the needs of this principle is reduced costs. Redundancy does not reduce costs. Neither does paying internally for bridges to be designed between systems, then continuing to enhance and maintain them. An information technology reengineering was needed in MCC.

#### **7.3.6.2. Outputs /Changes /New Process**

I/T has focused its strategy on three major components of achieving affordable costs, establishing a collaborative computing environment and deploying information technology to gain strategic advantage

First, to achieve affordable cost and enable MCC to fund new, business-critical information technology needs, I/T Corporate has set the objectives of reduction of total

I/S spending another 18%, consolidation to 28 staffed centers, reduction of network expense by consolidating and upgrading circuits and reduction of application development and maintenance expenses.

Second, to establish a collaborative computing environment for MCC's global team, I/T is making major investments in the areas of worldwide network upgrades to multi-protocol network technology, deployment of standard platforms for business process collaboration, development of a worldwide I/T framework to ensure interoperability and communications among all MCC units.

Through these investments, I/T will support the future requirements of the MCC work force team in the areas of mobility; communication with customers, suppliers, partners, and internal and external information services; global collaboration in engineering, programming and manufacturing.

These two major components create a strategic advantage for I/T. MCC has positioned I/T to deploy rapidly the new application and data centers which will implement the reengineered business processes

The MCC I/T Infrastructure will be in place by the end of first quarter of 1997 . This major effort operates as a prerequisite to some reengineering initiatives and runs concurrent with others. Sometimes, the adoption of an application drives the architecture to support it. In this case, MCC has four major projects interacting to support the infrastructure: Data Center Consolidation; Client/Server Office; Distributed Systems Management and Network Consolidation.

MCC plans to consolidate 150 data centers into eight megacenters. These eight strategically located data centers will provide a worldwide computing environment to support the entire MCC internal work load.

Two data warehouse projects already deployed demonstrate their strategic application works well. In the past, eight locations had information which required updates in all eight locations.

MCC also will deploy standard server platforms using Distributed Systems Management. Lotus Notes will be used for collaborative team computing. Currently, every Reengineering initiative has a common data base in Lotus Notes. Everyone on it can view all the information linkages, time schedules and activities. Participants can revise data and maintain the integrity of the total work. This permits joint work on presentation and documents. Those whose jobs require it will be able to communicate through desktop conferencing with video, audio and images, as well as text with comments. Plans call for the vast majority of MCC employees to be on Lotus Notes by the end of 1997. Lotus Notes also provides Lotus Smart Suite. This set of productivity tools contains spreadsheets, graphics, and word processing. This allows MCC to be standardized globally. This standardization will also reach to application development platforms for Human Resource and Finance applications, providing data in a more readily useable form.

Through network consolidation, I/T will rationalize the telecommunications infrastructure to achieve maximum efficiency and effectiveness to help MCC employees win in the marketplace, deliver on the promises of client/server technology and demonstrate leadership in network-centric computing.

MCC is deploying a global network with any-to-any connectivity, a seamless navigation for all work. MCC employees will benefit by becoming more productive knowledge workers. They will be able to let the computer system do the administrative work, just as MCC customers do.

Being on Internet makes the bulk of information about MCC products and services available through a system linked with high tech customer audience. In addition, Internet also serves many MCC employees' internal information needs.

### 7.3.6.3. Strategic Applications

The Strategic Applications Project of the I/T reengineering initiative will replace legacy systems with client/server based applications, deploy and manage the integration of SAP and other strategic applications, deploy business applications on the Executive Work Group computing platform.

How does I/T select such applications? First it focuses on teaming with other reengineering initiatives to support such strategies as networking, client/server, and run once.

One global integration is in Manufacturing. Today, MCC has six worldwide shop control systems. The strategic application Factory Operations Executive (FOE) gives Manufacturing more functions than the current multitude of systems. FOE supports Manufacturing's reengineering initiative by generating more flexibility to operate and react quickly to shifts in demand in the market place.

Manufacturing & Development's 24-hour batch operating system is being replaced by Product Manager, a tool that has a SAP-centric operations strategy. Using Product Manager reduces the time cost for making bridges to satisfy the needs of users and the future costs of maintaining those bridges. While Product Manager consists of a single logical database, it may not reside in a single physical location.

How does Product Manager work? If someone puts engineering records in the database, the system immediately and automatically notifies those people who need to know. This electronic folder serves the needs of manufacturing engineering, design engineering and procurement in a collaborative computing environment. When a person goes into the system, the electronic folder displays the automatic update with the revision date.

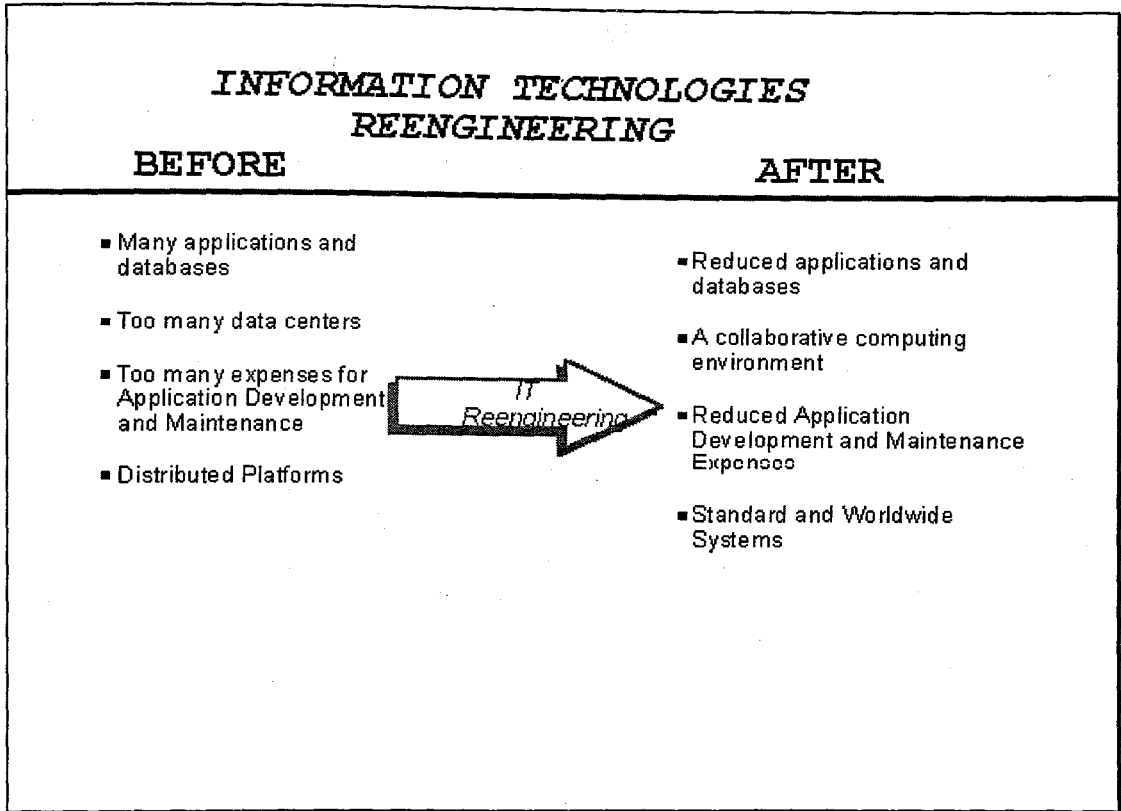
I/T continues to align all data initiatives with selected core databases. In doing so, it provides the global means for MCC employees to execute their projects quickly and effectively. No longer will information be hidden in a location next door or in another country. When one MCC employees makes an amazing discovery, the discovery can be available immediately to all team members.

#### **7.3.6.4. Next Steps**

In June 1995, MCC Chairman stated that MCC's mission is to be the leader in creating value for customers -- through technology, integrated solutions and services. MCC customers see that the processes used to serve them are simple -- to demonstrate to them what can be done to help them simplify their own complex processes. That's why MCC cannot simply continue to adapt legacy solutions. That's why MCC is reengineering information technologies infrastructure to be world class.

The following figure depicts the situations before and after the implementation of Information Technologies Reengineering.

**Figure 7.6. Information Technologies Reengineering**



The new work flow that came with the Information Technologies Reengineering can be seen in Appendix.

### **7.3.7. Human Resources (Skills Management)**

The Skills Management process enhances business results by increasing customer satisfaction and shareholder value. To satisfy customers and attract new ones, MCC must be responsive.

MCC's intellectual capital, which includes the skills resources -- the capacity to deliver value to MCC customers -- is something that need to be understood and managed. Managing skills is as integral to business as managing the financial assets or technology. Skills management is clearly a line function; it is interwoven into every aspect of business.

Because skills management is so critical to MCC's future, skills planning has been incorporated into the 1996 Financial Commitment Planning Cycle. This is the annual planning process for the entire corporation.

#### **7.3.7.1. Historical Perspective**

The importance of skills management is not new. For several years MCC was working on clarification of roles and responsibilities. Earlier efforts at skills management were done in an environment of autonomy. Each unit used its own approach and there were excellent solutions around the globe -- including Asia Pacific, Europe, Latin America, Canada, and the United States. There were many different approaches, with at least 21 different supporting tools.

Intense scrutiny in 1994 revealed that the company was experiencing increasing difficulties with having an adequate supply of the right skills. Skill shortages became most apparent in the technical areas. For example, MCC lacked an adequate skill supply in object-oriented programming and CMOS chip engineering. There was evidence of shortages for project management, consulting, and executive skills, as well. Some of the

shortages resulted from downsizing, limited hiring, and reductions or shifts in educational expenditures. In addition, the decisions to pursue new market opportunities -- such as client/server and network-centric computing -- surfaced new skill gaps.

New technologies and market directions bring challenges. For example, global linkages and the migration towards commonality of systems pose new requirements for skills mix.

MCC must have the system and organizational architectures to move with agility -- quickly and effectively -- in an industry that is changing rapidly. Currently, the capability to deploy the most appropriate skills for the customers anywhere in the world is lacking. Global deployment also requires that MCC sharpens the prediction skills as an organization. MCC must be able to anticipate in order to respond appropriately.

Prediction involves understanding complex relationships. In terms of skills management, data about interrelationships from all over the world is needed. This data will help to anticipate skill needs and gaps better, as well as plan for and execute actions to address future business skill requirements.

#### **7.3.7.2. What MCC Is Doing**

A worldwide skills management system is in place. The process is being implemented by all of units. In essence, the process takes customer requirements and business strategy and translates these into unit skill requirements -- which ultimately will result in skill deployment and development.

The Skills Management process is four-fold: Developing a plan for skills requirements involves gathering and interpreting business data; defining skills and skill sets; analyzing skill needs, gaps and solutions, and building the selected skills plan.

An assessment component, with employee involvement, generates a broad-based skills inventory. With enough data collected it can be used to determine gaps and to prioritize skills which are most needed. Updating and executing professional development plans focuses on acquisition of skills.

Developmental activities support the thrust of skills development and are planned concurrently with additional process enhancements. Again, proactive employee involvement is encouraged; accountability rests with each individual.

Deployment involves responding to identified needs, locating skills resources, and selecting appropriate people for projects or assignments.

This overall process is consistent across MCC, with reasonable variation to allow the tailoring necessary to ensure alignment with unit business goals and strategies. A management system is in place to coordinate and integrate skills management into each business unit's planning and implementation processes. A Skills Leader is responsible for unit skills management -- including planning, deployment and measurements. Global Human Resources is the enabler, providing direction and support. HR does not implement; the business units do.

HR is working to deliver more-effective tools to support the business units in this initiative. A common, worldwide approach was a design prerequisite. A tool has been developed, and, based on experience from initial deployment efforts, is being updated.

A tool does not determine how MCC does business. A tool is merely a formalized methodology for doing what is necessary to get the best results out of any process. Developing a tool that meets the many design requirements of a global system is very challenging. The tool, by design, is not perfect.

The increasing demand for skills has been felt most keenly by Sales and Services. Given their sense of urgency in responding to the customer, they took the initiative to

begin implementation of the tool as soon as possible. Some technical problems developed, and implementation of the tool was delayed, but modifications have been made, enabling employees to continue using the tool. Sales and Services has completed their first round of assessments using the skills tool in Europe/Middle East/Africa and Latin America. Most of Asia Pacific is using the skills tool now. North America was unable to continue using the tool for assessments, because of technical difficulties. Subsequent corrections now suggest an early 1996 completion date for North American assessments. Product groups will phase in by early to mid-1996, and should complete implementation by year end.

How does the process work? How might an employee use it and benefit from it? Currently, the skills process is focused on the assessment component which serves to help understand readiness to respond to skill needs, determine skill gaps and appropriate actions to alleviate them and assist individuals in personal growth and development decision.

Automated processes will supplant earlier methods where feasible. By March of 1997, MCC expects to have enough people and skills in the database to begin using the planning and search features of the system. As opportunities arise or needs are identified, the company will be able to respond. This means the company will have the technical ability to deploy the right skills, in the right place, at the right time, at the right cost.

A database is being constructed with employee data, including skills and skill sets, and proficiency levels, commonly defined worldwide. A self-assessment component emphasizes opportunities for personal development, and simultaneously supplies the data bank with information essential for predicting shortages, analyzing gaps, or planning for deployment of skills.

Given the globally competitive environment in which responsiveness is vital, it is likely that "retraining on a moment's notice" is impossible. One simply cannot become a subject matter expert over a weekend or even over a month. Anticipating the kinds of

skills expected in the future may help employees initiate developmental plans and reflect on their career direction.

MCC is committed to meeting its skill needs. To do that, several strategies may be used, including encouraging personal development, contracting for outside skills, hiring for specific skills and partnering for mutual gain and skill sharing.

Employability for an individual is much like agility in deploying skills resources is for a corporation. The skills management processes and the skills tool both assist in addressing these needs.

A carefully considered method for appropriate access is in place. Employees will be able to access and update their own data. In some cases, individuals will be able to search to find specific subject matter experts in order to access answers for customers quickly. This is important to provide the most efficient responsiveness for customers, where access to a highly specialized resource may leverage customer satisfaction significantly. Nevertheless, the system is highly restricted. Respect for customer needs and employee needs is paramount.

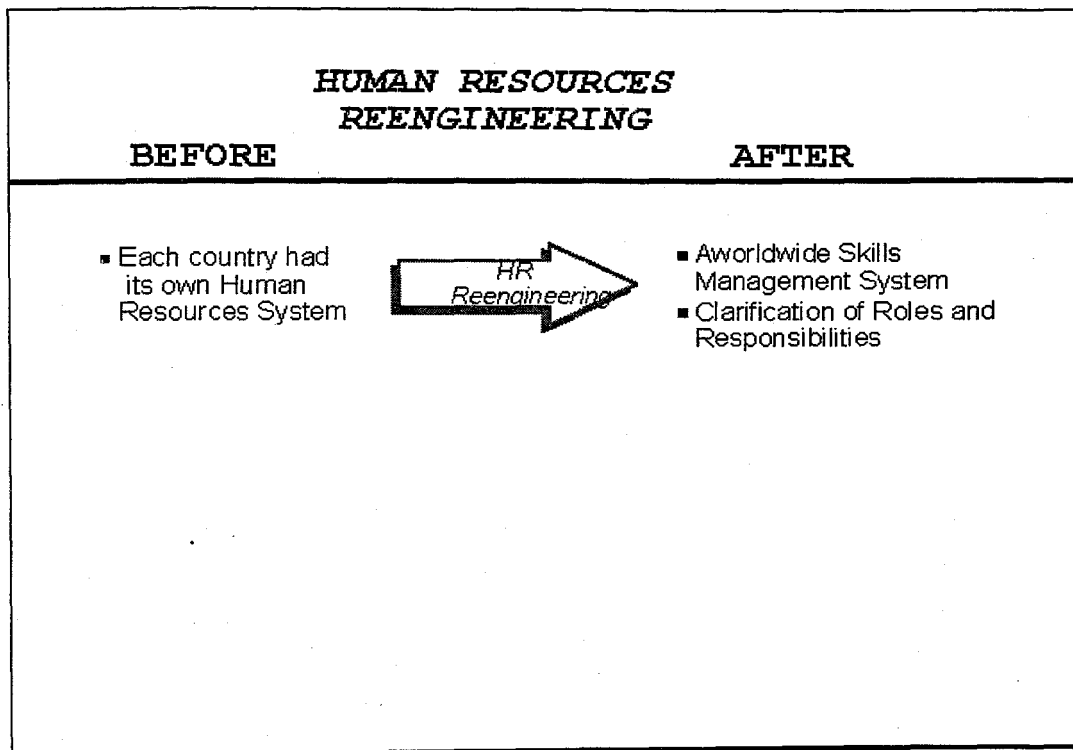
Selection of skills, and the combination of people to deliver them, must have some built-in flexibility. Future system enhancements will deal with such selection issues as: availability, length of current engagement, average billable rate and proficiency level factors. Team effectiveness and results are not merely the product of a collection of skills. The interaction and interfaces between the various roles, functions, and technologies can be synergistic, or not. Each outcome is unique in some respects.

From financial systems to manufacturing, from marketing to services, each arena of business is focusing on streamlining processes, and stretching capacity for delivering value, by leveraging collective knowledge, growing intellectual capital base and information technology infrastructure. Managing skills helps make this possible. The skills management process, in the broadest sense, is largely about learning and

development. MCC as a company is in a learning mode. Individuals are learning new skills and tackling new challenges, business units are learning how to streamline processes for better value to customers, and a global network of people is learning to work together in new ways. MCC is learning how to manage skills in ways that will help them better serve customers, be the technological leader in industry, and enhance own employability through development.

