

**THE USE OF INFORMATION TECHNOLOGY AS A
FACILITATOR OF BUSINESS PROCESS REENGINEERING: THE
CASE OF BIDCO OIL REFINERIES LIMITED**

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DECLARATION

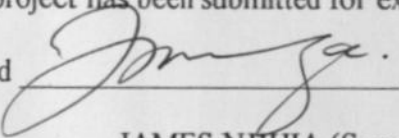
This project is my original work and has not been presented for a degree in any other University

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This project has been submitted for examination with my approval as the university supervisor

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DEDICATION

This project is dedicated to my late father Mr. Joab Owuor whose inspiration gave me strength to go on.

I can also not forget the encouragement from my wife Dorcas and baby Tracy.

My friends Bowa, Wycliffe and Samba, you never failed to encourage me.

Thank you all.

LIST OF ABBREVIATIONS

IT	INFORMATION TECHNOLOGY	1
IS	INFORMATION SYSTEM	1
KPLC	KENYA POWER AND LIGHTENING COMPANY	1
BPR	BUSINESS PROCESS REENGINEERING	1
EDI	ELECTRONIC DATA INTERCHANGE	1
EIS	EXECUTIVE INFORMATION SYSTEMS	1
PC	PERSONAL COMPUTER	1
LANS	LOCAL AREA NETWORKS	1
IA	INFORMATION ARCHITECTURE	1
ROI	RETURN ON INVESTMENT	1

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CHAPTER 1

1.0 BACKGROUND

In the past, companies used information technology to mechanize the way they did their business. The existing processes were kept intact and computers were used simply to speed them up. But as Reynolds (1995) observes, the mere automation of ineffective processes cannot eliminate their fundamental performance deficiencies. Many of today's job designs, workflows, control mechanisms and organizational structures were developed in the early 1950's, a period with a very different competitive environment and before the advent of the computer. These processes were geared mainly to efficiency and control.

Today most businesses are realizing that business –as-usual has become a path to disaster. Old ways of processing business activities have become obsolete and instead, the business environment has grown more sophisticated, and with more aggressive competitors to contend with. Firms are recognizing the need to achieve order – of-magnitude improvements in their key performance measures: cost, innovation, service and quality (Reynolds, 1995) in maintaining their competitive advantage. There is a strong change in focus on activities of productivity from the traditional cost – cutting efforts to radical changes aimed at improving organizational performance and effectiveness (Davenport, 1998). According to Reynolds (1995), this trend may be as a result of the following reasons. First, most cost restructuring programs failed to eliminate the root causes of an organization's problems - ineffectiveness in meeting customer needs. The result was often a weakening of the company in its market, and thus compromising its chances of survival. Secondly, the enabling effect of IT leads to complete high performance work-system models. Consequently, human energy is eliminated through headcount reduction. Increasingly business leaders are working to blend the new work processes and advanced IT with changed corporate structures to achieve real productivity gains.

Organization theorists have proposed that successful organizations in the future will be those networked across functions and designed around business processes (Drucker, 1988; Rockhart and Short, 1989). Business process reengineering (BPR) has emerged as a paradigm of organization change, which can help achieve the requisite flexibility and competitiveness of a networked organization (Hammer, 1990; Venkantraman, 1991).

Michael Hammer (1990) has defined BPR as the fundamental analysis and redesign of every process within a business to achieve dramatic performance improvements and the management of associated business changes.

Success in reengineering the organization requires a consideration of various factors. Thiga (1999) outlines a detailed approach to changing business processes through BPR. As Reynolds (1995) notes, successful reengineering requires revamping the most critical processes of the business in a way that capitalizes on the power of IT. While the business process can be reworked without IT, recent technological advances have placed greater emphasis on IT as a facilitator of process reengineering (Kettinger, et al., 1996). Increasingly, BPR is being deployed in tandem with the use of IT to revamp or overhaul existing business processes that limit effectiveness (Fried, 1991, Senn, 1991). Technologies such as local area networks (LANs) client-server architecture, electronic data interchange (EDI) and executive information systems in addition to teleconferencing, groupware and workflow technologies are some examples of IT which allows firms to achieve performance gains in the communication dimension of business process.

1.1 DEFINITION OF TERMS

1.1.1 Business process

Davenport and short (1990) define a business process as a set of logically-related tasks performed to achieve a business outcome. It also means a complete end-to-end set of activities that together create value for a customer. Furthermore, a business process can also be seen as a structured, measured set of activities designed to produce output for a particular customer or market. It puts a strong emphasis on how work is done.

1.1.2 Business Process Reengineering

This is a radical redesign of business processes for dramatic improvement (Hammer, 1993). It envisages the recognition and breaking away of the age – old rules and traditionally held assumptions that underlie operations.

1.1.3 Radical Redesign

Radical redesign means the process of getting to the root of things, not making superficial changes but reinventing completely new ways of accomplishing work.

1.1.4 Dramatic

This term refers to the fact reengineering is about making quantum leaps in performance and not marginal or incremental improvements.

1.1.5 Information System (IS)

This is a set of people, procedures and resources that collects, transforms and disseminates information in organization (Heeks, 1995). The main purpose of IS is to monitor performance in a whole range of a company's operations so as to help control direction (Cole, 1995). Operations are monitored so as to identify emerging problems and have the information to solve them. This study focuses on computer – based information systems that use hardware and software telecommunication and other forms of IT to transform data resources into a variety of information products.

1.1.6 Information Technology (IT)

According to French (1996), this is the technology, which supports activities involving the creation, storage, manipulation and communication of information, together with their related methods. IT represents the technical perspective of IS, and includes computing, telecommunications and automation activities. It is the enabling mechanism that facilitates the processing and flow of information as well as the technologies used in the physical processing to produce a product or provide a service.

1.1.7 Artificial Intelligence (AI)

This is an area of computer science that uses a collection of different programming techniques and languages to enable computers to mimic human thinking and reasoning processes.

