ORIGINAL ARTICLE

ROLE OF INFORMATION TECHNOLOGY IN SUCCESSFUL IMPLEMENTATION OF BUSINESS PROCESS RE-ENGINEERING

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Abstract:

The main objective of this research paper is to identify the basic role of Information Technology in enabling the model of Business Process Reengineering in the organization. Information Technology acts as positive catalyst while enabling the Business Process Reengineering model. As we know that BPR involves the application of scientific principles so that overall business process can be changed radically. This research paper is totally based on recent literature. The paper gives a theoretical overview that simply clarifies the significant role of information technology in enabling the BPR model. The paper provides helpful guidelines for implementing the BPR model with the help of information technology. Today, most organizations invest on IT and information solutions for more efficient information management and consequently develop more effective business processes. Information management lays a significant role in re-engineering of business processes. It also looks at the potential advantages of IT application in design of business processes to improve business. Results from this research indicate that IT solutions and initiatives play a vital role in improved information management and therefore re-engineering of business processes to a greater extent.

KEYWORDS:

Information technology, Business Process Reengineering.

INTRODUCTION

In the present world, well-organized use of information and communication technology has become a decisive success factor. Firms achieve competitive advantage by improving their IT services. Although not a solution in itself, IT facilitates the BPR process that allows organizations to do away with their existing set of rules and build new re-engineered processes. Therefore, BPR projects should revolve around IT specifically Internet and Intranet. Today Internet and Intranet technology can be effectively used in BPR projects as they are cost effective, compatible and help in easily obtaining required information by bridging the communication gap. The cost effectiveness is reflected through faster and easier access to reliable data, quicker processing of these data and thereby leading to better output both in terms of quality and quantity. This in turn makes the firms more competitive and puts them on a rapid growth path. As IT enabled BPR continues to upgrade business processes and enhance productivity, the organization should also simultaneously modify it in order to adapt to such changing environment. Significant parameters, which could transform an organisation from an industrial organisation to a knowledge organisation, are organisation culture; employee skill sets, resource management and most importantly change

management. Information technology has changed the way of doing business. Business is exceptionally depending upon the use of information technology. To run a business, massive support is available from Information technology. In terms of software on which the technology runs to support business, wide varieties of business software are available to fulfill almost every kind of operational need of the business.

1.1 Concept of Business Process Reengineering

The concept of BPR is introduced as a apparent solution to the economic crisis and the recession of the late 1980's and early 1990's (Butler, 1994; Arnott and O'Donnell, 1994). According to Butler "the '80s were a time for financial reengineering ... the '90s is for technological reengineering". Hammer and Champy (1993) suggest that "BPR can help organizations out of crisis situations by becoming leaner, better able to adapt to market conditions, innovative, efficient, customer focused and profitable in a crisis situation". In reengineering business processes are usually fragmented into sub processes and tasks that are carried out by several specialized functional areas within the organization. As no one is responsible for the overall performance of the entire process. Reengineering suggest that optimizing the performance of sub processes can result in some benefits, but may not yield dramatic improvements if the process itself is fundamentally inefficient and outdated. For that basis, reengineering focuses on redesigning the process as a whole in order to achieve the greatest possible benefits to the organization and their customers. This concept of realizing dramatic improvements by fundamentally rethinking how the organization's work should be done distinguishes reengineering from process improvement efforts that focus on functional or incremental improvement.

DEFINITIONS OF BPR

There is no universally accepted definition of business process reengineering. There are almost as many definitions of BPR as there are authors publishing on the topic, we can identify multiple aspects that they have in common.

Davenport & Short (1990) define BPR as:

"The analysis and design of workflows and processes within and between organizations" .

Hammer and Champy (1993) define BPR as:

"The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed."
Thomas Davenport (1993), another well-known BPR theorist, uses the term process innovation, which he says:
"Encompasses the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human, and organizational dimensions".
Additionally, Davenport (ibid.) points out the major difference between BPR and other approaches to organization development (OD), especially the continuous improvement or TQM movement, when he states:
"Today firms must seek not fractional, but multiplicative levels of improvement – 10x rather than 10%."
At last, Johansson et. al. (1993) provides a description of BPR relative to other process-oriented views, such as Total Quality Management (TQM) and Just-in-time (JIT), and state:
"Business Process Reengineering, although a close relative, seeks radical rather than merely continuous improvement. It escalates the efforts of JIT and TQM to make process orientation a strategic tool and a core competence of the organization. BPR concentrates on core business processes, and uses the specific techniques within the JIT and TQM "toolboxes" as enablers, while broadening the process vision."
Teng et al. (1994) define BPR as: "The critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures."