The following figure depicts the situations before and after the implementation of Skills Reengineering.

**Figure 7.7. Human Resources Reengineering**



The new work flow that came with the Human Resources Reengineering can be seen in Appendix.

### **7.3.8. Non Production Procurements**

The Non-production Procurement (NpP) reengineering initiative focuses on consolidating procurement activities. The reengineering process includes four main projects of improvement of the Management Systems; improvement of the Procurement Process; implementation of a Common Procurement Engine and establishment of Electronic Fulfillment.

#### **7.3.8.1. Historical Perspective**

Historically, MCC's NpP process has operated within a series of independent organizations. As recently as 1990, there were individual groups of procurement people in all locations. In 1991, they converged to five regions in the United States and four in Europe. Since then, MCC has gone to a national NpP organization in the United States and one pan-European region. Consolidated NpP organizations also serve Canada, Mexico, Latin America and Asia Pacific. This presented a culture shock to many people served by NpP.

It also gave management a shock when it discovered the magnitude of duplications in the old system. Almost every location had a different process and system configuration. MCC couldn't tell how much was being purchased from an individual supplier. In that environment, how could they possibly leverage the size and scale of MCC for cost advantage?

Until recently, location created a limiting factor in the leverage of suppliers. The skills behind the extended hand at each location and the span of its reach varied in each company office. This limited the range of access for each location. Creating or establishing connections off continent or out of the country was not impossible, it just wasn't practiced. Systems didn't network globally and databases differed. Few policies or means existed for creating and keeping contracts.

MCC's 28 NpP commodity areas range from cleaning room supplies and cafeteria/vending to original equipment manufacturer (OEM) purchases, technical subcontracting and charge cards. Multiply those 28 by the number of worldwide locations and what you get is the astronomical problem that faced MCC employees in making sense of the data, let alone being able to work with the data.

The magnitude of the NpP issue in MCC is underscored by one simple fact: Of the \$25 billion per year that MCC spends with suppliers, \$12 billion is in NpP.

### **7.3.8.2. Changes/New Process**

MCC has projects underway to improve the efficiency and productivity of procurement, concentrating on consolidating procurement activities and improving supplier management. Management Systems consolidates regional, autonomous structures and develops a centralized NpP organization.

The Procurement Process focuses on building the business processes to handle the size and composition of Integrated Procurement Solutions (IPS).

Commodity Teams use the Business Data Information Warehouse to provide access to key supplier and commodity data. This common database system has also enabled MCC to leverage size and scale.

Prior to August 1995, MCC had automobile rental contracts in Australia, Canada, Europe and the United States, all negotiated at different times. In early 1995, IPS developed a single global strategy which consolidated requirements into a global RFP (request for proposal, used to solicit bids from potential vendors). Each geography reviewed and approved the RFP. This represented a lot of work. It also meant a lot of savings.

During the past couple of years, there have been significant increases in the cost of vehicles to auto rental companies. This caused their rental rates to increase dramatically in the first half of 1995. By leveraging volumes worldwide, MCC's auto rental rates have significantly outperformed the industry. For both MCC and Hertz, one contract provides reductions in administration and internal costs. To continue these low rates, MCC must abide by the contract.

This also means abiding by other global contracts. MCC has low rates on many major airlines because of national leverage in negotiating contracts. MCC must resist the temptation to accept the low rate lure of another airline. Using these rates not only breaks the contract, but also makes future negotiations for low rates much more difficult.

A second example of procurement leverage is insurance. After looking at 1993 costs, IPS leveraged its size to secure MCC similar coverage at substantially lower rates. MCC went from 66 brokers with 203 insurers to two brokers with less than 25 insurers. This saved the company about \$36 million in 1995.

The Procurement Process, another major project, includes four processes to handle the Integrated Procurement Solutions (IPS): Procurement Information Warehouse, Supplier Management, Contract Management and Integration of Accounts Payable functions and cost savings.

IPS focuses on obtaining the things that make it possible for MCC employees to get their jobs done, securing contracts for materials and services needed in areas other than production. Through teaming with Information Technologies, development of an Information Warehouse will enable IPS to provide financial and operational measurements for NpP and Accounts Payable.

NpP also teams with other initiatives. For example, by teaming with Customer Relationship Management's (CRM's) improvement efforts, NpP has entered the arena of

purchasing for resale. This area shows the highest growth in procurement activity. Using OEM , MCC can meet the needs of any customer with a whole solution. NpP and CRM are working as a team to educate employees, rather than as two divisions working separately.

In the area of CRM, Supplier Management focuses on increasing the efficiency of several functional steps of qualifying suppliers, engaging suppliers, measuring suppliers, closing supplier contracts and continuing improvement within the process.

The mission of Supplier Management under the NpP effort is to establish a global process for the supply of hardware, software, and services in support of customer solutions. NpP manages MCC's suppliers by identifying them and defining their performance.

Each integral step determines and secures relationships with those suppliers whose operations and efficiencies best meet the needs and requirements of each MCC effort. MCC wants suppliers who provide the highest quality products, services and skills, deliver at the most competitive market price, provide substantial savings to MCC and maximize customer satisfaction.

The end result is the reduced costs, decreased delivery time, greater accessibility to technologies, and consistent improvement in the quality of suppliers, and, therefore, of entire operation.

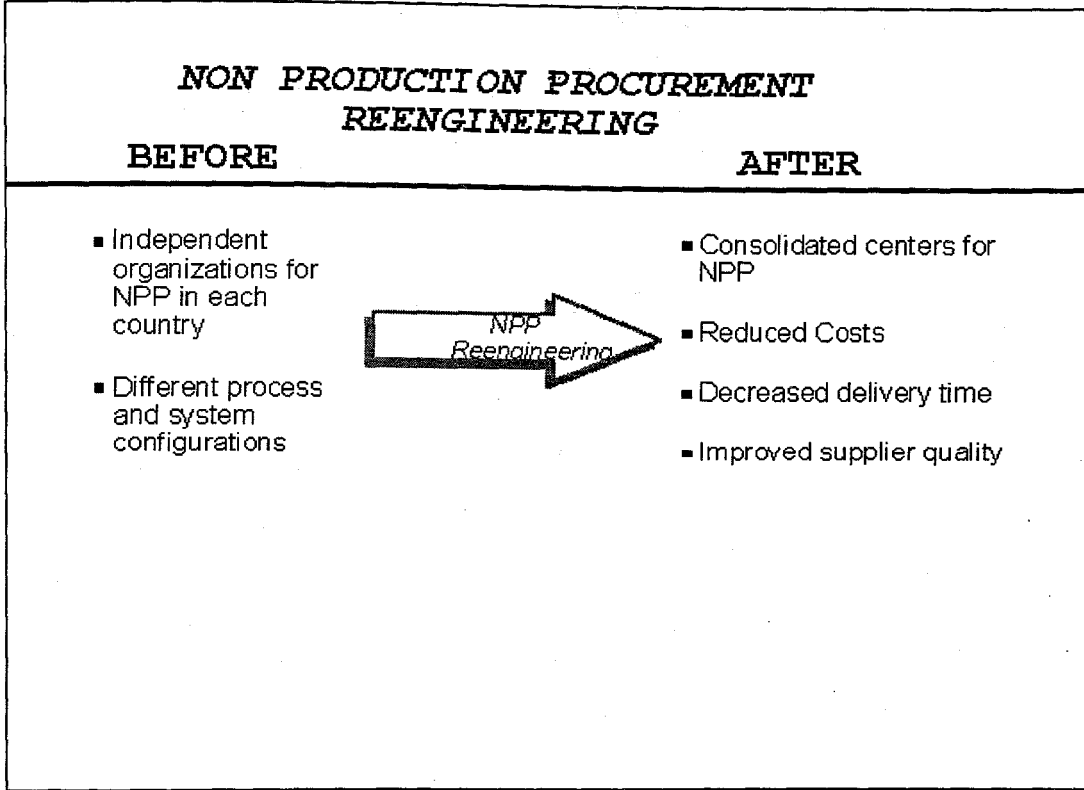
The third major project is implementation of a Common Procurement Engine. Once fully deployed, this communications tool will help coordinate procurement throughout MCC and greatly improve the leverage and control. It will shorten cycle time, increase productivity, help to automate business controls and balance workloads across the network. In short, it will help forge a world-class procurement organization that provides MCC with a significant competitive advantage.

Installation and deployment of the SAP-based Common Procurement Engine will begin early in 1997, in phases and by region, beginning in Rochester, Minnesota. NpP will start the second phase during the second quarter of 1997 in the U.S. South and Western Regions; the third phase during the third quarter in the U.S. Northeast. Implementation dates for Europe are in the planning stage.

The fourth major project, Electronic Fulfillment, consists of on-line tools for use in requisitions and supplier catalogs to provide Electronic Data Information (EDI) capability with MCC's suppliers. Along with the National Accounts Payable Process, MCC will integrate the purchasing and payables processes from requisition to check. You can shop from the comfort of your own computer!

The following figure depicts the situations before and after the implementation of Non Production Procurements Reengineering:

**Figure 7.8. Non Production Procurement Reengineering**



The new work flow that came with the Non Production Procurement Reengineering can be seen in Appendix .

### **7.3.9. Real Estate and Site Operations**

The purpose of the Real Estate / Site Operations initiative is to improve the space utilization of worldwide facilities, improve operational efficiency and reduce cost. To do this MCC has taken three approaches about establishing a centralized organization to manage site operations worldwide, developing real estate strategies and align them with MCC's business strategies and implementing activities to support alternative workplace solutions and find the best way to utilize the assets.

The desired result of the initiative is to improve space consumption and reduce gross spending. In addition, MCC is striving to improve operational results in the area of support services for the workplace.

#### **7.3.9.1. Historical Perspective**

In the past, Real Estate operations were managed as part of each operating unit. The purchase and operation of facilities were included in the budget and capital of each unit. Some units would build facilities, others would lease space. There was a lot of variation in how service and space were utilized in the different units. This wide variation had the potential for wasted space and money. Individual sites and divisions were focused on their own objectives and measurements. This was less than an ideal situation for MCC shareholders.

Early in 1994, a baseline assessment was conducted to look at near-term cost, restructuring, and long-term reengineering opportunities. That assessment was followed by a consulting study to validate opportunities and develop a restructuring blueprint. This identified needed changes in organization, governance and measurement.

In September 1994, a centralized site operation organization was announced. Extensive comparisons were made to various competitors to determine if MCC was world

class or not. The initial, anecdotal evidence made it clear that it was not. In terms of revenue per square foot, the company had the lowest performance. The degree of difference varied from 40 to 400 percent, depending on the competitor and the nature of their operations. The total amount of spending per year exceeded \$4 billion worldwide. This made it clear that improvements would have significant impact on the bottom line.

It was clear that MCC needed to change what was being done. They needed to match the facilities with the current needs of the business. The company could no longer afford to have empty space sitting around for long periods of time. MCC must utilize it, dispose of it, or lease it to someone else and get income from it and must consider the long-term issues and business cycles so the company is not bound by space problems in the future.

The new approach will take the control of real estate operations out of the hands of the operating units and place it in the hands of a central organization. The focus will be to make optimal use of facilities and services throughout MCC.

Total North America spending for 1994 was approximately \$2.5 billion. Another \$1.5 Billion is spent in Europe facilities. Savings in 1995, for North America, are \$380 million. Savings worldwide in 1996 will be approximately \$800 million. This could mean an after-tax increase in earnings of more than \$ 1 per share to MCC stockholders in 1996.

It is important to understand that a dollar saved in real estate operations goes directly to the bottom-line profit. It takes from 15 to 20 times that much in sales or revenue to generate the same level of profit. This is a significant multiplier and competitive advantage.

It is difficult to compare performance in Real Estate operations to the competition. Many of the competitors didn't exist when some of facilities were constructed. The legacy is in older facilities that may be obsolete.

Previously, MCC did not have good metrics to measure against the competition or measure space consumption and costs of services internally. MCC is constantly improving the capability in this area as experience with integrated operations of real estate is gained.

### **7.3.9.2. Changes /New Process**

The new approach to site operations was announced in September of 1994 and MCC began the transition immediately.

Strong emphasis has been put on improving occupancy level or space consumption. This means MCC is trying to be sure all available space is being utilized in a productive way. This is important because each square foot of space in a facility has a specific set of costs associated with it: rent / depreciation, energy, taxes, insurance, maintenance / cleaning, facility / property management and alterations.

For as long as you own the building, you continue to incur the cost of occupancy. The only way to control or reduce these costs is to get rid of the building or increase the number of people using the space available.

MCC began by measuring space consumption / utilization in terms of square foot per person. The actual requirement per person varies, depending on the nature of the work being done. Manufacturing and Development related activities require larger areas per person. Administrative functions, such as Finance and Headquarters, need less. Sales and Service often require little or no office space.

At the end of 1994, average cost per square foot for real estate operations was \$38.24. The goal is to reduce the cost 20 percent by 1996, which would be a cost of \$ 30

per square foot. MCC also want to improve the utilization, or reduce the square foot per person from 304 in 1994 to 250 in 1996.

Consider what this means in cost per person per office occupied each year. In 1994, the average square feet per person was 304. Multiplied times the \$38.24 per square foot, that means an operating cost of \$11,624 per person per year. If MCC reduces the average square feet per person to 250, at the \$38.24, the company gets \$9,560 per person per year.

If the cost per square foot was reduced from \$38.24 to \$30 per square foot, combined with the square feet per person reduced to 250, the cost per person is 250 times \$30, or \$7,500 per person. This is a potential savings of \$ 4,124 per person per year.

Achieving these savings may create some inconvenience for MCC employees. Having reduced space, or sharing space is an alternative to making similar reductions in the cost or improvements in revenue. The cash generated by the reductions in cost will enable us to expand facilities, develop new products, hire additional people or pay dividends to stockholders.

The personal inconvenience of less space does not reduce the salary, benefits, security or ability to function. In many instances, it can actually improve flexibility and satisfaction, facilitate teamwork and productivity. When you consider the alternatives, this is actually a fairly painless way to make a major contribution to the security and future of MCC.

The strategies used to increase space utilization also change based on the type of work being done. Here are a few examples of how MCC is trying to use space better: New standards for office size, based on the type of work being done. The issue is the requirements of the work, rather than the desires of the individual. Double occupancy of existing offices where feasible. Open landscape approaches where groups of people share a specific area. This is very good in team-based environments. Office sharing, where

people work on different shifts or have complementary travel schedules. Working at home and telecommuting. Customer location space that is made available for use. Mobile office approaches for people that travel from place to place regularly.

These new work arrangements need to be blended with the requirements of the job, and changing work styles of individuals. The need for flexible work arrangements are becoming increasingly important to employees. This provides the opportunity for win-win solutions.

A second major part of this initiative is reducing and controlling the cost of services provided in facilities. These include things such as: Administrative support, Food/vending, Office supplies, I/T systems support, Facilities and building services, Chemical management, Environmental management, Safety / health, Security, Emergency / planning.

MCC is working on several activities to control the costs of these services at each location. Savings in this area are related to improvements in space utilization. Additional savings are generated by working with non-production purchasing, and suppliers, for volume reductions, regional contracts, etc.

As the company increases the utilization of facilities, it will find some facilities that can be vacated and placed in vacant facilities program. They can then be considered for disposal or lease to other tenants. This would produce a positive cash flow back to MCC.

There are several positive customer impacts from the Real Estate / Site Operations initiatives shareholders see the most direct impact in the form of earnings per share, customers may see reductions in price, due to savings and closer contact with customer service personnel through external office strategies.

MCC employees in many of the locations have found direct benefits from the new work practices, including increased flexibility and improved team communications.

Another essential part of the initiative is to develop a real estate strategy that aligns with MCC's business strategies. This is critical because it is where MCC prepares for future. A major risk in facilities management is that MCC can become space bound. If facilities are consolidated too much, MCC may not be in a position to respond to change in the market or take advantage of growth opportunities.

MCC is one of the world's most complex, vertically integrated organizations. The company designs, develops, manufactures, sells, distributes and services a wide range of products. It deals in hardware, software and services. MCC does it on a worldwide basis in more than 130 countries. Planning and operating the facilities for the 200,000 people of MCC is complex and strategically important.

This means MCC must be proactive in the strategic plans of each business unit, must have a flexible plan that considers the future trends, both upward and downward. The company must be prepared to respond to changes quickly and effectively. It takes two years or longer to build a new high technology building. MCC must be able to see needs well in advance, and balance resources effectively before making major capital investments. Flexibility is critical to respond cost effectively to these changing requirements.

### **7.3.9.3. Deployment**

The Real Estate / Site Operations reengineering deployment plan is on schedule and progressing well. The worldwide, regional structure for site operations has been implemented. This was completed at the end of 1995. The Space Utilization Strategy is being aligned with MCC's business strategy. Pilot testing of alternative work strategies such as home office, telecommuting and shared workplace has been initiated and expansion is planned in 1997.

The management systems are now in place and MCC can focus on using them to realize additional savings.

In addition to direct savings, MCC expects to reduce the square foot per employee average from 304 in 1994 to 250 in 1996. The company also hopes to reduce total occupied space from 69 million square feet to 61 million square feet.

As MCC moves forward in the deployment and utilization of these changes, it will be critical that the company works closely with the operating units. MCC must keep strategic direction balanced with optimal use of current facilities. The results from pilot studies indicate very positive results.