1.1.8 Expert Systems

This is a domain of AI, which uses IT concepts to enable computers to function in decision support roles as advisors, personifying human expert decision making capabilities. Thus, an expert system can be seen as a computer system at near the level of a human expert. An expert system packages the knowledge of one or more human experts into a software format that can operate on a variety of computers (Mans and Keyes, 1991). Expert systems provide the capability to capture knowledge and spread it to those who need it. They also help to manage information overload of an organization by translating information into usable knowledge.

1.1.9 Automation

It may be any of three forms: intra-activity, intra-function or inter-function. It may also go beyond the firm and integrate the firm's activities with those of others. Automation uses EDI for the transfer of information, and e-commerce on the Internet to facilitate inter-company transaction processing.

1.1.10 Teleprocessing

This is a system that allows people to process data at a distance. Data is entered at a terminal that is not at the computer Centre. It can thus be used for ordering stock, storing and reporting incoming merchandise, recording a customer order, and removing stock from inventory.

1.2 STATEMENT OF THE PROBLEM

IT includes computing, telecommunications, and other office systems used as automatic means of handling information (Heek, 1996). It represents the technical aspects of information systems and thus, is the enabling mechanism which facilitates the processing and flow of information as well as the technologies used in the physical processing to produce a product or provide a service.

Reynolds (1995) has linked successful reengineering to the power of IT. In Kenya, various studies have been done focusing on different aspects of information systems. Kipngetich (1991) studied management satisfaction with IS, Gatune (1993) studied the factors considered important in implementing LANs, Nyambane (1996), evaluation of the extent of and factors limiting IT planning aspects. On the other hand, Thiga (1999) studied BPR at KPLC, while Njiru also

explored BPR as applies in the pharmaceutical industry in Kenya 2000. However, no study has specifically addressed the pertinent issue: How is IT used to facilitate BPR? This therefore becomes the subject of this study. This has been done as a case study in a manufacturing company in Kenya. The company was chosen for this study due to its heavy investment in IT in the management of the total organization and also as a result of the many changes it has initiated which reflect a reengineering exercise.

1.3 OBJECTIVES OF THE STUDY

This study was conducted to achieve the following:

- 1 To establish how IT has been used as a change lever or enabler of business process Reengineering.
- 2 To identify how and why specific information technologies were used in a reengineering exercise.

1.4 SIGNIFICANCE OF THE STUDY

The findings in this study will have many benefits. These include the following:

1. Provide a comprehensive background on the application of Business process reengineering in a Kenyan manufacturing firm.
2. Provide a useful guide to existing and potential manufacturing firms on how to use it to reengineering their activities.
3. It is also useful as a source material for researchers, academicians and management consultants.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

BPR authors emphasize the radical redesign of new processes of a business as the basis of reengineering (Hammer, 1990; Davenport and Short, 1990; Hammer and Champy, 1993). Davenport (1995) observes that implementation activities make a process design real. He further notes that IT not only enables better designs but also helps turn them into work behavior and business benefits.

According to Gilbert (1997), IT cannot, of itself, deliver a competitive edge, but has to be used to support a comprehensive strategy. He notes that successful strategies lead change and also have speed as their essential element that is greatly facilitated by IT. Speed is a lever to increase perceived value without further delivery cost, or to reduce the delivery cost without reducing the perceived value. Faster response to the market can therefore boost the perceived value. It also requires a more fluid organization that has a high strategic intelligence (Gilbert, 1997). One can therefore conclude that BPR, being linked to an organization's strategy (Thiga, 1999) needs IT to enable its successful implementation.

2.2 THE DEVELOPMENT OF INFORMATION TECHNOLOGY

Milestones in the development of IT were the first big and expensive mainframe computers introduced in the early 1960's to handle large -scale operations. The development of integrated circuits led to the production of smaller, and less costly but more powerful minicomputers. Then 1980s saw the wide adoption of PCs largely due to their lower prices and the development of a wide range of user - friendly software packages. Initially, computer - based systems tended to be associated with scientific applications, with commercial applications coming later. Such applications were mainly at the operational level of information preparations and decision - making. This trend was reinforced because the prime justification of computerization was cost saving and was more focused on operational areas (O'Brien, 1993).

In the 1990s many companies gained access to what used to be the tuff of the rich companies due to the coming of the global network and the lowering of the taxes paid on computers. Within a period of barely a decade computers had dominated virtually all business spheres and firms are now hastening to keep abreast with the ever-changing technologies.

As computers became more affordable so was the spread of their exploitation and individuals found themselves more obligated to be computer literate. A research of approximately 500 firms in the US indicated that only about 9% of the executives were happy with the services they were getting from their information technologies (Miraini, 1993; Davis, 2001).

IT has emerged from its initial stages as a labor saving and cost cutting function to an all-pervasive force, which encompasses the corporate organization and structure, customer relations, retailing, marketing and advertising. The transition from an industrial to an information era is evidenced by the constant decrease of industrial employment and the increase of service and information/knowledge workers. There has been a rapid growth of computer literacy with improved communications – related activities such as telebanking and teleconferencing, since it has become cheaper to transfer information than move people and goods (Reck, 1987).

The potential of IT should be appreciated, as was that of its predecessors – the introduction of the steam engine, the internal combustion engine, or even electricity. IT is now a powerful driving force and managements' task is to exploit its technologies to the organization's benefit. The new emerging technologies such as electronic commerce are having a tremendous impact on the way national and international business is to be conducted (Muganda, 2001). The information revolution is fundamentally changing the way business is conducted, communication, marketing of products and how to find new buyers (Maxwell, 2000). Furthermore, virtual industries have come up which only exist electronically, such as the virtual shopping malls, virtual universities and virtual banks.

As the impact of the information era permeates the society, it will induce structural change to which the more proactive and successful businesses must respond. The momentum of the interaction of technology and business success is likely to increase even more in the days to come.

2.3 THE NEED FOR BPR

Many organizations perform poorly due to many reasons. For them to effectively compete, some of them undertake measures such as restructuring and downsizing. Others revert to automation as a way of solving their problems. As Nyembati (2000) observes, many such attempts have been

done without effective IT planning. Rather, automation has only turned out to be a technical means of carrying out the same old practices.