1.2 Role of Information Technology in Reengineering Process

Many academics wrap up that there is a relationship between IT and BPR. Most academics suggest that this relationship is positive and that IT is a vital driving force behind productivity. This contradicts what failure rate statistics show since they say failure rates are very high, estimated at 70%.

These contrasting views lead to research to find out what the answer really is. Studies suggest that Information technology has a synergistic relationship with process redesign. Further research examined these IT-BPR relations to measure its advantages. Businesses were independently examined depending on the focus of the redesign. When the focus was work restructure they found that there is a positive performance association with respect to production and market values.

Due to the complexities associated with the use of IT, its role in BPR has been debated by several authors. Authors like Davenport (1993), Davenport and Short (1990) and Hammer (1990) believe that IT has a major enabling role in BPR, and that many BPR projects contain IT as one of its major components. Morris and Brandon (1991), for example, argue that BPR may not make use of IT. Guha et al. (1993) and Teng et al. (1994) suggest that installing new hardware and software, as well as using system analysis and modeling tools, are major components in BPR efforts. Furthermore, some authors like Davenport and short (1990)s, go beyond viewing IT as an enabler for BPR, and consider it to be a driver for the reengineering process as it is used essentially to model technically the organizational change. However, other authors like Boudreau

and Robey (1999), believe that IT can also disable the change efforts. They argue that the use of IT in redesigning the business processes involves new structures, which inhibits changes in the future. They note that since the technical backbone of automated processes exists as software applications, any future change to the processes requires a reconstruction of these software systems. They also argue that BPR in itself will continue to build new heritage systems and organizations which need transformation. Though, according to a survey of reengineering practices, carried out by business intelligence, 60 percent of companies surveyed state that IT is a critical enabler for the reengineering efforts (Harvey, 1995). To ensure successful use of IT in BPR, its capabilities, constraints and behavior need to be thoroughly understood. Wyse and Higgins (1993) see the role of IT in BPR as having three major aspects:

(1) Knowing what new business opportunities are made possible with computer-based technologies;
(2) Building an active platform of systems and capabilities; and
(3) Focusing on the process of delivering new systems.

Childe et al. (1994) categorize IT applications in BPR under two groups, i.e. change and support technologies. By change technologies, they mean analyzing, modeling and mapping existing processes, assessing their efficiency and effectiveness, measuring performance, and providing structured support for the change projects management and associated planning and control functions. They describe support technologies as relating to implementing IS to support the process configurations needed. Heiman (1988) argues that in organizations which depend heavily on integrated IT systems, managing change is shaped by these technologies, and that an information planning strategy is necessary to map organizational plans and structure to a business – wide communication infrastructure. Adequate use of open systems, fourth-generation

Programming languages, advanced data base management systems, and software re-usability techniques may reduce the inflexibility of IT systems so they can support BPR more effectively (Al-Mashari and Zairi, 2000). By the use of IT some items such as inventory, lead time, process, performance, data exchanging, internal communication, access to suppliers, information flow, order flow, strategy, product, marketing/sales, services, personnel, technology, and accounting that are really influenced by IT during BPR process are listed (Gunasekaran and Nath, 1997).

IT can help make the changes promoted by reengineering, and it can be considered as an enabler of BPR. There are several studies that show IT as a fundamental capacitor of process redesigning [Naisbitt and Aburdene, 1985; Davenport and Short, 1990; Hammer, 1990; Harrington, 1991].

IT and Organizational Processes

Processes can be classified according to two dimensions: degree of mediation and degree of collaboration [Teng et al., 1994]. The degree of mediation refers to the sequential flow of input and output among the participants' functions in a business process. A process at a high degree of mediation involves a large number of intermediate steps, performed in various functions that contribute indirectly to the process outcome. A process at a low degree of mediation has several functions that contribute directly to the process outcome without the mediation of sequential steps. The degree of collaboration dimension is related to the degree of collaboration between functions through information exchange. The frequency and intensity of information exchange can range from none (process at the low degree of collaboration) to extensive (process at the high degree of collaboration).