Some examples to illustrate the breadth of the initiatives are: At MCC Santa Teresa, a new environment for software developers was implemented. The objective was to minimize human interaction problems. This would result in improved productivity, increased employee morale, improved product quality, and decreased cycle time. The results of this environment have been extremely high employee morale and productivity. Burlington site has implemented several space saving strategies. They include the use of 8 x 12 offices, significant doubling in 8 x 12 offices, four-foot aisle widths, consolidated copier/fax/printer room, former labs utilized as open landscape office areas, testing shift sharing of offices, open layout for OEM marketing, 25 percent reduction in manufacturing office space.

Significant savings have been generated through volume and technology leverage with suppliers and contract changes. Examples include national food/vending service contracts, copier/reproduction services and facility contract considerations.

The major issue faced in deployment is keeping focused on the new direction for MCC. MCC is making a major cultural shift from a collection of individual businesses to an integrated team approach. The new focus is on optimizing the total organization to

maximize shareholder value, not the individual environment. The Real Estate / Site Operations initiative is just one part of the overall direction.

Continuous change is the future of MCC and all other businesses in the world. MCC must make the transition from being a 1970's company to a 21st Century company. The employees all must keep focused on the future and let go of the past. They realized the results of old culture in 1993. They don't have the option of going back.

#### **7.3.9.4. Critical Success Factors And Dependencies**

As MCC approaches world-class levels in the management of real estate assets, MCC employees must stay clearly focused on the strategic direction of MCC. They must be sure they are investing in the right things and not allow themselves to become space bound.

Another key to success will be how they deal with success. When business gets good, they could go back to doing things the way they used to. They must learn to maintain the discipline they learned in hard times, in the coming good times. This means staying the course, and continuing to improve when the pressure is off. It will also be important for business units and divisions to work together maximize shareholder value.

Site Operations must have a clear understanding of the structure, size, sourcing requirements, and workplace requirements for the core initiatives in hardware development, software development, production, solution design / delivery, and customer relationship management. Good communication will be critical to good planning and effective management of real estate for MCC.

The company also needs to have suppliers with the capability to support MCC business activity as a whole, not just at a site or division level. This will be increasingly important as the company strives for continuous improvement. This will be directly linked with the Non-Production Procurement initiative. MCC has initiated joint

commodity teams to negotiate new contracts and supplier arrangements that cut across other initiatives. Other areas being addressed include energy consumption and utilities, sites and taxes.

As the new workplace changes are implemented, people will need to develop new skills to be successful. This will require assessing the skills needed, and finding ways to help people gain those skills. The Human Resource initiative on Skills will help with this. There are also direct linkages with other initiatives such as the I/T infrastructure and the new software/hardware platform for the strategic office initiative.

#### **7.3.9.5. Next Steps**

MCC now has a structure in place. The company has made real progress and realized some savings. It must continue to make progress in each of the critical areas as utilizing space efficiently and effectively, providing cost effective services to operations, linking Real Estate strategy to Business Strategy

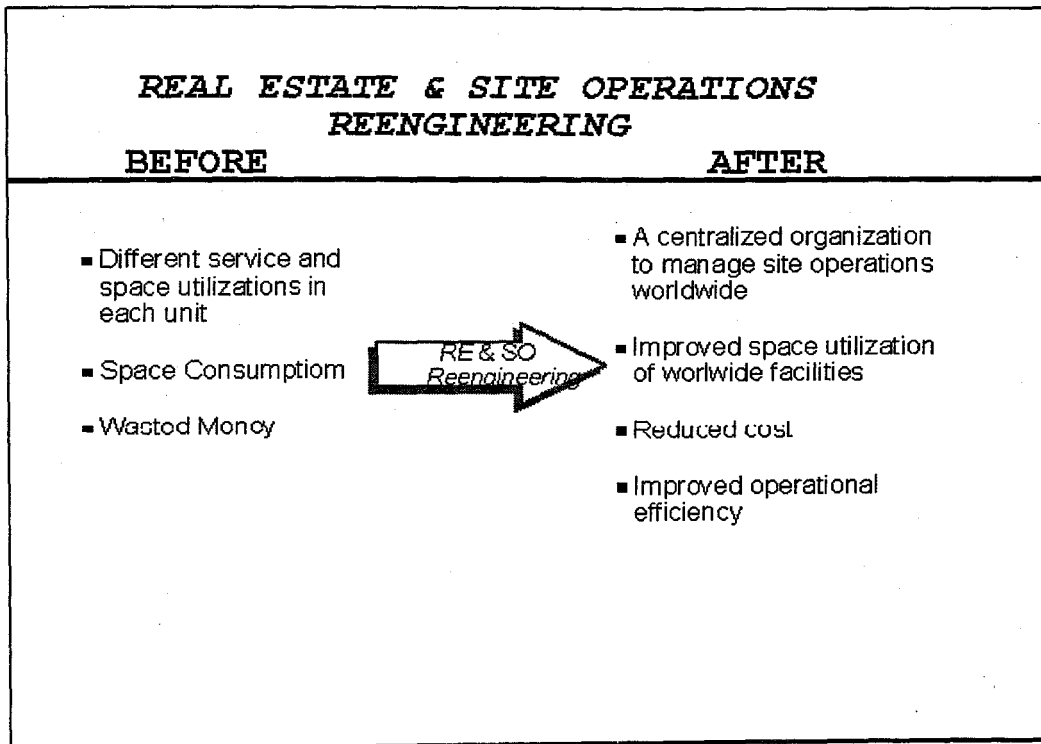
MCC will continue to work on using what it has to better advantage. The company must be nimble and flexible in responding to business needs while becoming more efficient and effective.

As the Integrated Supply Chain initiative is implemented, there will be a major change in manufacturing and warehousing space. When the Integrated Product Development Process is implemented, the proximity of key people will become critical. This will mean changes in facility and locations. As the distribution system is optimized, there will be major changes in storage and warehousing space. Information Technology involves the consolidation of data centers, the creation of new megacenters and business recovery centers.

In Site operations, the objective is to balance the operational needs of the organization with the lowest cost for facilities. They want to reduce cost as much as possible, provide what is needed to be competitive, and be prepared for the future needs of MCC. By doing this the company is supporting several of the key initiatives for the business as leveraging MCC technology to benefit, being best at delivering value to customers, internal and external, leveraging size and scale for cost and market advantage and being prepared to expand into emerging geographic markets.

The following figure depicts the situations before and after the implementation of Real Estate Reengineering.

**Figure 7.9. Real Estate and Site Operations Reengineering**



The new work flow that came with the Real Estate and Site Operations Reengineering can be seen in Appendix.

## VIII. RESEARCH METHODOLOGY

A research has been conducted on MCC employees in order to see the reengineering effects and consequences and with the aim of evaluating the success of MCC reengineering initiatives and employee satisfaction about these initiatives.

Reengineering consequences in any company are expected to be improvements on employee performance and motivation; simpler processes, reduced workload and increased customer satisfaction. MCC employees' perceptions towards these expected consequences are questioned with the research applied.

The type of the research is both exploratory (for discovery and measurement of perceptions and opinions) and hypothesis testing (for evaluating success and satisfaction on employees with different reengineering initiatives).

### **8.1. Purpose**

The purpose of the research is to measure the perceptions of MCC employees about reengineering that is being implemented in their company, evaluating the success of reengineering initiatives and measuring the employee satisfaction with reengineering.

This research will reveal how reengineering initiatives and reengineering consequences are evaluated among the company employees and how company employees are affected by the business process reengineering implemented in the company.

### **8.2. Sampling**

The population is the MCC employees in Turkey. The employees who are related to reengineering are the *element*, MCC employees are the *unit*, Istanbul city is the *extend* and the last three years are the *time* dimensions of the population. The sample is drawn

from this population which includes 400 MCC employees working in Istanbul office and are related to reengineering in the last three years.

**Proportional Stratified sampling** is selected as the sampling method according to the positions of the employees. Sample size is calculated using the *estimation of proportions* formula with 95% confidence level and 0.09 error precision. It is assumed that 90% of the MCC employees are related to reengineering in the last three years time.

Using the estimation of proportions formula, the sample size is calculated as follows:

$$n = \frac{z * z}{H * H} \pi (1 - \pi)$$

Where  $z$  is the  $z$  - table value corresponding to the desired degree of confidence,  $H$  is the desired level of precision and  $\pi$  is the population proportion.

$$n = \frac{1.96 * 1.96}{0.09 * 0.09} 0.1 * 0.9 = 42$$

The sample size is calculated as 42, and 40 is used in practice. And then, the organization chart is taken and three stratas are formed in proportion to the management levels of the population. Strata sizes were defined as 6 top level managers, 14 middle level managers and 20 nonmanager employees. Elements of each of the three stratas are selected randomly.

### **8.3. Data Collection**

Data collection method chosen is **interviews** at the place of work. Interviews have been conducted with MCC employees.

The respondents are asked the questions about their opinions of as to whether the employee performance and motivation has improved or not, whether the processes became simpler or not, whether workload of employees is reduced or not, whether customer satisfaction has increased or not after the implementation of reengineering. They are also asked to rate the success of reengineering initiatives to date, their own satisfaction with the reengineering initiatives to date. The information about the respondents like their age and for how long they have been working for MCC is also collected.

The questions are asked to indicate the respondents degree of agreement and disagreement. The respondents are also asked some questions about demographic characteristics for analysis.

A copy of the interview form and the coding key used for the data processing can be seen in Appendix - B.

## **8.4. Data Analysis**

The analysis of data in the next sections will investigate answers to the following research questions:

- What are the perceptions MCC employees about employee performance improvement, employee motivation improvement, processes simplification, workload reduction, and customer satisfaction improvement that comes as consequences of the implementation of reengineering ?
- Are there any significant differences between top level, middle level and nonmanager employee perceptions?
- How does each strata of the sample rate the success of reengineering initiatives?
- To what degree are top level, middle level and nonmanager employees satisfied?
- Do the success and the satisfaction levels differ according to age groups? Which perceptions of the employees are correlated with the age of the employee?
- Do the success and the satisfaction levels differ according to number of years they have been working for MCC? Which perceptions of the employees are correlated to the experience of the employee?

For the investigation of the answers for these questions Frequency Statistics Analysis is applied for each variable about reengineering initiatives, One - Way Anova is applied in order to find about the difference between three stratas.

## 8.5. Findings of the Analysis

The following sections list the findings about perception of MCC employees about performance and motivation improvement, process simplification, workload reduction and customer satisfaction improvement that come with the implementation of reengineering. The success and satisfaction ratings can also be seen in the findings.

### 8.5.1. Analysis of Perception Towards Performance

Question 1 asks the employees about their opinion of whether the performance of employees has increased after reengineering. This question needs an analysis of the variable V1.

Table 8.1. represents the results of **Frequency Listing Statistics** of V1.

**Table 8.1. Frequency Listing of Perception Towards Performance**

	<i>Value</i>	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Strongly Disagree</i>	1	2	5	5
<i>Disagree</i>	2	9	22.5	27.5
<i>Neither agree nor disagree</i>	3	11	27.5	55
<i>Agree</i>	4	15	37.5	92.5
<i>Strongly Agree</i>	5	3	7.5	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>3,200</b>	<b>Std. Dev.</b>	<b>1.043</b>
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From the MCC employees that were involved in the interviews 5 % indicated that they strongly disagree, 22.5 % disagree, 27.5% neither disagree nor agree, 37.5% agree and 7.5 % strongly agree that performance of the employees has increased after the implementation of reengineering.

The mean is the legitimate measure of central tendency for this variable, since the variable of the perception towards performance increase is interval scale.

It can be said that most of the MCC employees think that employee performance has increased after the implementation of reengineering.

**Ho :** *There is no difference in the perceptions towards performance of the employees with respect to their positions.*

This null hypothesis is related to V1 (Perception Towards Performance Increase) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the perceptions towards performance improvement of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.2. One Way ANOVA Test of Performance with respect to Position**

	<b>D. F.</b>	<b>Sum of Squarres</b>	<b>Mean Squarres</b>	<b>F Ratio</b>	<b>F Prob.</b>
<b>Between Groups</b>	2	11.866	5.933	7.19	.023
<b>Within Groups</b>	37	30.533	.8242		
<b>Total</b>	39	42.400			

	<b>Top Level Mngr.</b>	<b>Middle Level Mngr.</b>	<b>Non Mngr. Empl.</b>
<b>Means</b>	4.166	3.5	2.7

F ratio value seen in the table is 7.19 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accordingly, Ho can be rejected with a “p” value of .023.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of perception towards performance are significantly different.

Scheffe Test with significance level of .05 indicates a significance between the means of top level manager perceptions and the means of non manager employees perceptions towards performance increase. The difference of the means can also be seen from the table above.

Top level managers’ opinions about performance improvements coming with reengineering implementation is more positive compared to the opinions of non manager employees. The positive perception towards performance improvement increases going from bottom to top levels of management.

### 8.5.2. Analysis of Perception Towards Motivation

Question 2 asks the opinion of the respondents as to whether the motivation of employees has increased after reengineering, refers to the variable V2.

Table 8.3. presents the results of **Frequency Listing Statistics** of V2.

**Table 8.3. Frequency Listing of Perception Towards Motivation**

	<i>Value</i>	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Strongly Disagree</i>	1	1	2.5	2.5
<i>Disagree</i>	2	8	20	22.5
<i>Neither Agree nor Disagree</i>	3	10	25	47.5
<i>Agree</i>	4	19	47.5	95
<i>Strongly Agree</i>	5	2	5	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>3,3250</b>	<b>Std. Dev</b>	<b>.944</b>
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For the second question that asks the opinion of whether the motivation of employees has increased after reengineering, 5% of the sample strongly agreed, 47.5% agreed, 25% neither agreed nor disagreed, 20% disagreed and 2.5% strongly disagreed.

The mean is 3.325 which indicates a little improvement in motivation.

It can be said that 52.5% of the MCC employees think that employee motivation has increased after the implementation of reengineering.

**Ho :** *There is no difference in the perceptions towards motivation of the employees with respect to their positions.*

This null hypothesis is related to V2 (Perception Towards Motivation Increase) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the perceptions towards motivation improvement of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.4. One Way ANOVA Test of Motivation with respect to Position**

	<b>D. F.</b>	<b>Sum of Squarres</b>	<b>Mean Squarres</b>	<b>F Ratio</b>	<b>F Prob.</b>
<b>Between Groups</b>	2	8.227	4.113	5.73	.0068
<b>Within Groups</b>	37	26.547	.717		
<b>Total</b>	39	34.775			

	<b>Top Level Mngr.</b>	<b>Middle Level Mngr.</b>	<b>Non Mngr. Empl.</b>
<b>Means</b>	4.33	3.36	3.00

F ratio value seen in the table is 5.73 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accodingly, Ho can be rejected with a “p” value of .0068.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of perception towards motivation are significantly different.

Scheffe Test with significance level of .05 indicates a significance between the means of top level manager perceptions and the means of non manager employees perceptions towards motivation increase. The difference of the means can also be seen from the table above.

Top level managers’ opinions about motivation improvements coming with reengineering implementation is more positive compared to the opinions of non manager employees. The positive perception towards motivation improvement increases going from bottom to top levels of management.

### 8.5.3. Analysis of Perception Towards Process Simplification

Question 3 asks the opinion of the respondents whether the processes have become simpler after reengineering, refers to the variable V3.

Table 8.5 presents the results of **Frequency Listing Statistics** for V3.

**Table 8.5. Frequency Listing of Perception Towards Process Simplification**

	<i>Value</i>	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Strongly Disagree</i>	1	7	17.5	17.5
<i>Disagree</i>	2	18	45	62.5
<i>Neither Agree nor Disagree</i>	3	8	20	82.5
<i>Agree</i>	4	7	17.5	100
<i>Strongly Agree</i>	5	0	0	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>2,3750</b>	<b>Std. Dev.</b>	<b>979</b>
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For the third question that asks the opinion of whether the processes became simpler after the implementation of reengineering, 17.5% of the sample agreed, 20% neither agreed nor disagreed, 45% disagreed and 17.5% strongly disagreed.

It can be said that most of the MCC employees think that processes have not become simpler after the implementation of reengineering.

*Ho : There is no difference in the perceptions towards simplification of processes of the employees with respect to their positions.*

This null hypothesis is related to V3 (Perception Towards Process Simplification) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the perceptions towards process simplification of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.6. One Way ANOVA Test of Process Simplification with respect to Position**

	D. F.	Sum of Squarres	Mean Squarres	F Ratio	F Prob.
<b>Between Groups</b>	2	9.66	4.83	6.45	.0039
<b>Within Groups</b>	37	27.71	.749		
<b>Total</b>	39	37.37			

	Top Level Mngr.	Middle Level Mngr.	Non Mngr. Empl.
<b>Means</b>	3.33	2.57	1.95

F ratio value seen in the table is 6.45 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accordingly, Ho can be rejected with a “p” value of .0039.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of perception towards process simlification are significantly different.

Scheffe Test with significance level of .05 indicates a significance between the means of top level manager perceptions and the means of non manager employees perceptions towards process simlification. The difference of the means can also be seen from the table above.

Top level managers’ opinions about process simplification coming with reengineering implementation is more positive compared to the opinions of non manager employees. The positive perception towards process simlification increases going from bottom to top levels of management.

#### 8.5.4. Analysis of Perception Towards Workload Reduction

Question 4 asks the opinion of respondents as to whether the workload of the employees have been reduced after reengineering, which also refers to V4.

Table 8.7 presents the **Frequency Listing Statistics** for V4.