Reengineering strives to break away from the old rules about how to organize and conduct business. Hammer (1990) emphasized that BPR involves recognizing and rejecting some of the old practices and then finding imaginative new ways to accomplish work. From the redesigned processes new rules emerge that fit the time (Njiru, 2000).

Thiga (1999) has argued that reengineering advocates for a discontinuous thinking – of recognizing and breaking away from the old rules and fundamental assumptions that underlie operations. Hammer (1990) adds that no improvements in performance can be realized merely by automation. A challenge on the old assumptions by shedding the old rules that made the business to under perform in the first place is a prerequisite.

Every business organization has its own culture (Randlesome, 1995; Ott, 1989), which dictates its operations behavior. Implicit in such a culture are rules of work design based on assumptions about technology, people, and organizational goals, which may not be value-adding in the present situation. On the contrary, reengineering recognizes that there are vast amounts of information technologies (Thiga, 1999) that can be more useful. It further gives significance to quality, innovation and service rather than cost, growth and control.

Drucker (1993) also observes that BPR also recognizes works as more educated and capable of assuming responsibility. Reengineering therefore find a place in many businesses with stagnating performances.

2.4 WHY BUSINESS MANAGERS MUST UNDERSTAND INFORMATION TECHNOLOGY

Significant improvements in IT continue to occur at an ever – increasing pace. The speed, size, cost and capabilities associated with computers, office automation and telecommunications provide attractive opportunities for using IT to solve business problems, or enhance current ways of doing business or both. Reynolds (1995) believes that the ability of most organizations to assimilate and apply IT lags behind the recognition of its use.

Business managers need to understand IT for the following reasons:-

- i) They must ensure that the use of IT supports corporate strategy,

- ii) They are in the best position to identify opportunities to apply IT to achieve strategic competitive advantage;
- iii) They must ensure that there are strong linkages between IT and the business;
- iv) They must use IT to become more efficient and effective.

2.4.1 IT Supports Corporate Strategy

The value attached to IT varies from company to company. Some perceive IT as a tool to improve organizational effectiveness and profitability, while for others; it is only for administrative convenience.

To increase the return on investment, IT must be tied into the business strategy of the organization. According to Michael Porter (1993), successful companies within an industry attempt to position themselves relative to their rivals by adopting one of the following three basic strategies:-

- i. Becoming the lowest cost producer or service provider within an industry;
- ii. Developing specialized products that set the company apart from others;
- iii. Concentrating on selling to a particular market or occupying a specific product niche.

The strategy finally selected provides a general framework to guide the activities of the organization. The firm's success will also depend on the extent to which it successfully implements the chosen strategy. The primary purpose of IT should be to support the basic business strategy. This must be clearly understood by IS organization and used as the basis for setting the system project priorities. An understanding of the firm's basic strategy is therefore an essential first step in application's selection. The need to align IT with the corporate strategy implies that the project identification and prioritization will be recognized as needing the business manager's directed and input. The manager then has to establish a close working relationship between business strategists and information technologists. The reengineering of operations therefore must be done to ensure improved co-ordination and communication among critical organization units.

2.4.2 IT Opportunities For Strategic Competitive Advantage.

Business managers must be able to identify opportunities to seize a competitive advantage. Rackhoff et al (1985) gives a planning process for the implementation of IS for competitive

advantage. Their model is based on the identification of five areas where the company can make a major offensive competitive move. These thrust areas include:-

Differentiation: Achieve advantage by distinguishing your products from those of your competitors,

Cost: Achieve advantage by reducing the firm's costs, suppliers' costs, customer' cost or by increasing the costs your competitors must be able to pay to match the quality and service you are offering,

Innovation: Achieve advantage by introducing a product or process change that results in fundamental transformation in the way business is conducted in the industry,

Growth: Achieve advantage by forging marketing agreements, forming joint ventures, or making acquisitions related to the thrusts above.

2.4.3 Linkages between IT and Business

IT projects frequently fail despite the IS itself being well designed and executed. The major problem is the insufficient given to the IS's linkages with the business with which it interfaces. IT has become more powerful, diverse and increasingly more entwined with the organization's critical business processes. Often, business managers expect that when an IS is delivered to them, they will use it in the context of the current decision processes. On the other hand, system designers expect that the need that they are to satisfy is to distil large amounts of data into useful information (French, 1996). The gap between these two divergent expectations is in addressing the changes in behavior the new system will trigger. Unless the new IS to be used is thought in advance, it only creates an information overload situation to the very managers it is supposed to help.

2.4.4 Leadership of IT Projects

To avoid the above confusions, business managers must take the initiative to lead the IT projects and they must be held accountable for the use and results of IT in their operations. They must recognize and take an active role in systems development when a key business initiative depends on it. *The managers will need to find new ways to better control the outcomes of critical projects since they will be held responsible.*

2.5 IT OPPORTUNITIES FOR PROCESS REENGINEERING

IT opportunities both for and imposes constraints on process design. For Davenport (1995), opportunities for IT involve using the technologies in ways new to the company or industry to achieve radical changes in the process. He classifies the opportunities for supporting process reengineering with IT into the following categories:

Automation: Elimination of human labor from a process.

Informational: Capturing process information for purposes of understanding.

Sequential: Changing process sequence or enabling parallelism.

Tracking: Closely monitoring process status and objects.

Geographical: Co-ordination of process across distances.

Integrative: Co-ordination between tasks and processes.

Intellectual: Capturing and distributing intellectual facts.