Today's competitive environment is challenging firms to quickly develop and offer products that

will satisfy customers' needs. Companies cannot be able to do this if they use processes with many steps and scarce collaboration. As a result, this environment forces a change in business processes to feature reduced mediation and increased collaboration. Can IT make this change easy? That is, does IT reduce the degree of mediation and increase the degree of collaboration? First, companies must reduce the degree of mediation in processes. That is, they must convert processes with a great number of intermediate steps into processes that take part directly in the final outcome. ITs that make this modification easy might be:

1) Shared databases: Different functions are allowed to take part directly by using the information stored in databases. Each function can approach, enter, or recover Information from this database the moment it is needed.
2) Imaging technology: Several people may work at the same time on a digitalized image of documents or graphics.
3) Electronic data exchange and electronic funds transference.

Furthermore, shared computing resources make it possible for different functions to have access to information at any time.

Second, companies are required to increase the degree of collaboration in processes so that involved functions will share information. The IT that makes the collaboration easy among different people may be communication technologies. These allow information transfer by using tools such as electronic mail, video conference, and file transfer protocol.

IT and Types of Processes

Up to now, this paper has referred to the persuade of IT on business processes. An in depth study could be done for defined processes. Davenport and Short [1990] proposed an initial classification of processes by using three criteria: dimension of the involved, object, and activities. Regarding dimension of the involved, there are three types of processes: interorganizational, interfunctional, and interpersonal. With The use of IT, such as electronic data interchange and shared databases, reduces transaction costs and eliminates intermediaries in organizational processes. Telecommunication networks make simultaneous work in various locations possible in interfunctional processes. Technologies that combine work and image technologies make it easier to integrate tasks into interpersonal processes. Regarding the object, there are physical or informative processes. Physical ones require a labor reduction or substitution which is facilitated by CAM and robotics. Informative ones imply processing a great deal of information, made easier by new IT. Activities criteria differentiate between operational and managerial processes. ITs, such as electronic commerce and shared databases, reduce time and costs and improve the output quality in operational processes. Besides, expert systems, decision support systems, and executive information systems are useful techniques in managerial processes. Gunasekaran and Nath [1997, pp. 96-7] classify the most important processes in a

manufacturing or service company and distinguish the following ones: order flow, strategic process, product, marketing or sales, services, accounting, personnel, and technology. Order flow includes supplying activities, product assembly, product manufacturing, obtaining order, delivery, and installation of the product. Bearing in mind that this process is specific for each company depending on its main activity, goals, or customer needs, IT may have a key role. In this way, some ITs might ease the material and information flow through the whole process. Some examples are multimedia, shared databases, artificial intelligence (mainly expert systems), computer-integrated manufacturing, CAD/CAM/CAE, electronic data interchange, and electronic funds transfer. These technologies not only can reduce lead time of order flow, but they help eliminate certain barriers among the different\ functions. The strategic process is composed of formulation functions of the strategy and design of the organizational structure. This process demands not only an external analysis, but an internal analysis as well. So the strategic process will collect and manipulate a great deal of information in order to elaborate corporate strategy. In this way, we can differentiation between two IT uses. First, there are technologies that collect and distribute information such as video conferences, databases, e-mail or telecommunication networks, and executive information systems. Second, there are the information systems that help make decisions, namely decision support systems and intelligent decision support systems. Management information systems and expert systems will have less importance in this process once they become programmed decisions.

The product process is formed by design functions, engineering, and process planning.CAD/CAE and concurrent engineering technologies make the previously mentioned Functions easy, provoking important improvements in productivity and cost savings.

The marketing or sales process includes customer satisfaction, market research, forecasting, and

product-mix decisions. This process acquires the most information possible on customer needs, preferences, and testing. ITs that make this process easy are computer-assisted telephone interviews and company-customer communication through the internet. The service process is formed through the maintenance of products and after-sales service. In this way, client-server systems are very useful. The accounting process includes product pricing, budgeting, and make-or-buy decisions. This process requires information from all company areas. This process takes many steps and is slow in collecting data. This task could be made easier by implementing integrated systems such as SAPR/3 which connects the whole company and obtains the necessary information. Of course in this case, the telecommunication network is of great importance. The personnel process involves several functions such as recruitment, selection, training, compensation systems, and performance appraisal. Traditionally, IT has had a scarce role in this process, but today, new possibilities are appearing. Employees desire more participation in changes that affect them, and this might be made easier by introducing multimedia technologies and networks. Still wagon and Burns [1993] propose human performance engineering, defined as a new method of organizing, developing, and changing the human resources of an organization, utilizing geometric or algebraic principles, as typically found in engineering analysis, with functional elements of performance. Therefore, IT acquires a relevant role at the time to integrate the different functions involved in a process. As discussed previously, BPR demands the elimination of existing barriers within each functional area. This can be achieved by implementing IT.