**Table 8.7. Frequency Listing of Perception Towards Workload Reduction**

	<i>Value</i>	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>StronglyDisagree</i>	1	9	22.5	22.5
<i>Disagree</i>	2	19	47.5	70
<i>Neither agree nor disagree</i>	3	9	22.5	92.5
<i>Agree</i>	4	3	7.5	100
<i>StronglyAgree</i>	5	0	0	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>2,150</b>	<b>Std. Dev.</b>	<b>.864</b>
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To the fourth question that asks the opinion of whether the workload of employees has reduced after reengineering, 7.5% of the sample agreed, 25% neither agreed nor disagreed, 45% disagreed and 22.5% strongly disagreed. No respondents in the sample strongly agreed with the opinion.

It can be said that most of the MCC employees think that workload of the employees is not reduced after the implementation of reengineering.

*Ho : There is no difference in the perceptions towards workload reduction of the employees with respect to their positions.*

This null hypothesis is related to V4 (Perception Towards Workload Reduction) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the perceptions towards workload reduction of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.8. One Way ANOVA Test of Workload Reduction with respect to Position**

	<b>D. F.</b>	<b>Sum of Squarres</b>	<b>Mean Squarres</b>	<b>F Ratio</b>	<b>F Prob.</b>
<b>Between Groups</b>	2	7.04	3.52	5.90	.0059
<b>Within Groups</b>	37	22.05	.5961		
<b>Total</b>	39	29.10			

	<b>Top Level Mngr.</b>	<b>Middle Level Mngr.</b>	<b>Non Mngr. Empl.</b>
<b>Means</b>	3.00	2.28	1.80

F ratio value seen in the table is 5.90 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accordingly, Ho can be rejected with a “p” value of .0059.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of perception towards workload reduction are significantly different.

Scheffe Test with significance level of .05 indicates a significance between the means of top level manager perceptions and the means of non manager employees perceptions towards workload reduction. The difference of the means can also be seen from the table above.

Top level managers’ opinions about workload reduction coming with reengineering implementation is more positive compared to the opinions of non manager employees. The positive perception towards workload reduction increases going from bottom to top levels of management.

### 8.5.5. Analysis of Perception Towards Customer Satisfaction

Question 5 that asks the opinion of respondents as to whether the customers are more satisfied with MCC after reengineering, refers to V5.

Table 8.9 presents the results of **Frequency Listing Statistics** for V5.

**Table 8.9. Frequency Listing of Perception Towards Customer Satisfaction Increase**

	<i>Value</i>	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Strongly Disagree</i>	1	0	0	0
<i>Disagree</i>	2	8	20	20
<i>Neither Agree nor Disagree</i>	3	8	20	40
<i>Agree</i>	4	21	52.5	92.5
<i>Strongly Agree</i>	5	3	7.5	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>3.475</b>	<b>Std. Dev</b>	<b>.905</b>
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The results to fifth question that looks for opinions of whether the customers are more satisfied after reengineering, 7.5% of the sample strongly agreed, 52.5% agreed, 20% neither agreed nor disagreed, 20% disagreed.

It can be said that most of the MCC employees think that customers are more satisfied after the implementation of reengineering.

**Ho :** *There is no difference in the perceptions towards customer satisfaction of the employees with respect to their positions.*

This null hypothesis is related to V5 (Perception Towards Customer Satisfaction) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the perceptions towards customer satisfaction of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.10. One Way ANOVA Test of Customer Satisfaction with respect to Position**

	<b>D. F.</b>	<b>Sum of Squarres</b>	<b>Mean Squarres</b>	<b>F Ratio</b>	<b>F Prob.</b>
<b>Between Groups</b>	2	10.31	5.15	8.80	.0007
<b>Within Groups</b>	37	21.66	.58		
<b>Total</b>	39	31.97			

	<b>Top Level Mngr.</b>	<b>Middle Level Mngr.</b>	<b>Non Mngr. Empl.</b>
<b>Means</b>	4.50	3.60	3.05

F ratio value seen in the table is 8.80 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accordingly, Ho can be rejected with a “p” value of .0007.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of perception towards customer satisfaction are significantly different.

Scheffe Test with significance level of .05 indicates a significance between the means of top level manager perceptions and the means of non manager employees perceptions towards customer satisfaction. The difference of the means can also be seen from the table above.

Top level managers’ opinions about customer satisfaction coming with reengineering implementation is more positive compared to the opinions of non manager

employees. The positive perception towards customer satisfaction increases going from bottom to top levels of management.

#### 8.5.6. Analysis of Reengineering Success

Question 6 asks the opinion of respondents as to whether the employees find reengineering implementation successful or not.

Table 8.11 presents the **Frequency Listing Statistics** for V6 .

**Table 8.11. Frequency Listing of Reengineering Success**

	<i>Value</i>	<i>Frequency</i>	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Very Unsuccessful</i>	1	2	5	5
<i>Unsuccessful</i>	2	2	5	10
<i>Neither Successful nor Unsuccessful</i>	3	15	37.5	47.5
<i>Successful</i>	4	21	52.5	100
<i>Very Successful</i>	5	0	0	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>3.375</b>	<b>Std. Dev</b>	<b>.807</b>
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The answers to the sixth question that measures the rate of reengineering initiatives' success were 52.5% think that it is successful, 37.5% rate it as neither successful nor unsuccessful, 5% rate it as unsuccessful and 5% see the reengineering initiatives as very unsuccessful.

It can be said that most of the MCC employees think that implementation of reengineering is successful.

**Ho :** *There is no difference in the reengineering success ratings of the employees with respect to their positions.*

This null hypothesis is related to V6 (Reengineering Success) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the reengineering success ratings of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.12 One Way ANOVA Test of Reengineering Success with respect to Position**

	<b>D. F.</b>	<b>Sum of Squarres</b>	<b>Mean Squarres</b>	<b>F Ratio</b>	<b>F Prob.</b>
<b>Between Groups</b>	2	4.37	2.18	3.85	.0301
<b>Within Groups</b>	37	20.99	.567		
<b>Total</b>	39	25.37			

	<b>Top Level Mngr.</b>	<b>Middle Level Mngr.</b>	<b>Non Mngr. Empl.</b>
<b>Means</b>	3.83	3.64	3.05

F ratio value seen in the table is 3.85 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accordingly, Ho can be rejected with a “p” value of .0301.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of reengineering success ratings are different, but it should be noted that not significantly since F ratio and F table values are close to each other.

Scheffe Test indicates that no two groups are significantly different at .05 level. The means of top level manager reengineering success ratings and the means of non manager employees reengineering success ratings are close to each other.

There is a very slight difference between the reengineering success ratings of managers and non managers.

### 8.5.7. Analysis of Reengineering Satisfaction

Question 7 asks the opinion of whether the employees are satisfied with reengineering initiatives or not.

Table 8.13 presents the **Frequency Listing Statistics** for V7.

**Table 8.13. Frequency Listing of Reengineering Satisfaction**

	<i>Value</i>	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
<i>Very Unsatisfied</i>	1	0	0	0
<i>Unsatisfied</i>	2	4	10	10
<i>Neither Satisfied nor Unsatisfied</i>	3	17	42.5	52.5
<i>Satisfied</i>	4	18	45	97.5
<i>Very Satisfied</i>	5	1	2.5	100
<i>Total</i>		40	100	

<b>Mean</b>	<b>3.400</b>	<b>Std. Dev.</b>	<b>.709</b>
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For the seventh question that measures the satisfaction of employees with reengineering initiatives, 2.5% of the sample said that they are very satisfied, 45% say that they are satisfied, 42.5% rate themselves as neither satisfied nor unsatisfied, 10% say that they are unsatisfied.

It can be said that most of the MCC employees are satisfied with reengineering initiatives.

**Ho :** *There is no difference in the reengineering satisfaction of the employees with respect to their positions.*

This null hypothesis is related to V7 (Reengineering Satisfaction) and V11 (Position of the employee : whether he/she is a top level manager, middle level manager or nonmanager employee ) and can be tested using the **One Way ANOVA Test**.

This test makes a comparison of three stratas of the sample, and compares the means of the reengineering satisfactions of each strata of the sample. The results of the Anova Test can be seen on the following table:

**Table 8.14. One Way ANOVA Test of Reengineering Satsisfaction with respect to Position**

	<b>D. F.</b>	<b>Sum of Squarres</b>	<b>Mean Squarres</b>	<b>F Ratio</b>	<b>F Prob.</b>
<b>Between Groups</b>	2	4.37	2.18	5.31	.0094
<b>Within Groups</b>	37	15.22	.411		
<b>Total</b>	39	19.60			

	<b>Top Level Mngr.</b>	<b>Middle Level Mngr.</b>	<b>Non Mngr. Empl.</b>
<b>Means</b>	4.00	3.57	3.10

F ratio value seen in the table is 5.31 for the degrees of freedom 2 and 37. F table value for these degrees of freedom is 3.23. Accordingly, Ho can be rejected with a “p” value of .0094.

As a result of One Way ANOVA analysis, null hypothesis is rejected. It can be said that the strata means of reengineering atisfactions are significantly different.

Scheffe Test with significance level of .05 indicates a significance between the means of top level manager satisfactions and the means of non manager employees satisfactions with reengineering. The difference of the means can also be seen from the table above.

Managers satisfaction with reengineering implementation is more positive compared to the satisfactions of non manager employees. Top levels are more satisfied with reengineering.

#### 8.5.8. Correlation Between The Variables and the Age of Employee

The following table gives the Pearson Correlation Coefficients for the variables to be used in the below hypothesis with respect to age of the employee.

**Table 8.15. Pearson Correlation Coefficients with respect to Age.**

	<b>r</b>	<b>p</b>	<b>t calculated</b>
<i>Performance (V1)</i>	.4619	.003	3.6195
<i>Motivation (V2)</i>	.3374	.033	2.3471
<i>Process Simplification (V3)</i>	.3496	.027	2.4551
<i>Workload Reduction (V4)</i>	.3311	.037	2.2923
<i>Customer Satisfaction (V5)</i>	.4619	.003	3.6195
<i>Reengineering Success (V6)</i>	.3532	.025	2.4875
<i>Reengineering Satisfaction (V7)</i>	.5096	.001	4.2433

Table 8.15 indicates that each one of the following variables covered is positively and significantly correlated with age. That is, older employees have the opinion that reengineering implementation improved the performance of the employees and also their motivation, simplified the processes, reduced the workload, is successful and is satisfactory.

### 8.5.9. Correlation Between The Variables and the Experience of Employee

The following table gives the Pearson Correlation Coefficients for the variables to be used in the below hypothesis with respect to experience of the employee..

**Table 8.16. Pearson Correlation Coefficients with respect to Experience.**

	<b>r</b>	<b>p</b>	<b>t calculated</b>
<i>Performance (V1)</i>	.4607	.003	3.6051
<i>Motivation (V2)</i>	.3189	.045	2.1883
<i>Process Simplification (V3)</i>	.3257	.040	2.2460
<i>Workload Reduction (V4)</i>	.2985	.061	2.0200
<i>Customer Satisfaction (V5)</i>	.4734	.002	3.7611
<i>Reengineering Success (V6)</i>	.3260	.040	2.2485
<i>Reengineering Satisfaction (V7)</i>	.4360	.005	3.3185

Table 8.16 indicates that each one of the following variables covered is positively and significantly correlated with experience. That is, older employees have the opinion that reengineering implementation improved the performance of the employees and also customer satisfaction and is satisfactory.

## **8.6. Evaluation**

The research was conducted in order to learn about satisfaction levels of MCC employees with reengineering implementation, and to evaluate how they rate the success of reengineering initiatives to date. The findings can be summarized as follows:

Most of the MCC employees think that employee performance has increased after the implementation of reengineering. There is a relationship between the position of the employees and their perceptions toward performance increase that comes with reengineering. There exists a significant difference between top level manager and nonmanager perceptions towards performance. Top level manager opinions about performance improvement is more positive compared to the non manager employees' opinions.

Most of the MCC employees think that employee motivation has increased after the implementation of reengineering. There is a relationship between the position of the employees and their perceptions toward motivation increase that comes with reengineering. The means of perception towards motivation of the three stratas of the sample are significantly different. The perceptions toward motivation become more positive going from bottom to top levels of management.

On the process simplification subject, MCC employees think that processes have not become simpler after the implementation of reengineering. The relationship between the position of the employees and their perceptions toward process simplification that comes with reengineering is that top level managers believe more on process simplification consequence of reengineering when compared to nonmanager employees.

Most of the MCC employees think that workload of the employees is not reduced after the implementation of reengineering. There is a relationship between the position of the employees and their perceptions toward workload reduction that comes with

reengineering. Nonmanager employees think more pessimistic compared to the top level managers.

It can be said that MCC employees think that customers are more satisfied after the implementation of reengineering. The relationship between the position of the employees and their perceptions toward customer satisfaction that comes with reengineering does exist. The general opinion is that MCC employees think that customers are more satisfied since reengineering implementation started but top level managers more agree with the idea when compared to the nonmanager employees.

Most of the MCC employees rate the implementation of reengineering as successful. There is a very slight difference between reengineering success ratings of managers and non managers.

When the satisfaction levels are measured, most of the MCC employees are satisfied with reengineering initiatives. Top level managers are more satisfied with reengineering initiatives compared to middle level managers. And similarly middle level managers are more satisfied with reengineering initiatives compared to nonmanager employees.

The age of the employee is found to be correlated with perception towards performance improvement, motivation improvement, perception towards process simplification, perception towards customer satisfaction, success and satisfaction levels of the employees. Older employees evaluate the reengineering implementation more positively than those who are younger.

The experience of the employee, on the other hand, is found to be correlated with perception towards performance, perception towards customer satisfaction and satisfaction levels. The more experienced employees evaluate these items more positive than the less experienced ones.

## **IX. REENGINEERING METHODOLOGIES**

Methodologies refer to systematic approaches to conducting a Business Process Reengineering project. An effective methodology is like a road map. It helps you select your destination and then find the best way to get there.

The majority of methodologies developed so far for conducting reengineering are the intellectual property of the leading reengineering consulting firms. Typically consultants conduct reengineering by following a proprietary methodology which factors in their own philosophical assumptions concerning BPR while tailoring the methodology to fit each client's unique needs. These approaches usually share some high-level similarities in that they call for the articulation of a strategic vision, development of a BPR plan, establishment of appropriate performance measures, and implementation of improved process and organizational systems. In this way, these methodologies typically proceed through a project life cycle. However, there are several points on which these approaches often fundamentally differ. The first concerns the extent to which a BPR project focuses on redesigning an existing process as opposed to immediately focusing on designing a new process. Second, methodologies differ in the inclusion and sequence of steps. Third, the specific techniques applied will often differ depending on the two preceding factors. For example, BPR methodology may differ to the extent that they require an examination of the firm's core; competencies, involve senior management, and to the degree of business transformation.

Many reengineering consultants have adopted a more radical approach to reengineering. Sometimes referred to as a "Greenfield" approach, these consultants adhere to the belief that "the grass may be greener" by directly designing a new process rather than trying to rework an old "farmed-out" process. Such radical views advocate that there is little value in detailed study of existing processes and new design based on

strategic visioning is the medicine required for American business. As Hammer states it, “if you automate a mess, what you get is an automated mess.” An opposing school of thought views it necessary to properly diagnose an existing disease before devising a cure. While believing that linkage needs to be established between process redesign and strategic “stretch targets” many reengineering consultants believe that BPR involves a systematic examination of current process as well as strategy driven design.

Clearly, this philosophical difference in the definition and approach to reengineering reflects yet another sign that reengineering methodology immaturity and moving beyond the hype to proven successful approaches is now a much needed priority. While both schools of thought appear to have merit, these definitions and approaches to reengineering might be placed along a spectrum from process improvement, requiring an understanding of the existing business process prior to redesign, to radical reengineering which stresses the design of totally new processes based on a powerful business vision (Davenport, 1993).

BPR employs a combination of management theory, system analysis, industrial engineering, operations research, quality management, communication analysis, and information systems techniques and tools. Although the degree of change may differ on a project by project basis, BPR typically lead to a (re)design of work flows, control processes, job definitions, reward structures, communication structure, organizational structure and boundaries, technological infrastructure, and, in some cases, organizational culture, philosophy and the nature of the business itself.

The following sections will give out some of the known reengineering methodologies in the literature and the next chapter will outline the methodology proposed by the author of this thesis.

## **9.1 Gateway's Rapid Re Methodology**

Gateway's methodology for BPR (Klein, 1994) was taught in American Management Association seminars. The methodology is customized to the needs of each BPR project, because that is what happens in practice. Individual projects skip, rearrange or recombine tasks to meet their needs or give greater or lesser emphasis to some tasks.

Rapid Re methodology has 5 stages:

*1. Preparation* : Mobilize, organize and energize the people who will perform the reengineering project.

This stage includes recognizing the need, planning executive workshop, training team and planning change processes.

*2. Identification* : Develop and understand a customer oriented process model of the business. Identify activities that add value. Prepare a process map of the organization.

This stage includes modeling customers, defining and measuring performance, defining entities, modeling processes, identifying activities, extending process model, mapping organization, mapping resources and process prioritizing processes.

*3. Vision* : Select the processes to reengineer and formulate redesign options capable of achieving breakthrough performance. Define what changes are required: state the new process vision.

This stage includes understanding the process structure, understanding the process flow, identifying value adding activities, benchmarking performance, determining performance drivers, estimating opportunity, envisioning the ideals from external and internal environment, integrating visions and defining subdivisions processes.

*4. Technical and Social Solution* : Specify the technical and social dimensions of the new process. Describe and plan for the technology, standards and procedure needs as well as staffing, recruitment, education and training needs. Develop detailed implementation plans.

The technical design solution stage includes modeling entity relationships, reexamining process linkages, informing, consolidating interfaces and information, redefining alternatives, relocating and retiming controls, modularizing, specifying deployment, applying technology and planning implementation processes.