Disintermediating: Elimination of intermediaries from a process

2.6 DEVELOPING A GENERAL BPR APPROACH

Njiru (2000) has outlined a five-step approach to BPR implementation as prescribed by Devenport and Short (1990). It is important to note that BPR reduces fragmentation by crossing traditional department lines and reducing overheads to compress formerly separate steps and task that are strategically intertwined in the process of meeting customer needs (Pierce and Robinson, 1995). The "process orientation" rather than functional orientation becomes a perspective around which various tasks and activities are then grouped to create the various building blocks of the organization's structure (Thiga, 1999). This is accomplished by assembling multifunctional, multilevel teams (Wilson, 1994) than begin by identifying customer needs and how the customer *wants to deal with the firm. Customer focus becomes paramount in all activities.*

Companies that have successfully reengineered their operations around strategically critical business processes (Wade, 1993) have pursued the following steps:

1. Develop a flowchart of total business processes, including its interface with other value chain activities
2. Simplify the processes, eliminating tasks and steps where possible, and analyzing how to streamline the performance of the remaining tasks.
3. Determine which part of the process can be automated (the repetitive and time consuming ones) considering at the same time the introduction of advanced technologies that can be upgraded to next generation capability and provide a basis for further productivity gains.
4. Evaluate each activity in the process to determine whether it is strategy – critical or not. Benchmark the strategy critical activities to achieve best –in –industry, or best-in-world performance.
5. Weigh the pros and cons of outsourcing activities that are not critical or that contribute little to the organization’s capability and competencies.
6. Design a structure for performing the activities that remain, while reorganizing the human resources accordingly (Papers, 1998).

2.7 CAUSES OF FAILURE IN CHANGE INITIATIVES

Many organizations have business process application’s under the heading “BPR project” as shown by many surveys in North America, Europe, and the UK (Cafassa, 1993; Person and Skinner, 1993; Preece and Edwards, 1993; CSC Index, 1994; Harvey, 1994; Pitney Bowes Management services, 1995; Sockalingham and Doswell, 1996). CSC Index has shown, however, that approximately 70% of those projects failed. To date, major change efforts have helped some organizations adapt significantly to shifting conditions, have improved the competitive standing of others, and have positioned others for a better future (Kotter, 1996). But in too many situations the improvements have been disappointing, with wasted resources and burnout, scared or frustrated employees (Deloitte and Touche, 2002). Njiru (2000) cites Unga ltd. as a local example.

Kotter cites common errors organizations make while trying to implement a change as the following:

2.7.1 Allowing too much complacency

This involves plunging into a change program without creating a sense or urgency in the members of the organization. This can be by assuming that people will see the need for change and willingly participate.

2.7.2 Failing to create a sufficiently powerful guiding coalition

Individuals alone never have all that it takes to overcome tradition, except in very small organizations. Weak committees are ineffective as well. The taskforce must include key people in the organization and they must not underestimate the difficulties in producing change and thus the importance of a strong guiding coalition. Ott (1989) also emphasizes the importance of teamwork.

2.7.3 Underestimating the power of vision

A sensible vision must always be present in successful transformations. Thiga (1999) notes that vision plays a key role by helping to direct, align and inspire actions of people. Without an appropriate vision, a transformation effort can easily dissolve into a list of confusing, incompatible, and time-consuming projects that go into the wrong direction.

2.7.4 Permitting obstacles to block the new vision

Njiru (2000) notes that BPR must be driven by a business vision. To implement any kind of change action is required from the majority of the organization members (Kotter, 1994). New initiatives will therefore fail when employees feel disempowered by obstacles such as organization structure, poor compensation system, or repressive performance appraisal systems, among others.

2.7.5 Failing to create short-term wins

Complex efforts to change strategies to restructure a business may lose momentum if there are no short-term goals to meet and celebrate. People may give up or actively join the resistance.

2.7.6 Declaring victory too soon

Meaningful change may take years to sink down deeply into the culture of the organization. *Otherwise the new approaches still remain fragile and subject to regression.*

2.7.7 Neglecting to anchor changes firmly in the corporate culture.

Change will only sink into the organization's culture when it becomes the way of doing things. Until new behavior is rooted in the social norms and shared values, they will still be subject to regression as soon as the pressures associated with a change effort are removed. Thus, a conscious attempt must be made to show people how specific behaviors and attitudes have helped improve performance. Also, succession policies must ensure that the next generation of management really personifies the new approach.

2.8 ROUTE TO SUCCESSFUL BPR IMPLEMENTATION

Jarvenpaa and Stoddard (1993) insist that successful implementation of BPR must have specific features. Caron et al (1993) identified such success factors as follows:

2.8.1 Diffusing learning from one project to another

Re engineering should begin as a pilot project. A team of about six to ten with more experience with the business are grouped and exposed to BPR initiative. Such people are later transferred to other units where they apply their skills on a continuous basis. Personnel transfers coupled with training programs will diffuse BPR learning and also enable the divisions to develop their own problem solving methodology for a bottom-up change. A BPR database is then created to allow knowledge sharing from project to project.

2.8.2 Learn from failure

Research by Stoddard (1994) show that success might require multiple trials. Accepting initial failure could be difficult, but as Caron shows, only about 50% of BPR efforts succeed in the first go-round. Therefore, a prerequisite to success in BPR is a corporate environment that promotes learning, including learning from failure.

2.8.3 Foster commitment and ownership at all levels

Ownership of the change has to exist at all levels, and particularly in the frontline personnel. Real changes will only occur where the people, from the top down, from bottom up, and across business function lines believe in its merit and the importance of their own roles (Caron, 1994). Wilson (1994) also adds that successful change rotates about a powerful group of people who are committed and single-minded about changing the business processes.

2.8.4 Exploit clean-slate opportunities

Surveys done by Caron and Stoddard in 1994 in Scotland revealed that BPR work with no institutional knowledge recorded higher success than with employees who have experience with the organization. The 'clean-slate' meant that institutional knowledge did not get transferred. Thiga (1999) has rightly argued that values, which have been internalized by employees, are very difficult to shed. Clean – slate opportunities will enable the division implementing BPR to instill the desired values without the interference and expected resistance from those traditional values of the organization. Thiga also adds that the employees must internalize the new values because only deep-seated belief in the right values can generate the passion and the commitment that a reengineered process requires. Trying to overlay a new process on people who have old process values is a recipe for chaos. Thiga warns that this could lead to cognitive dissonance, confusion and cynicism. Care must be taken when starting another project after one successful BPR pilot. Caron (1994) warns that a design can not be handed down from another site, but recommends that the site must redesign its work processes, roles and some times, systems.