2. OBJECTIVE OF THE STUDY

The main objective of this paper is to investigate the role of information technology (IT) in business process reengineering
Provide a framework for facilitating BPR efforts through IT tools

3. LITERATURE REVIEW

Over the last few years the number of articles and books on BPR has gradually increased. The key points of most of the existing BPR literature (see for example Davenport/Short,1990; Hammer, 1990; Kaplan/Murdoch, 1991; Davenport, 1993; Hammer/Champy,1993) can be summarized in the following three statements:

BPR improves corporate performance significantly through radical transformation.
BPR involves a fundamental rethinking of how the company does business.
IT is a key enabler for making transformations of the business possible.

Business process reengineering (BPR) is a management technique to radically transform organizations for dramatic improvement (Hammer, 1990; Hammer and Champy, 1993;Davenport, 1993). BPR movement has emphasized that managing change is a fundamental business skill. One of the fundamental creeds of BPR is the requirement to apply information technology (IT) to the correct processes (Freedman, 2000). The foremost proponents of BPR, Hammer (1990) and Hammer and Champy (1993), convincingly argue the critical role of IT in BPR. IT infrastructure helps organizations not merely in automating business activities, but also reshaping and redesigning business processes (Venkatraman, 1991). Additionally, IT is one of the most common facilitators of process change. IT is often the primary catalyst, which allows a company to achieve its business objectives (Chan and Land, 1999). It is regarded as the essential "enabler" of reengineering. Meanwhile, all companies that embrace reengineering are not successful in attaining their goals. By some estimates, 70 percent of reengineering projects fail for one reason or another (Hammer and Champy, 1993). In some companies, failures are often attributed to internal organization problems. In other companies, projects fail because the IT organization is often viewed as a barrier to innovation (Chan and Land, 1999). In spite of the general understanding of the useful roles of IT infrastructure in BPR, empirical studies examining such types of relationships are scarce in the literature. Though there have been some studies, which have looked at the relationship between IT and BPR, most of these studies are case-based descriptions. For example, Broadbent et al. (1999) in a recent study demonstrated the critical role of IT infrastructure in BPR. Similar subjective case-studies were also elaborated by Hammer and Champy (1993). In addition, several researchers have argued about different roles of IT. For example, hammer (1990) and Hammer and Champy (1993) argue that IT plays a critical role in BPR, while some others, such as Davenport (1993) and Hammer and Stanton (1994) believe that BPR is not an IT initiative; rather it requires to bring organization-wide IT resources together, in order to enhance customer responsiveness and business performance. IT resources, according to Grover et al. (1995), consist

of IT infrastructure, IT competence, and organizational expertise in employing and sustaining IT-enabled work. Thus, IT infrastructure includes both technical and organizational capabilities that enable organizations to share information resources (Bhatt, 2000) Furthermore, it is important that managers understand the range of IT tools available that will allow a company to perpetuate a reengineering initiative. This understanding will lead managers to cultivate inductive thinking. This is a key point developed by Hammer and Champy whereby people recognize a powerful solution and then seek the problems it might solve. This objective of searching for solutions and seeking problems can be achieved once management has a better understanding of the IT organization and its applicability to everyday business and its relationships by BPR during change program (Chan and Land, 1999 BPR and Corporate Performance Competition has been a persistent theme for the last decades. New standards of corporate performance were set through the 1980s, marked by time-based competition, globalization, customer service philosophies and quality programs. Applying these ideas may improve corporate performance. However, to become a leading-edge company is thought to require more of a breakthrough in corporate performance. These quantum leaps in performance are a typical promise of BPR. They are to be achieved by radical transformations of structure, roles and culture. Several authors point out the differences between BPR and "traditional" approaches like quality initiatives and continuous improvement (e.g. Leibs, 1992; Eliot, 1993; Davenport, 1993) which are based on incremental improvements. Due to the resulting large scale changes, the projects have to be supported and pushed by top management (Krass, 1992; Hammer/Champy, 1993). Successful implementation of the changes depends to a large extent on the unlimited buy-in of the employees in the departments. Therefore, everybody in the departments has to be involved in the projects to make the transformation take place.