The social design solution stage includes empowering customer contact personnel, identifying job characteristic clusters, defining jobs or teams, defining skills and staffing needs, specifying management structure, redrawing organizational boundaries, specifying job changes, designing career paths, defining transitional organization, designing change management program, designing incentives and planning implementation.

*5. Transformation* : Realize the process vision. Embark on a pilot program and employ continual change mechanisms.

This stage includes completing business system redesign, performing technical design, developing test and roll out plans, evaluating personnel, constructing system, training staff, piloting the new process, refining and transition, and continuous improvement processes.

The methodology does not require a specific consulting involvement. A BPR project team should include both insiders, who have knowledge of current processes and an understanding of a company culture, and outsiders who have the creative naiveté to ask why things are done a certain way. Project teams also need leadership and facilitation. If they are going to use a methodology, the project team members must be trained. Rapid Re

does not require any consultants to work on a BPR project. The process is designed for use by managers and professionals in companies.

The methodology requires very few tools. It can be used with a pencil or paper, a flowchart template and a few paper forms. Spreadsheets can be used for all of the quantitative tasks, as well as for the presentation of qualitative data in tabular form. Project management systems can be used not only for planning and tracking the BPR project, but also for simple process flow diagrams. The methodology can be used with any or all of the categories of BPR tools. Flexibility is essential if the methodology is to be useful in a broad range of environments.

Finally the overhead associated with the methodology is low and it is easy to learn, requiring only two or three days of training.

## **9.2. Comprehensive Reengineering Workplan**

The Comprehensive Reengineering Plan is proposed by Micheal Mische and Warren Bennis. It is a five-phase approach for reinventing the organization through reengineering. It is based on a unique concept called process clusters, which is used to organize the work and flow of the reinvention journey. The methodology contains 23 process clusters representing more than 700 individual worksteps. Specialized data collection and analytical instruments are used to support the reinvention through reengineering process. (Mische and Bennis, 1996)

The five phases of the methodology are as follows:

*Phase 1: Creating a Vision and Setting Objectives:* The starting point for all projects is the creation of a vision. A vision is necessary to establish the parameters of the effort, the direction and the scope of the project and the specific targets and objectives of the

process. Visions are important because people can aspire to them and align their efforts with them. Visions are also integral to effective communication.

From the vision, specific and well defined objectives are developed. The objectives form the milestones and targets for the reinvention process.

*Phase 2: Evaluative Baselineing and Benchmarking* : During this phase, organizational responsibilities, personnel assignments, reports, work volumes and value created are documented and analysed. This baselining is necessary for developing the appropriate benchmarks and for comparisons and for identifying potential candidates for reengineering that will best support the vision and objectives developed in Phase 1.

The baselining and benchmarking step involves a validation of information that provides a comparison of internal performance measurements to peer or external benchmarks and best practices. This comparison process provides key information and insights into how existing processes perform, why they behave a certain way, what the cycle times and the costs of the processes are, how the organization is supporting the process, the rationale and management practices of the organization for the process and a host of other information required for reinventing through reengineering.

Extreme care must be exercised in using benchmarks, however because they often are superficially interpreted. In using benchmarks it is not as important to have a comparative number as it is to understand how the benchmark was developed, how the data was defined and analysed, and whether the benchmark is appropriate for the specific circumstances.

*Phase 3: Process Innovation and Reengineering* : The third phase of the reengineering journey involves the essence of reengineering: process innovation and functional consolidation. The main challenge in this phase is identifying and understanding that a series of individual tasks, which transverse organizational boundaries, can aggregate to a seamless business process. This process was always present, however it was obscured

among many tasks (most of which were unnecessary) departments, organizational layers, and responsibility centers.

Fundamental to reinventing and reengineering is the identification of core processes and the development of new “to be” business processes. Process innovation and organizational consolidation are achieved by interrogating and reducing the traditional practices to their essence and establishing a new value chain of the activities that create a seamless and harmonious process.

In reinventing and reengineering processes, effort is concentrated on identifying breakthrough opportunities and designing new work steps and organizations that will create quantum gains and competitive advantage. The effort involves visualizing work as concurrent and natural activities, not traditional or linear processes. The reengineering team must be free to explore, test, modify and resequence everything related to the process without regard for organizational resistance and individual agendas. This openness and constant challenging of existing processes promotes creative synergy and ultimately produces quantum results.

*Phase 4: Organizational Transformation and Reengineering Implementation:* The fourth phase of the reinvention journey is most challenging and demanding: the actual transformation to the reinvented enterprise. Once traditional business practices have been reengineered into business processes, they must be implemented and successfully integrated into the organization. This integration involves employee education, leadership, organizational change, and structural realignment and redeployment of technical and human resources. The majority of transformation is cultural, occurring as managers and employees move from hierarchical structures, classic command and control behavioral patterns and job specific tasks and measurements to empowered workgroups, process teams and value chain decision making.

*Phase 5: Continuous Calibration and Improvement:* The fifth phase of reengineering is one of the continuous commitment to the process of reengineering and improving share

holder value and competitive position. During this perpetual phase, reengineered processes and transformed operations and organizations are constantly evaluated and calibrated to the vision and goals established in phase 1 and the current environment of the organization to ensure that desired results are achieved. This phase also involves reaching out to customers, business partners and potential business alliance members to create new processes designed to achieve greater integration among processes and organizations.

### **9.3. The Process Reengineering Life Cycle**

The Process Reengineering Life Cycle is based on the analysis and synthesis of stages, tasks, and techniques of many of the leading BPR methodologies in practice today. The compilation of these various methodological approaches was completed in a study using both primary and secondary research. Although this study did not uncover a standard BPR methodology, most approaches follow a sequence of steps that may be divided into three broad phases: conceptualization of a project, creation of a new process, and integration of that process into the organization. Using a life cycle as a metaphor for reengineering, these three phases may be further divided into the six stages of the Process Reengineering Life Cycle (PRLC). PRLC attempts to capture the procedural, human, communication, technological, and socio-technical dimensions of a business process. In addition, the PRLC is based a contingent view that allows the adaptation of a comprehensive reengineering cycle to a firm's specific reengineering requirements. By tailoring the sequence of stages and activities, a BPR project's focus may range from business process improvement to radical design. By offering this non-proprietary, comprehensive and flexible approach, it is hoped that the PRLC provides a valuable reengineering framework. (Grover, Jeong, Kettinger & Wang, 1995)

#### *Stage 1: Envisioning Process Change*

Due to the strategic nature of BPR and the extent of risk involved, some championship from the top is imperative. The envision stage emphasizes securing management commitment and the discovery of reengineering opportunities by matching corporate strategy with emerging IT levers. This stage requires the selection of a business process to be reengineered and the definition of the project scope.

### *Securing Management Commitment*

The first critical step of the PRLC is to persuade top management that a BPR project is strategically important. Ultimately, it is the corporate leaders who provide the legitimacy needed to initiate BPR and to ensure that recommendations are implemented. To spearhead the effort, a "reengineering champion" typically emerges or is identified (Guha, Kettinger & Teng, 1992). The champion should be a high-ranking manager with significant authority and influence to mobilize resources and stimulate enthusiasm for BPR. An external BPR consultant may also be employed to act as a catalyst and to provide insight gained from past successful BPR efforts. In either case, the role of these individuals must be to sell major reengineering opportunities. Such opportunity targets include cost cutting, decreased cycle time, or improved customer satisfaction.

The individuals responsible for introducing BPR often presents, in an introductory fashion, the potential benefits and costs to senior management. Topics to be discussed during this executive orientation may include: introduction to BPR and its techniques; a review of past reengineering successes and failures in other firms; a discussion of the company's business process problems; how BPR would enhance the company's strategic objectives; organizational implications; and, a consideration of a BPR plan-of-action. Based on a preliminary decision to move ahead, members of senior management, along with consultants (if used), form a high level reengineering task force responsible for conducting all the activities and tasks in the ENVISION and INAUGURATE stages until a project team is formally assigned. The task force then monitors the progress of the team and ensures the successful accomplishment of the BPR project.

### *Discovering Process Opportunities*

As a prerequisite to identifying candidate processes for reengineering, the top management task force should conduct a high-level evaluation of existing business conditions and performance in the context of corporate strategy. Using such techniques as Competitive Analysis, Value Chain Analysis (Porter & Millar, 1985), and Critical Success Factors (CSF) (Rockart, 1979), a clear assessment of corporate goals, objectives and Key Performance Indicators (KPIs) should be outlined. Next, the major corporate processes that support these business objectives and goals should be identified. These may be product, service, or managerial processes, and in most cases are cross-functional in nature. The completed list of business processes will later be prioritized and one of them selected for the initial reengineering project.

Certain planning tools such as Information Systems Planning (ISP) (Martin, 1990), Business Systems Planning (BSP) (IBM, 1975), CSFs and Core Process Analysis (Kaplan & Murdock, 1991; Ostroff & Smith, 1992) may be used in the identification of business processes. Two approaches currently used for defining processes are the “comprehensive” and “targeted” methods (Davenport & Short, 1990). The targeted method defines those processes known to be most vital to the organization, as determined by discussions among top management or managerial interviews. The advantage of a targeted approach may be fast payoff and timeliness of project completion. The comprehensive approach, on the other hand, attempts to identify all the processes within an organization and then prioritize them. This comprehensive approach can be labor intensive and time consuming, however, it can offer a well thought out rationale for BPR in terms of project prioritization that is consistent with corporate strategic goals.

### *Identifying IT Enabling Opportunities*

While reengineering can occur without computers or telecommunications, IT must be viewed as a major catalyst that has the potential for magnifying the effects of BPR

(Huber, 1990; Keen, 1987; Venkatraman, 1991). Underlying most business reengineering efforts are technologies such as Local Area Networks (LANs), object-oriented systems, imaging, Electronic Data Interchange (EDI), Executive Information Systems (EIS), expert systems, client-server architecture, workgroup technologies and decision support systems. In particular, coordination technologies, groupware and workflow (Mora-Medina, Winograd, Flores, & Flores, 1992) are critical IT enablers that facilitate group cohesion, enterprise information sharing, and process workflow automation.

The BPR project should identify "IT enablers" that have the opportunity to improve internal efficiency, satisfy customers, and allow organizations to operate independent of geography. Senior IS staff, along with the task force members, should review the corporate IT plan to determine the extent to which the firm's overall Information System Architecture (ISA) (Zachman, 1987) meets identified strategic goals and objectives. The potential to use new IT should be examined for their compatibility with the firm's ISA, applicability for implementation, and enabling capabilities toward achieving performance breakthroughs.

### *Selecting a BPR Project*

With an understanding of corporate strategic direction, candidate processes and IT enabling opportunities, the top level management task force should next make a high-level assessment of candidate processes and their relationships to products and services provided by the firm. This alignment analysis includes potential redesign impact on key performance measures, with major problems involved in each process identified and discussed. The results of the alignment assessment should indicate the level of ease/difficulty in reengineering each process. After this high-level analysis of each process is completed, the processes should be ranked with respect to conformance to corporate goals and objectives, availability of IT levers, and level of difficulty and risk in reengineering. With this prioritization the most critical process(es) may be selected. Upon determination of a process for reengineering, the definition and boundary of the process should be delineated

to remove any ambiguity as to what constitutes the process. In addition, it is necessary to specify the level of effort required to conduct the selected reengineering project. This includes the evaluation of necessary resources and other high-level budgeting issues.

### *Stage 2: Inaugurating The Reengineering Project*

The inaugurate stage ensures the careful launching of the reengineering project and encompasses the assignment of a BPR “working” team, the setting of performance goals, project planning, and stakeholder/employee communication.

#### *Informing Stakeholders and Organizing the Reengineering Team*

BPR represents significant organizational change and, as such, demands careful attention to both internal and external stakeholders interests. A message, typically from the CEO or president, addressing the need, scope, commitment, and leadership of the project should be communicated to stakeholders. Managing resistance to the BPR project typically involves a concerted in-house public relations campaign that may focus on the project's “challenges as opposed to threats,” the “urgency or risk” of not proceeding, and clear definitions of project success and levels of involvement. This may be accomplished by stimulating themes of pride, innovation, achievement, and cooperation. Next, management should appoint a “process owner” responsible for the BPR project's conduct and accountable for its results. The first task of the process owner should be to assemble a BPR working team.

In developing a BPR team it is important to collect the right pool of personnel, including those knowledgeable in the functional areas of the selected process, but also who possess creative talents for process design. In determining the proper skill-requirement match, selection criteria may include past BPR and TQM expertise, industrial engineering, operation research and systems analysis skills and project and change management experience. At least one human resource specialist should be

assigned to the team to assist in organizational structural changes. Three types of IS professionals should be included in a BPR team: staff application analysts, technology specialists, and system planners. One job of information technology specialist should be to educate fellow team members on the suitability of various IT platforms for alternative process designs (e.g., networking, client-server databases, imaging, multi-media). The system planner provides expertise concerning enterprise-wide system integration and compatibility. This individual should also possess some process modeling skills to assist in the selection of an appropriate process alternative. Working with the other IS team members, the application analyst should provide advice concerning system feasibility, development, and implementation issues.

While many companies assign one team to study a process from its first activity to its last node, an alternative approach is to use multiple teams of varying composition and specialization for different stages of BPR; however, common members typically include executives from the IS department and other major functional departments (finance, marketing, manufacturing, etc.) as well as key staff and line managers from the areas under study. While the appointment of a project leader may come from internal ranks, in the case of an initial BPR project, many companies enlist the help of consultants as either co-leaders or facilitators. Appointing a consultant who is experienced in aiding other companies in BPR can bring in an objective viewpoint and creativity.

### *Preparing the Project Schedule and Setting Performance Goals*

Using such techniques as Gantt Charting, PERT or CPM, the team should complete a project schedule that outlines the project's resource requirements and budget, milestones, and deliverables. The next critical task involves the setting of high-level stretch goals and process attributes that will later provide the metric for judging project success. Based on the preliminary analysis of the process, which was performed in conjunction with process selection in the ENVISION stage, process performance targets may strive for very ambitious, but achievable, goals resulting from a newly designed process. These performance goals should be derived directly from market-based corporate

objectives such as product quality, customer/supplier satisfaction, and delivery time. Many BPR experts such as CSC/Index Inc. suggest that lofty goals establish the organizational momentum necessary to affect radical change. Techniques that are used to assist in setting performance goals include: brainstorming, Out-of-Box Thinking, Nominal Group and Delphi Techniques, Visioning and Affinity Diagramming (AT&T, 1991). Often these stretch goals are based on world-class standards or best practice as set by industry leaders and determined through formal benchmarking techniques. It is important to determine whether the performance measures of the existing process reflect the goals and missions of the firm.

To assist in process attribute setting, it may be prudent to conduct a Process Customer Requirement Analysis which involves the evaluation of requirements demanded by the final process customers to ensure that process objectives and attributes support determined customer requirements. Typical techniques used to undertake such analysis include: customer interviews, Focus Groups, Quality Function Deployment (QFD) (Akao, 1990), Transaction Analysis, Customer Analysis, and Customer-Supplier Protocol Modeling (Scherr, 1993).

### *Stage 3: Diagnosing*

In the case of “radical” or “Greenfield” reengineering (where the time, cost, or strategic objective does not warrant study of the existing process) the DIAGNOSE stage may be completed in a very cursory manner or completely skipped and the BPR team may move directly to the DESIGN stage. However, if the existing process is deemed worthy of detailed analysis, then the BPR project should document and critically analyze the pathologies of the existing process.

### *Documenting the Existing Process*

Documenting the existing process, or “process capture” as it is often referred, involves the capture of activities, resources, controls, business rules and information flows. This includes the representation of relationships between activities, information and other relevant process characteristics. This task must develop high-level diagrams of the selected process and also decompose this into sub-processes. Several levels of decomposition may be necessary. In documenting an existing process, the following guidelines should be considered:

Depict the process from its starting node to its end node, which may include several functions, departments, internal and external customers and external linkages. Identify components of the process such as information systems, human, controls, physical, and other process resources. Document the performance of the existing process in terms of customer satisfaction, inventory turnover, cycle time, waiting queues, defect rates, activity times, transfer rates, priority rules, and other relevant measures. Decompose a large process into a set of sub-processes and assign BPR team members to the appropriate sub-processes based on their expertise.

The participants in a process should be interviewed to reveal the flow of information and linkages. The added value may be determined by the nature of the information being processed, how it is processed, and the resources used during processing. The time required for information capture, processing, transport, and waiting should be recorded to indicate costs and to act as a benchmark against which improved processes will be measured. Many documentation techniques and tools may be used to support process capture including: Data Flow Diagramming (DFD), Block Diagramming, Process Flowcharting, and Process Data Flow Diagramming (PDF), and commercially available work flow design tools

### *Uncovering Pathologies*

Process pathologies may be defined as work flow activities, business policies, unchallenged bureaucracies, missed communication, and non-value added roles that

hinder and fragment the overall effectiveness of a business process. To uncover such pathologies, a critique of the newly documented existing process should be undertaken. The following guidelines are suggested:

Identify undesirable sequential activities, bottlenecks and unnecessary bureaucratic steps. Identify separate functional information systems and integrate into a single process-wide system. Identify all unnecessary paper work and question the need for forms, approvals, and reports. Identify formal and informal dysfunctional policies and rules which lead to non-value adding activities.