2.8.5 Tailor reengineering to the characteristics of the environment

Clean –slate opportunities may result from environmental peculiarities. Early researches in BPR (Caron, et al, 1994) establish that business reengineering was not seen as applicable in every country. They show that in Japan, a process improvement approach was more emphasized instead of reengineering. BPR is top down (Thiga, 1999; Njiru, 2000) and results in new structure and workflows (Champy, 1995). The top must dictate 'we are going to do things differently'. Therefore if the management approaches in operation are culturally based, more care has to be taken. Thiga agrees by stating that in BPR, one has to adapt to change. One way to adapt BPR to the characteristics of the environment is by training. Thiga (1999) established that every employee of KPLC had to undergo at least one training program in a year in its bid to sustain its BPR efforts. On the surface, training simply provides the skills that people need to carry out the new tasks they might be assigned to (Upton, 1995). However, its ancillary roles are much more important. First, it builds confidence. Second, it establishes credibility and communication channel with others. And third, it builds esprit de corps, a sense of common purpose and experience critical in overcoming difficult times as the path is followed.

2.8.6 More to higher forms of reengineering.

There are two forms of recognizable forms or levels of BPR. The first 'wave' of BPR primarily focused on cost cutting and improvements in service delivery. It focuses on dramatic

improvements that, according to Caron, et al (1994), bring the organization's cost structures in line with changed market conditions.

The second 'wave' of BPR, on the other hand, is more closely associated with new business strategies and new businesses. It applies to large businesses, those that employ most equity capital, and with a scope that go beyond increasing the efficiencies of the core processes. This new form of BPR is more strategic and focuses on growth objectives and new 'core competencies'. It is comparable to Upton's 'structures to stop backsliding', which completely removes the 'old ways of doing things' and ensures that there is no way of slipping back. This latter form is also close to what Venkantraman (1994) has described as Level 5 – type IT-enabled change. Such an IT-based transformation can be summarized as in Table 1 below

Level 1	Localized exploitation of technology to existing business processes
Level 2	Internal integration of IT capabilities across an entire existing business process
Level 3	Use of IT as a level for designing an organization's core business processes
Level 4	Exploitation of IT to redesign processes extending beyond one organization to a network of organizations
Level 5	Use of IT to redesign an organization's business scope

Table 1: Levels of IT – Based Transformation.

The initial conceptualization of BPR (Davenport and Short, 1990; Hammer, 1990) most closely resembles Level 3. The 'second wave' BPR is most characteristic of Level 5. This form of BPR puts the strategic link (Njiru, 2000) to reengineering, which, as Earl (1994) notes, has been missing both in practice as well as in the popular writings on reengineering (Hammer, 1990; Davenport, 1993; Hammer and Champy, 1993). Such a change redefines the business scope and builds the key competencies to achieve the new vision.

2.8.7 Move with speed

It is very important to carry out BPR implementation very fast without dragging over many years. Caron (1994) has captured this as follows:

'... The business unit is paralyzed by the fear of what might happen. Over the previous five years, employees had been told over and over again that the 'building is burning down' – but

having seen so many fire-fighting efforts fail, they were going to take their time accepting, and attempting any new fix'.

In light of this, Njiru (2000) recommends increased speed or improved cycle times as a means of dramatic improvements in performance. If the changes to be implemented take too long then the mechanisms suggested by Upton (1995) for preventing backsliding may not be very effective. However, Kotter (1996) has warned against declaring victory too soon.

2.8.8 Communicate truthfully, broadly and via multiple of forums

Kotter (1996) notes that a great vision can serve a useful purpose, even if just a few key people understand it. But the real power of a vision is felt when most of those involved in an organization or activity have a common understanding of its goals and direction. Such an understanding can be reached by truthful and broad communication (Thiga, 1999; Njiru, 2000).

The message to be communicated must be simple and direct and passed through multiple channels. Simple and direct communication, according to Kotter (1996), requires great clarity of thought and courage.

The Table 2 below shows a list of some of the key elements in the effective communication of BPR vision.

TABLE 2: Key elements in the effective communication of BPR vision.

Simplicity	All jargon and technical words must be eliminated
Metaphor, analogy and example	A verbal picture aids understanding
Multiple forums	Big and small meetings, memos and newspapers, formal and informal interactions
Repetition	Ideas sink deeply only after they have been heard many times
Leadership by example	Behavior from important people that is inconsistent with the vision overwhelms other forms of communication
Explanation of seeming inconsistencies	Unaddressed inconsistencies undermine the credibility of all communication
Give and take	<i>Two-way communication is always more powerful than one-way communication.</i>

Caron (1994) observes that the management needs to tell employees early and repeatedly what results are expected and the need for all employees to learn new skills. Communication should occur through employee involvement. Employees either anonymously or otherwise, should be encouraged to send electronic mails or faxes to and/or call a senior manager. The reengineering team should also carry out a special communication program to prepare all affected employees for imminent change.

2.8.9 Have the right people in the organization

All change programs, including BPR, require a substantial input of resources and expertise (Wilson, 1994). The organization will need people who are capable of owning and effectively carrying out responsibilities arising out of the new design. As the business reengineers its processes, information systems groups within the firm will also face the pressures to improve their processes to meet the growing needs of information (Caron, 1994). The IS will be required to perform three major functions: (1) providing more integrated services expanding over a wider array of technologies, (2) Demonstrating that the value of its products and services could meet or exceed the value of similar services available in the marketplace. (3) Provide high quality service in a timely fashion. Rightly qualified personnel can only deliver such an array of functions. The BPR must therefore focus on human resources so as to ensure that only those with the required skills and competencies are considered for positions (Caron, 1994)

Another alternative of having the right people is by training. Kotter advises that before any training begins; careful thought into what new behavior, skills and attitudes needed is a prerequisite. He adds that this will help the management recognize the kind and amount of training that will be required to help people learn the new behaviors, skills and attitudes.