Rethinking the company

The BPR movement precipitates a move away from monolithic and static organizational designs which were geared for repetitive and routine activities. Hammer/Champy defines reengineering as "the fundamental rethinking and radical redesign of business processes [...]" (1993, p.). The power of BPR lies in the breadth of the definition of business processes as it captures cross-functional and cross-national interdependencies.

Furthermore, it implies that decision making structures, work flows, organization, and information systems are redesigned in an integrated, often parallel fashion rather than independently or sequentially. Horizontal or lateral views of organizations emerge but not in classic matrix or project management forms but in activity, task-oriented, systemic forms (Earl, 1994). The resulting momentum is toward flexible organizational forms which can accommodate novelty, innovation, and change.

IT as enabler

Achieving the predictable radical improvements in business performance depends to a large extent on the use of IT. Davenport/Short (1990) point out that there is a recursive relationship between process design and IT and that "each is the key to thinking about the other" (p. 12). This statement is typical for a totally different approach towards processes and the use of IT as compared to the 1980´s. Whereas in the past IT was used to automate existing processes, it is now widely recognized that this will very often only result in high investments and increased operating costs but not in the anticipated improvements in performance (Dent, 1990; Erben, 1991; Stadler/Elliot, 1992). Today, the central premise is that IS is a lever for designing processes and therefore should not be simply overlaid on the existing organizational structure. Instead of treating the existing business processes as a constraint in the development of an optimum IT infrastructure, the basic logic of the processes itself is questioned (Venkatraman, 1991).

4. RESEARCH METHODOLOGY

This study is entirely based on secondary data collected from different sources. The data are generated by responsible authorities of the departments and published research by various researchers provided on their site/reports. Apart from these, data has been taken different Books, Journals, Research Papers and other print media. The present study was undertaken to understand the role and contribution of organization world in the form of Role of Information Technology in Successful Implementation of Business Process Re-engineering

5. RESULTS AND DISCUSSIONS

Yet BPR is a strong management technique for transforming organization to grab spectacular improvement in a radical way, implementing BPR is faced some problems without help of IT. IT plays a vital role in facilitating BPR implementation in the organization. Central to the access of reengineering is the synchronization of IT throughout the organization because IT represents the core mechanism of information flow which is so important in BPR activities. IT plays the role of a positive catalyst and a vital enabler in BPR programs. Since process is the main objective of BPR, IT can help BPR in analyzing, modeling and mapping existing processes, evaluating their effectiveness and usefulness and also the process configuration that is needed. Many items can be affected in the organization during BPR programs through IT.IT can efficiently solve inventory problems by using online stock control with the help of databases. Lead time can be reduced by IT through CAD, CAPP; CAE, and CAM, processes can be analyzed, modeled and optimized by simulation and modeling tools. Data exchanging is facilitated by IT and communication in the organization and relationships between suppliers and also customers are developed. IT speeds up information flow to a greater extent in the organization to make it act rapidly in the rapid changing environment. Products and services of the organization can also be affected by use of IT; product design and engineering, and process planning can be also incorporated by IT tools. The organization can be outfitted by special IT sensors that can sense market fast and carefully in marketing and sales activities. Accounting, technology selection and subjects related to employee are some another items that IT affects them during BPR programs. In total it can be said that one of the main objectives behind the development and implementation of any information system, is to enhance process capabilities within the organization.

6. CONCLUSION

The information technology has an enormous role in BPR this is for the reason that information technologies exclusive attributes cover most BPR heuristics. This research paper points towards a relationship between Information technology and Business Process Reengineering where Information technologies involvement has a large positive effect. IT enables the analysis information and helps find the best approach for redesign projects. For IT to be used effectively in BPR it must be aligned with business. Without the support from management the process reengineering may be less effective than if it took into account the importance of IT. IT should be seen as a partner in planning the future of businesses and organizations. I think that the alignment of business and IT can help the effectiveness of a BPR project by giving understanding of the business to the IT team. This allows them to create systems which work towards what the organizations goals wish to achieve. This is supported by research which states that the cohesion of BPR and IT strategies has shown greater success in redesign projects. Information technologies such as the internet could be used as a tool to achieve both focuses of BPR. The internet is known for its centralization and decentralization of information which can help with process redesign. Internet technologies can allow parallel task to take place and can help delegate processes to other users. When a organization makes the decision to create a online presence or transitions to an online system it seems like a good time to think about the processes the organization and how they relate with the new system.

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