Each activity of the documented existing process should be related to performance measures set in the INAUGURATE stage. For example, if the goal is to reduce time and cost, it is beneficial to depict: the elapsed time, bottleneck delays, labor requirements, and incremental costs of each activity. Performance-based process flow charts may be used for comparison with the redesigned process in the next stage to allow the BPR team to select the optimal new process configuration. The performance of the existing process may also be compared to the requirements determined earlier for both internal and external customers, deviations may then analyzed and causes traced. Many commonly used TQM and industrial engineering techniques are particularly effective at determining the root causes of problems in the existing process, these include: Backward Chaining, Fishbone Analysis, Force Field Analysis, and Pareto Diagramming. Once identified, process pathologies may be rank ordered and prioritized in terms of criticality and their relative "contribution" to deviation from desired performance measures. This step would make it more likely that the new process ideas generated subsequently will indeed eliminate existing pathologies and meet performance goals.

#### Stage 4 :(Re)Designing

The (Re)design stage involves iterative design through the exploration of process alternatives that meet strategic objectives and integrate new human resource and IT architectures.

This stage entails prototyping of alternatives and development of the selected IT platform. In pursuing such improvements, the BPR team should not be bound by existing concepts of organization or process designs. However, if the DIAGNOSE stage was undertaken, input from this stage should be used to eliminate pathologies identified. This (re)design becomes more than a system design and should strive to achieve a proper fit between people, work process, information management, and technology in a newly configured socio-technical system.

### *Exploring Alternative Designs*

There is no universal recipe for designing an effective process. However, a key component of this task is to unbridle the creativity of the BPR team to explore alternatives that may at first seem “outrageous”. This is typically accomplished through brainstorming sessions using such creativity techniques as word and thought variation, creativity barrier exploration, idea generation exercises and open-forum, non-critical discussion. These ideas should represent broad new approaches rather than detailed blueprints. Often referred to as Visioning, this task requires asking the fundamental questions: “Where do we want this firm to be? and, How do we get there ?”

Process visioning involves assessing the outlined strategy and external and internal inputs gathered, and then translating this information into specific process attributes with specific measurable objectives. This may be difficult given that strategy and attributes, as originally envisioned, rely more on estimation than exactness. Because of this difficulty, process visions should be based on what is necessary from a business standpoint, rather than what initially seems reasonable or accomplishable. Nominal group technique as well as Critical Analysis, Backward Chaining, and Affinity Diagramming may also be used to support this task.

### *Designing The New Process*

Using similar documentation techniques as employed in the high-level design, the selected alternative may next be expanded into several levels of details. Depending on the technique used, various aspects of the process may be captured including inputs, outputs, job, resources, control procedures, timing, etc. The key to a successful design is to constantly question why a certain task is performed, who should be responsible for it, and which information technology will support the new process. Some fundamental elements of process design are summarized below:

**Pattern breaking:** break age old principles and rules such as: "In this company, travel requests must be approved at the unit, departmental, and divisional levels ". **Align with Performance Goals:** ensure that performance goals set earlier are truly aligned with process outcomes. Think of performance in terms of meeting customer requirements and not just short-term profits. **Job Assignment:** Design a person's job around the goals and objectives of the process, not a single task. **Eliminate Hierarchies:** Replace bureaucratic hierarchies with self-organized teams working in parallel. **Eliminate Identified Pathologies:** Question activities and roles that simply relay information, as these can be handled with information technology. **Improve Productivity:** Move focus from work fragmentation and task specialization towards task compression and integration. **Consider IT:** Consider the appropriate IT configuration that will support and enable the redesigned process.

One major focus in design is on leveraging time. Vast amounts of time can be saved by eliminating multiple approval levels and non-critical control checks, by integrating data processing into the work that produces the information, by eliminating wait buffers, and by integrating multiple tasks. An important redesign possibility involves the substitution of sequential activities for simultaneous ones. This will reduce the waiting time involved in processes and can be achieved by applying on-line databases and information networks across the process. This will allow information access to nodes without delay or waiting time. Separate tasks within processes should be integrated as much as possible into one job description to keep important information from being lost. Appropriate information, including immediate feedback on performance, should be

provided to the line workers to ensure that problems are resolved immediately. The performance of the detailed design may be further simulated using many of techniques previously mentioned to determine its strengths and weaknesses. This simulation not only can facilitate the tuning of the overall performance such as cycle time, but can pinpoint bottlenecks that should be removed to smooth and balance the workflow.

### *Designing Human Resource Architecture*

BPR may cause significant change in organizational structure. By reducing the “we versus they ” mentality, a by-product of traditional functional boundaries, confrontations that consume time and money can be bypassed. Minimizing interdependencies between sub-units can be accomplished by increasing the alignment of objectives, tasks, and people within a single sub-unit. Where possible, a well designed human resource architecture should support a free exchange of information and a refocusing of decision-making and actions at the individual and work-group levels. The (RE)DESIGN stage should include a human resource component that incorporates the following:

Redefinition of job titles and positions affected by changes in cross-functional processes. Team-based management techniques: self motivated teams assigned to specific business processes based on unique skills. Continual organizational learning assisted by on-the-job training. Performance evaluation based on team productivity, measured by group effectiveness. Incentives and reward structures based on group performance and an individual's team contribution. Modification of management structures that require managers to be equals as well as team leaders. Continuous BPR project progress updates to all employees.

### *Selecting an IT Platform*

Several factors influence the selection of an IT platform to support the newly designed process. Often, the IT base requires support of communication between

corporate systems and decentralized systems; and ties suppliers, vendors, and customers using wide-area networks. The need for greater flexibility and economy may call for down-sizing mainframe-based systems to LAN-based open systems using object-oriented technology. The need for information sharing may determine the extent of corporate vs. process database design requirements. In light of these concerns, the selected IT platform should be related to the enterprise-wide ISA architecture. A feasibility analysis by the IS professionals, along with other members of the BPR team, may be generated in terms of migration plans, interoperability, cost, availability of technology, and systems development efforts. The best IT alternative that supports the (re)designed process should be selected for implementation.

The IT platform selected should outline platform decisions such as choice of hardware, operating systems (e.g., OS/2, UNIX, MVS, DOS/Windows), and data architecture at all levels of systems implementation. Such selection must also detail the appropriate software systems to be implemented at every level, including the development of an Executive Information Systems (EIS) and/or Decision Support Systems (DSS) at the executive level and integrated workgroup applications for transaction processing. A conscious decision may also be made in the choice of the IT deployment of third-party software, in-house software development kits (SDKs) to support application development, software reengineering plans, documentation, and training plans.

### *Prototyping the Holistic Process*

The “Holistic” process prototype may be undertaken at this step to depict the new process in an intuitive manner and to provide top management with a certain level of detail of the process characteristics, process flow, job assignments, IT infrastructure and system requirements. This is similar to the idea of prototyping in the traditional information systems sense, where the system behavior can be tried out to solicit users' feedback. Here, the entire process is to be rehearsed (possibly with a selected group of real customers) using such techniques as role playing, paper process tests, and workflow

designs to identify further opportunities for refinements. Since IS professionals are quite familiar with prototyping because it is widely used in traditional systems development, they are well qualified to facilitate these prototyping tasks. Prototypes should be reviewed and evaluated by the BPR team and should provide management with a vehicle to make judgments toward a final process design. If the decision is to move ahead, the determination of the best phasing strategy should be made including phasing for human resource reorganization, IS development and implementation, and process procedure/policy cut-over. Some forms of piloting may also be conducted to help determine the best overall conversion strategy.

#### Stage 5: (Re)Constructing

In accordance to the human resource architecture specified and IT platform selected, the (RE)CONSTRUCT stage uses information system development and change management techniques to implement the new process. As with any major organizational change, a methodical approach should be adopted which takes advantage of user training and user feedback. When problems arise, those involved must retain their commitment to the major ideas of the process redesign, while also being amenable to changes required to facilitate the installation.

#### *Developing and Deploying IT*

A major effort undertaken during the (RE)CONSTRUCT stage is the development and deployment of new information systems and technology to support the new process. A primary task of the IS professional of the BPR team is to develop detailed systems analysis specifications in terms of information requirements, information/data flows, logical and physical system design, database designs, systems configuration, distributed access, and security. This task may take place at a higher-level prior to final design

selection, but must be completed in a detailed fashion before coding, testing, and other steps for actually implementing the information systems can be undertaken.

In the extreme case, the firm's existing systems and technology are replaced entirely with new hardware platforms and application programs. Migration to LAN-based platforms and groupware applications based on object oriented design and open systems may allow the firm to develop more easily integrated applications. As opposed to developing new application systems from scratch, "software reengineering" may be employed to redesign and reuse existing system code for migration to improved hardware and software platforms. By reverse engineering object code to produce recyclable source code forward-engineering techniques, such as CASE tools, may be used to add functionality to current systems. The IS staff assigned to the BPR Team should oversee systems integration, testing and walk-through procedures. Next, shared databases and client interfaces are typically implemented, and coordination with existing systems operation is tested.

### *(Re)organizing*

The Human Resource architecture outlined in the (RE)DESIGN stage must be thoughtfully executed with careful attention to minimize animosity and disruption to employee morale. This step focuses on a smooth transition to a new organizational design that incorporates improvements such as sub-unit reorganization, staff reduction, team and employee selection, job rotation, empowerment of remaining employees through training and educational programs, and improvement in the quality of work life. Based on the new process design, various job roles and descriptions may have been altered, eliminated or redefined. New organizational structures and detailed job assignments must be conveyed to the affected employees outlining their new responsibilities and performance expectations.

Training personnel in a newly installed process-based environment is critical. Awareness, enthusiasm, and expectations must be properly infused. A plan for developing

knowledge and skills for the employees should be prepared and be directed at retraining employees to think in terms of process and customers. In addition to specific job and systems training, education may also be given in terms of the new organizational structure and cultural change philosophy. Incentives and reward structures must be redesigned based on group performance. In addition, individual reward structures need to be redefined based on the individual's contribution to the group. The dramatic changes during this step may cause anxiety that must be addressed by continual communication between top management, the BPR team and employees.

#### Stage 6 :Evaluating Process Performance

During the EVALUATION stage, the performance of the (re)designed process is measured and links to the firm's other process management activities such as process quality control are established.

#### *Measuring Performance*

After implementation, an ongoing task is monitoring and evaluating process performance. This may include the dynamic monitoring of qualitative and quantitative performance measures set in the INAUGURATE Stage. A rich spectrum of process measure should be implemented including:

Process Performance: cycle time, cost, customer satisfaction, resources consumption, quality. IT Performance: downtime, system use, paper reduction. Productivity Indices: orders processed per hour, number of sales closed per week.

Such monitoring should not only be based on "hard" measures, but also soft measures such as morale and customer good will.

The communications flow between jobs, activities and sub-processes can also be measured for effectiveness and conformance to design specifications. A comparative

analysis of customer requirements to process performance goals may be conducted to identify un-met expectations that demand further design improvement. Due to BPR's greater reliance on self-managed team structures and the use of generalists, a detailed audit of the redesigned process may be prudent to ensure process integrity. Individual and team satisfaction measures also should be analyzed. Results of these evaluation may be fed into the process simulation model for possible process improvement.

### *Linking to Quality Improvement*

Process management and Total Quality Management (TQM) have been the subjects of major corporate attention. While BPR goals typically differ from process management activities aimed at incremental gains, the EVALUATION stage provides a fundamental link between the more radical/one time focus of BPR and the continuous incremental improvements of TQM (Kettinger & Lee, 1994). By using traditional TQM techniques on the newly designed process it may be anticipated that additional substantial process improvement will be made over time.

### **9.4. The Process of Process Innovation**

The Process of Process Innovation method has been proposed by David Pittle from the Kerner group in 1996.

This is neither "how-to" book nor a detailed road-map but there are several general stages in the applying business process innovation. A successful effort will go through these stages. Depending on the practitioner, they may be broken down into more or fewer discrete steps.

Most successful projects use the expertise of an outside consultancy. It is difficult to see our own environment clearly and an outsider can often point out areas that cry for

examination. Still for the sake of clarity these are the steps most consultants will guide you through.

It will be often be obvious in which process stage an innovation team is laboring, but there is not always a clear demarcation between stages. An innovation effort will sometimes find itself at a boundary between where it is not quite sure whether it is in one stage or the next. Further, as the team moves through a step it may discover reasons to go back and revisit a previous effort.

### *Stage 1, Identify Problem Processes for Innovation*

The reengineering effort is often triggered by a senior manager who recognizes a change in the marketplace, technology, or the social environment. It needs to be revisited after Stage 3. The problem or potential originally coming from one manager's sense of angst is not always the best place to innovate, but it is often the trigger to start the process.

### *Stage 2, Get Executive-Level Agreement and Support*

Before any other effort is undertaken, if the instigator of the business process innovation effort is not top management, the first step is to get whole-hearted support at the executive level. The changes demanded by an business process innovation strategy are such that without top management's enthusiastic support and participation, the undertaking will fail. Note that there is no equivocation in my statement. If there is no possibility of getting this support choosing some other management strategy would be advisable.

This is most often where a consultant comes into the picture.

### *Stage 3, Develop An Innovation Team*

A team needs to be selected which will oversee the innovation project. The team must be trained and equipped. This includes learning what is expected of them; finding how to function together; learning the innovation process; developing a common terminology; and discovering the range of resources which are available and those which are needed.

#### *Stage 4, Define and Choose a Process for Innovation*

Organizational processes can be defined in many ways. Whether a warehouse is one process or many hundreds depends on how it is viewed. Processes which provide order-of-magnitude improvement are normally value-added processes with a focus on the external customer. It is important to choose a high-value process. It is also important to define the process chosen based on customer-oriented measures, standards of performance and system interactions.

Some processes have internal customers but, because of their impact on the organization, on production, marketing or other systems, they can provide major improvement.

#### *Stage 5, Envisioning A Breakthrough Process*

Create a vision of the new process which would be a radical improvement over the current. Innovation is the key here. It is this stage which gives the approach its name. The team can never create a new process better than what it envisions.

It is more important to break free of the old ways than to rehash them to see what's wrong. This step would best be done by stating the results desired and then thinking of ways to achieve them without being bound by the limitations of present processes.

#### *Stage 6, Understand The Present*

Now, not before, is the time to analyze the current process. There may be important portions of the present methodology which can be incorporated to the benefit of the result. Even if not, the project will be judged against the history of the current way of doing things.

We often find that there are hidden constraints which must be overcome and system-level interfaces which must be considered and either maintained in the new process or deliberately broken and replaced. Business process innovation is not change for change's sake.

### *Stage 7, Design the Innovative Breakthrough Process*

This is the technical stage. It includes designing all methods, tools, information systems. Included are examination of process linkages and interfaces with other systems and customers--both internal and external.

At the same time we continue to look for alternatives and better ways to implement. In this stage we need to identify any possible instances which are outside of the basic parameters. Often a process is complicated because it must deal with a wide band of parameters. It may be improved by substituting a simpler process and shunting the exceptions to redesigned side-track processes.

This is the most complicated stage. It takes the product of the previous stages and creates a blueprint which must also include design of feedback loops, evaluation and instruments for continuous improvement.

### *Stage 8, Creating the Human Resources--Social Design*

This is the stage that most "Workflow" and "Reengineering" consultancies ignore or short-change. Only a few books even deal explicitly with this stage. One that does is *Business Reengineering: the Survival Guide* by Andrews and Stalick. The values, culture, social infrastructure, political and management leadership parts of the puzzle are often the

most intransigent and difficult to change. But short-changing them can sabotage the whole effort.

### *Stage 9, Prototype, then Implement the Innovative Process*

While this is stage 9 and the last step, we have deliberately built feedback loops and evaluation data into our new system to keep the system self-correcting. This needs to be reviewed, frequently at first and then on a regular basis with the results going back to the Innovation Team. Eventually all ownership will be turned over to the regular management line so that the Innovation Team can go on to other innovation projects

### **9.5. Critical Success Factor (CSF) Methodology**

CSF was introduced by Mckinsey and Company in 1950s as means to identify key areas where improvements are necessary for achieving the goals, set through benchmarking (Daniel, 1961 ; Elzinga, 1995). This approach has two steps: first, to establish and classify CSF through interviews with the top management, and the second, to establish measures to monitor the success factors. These include customer satisfaction, free flow of information, implementation of an electronic master for products and processes, predictive cost methods and the management of cultural change and team dynamics.

Identification of critical success factors leads to the next stage in process re-engineering. Chrysler embarked on the re-design of the workplace in order to achieve the CSF corresponding to free flow of communications. Caterpillar, on the other hand, instituted the goal of creating a shared electronic master of product and process to facilitate free flow of information to compensate for its geographically distributed business.

Many firms, instead of adopting such radical restructuring, approach re-engineering by an incremental process-to-process basis. In this approach, the question is one of selection of the process. Methods used for the process selection range from informal approaches such as brainstorming, to formal ones using multi-attribute utility theory or other decision analytic approaches such as Analytical Hierarchy Process (AHP) (Saaty, 1980). AHP has been used extensively in a number of decision making contexts and allows for the hierarchical structuring of a goal with its attributes, sub-attributes and alternatives corresponding to such sub-attributes. Input data are collected from the participants in the form of pair-wise comparison of decision elements. AHP uses its logical reasoning and other mathematical models in determining the relative order of priority among the alternatives and is available as a software package.

## **X. A PROPOSED METHODOLOGY**

The following methodology is proposed by the author of this thesis.

### ***1. Recognize The Need For Change In The Company***

If a business process reengineering is to be implemented in a company, it means that a change is needed in the company. Some processes or some outcomes are not as they are expected to be. It is important to find out the needs for change. The the first step of this methodology makes start to reengineering with recognition of this need.