2.8.10 Focus on mindset change

Thiga (1999) and Njiru (2000) have emphasized the importance of cultural change for a successful reengineering. Gilgeous (1997) also observes that managers need to challenge the way things are as well as their own mindsets. He further notes that opportunities are there for organizations to consider themselves from a holistic perspective and radically transform processes in order to achieve dramatic improvements. According to Kotter (1996), culture refers to *norms of behavior and shared values among a group of people*. The norms of behavior are *pervasive/common ways of acting found in a group of people and that persist because group members tend to behave in ways that teach these practices to new members, rewarding those*

who fit and sanctioning those who do not. Shared values are important concerns and goals shared by most of the people in a group that tend to shape group behavior and often persist over time even when group membership changes. This will together determine the organization's behavior.

2.9 CONCLUSION

As a conclusion, it is important to note that the use of IT for business purposes started many years back, but at its inception, computers and its related technologies were only used for automation purposes.

Later, businesses were faced with very dynamic environments and the management discovered ways they could benefit more from the use of IT. This included the use of IT in change management, and especially in business process reengineering. By its nature, BPR is a change initiative, which drastically redesigns business processes so as to fundamentally change how the business is operated. It heavily relies in the use of IT for it to be successful. It would therefore be very difficult to imagine of any BPR exercise without the use of IT.

Information technology has very many characteristics, which endears it process redesign. It requires fewer people to operate, saves on time and can be able to perform many operations all at the same time, to mention but a few. A successful route to reengineering, therefore, is one that carefully integrates the use of IT in its implementation and one that deliberately exploits the capabilities offered by IT.

However, the use of IT in process redesign must be able to overcome the unique requirements of the related technologies. Such requirements may end up becoming constraints to the reengineering exercise.

INFORMATION TECHNOLOGY AS A PROCESS CONSTRAINT

Over the years there have been a number of studies that have revealed some of the problems firms face in adopting technological innovations and failures of IT to meet the expectations (Greaty and Gordon, 1991; Bessant, 1993). These studies point to technical difficulties, strategic shortcomings and inattention to work organizations and the issue of skills. Indeed IT can impose

considerable constraints on the attempts to reengineer business processes. Such problems include the following:

1. Lack of strategic framework for investments
2. Lack of planning and foresight
3. Inability to adapt to organizations and produce the level of organizational integration required.
4. Preoccupation with short-term returns
5. Technological complexities
6. The need to undergo extensive learning and adaptation
7. A requirement for a greater breadth of skills and flexibility in the workforce.

2. THE POPULATION

The population of the study consists of all the processes of production and work at the company.

3. THE SAMPLE

A sample of 30 people has been selected for the study. The sample was based on the number of respondents in the management positions whom were granted the permission to talk to the researcher. As a result, thirty managers were interviewed and assisted in the collection of some data for the study.

4. DATA DESCRIPTION AND COLLECTION

The research is basically qualitative in nature. Both primary and secondary data have been used. Primary data were collected through observation and interviewing by asking some relevant questions. Attached is an interview guide, which shows some guiding questions, used during the survey. The interview guide has been divided into two parts for purposes of convenience to respondents. Also since the research was based on a case study, observation of work processes is included. The secondary data were include reports from business magazines, journals, books, journals and other resources in this area and also from the Internet.

5. DATA ANALYSIS AND PRESENTATION

Qualitative approach of the data presentation and analysis has been used and numerical table form of data were provided. Thus, a narrative presentation has also been used for analysis.

CHAPTER 3

3.0 RESEARCH DESIGN

3.1 SAMPLING DESIGN

This was a case study based in a manufacturing firm in Kenya (name withheld upon their request). This method has been preferred for the reason that it allows for a more intensive study of one entity so as to the extent of the application of IT in the reengineering exercise. Also, this method allows for a constant face-to-face contact with the respondents, more direct observations also being made possible.

3.2 THE POPULATION

The population of the study consists of all the processes of production and work at the company.

3.3 THE SAMPLE

A sample of ten processes has been selected for the study. This sample was based on the number of respondents in the management positions whom were granted the permission to talk to the researcher. As a result, thirty managers were interviewed and assisted in the collection of some of the information.

3.4 DATA DESCRIPTION AND COLLECTION

The research is basically qualitative in nature. Both primary and secondary data have been used. The primary data were collected through observation and interviewing by asking some relevant questions. Attached is an interview guide, which shows some guiding questions, used during the interviews. The interview guide has been divided into two parts for purposes of convenience to the researcher. Also since the research was based on a case study, observation of work processes was possible. The secondary data used include reports from business magazines, journals, books and works of other researchers in this area and also from the Internet.

3.5 DATA ANALYSIS AND PRESENTATION

A qualitative approach of the data presentation and analysis has been used and summaries made in form of tables where possible. Thus, a narrative presentation has also been used for presentation.

CHAPTER 4

4.0 DATA PRESENTATION, ANALYSIS AND FINDINGS

Out of the thirty managers who were given the questionnaires, 27 were able to fill and return the questionnaires. Thus a response rate of 90% was realized.

The respondents included all the senior managers, departmental heads and section heads all of whom have an office and use computers in their management process.

The result of observation and interaction with the respondents were as follows:-

- 80% of the respondents have been working for the company for more than five years.
- All of the respondents heavily depend on the computer and its related IT'S to carry out their duties.
- It was also observed that majority of changes that have occurred in the company involved a change in how the work is done and included the use of information technologies for implementation.
- The changes have been described as radical, rapid, and top-down in nature, although quite often teams were made to assess the need for certain kinds of changes before implementation.
- The use of information technologies dominates the activities of the respondents. The human resources manager uses IT for human resource planning, the marketing manager can monitor the sales activities of their sales representatives in remote locations by the help of portable computers and wireless modes of communication while in the transport department, tracking of company vehicles is made possible by the use of wireless radio systems, and so on.
- Respondents agreed that it will not be possible for them to be effective and efficient in carrying out their duties in the absence of computer technologies.

Changes brought about by use of IT

- Information is readily available whenever needed.
- Even the newly recruited can be able to perform a complex task.

- Work activities can both be centralized and decentralized (i.e. distributed).
- Decision-making has been made part of everyone's job.
- The field personnel can manage information from any location.
- Cost minimization still remains a major business goal.
- Company vehicles can now be located automatically.
- Plans can get revised instantaneously whenever necessary.
- It is possible for people to work together and still operate from different locations at the same time.
- Customized products can be made quickly and relatively inexpensively.
- Time to market can be reduced by 90%.

Decision-making is part of everyone's job	<ul style="list-style-type: none"> • Decision support systems (DSS) • Expert systems
Field personnel can manage information from any location	<ul style="list-style-type: none"> • Wireless communication, portable computers, the web, e-mail
Costs are minimized	<ul style="list-style-type: none"> • Tracking technology • Groupware • Workflow software • Supply chains
Plans can be revised instantaneously	<ul style="list-style-type: none"> • High performance computing systems • Intranet systems
People can work together and still operate from different locations at the same time	<ul style="list-style-type: none"> • Groupware • Group support systems • Telecommunications • E-mail • Cloud server
Customized products can be made quickly and relatively inexpensively	<ul style="list-style-type: none"> • CAD/CAM • CASE tools • Online systems for JIT decision making • Expert systems
Time to market can be reduced by 90%	<ul style="list-style-type: none"> • CAD/CAM • Electronic data interchange (EDI) • Groupware • Intranet (intranet)
Organizations use processes that are increasingly automated	<ul style="list-style-type: none"> • Robotics • Artificial intelligence • Expert systems
Technology is constantly improving	<ul style="list-style-type: none"> • Robotics • Emerging technologies • Object-oriented programming • Geographical information systems (GIS)

The information technologies used to bring about the changes. The various assisting information technologies used to achieve process objectives are summarized in the following table alongside the objectives they help achieve.

Information Technology	Process
Process objective Readily available Information	Information Technology used. <ul style="list-style-type: none"> • Shared databases • Client server architecture • Internet and • Intranets
Novice to perform complex work	<ul style="list-style-type: none"> • Expert system neural computing
Centralization and decentralization of tasks	<ul style="list-style-type: none"> • Telecommunications and • Networks • Client /server • Intranets.
Decision making to be part of everyone's job	<ul style="list-style-type: none"> • Decision-support system (DSS) • Expert systems.
Managing information from distant locations	<ul style="list-style-type: none"> • Wireless communication, portable computers, the web, e-mail.
Locate items automatically	<ul style="list-style-type: none"> • Tracking technology • Groupware • Workflow software • Search engines
Instantaneous plans revision	<ul style="list-style-type: none"> • High performance computing systems • Intelligent agents
Work together from remote locations	<ul style="list-style-type: none"> • Groupware • Group support systems • Telecommunications • E-mail • Client/server.
Customized products	<ul style="list-style-type: none"> • CAD/CAM • CASE tools • Online systems for JIT decision making • Expert systems.
Reduce time -to- market	<ul style="list-style-type: none"> • CAD/CAM • Electronic data interchange (EDI) • Groupware • Imaging (document)
Organization and processes to be knowledge-based	<ul style="list-style-type: none"> • Processing • Artificial intelligence • Expert systems
Few highly – skilled personnel	<ul style="list-style-type: none"> • Robots • Imaging technologies • Object-oriented programming • Geographical information systems (GIS).

The following table reflects the response of the respondents in identifying the use of various technologies in performing the sampled processes:

Process Objective	No. of those who use IT to Perform this task	No. of those who do not Use IT for the task
1. Making information available at any point.	27	0
2. Recruitment Process	25	2
3. Centralizing and decentralizing tasks	27	0
4. Managing information from distant locations	27	0
5. Order fulfillment	22	5
6. Locating company assets	23	4
7. Revision of Plans	26	1
8. Customizing of products	27	0
9. Reducing time to market	27	0
10. Reducing the number of staff	27	0

CHAPTER 5

5.0 DISCUSSIONS AND CONCLUSION

Information technology has been used to improve productivity and quality by automating existing processes. However, in process reengineering, the traditional process of looking at the problems first and then seeking technology solutions for them has to be reversed. It has become necessary to recognize the powerful solution IT makes possible and then identify the process that can be helped by it. Such information requires innovation. Information technology breaks the old rules that limit the manner in which work is performed.

Business process redesign is a challenging tool for organization undergoing transformation. Information technology plays an important role by either enabling or constraining successful business process redesign. The organization apparently needs some basic level of information technology infrastructure and capability of it to implement BPR.

THE IT TOOLS FOR BPR

A large variety of information technology tools are used to support BPR and organizational transformation. Such tools are categorized as follows:-

Simulation and visual simulation tools

Simulation is essential to support the modeling activities of BPR in addition to conventional simulation and visual simulation tools that are specifically oriented for BPR such as SIMPROCESS, PRROMODEL, BPSIMULATOR Witness and BPR Workflow.

Flow diagrams

Flow diagrams can be made with the case tools or other system development charting tools. Specialized BPR tools usually integrated with other tools can also make them.

Application development tools

BPR application can be built with some application development tools such as photo typing.

Work analysis

Analyzing both existing process and proposed solution is accomplished with tools that conduct forecasting, risk analysis and optimization, such as BizCase and Turbo SPR.

Integrated Tool kit .

Several integrated tool kits are used in support of BPR, for example, ERP software such as SAP R/3

Workflow software

In designing business process, it is necessary to analyze the work to be done and the manner in which it flows from one point to another. A workflow system is powerful business process automation that places system controls in the hands of end user departments. A workflow provides quality interface between business systems.

Business process Redesign

New architecture is designed around business processes rather than around traditional application hierarchy of most functional applications.

Comprehensive modeling tools

These are software that model, simulate and manage business process.

Other tools

Several tools are used for planning and managing BPR process and the organizational transformation. Information and technologies can be part of the BPR solution itself. for example CAD/CAM and imaging technologies contribute to cycle time reduction; expert system support case managers. And mass customization; and cognitive maps can support the redesign process.

Information technology constraints

Information technology has unique characteristics that differentiate it from other aspects of the organizational world. It therefore requires management practices that are more effective than, and in some cases different from that are adequate for non IT activities. Managers therefore need to be aware of and responsive to the following issues:

1 constant growth and change

The power of microprocessor doubles every two years, while the cost remains the same. The ever-increasing power creates both major opportunities and large threats as its impact ripple

across almost every aspect of the organization and its environments. Managers need to continually monitor development in this area to identify new technologies relevant to their organization and to keep them up-to-date on their potential impacts.