### ***2. Build Awareness Of The Need In The Company***

After the need for change is recognized, it is important to make all employees aware of this need so that they will not resist to change in the following stages. The entire organization must understand that a significant change is needed in the company.

### ***3. Get Commitment And Support From Top Level Management***

Top level managers must understand and support the project, they should be involved in the project from orientation through implementation. Before defining the reengineering scope and making the plans, commitment should be taken from top level management.

In addition there must be commitment and understanding throughout the organization concerning the drivers behind management's decision, benefits of reengineering for the company. This commitment must be maintained and enhanced during the entire process through continuous communications and by involving the entire

organization to the greatest extent possible. Business process reengineering demands change and the most difficult change to achieve is with people.

#### ***4. Develop Objectives***

Business Process Reengineering may be guided by a series of objectives. These objectives may be enhancing the market share, decreasing the cycle time, reducing the costs

The objectives should be defined before the implementation starts.

#### ***5. Organize A Reengineering Team***

A reengineering team should be organized to carry on the next stages of the methodology. Choosing the members of the reengineering team is very important. The right mixture of experience, skills, and characteristics is critical.

Assigning the best people in the organization is appropriate for emphasizing the importance of the project. Good people are more likely to learn reengineering concepts and teach them to others.

The overall project team can contain 5 - 20 people, depending on the size of the organization. In case small teams are organized; involvement, creativity and commitment will increase and so the overall effectiveness of the team will increase.

It is also important to clearly define the roles and the responsibilities of the team members. Each member should be given an opportunity to fully understand and make commitment concerning his roles, responsibilities and expected involvement.

#### ***6. Define The Scope Of The Project & Prepare A Schedule***

The project scope should be established with the focus and the planning horizon. The project schedule, duration should be defined at this stage. Team members should gather together and make a plan of what will be done in the following stages.

### ***7. Analysis Of Existing Processes***

An understanding of the current processes is needed. The questions of “what” and “why” will reinforce the need for significant change.

A detailed analysis of the existing processes should be performed. All activities, resources, work flows should be investigated and documented. The critical tasks and critical success factors of the business processes should be identified.

### ***8. Identification Of Constraints And Unnecessary Activities***

During the analysis of existing processes, some realities and constraints that prevent the company from being where it wants to be will be realized. These can be physical resources, capacities, human resources, resistance to change and so on..

There may be undesirable activities, unnecessary bureaucratic steps, unnecessary paper work within the existing processes.. It is important to identify these and to discard them when the new processes are designed.

### ***9. Talk to Customers***

Since one of the objectives of reengineering is to be a better company and give better service to the customers and so increase the customer satisfaction; it is a good action to ask customers their needs and wants. This may require performing comprehensive studies, interviewing and observing how the customer uses the output of the process. It is only by measuring customer satisfaction that the redesigned process will

be successful, therefore it is critical to understand how customers perceive quality and value.

### ***10. Select Processes To Reengineer***

After an analysis of the existing processes, identifying their critical and unnecessary activities, having talked to the customers; it is now the time to decide which processes will be reengineered.

### ***11. Learn From Others***

Before redesigning the processes, it may be a good idea to have a look at outside: customers, associates, other companies. They may have similar processes, looking at their processes may be useful while defining the alternatives for the processes selected to be reengineered.

Benchmarking can be considered at this stage, it is an effective tool for determining process objectives and discovering innovative practices. The reengineering team may decide to benchmark another company's process. This provides the team with proven methodologies for designing processes as well as an exercise in generating creative ideas.

### ***12. Design New Processes***

This step formulates customer- focused breakthrough redesign concepts based on the knowledge and understanding gained in the previous steps. The selected business processes are redesigned to satisfy the service chain, both physically and logically.

Brainstorming, Blue-Slip, Dyad, Discussion, Wishful Thinking techniques can be used during this stage for fostering creativity. Single Point Data Collection, reduction of

checks and controls and parallel workflow techniques can be used during redesigning the processes.

### ***13. Create An Implementation Plan***

Since the processes are redesigned, it is now the time to make an implementation plan that considers about what changes will be performed, how will the employees start using the new processes, how will the processes tested what will be the implementation prospects, how will the cost - benefit analysis will be performed and so on...

### ***14. Deploy Human Resources***

The most problematic aspect of reengineering is that people are often asked to be creative so that their jobs, or of those of their colleagues can be eliminated or dramatically changed. Sometimes the company needs to be reorganized with the reengineering implementation. A Human Resources Strategy is required.

### ***15. Develop And Deploy IT Structure And Infrastructure***

The Information Technology and the infrastructure available in the company with the previous processes may not be adequate for the newly designed processes.

IT components required to support the reengineered processes should be identified and the requirements against the current level of IT should be mapped so that the level of IT change needed will be determined.

Redesigning infrastructure maps the reengineering recommendations against the internal infrastructure ( jobs, organization, policy, management systems, recognition and reward systems) to determine the recommended changes in those areas.

The hardware platforms and the applications used in the company may be altered with newly technologies.

### ***16. Educate The Personnel***

Some processes in the organization will be changed. People will need to be convinced of the cultural change which must take place and be trained in the skills the new processes demand. Before switching to the transition of reengineered processes, the personnel should be educated.

### ***17. Test The Processes, Prototype***

Once the reengineering team has a conceptual reinvention of the process, they can prototype it - creating a laboratory version to simulate and test the new design. Inevitably, the team will discover shortcomings and mistakes that can be repaired before the actual implementation.

Prototyping is an iterative process by which the team will continuously refine the design until they achieve a proper fit between people, process and technology.

### ***18. Pilot the Processes***

Before real implementation, a pilot of the redesigned processes is performed. The pilot is a smaller scale, but fully operational, implementation of the new process. The objectives of the pilot are to “debug” the design and to expedite organizational readiness. Although it is unlikely for every possible mistake to surface, the pilot is a critical component in reducing implementation problems.

### ***19. Create A Transition Plan***

Since everything is ready for real implementation, it is now the time to make an transition plan and a strategy that considers about how the new processes will function and how the roll-out will be made.

### ***20. Switch To Transition***

This is the stage where all the previous stages were performed for: the real implementation, the deployment of reengineering throughout the whole organization.

Building enthusiasm and managing the change at all levels of the organization is necessary for the success of the reengineering implementation.

### ***21. Monitor Performance And Measure Results***

The reengineering team will monitor the performance of the reengineered processes for an appropriate period of time. Successful implementation of BPR requires continuous monitoring and measuring the improvement efforts. Even the best of plans can flounder on unforeseeable roadblocks. When this occurs management must have the discipline to revise the efforts if required results are not being achieved.

### ***22. Continuous Improvement***

The last step in the methodology is to integrate continuous improvement principles into the new processes. This may come easily to organizations that have continuous improvement and total quality management practices built into their culture. However, companies lacking that experience will find it necessary to acquire those skills in order to complete the reengineering and continuous improvement cycle.

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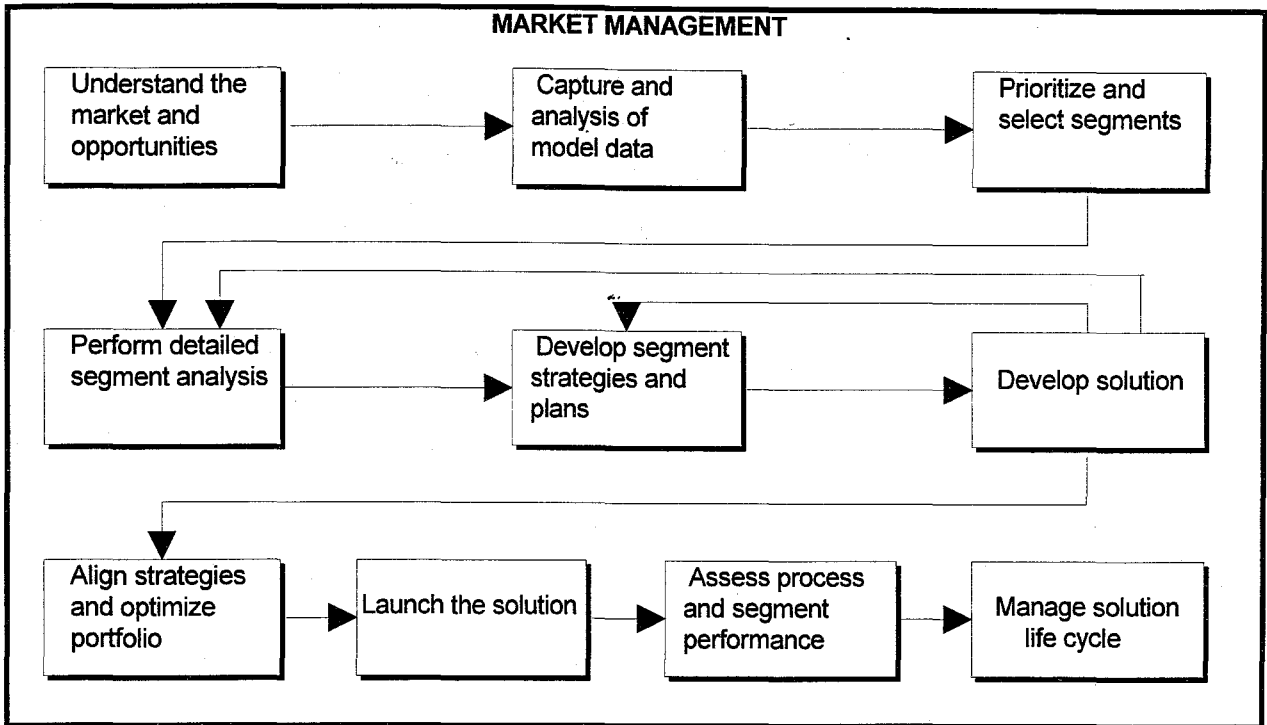
# **APPENDIX**