2 shift from tangible to intangible benefits

Few opportunities remain for automation project that simply replace manual labours with IT on one-for-one basis. The economic justifications for IT increasingly depend on intangible benefits prior to the actual implementation. Managers must understand and use tools that bring intangible benefits into the decision making process for IT investments.

3 Net a sure thing – although IT offers opportunities to significant improvement in organization performance these benefits are not necessarily automatic. Managers need to very actively plan and control implementation to increase the return to IT investments.

4 charge back users have little incentives to control IT cost if they do not have to pay for them at all. On the other hand, an accounting system may allocate cost fairly to users but discourage exploration of promising new technologies. The solution would be to have a charge back system that has primary objective of encouraging users behavior that corresponds to organizational objectives.

5 risks- investments in IT are inherently more risky than investment in other areas. Managers need to evaluate the level of risk before committing to IT projects. The general level of management involvement as well as specific management technique and tools need to be appropriate for the risk of individual project.

6 out sourcing- the complexities of managing IT and the inherent risk may require more managements skills than some organizations posses. In this case, the organization may want to outsource some or all of its IT function. Thus it will ensure that the terms of out sourcing contract are in its best interest both in short- run and long- run.

7 Increasing returns-industries whose primary focus is IT or that include large amounts of IT in their products operate under a paradigm of increasing returns. In contrast those that primarily produce physical output are object to diminishing returns. Managers have to understand which paradigm applies to their products and employ management strategies that are most appropriate.

Therefore BPR as a change initiative heavily depends on the use of IT and it remains very difficult to have a BPR program without putting into use a wide range of information technologies in a modern manufacturing company. IT will cut across the whole organization and very few people in the company may do without IT.

5.1 LIMITATIONS OF THE STUDY

This study was carried in one of the company only and in manufacturing sector. The finding has therefore to be applied with caution in other situation. For this one company, it was still very difficult all the information required due to restrictions from the senior management. The researcher was barred from taking any sample of work flow processes and this has impacted very negatively on the presentation of data and its analysis.

5.2 SUGGESTIONS FOR FURTHER RESEARCH

A comparative study could be carried out to establish whether the same information technologies are used in re-engineering in the manufacture sector and the service industry.

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APPENDICES

LETTER TO THE RESPONDENTS

OWOUR, JSO
UNIVERSITY OF NAIROBI,
FALCULTY OF COMMERCE,
P.O.BOX 23030,
NAIROBI

Dear Sir /Madam

RE: INFORMATION FOR POST- GRADUATE STUDE NT RESEARCH

I am a post- graduate student pursuing a Master of Business A administration (M.B.A) program in the faculty of commerce , University of Nairobi. One major requirement of this program is for the post graduate student to carry out a practical study in any area covered in the course and submit the results to the examiner for assessment. I have chosen to study "THE USE OF INFORMATION TECHNOLOGY AS A FACILITATOR OF BUSINESS PROCESS REENGINEERING".

Your company being one of the very vibrant and competitive organizations in this region for the last ten years has been chosen as the best place to carry out a study of this nature. I would therefore highly appreciate if you provide me with some of the information needed for this study by completing the questionnaire attached.

Any information provided will be used strictly for academic purposes only and will be treated with strict confidence.

Thank you very much.

Yours Faithfully,
Owour J.S,O

INTERVIEW GUIDE 1

1 How long have you worked for this company?

Less than 2 years

2-5 years

over 5 years

2 How would you describe your work?

Labour intensive

Computer oriented

Other, please specify _____

3 Please list any three of your duties:

i. _____

ii. _____

iii. _____

4 During the period that you have been working in this company, have there been significant changes in the way work is done?

YES

NO

5 If answer in 4 above is YES, please categorize the change effort by putting a tick (✓) on the statement, which closely describes the changes efforts.

Incremental

Fresh start

Radical and rapid

Driven from top down

Use team approach

6. Do the changes involve the use of information technology?

Not at all

Occasionally

All the times

7. Where does the change initiatives start from in your company?

Top management

Middle management

Lower level staff

Others, if any, _____

8. You use computer for the following activities:

Log in when reporting and leaving the office

Carry out your daily activities

Read incoming report from colleagues and clients

Send reports to other employees or clients

Others, if any _____

9 Your are likely to find the following areas of your work more costly in the absence of Information Technology:

Receiving reports from clients

Receiving some information from colleagues

Sending information from colleagues and customer

Storing and accessing files and other information

Ordering of products

Others if any _____

INTERVIEW GUIDE 2

1. What benefit has your company gained by involving the use of information technology in the change efforts?

Reduce salary cost

Reduced cost of maintaining records

Efficiency in carrying out duties

Reliability of information

Increased communication

Increased security of company information

Others, if any, _____

2. Please tick (✓) any of the following statements, which closely describes your daily work:

You can work on a task from the beginning to the end

You normally receive tasks, which are partly worked on

You work on activities and pass it on others

You initiate all the task you work on

All the task you handle end with you

Computers help you very much in tracing the stage of any task that you may be concerned with

3. The following are some facts about work in many organizations. Please tick (✓) as may be appropriate for your case.

Your work is accessible to authorized person at all times

The company as computer- controlled processes

There are some tasks, which require high degree of monitoring

Your communication activities are mostly on line

The company highly uses IT in its products- development activities

Order fulfillment process will adversely affected in the absence of computers

The company regularly trains the employees in various areas, including how to carry out their own duties

4 The following benefits have been realized from the intensive use of IT in my company (please tick as appropriate)

Dramatic performance gains

Reduced number of employees

Increased individual responsibility

Team working

De-layering of duties

5. The list below outlines some of the problems that may be experienced while adopting change efforts. Please, identify by ticking any problem that may be associated with your company.

I) Greater stress

II) More intensive work condition

III) Los of working expertise and knowledge

IV) Lack of expected dramatic transformation

Others if any _____

THANK YOU VERY MUCH FOR YOUR COOPERATION AND THE MUCH NEEDED ASSISTANCE YOU HAVE PROVIDED