**A : WORKFLOWS IN MCC AFTER REENGINEERING**

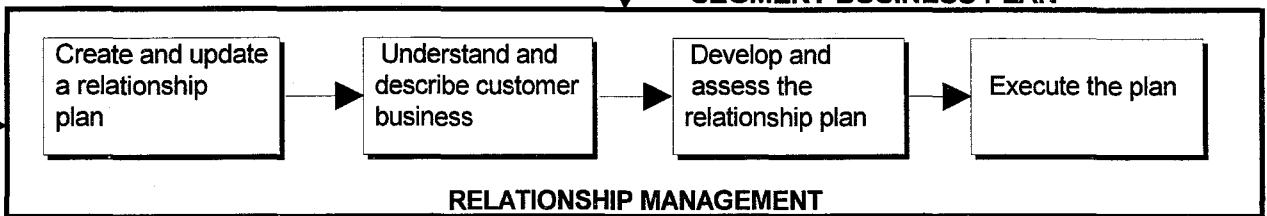
**B: INTERVIEW FORM & CODING KEY**

# CUSTOMER RELATIONSHIP MANAGEMENT REENGINEERING

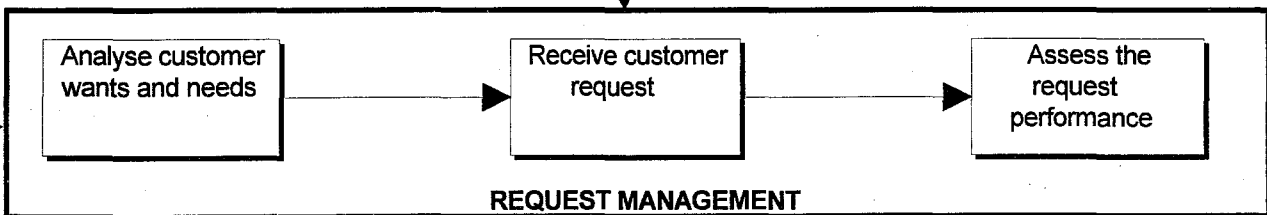
## MARKET MANAGEMENT



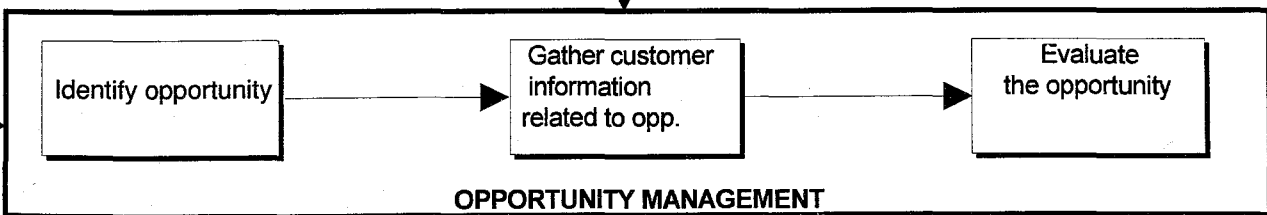
## SEGMENT BUSINESS PLAN



## RELATIONSHIP MANAGEMENT



## REQUEST MANAGEMENT



## OPPORTUNITY MANAGEMENT

Selected opportunity

Customers & Business Partners

Determine if resources are available

Design solution

Create proposal

Obtain customer acceptance

**Solution design and delivery**

Accepted Proposal

Implement the solution

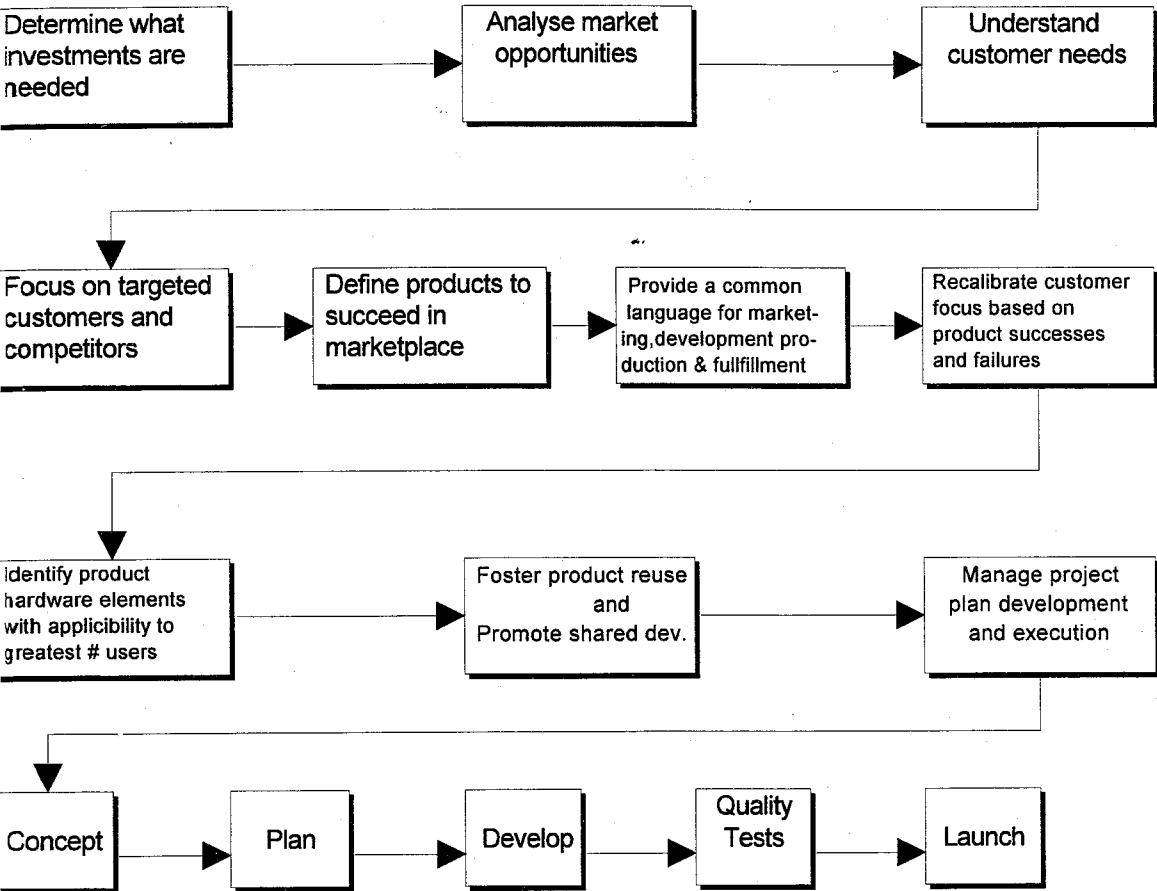
Solution startup

Close the solution

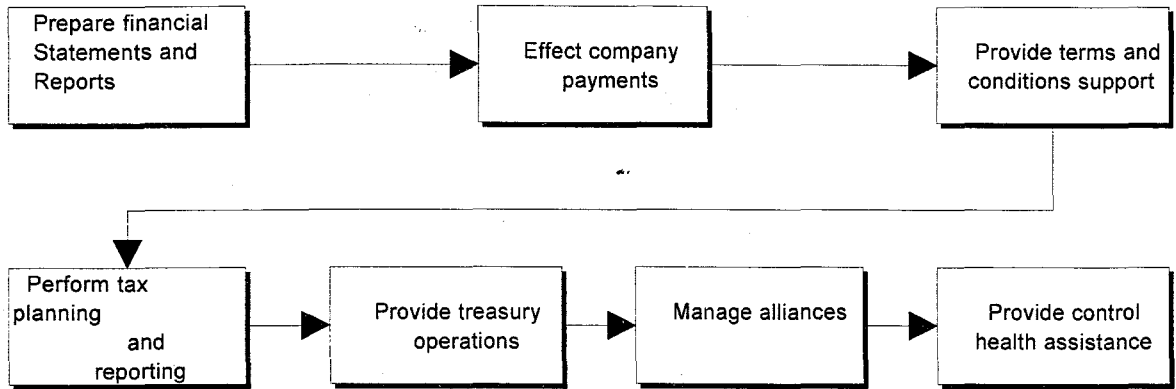
Manage the solution

**Customer satisfaction management**

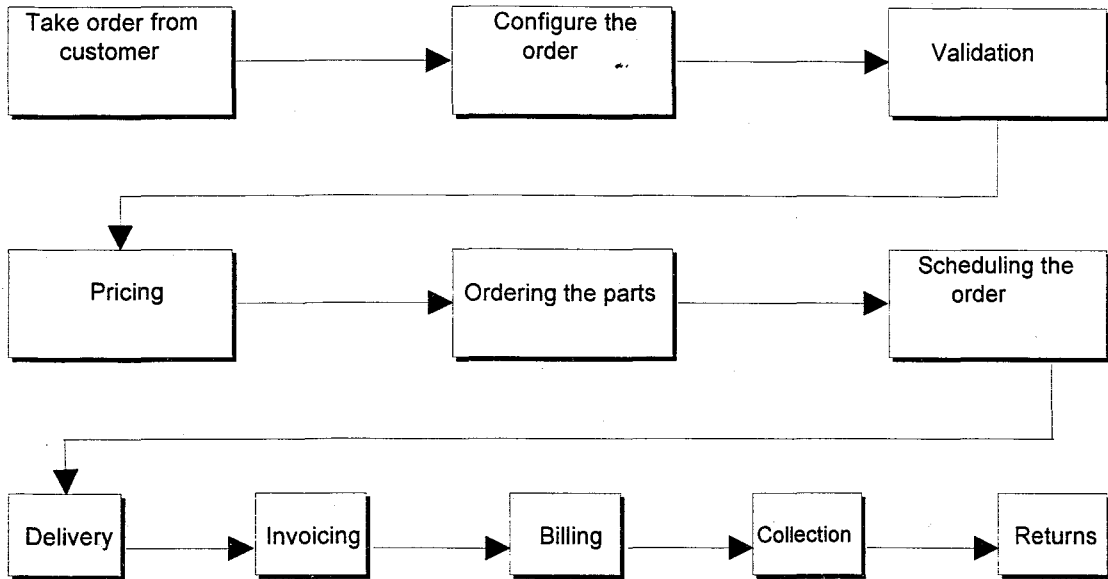
# INTEGRATED PRODUCT DEVELOPMENT REENGINEERING



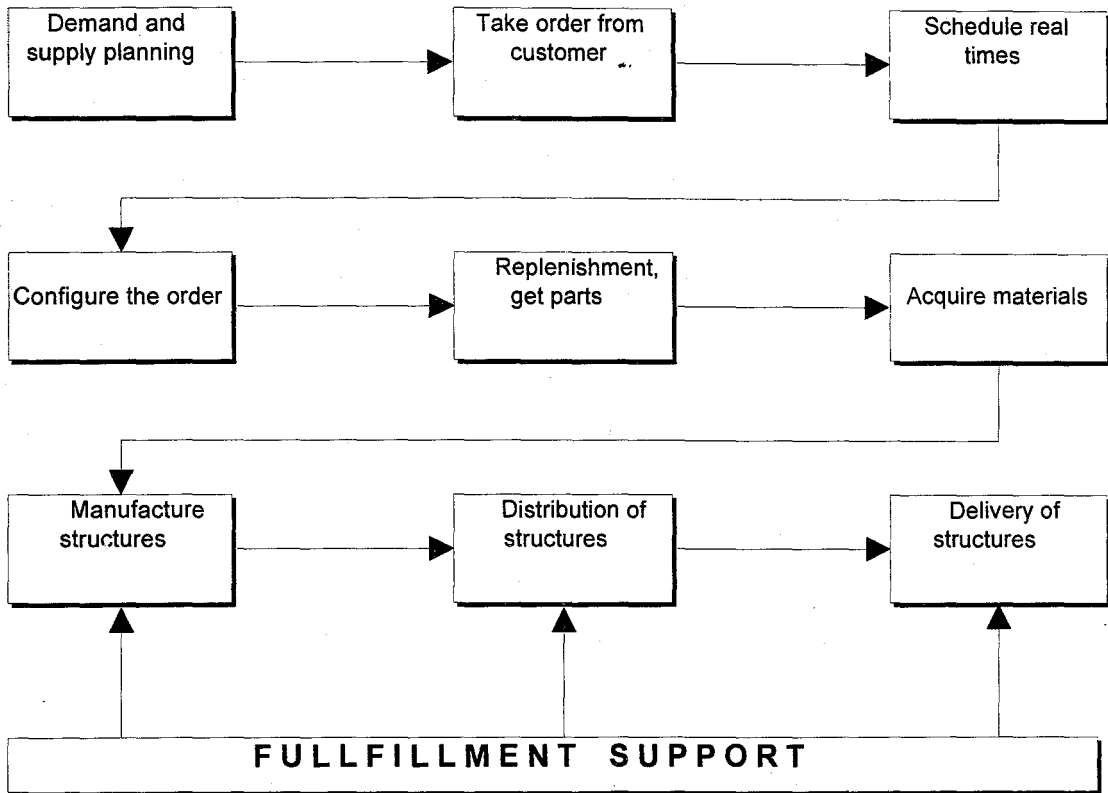
# FINANCE REENGINEERING



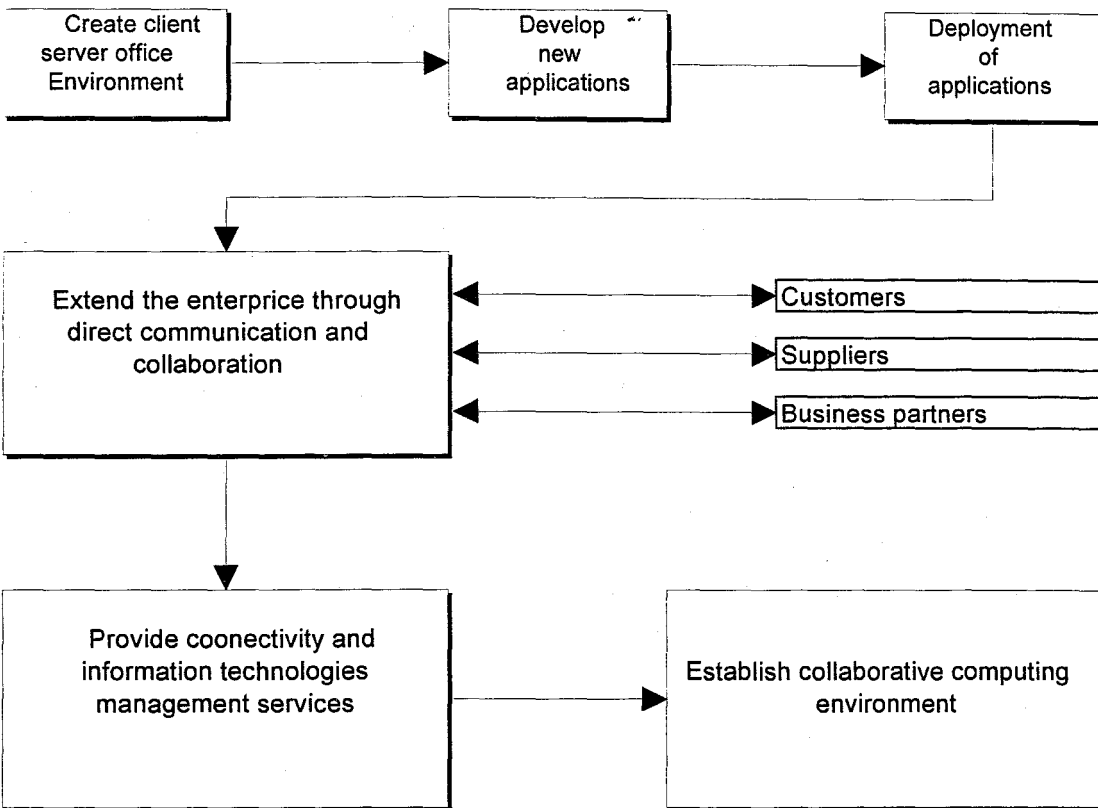
# FULFILLMENT REENGINEERING



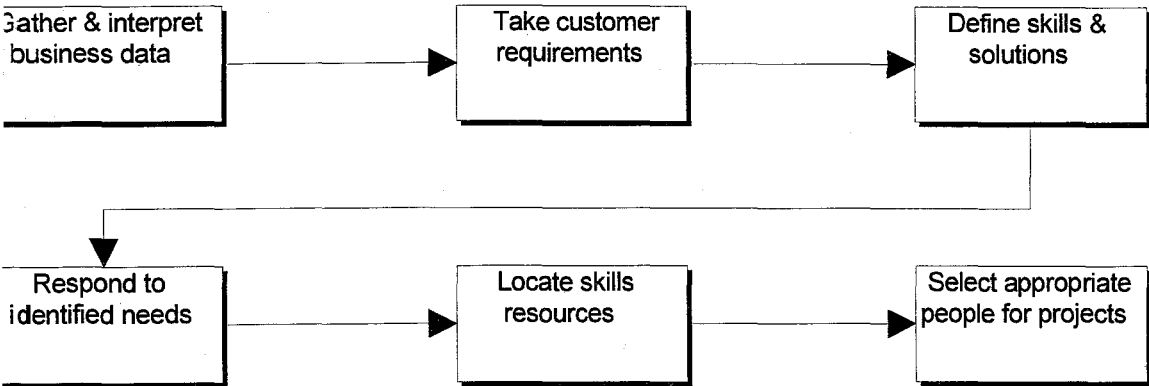
# PRODUCTION REENGINEERING



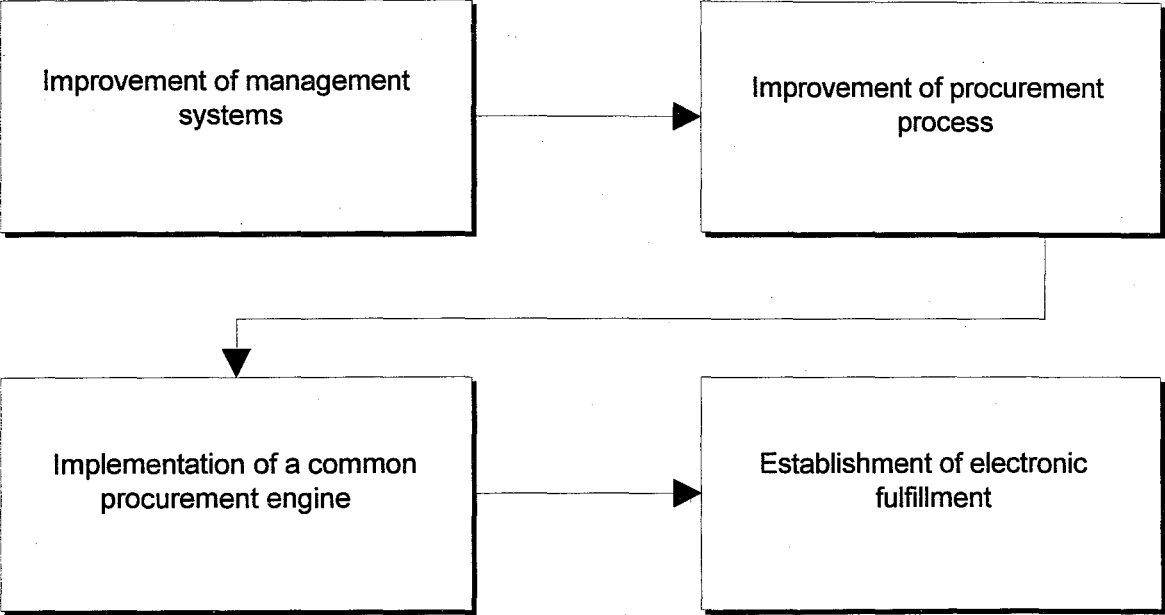
# INFORMATION TECHNOLOGIES REENGINEERING



# HUMAN RESOURCES REENGINEERING



**NON PRODUCTION PROCUREMENT  
REENGINEERING**



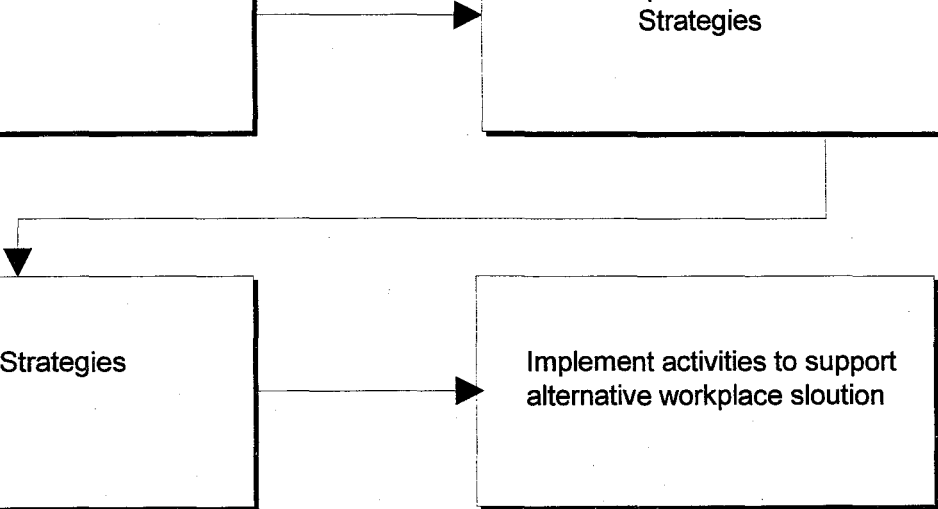
## REAL ESTATE & SITE REENGINEERING

Worldwide Site Operations

Develop Real Estate  
Strategies

Align the Strategies

Implement activities to support  
alternative workplace sloution



# APPENDIX \_ B

## Interview Form

Please put a cross mark under the coloum that indicates your opinions about the following statements for the questions 1 - 5. The statements are about the current situation in MCC in comparisons with the situation before the implementation of reengineering.

<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neither Dis. Nor Agree</u>	<u>Agree</u>	<u>Strongly Agree</u>
--------------------------	-----------------	-------------------------------	--------------	-----------------------

- Employee performance has increased.*
  - Employee motivation has increased.*
  - Processes became simpler.*
  - Workload is reduced.*
  - Customer satisfaction has increased.*
6. *Please rate the success of reengineering initiatives to date.*
- Very Unsuccessful
  - Unsuccessful
  - Neither Unsuccessful Nor Successful
  - Successful
  - Very Successful
7. *Please rate your satifaction about the reengineering initiatives to date.*
- Very Unsatisfied
  - Unsatisfied
  - Neither Unsatisfied Nor Satisfied
  - Satisfied
  - Very Satisfied

8. *Please fill the following section about yourself.*

Your Position :

Your Age :

How long have you been working for MCC?

## Coding Key

Each question asked in the interview is a variable. For the measurement of questions that ask about the perception of the employees about changes that have come with reengineering, a likert scale of five points (Strongly Disagree - Disagree - Neither Disagree Nor Agree - Agree - Strongly Agree) is used as an attitude scaling technique. Likert scale allows respondents to express the intensity of their feelings (Churchill, 1995).

The following table lists the variables measured with the questions and how they are coded for data analysis:

Variable	Description	Scale	Code
V1	Perception Towards Performance Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neither Dis. nor Agree 4. Agree 5. Strongly Agree
V2	Perception Towards Motivation Increase	Interval	1. Strongly Disagree 2. Disagree 3. Neither Dis. nor Agree 4. Agree 5. Strongly Agree
V3	Perception Towards Processes Simplification	Interval	1. Strongly Disagree 2. Disagree 3. Neither Dis. nor Agree 4. Agree 5. Strongly Agree

V4	Perception Towards Workload Reduction	Interval	<ol style="list-style-type: none"> <li>1. Strongly Disagree</li> <li>2. Disagree</li> <li>3. Neither Dis. nor Agree</li> <li>4. Agree</li> <li>5. Strongly Agree</li> </ol>
V5	Perception Towards Customer Satisfaction Increase	Interval	<ol style="list-style-type: none"> <li>1. Strongly Disagree</li> <li>2. Disagree</li> <li>3. Neither Dis. nor Agree</li> <li>4. Agree</li> <li>5. Strongly Agree</li> </ol>
V6	Reengineering Success	Interval	<ol style="list-style-type: none"> <li>1. Very Unsuccessful</li> <li>2. Unsuccessful</li> <li>3. Neither Unsuc. nor Suc.</li> <li>4. Successful</li> <li>5. Very Successful</li> </ol>
V7	Reengineering Satisfaction	Interval	<ol style="list-style-type: none"> <li>1. Very Unsatisfied</li> <li>2. Unsatisfied</li> <li>3. Neither Unsat. nor Sat.</li> <li>4. Satisfied</li> <li>5. Very Satisfied</li> </ol>
V8	Age of the employee	Ratio	<ol style="list-style-type: none"> <li>1. 20 - 25</li> <li>2. 26 - 30</li> <li>3. 31 - 35</li> <li>4. 36 - 40</li> <li>5. 41 - 45</li> </ol>

			6. 46 - 50
			7. 51 - 55
V9	How Long the employee has worked for MCC	Ratio	1. 1 - 5 2. 6 - 10 3. 11 - 15 4. 16 - 20 5. 21 - 25 6. 26 - 30
V10	Gender	Nominal	1. Male 2. Female
V11	Position	Nominal	1. Top Level Manager 2. Middle Level Manager 3. Nonmanager Employee