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ABSTRACT

The concept of *business process redesign* or *reengineering* (BPR) has been around for about twenty years, and as technologies used in business and associated business practices have changed over the years, BPR has evolved as well. Reflecting these changes, various definitions and alternative names have been proposed for BPR. In this paper, we investigate the literature on BPR in order ascertain current uses, practices, and relevance of BPR in today's business environment. Based on this review we classify BPR projects into three types according to business needs: internal, external, and traditional. We propose a simple framework that should help in determining the most appropriate approach in future BPR projects.

Keywords

BPR, business process redesign, reengineering, process renovation, process management

INTRODUCTION

The concept of *business process redesign* or *business process reengineering* (BPR) was introduced in 1990 by Hammer's article "Reengineering Work: Don't Automate, Obliterate", and BPR quickly became a new and hot buzzword in management (Markus et al. 1995). At that time, BPR was generally defined as a managerial approach to improving efficiency and effectiveness of business processes that exist within and across organizations (Boar 1993; Hammer 1990; Marcum 1993). Specifically, Champy and Hammer (1993) define BPR as "the fundamental rethinking and radical re-design of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed" (1993). The emphasis of BPR has been on redesigning business processes, using a radical information technology (IT) enabled approach to organizational change, to obtain dramatic and sustaining improvements in quality, cost, service, lead-time, or outcomes (Al-Mashari and Zairi 2000). Perhaps the simplest definition was provided by Davenport and Short (1990) who view BPR as "the analysis and design of processes within and between organizations."

In the early 1990's, BPR was mainly about headcount reductions, budget cuts, facility closures, and expensive consulting engagements (Jaklic et al. 2003). However, as business needs and practices are changing, the definition and use of BPR needs to change as well. To reflect some of these changes, Groznik et al. (2008) proposed to use *business renovation* (BR) instead of BPR. They justified this by stating that traditional BPR is a reengineering strategy, that critically examines current business polices, practices, and procedures, rethinks them through and then redesigns the mission-critical products, processes and services. But in addition to business processes, BR projects should also include new technological options as well as different organizational, economic and social views of organizations. BR integrates the radical strategic method of BPR and the more progressive methods of *continuous process improvement* (CPI) with adequate IT infrastructure strategies.

Since the introduction of BPR twenty years ago, organizations have been focusing on improving their processes. However, in recent years, standardizing many of these processes has become more important than ever (Attaran 2003; Terziovski et al. 2003), as organizations must increasingly compete in the global market and thus need a new approach to viewing business practices and processes (Adesola and Baines 2005; Aversano et al. 2002). Also, the rising development of inter-organizational relationships and significant improvement in business integration make BPR or BR a necessity. Redesigning business processes is required to facilitate processes across organizational boundaries and to integrate back- and front-office processes (Abdolvand et al. 2008)

The objective of this article is to support future applications of BPR or BR by providing a new framework for such projects based on current business environments and needs. The motivation for this framework is the emergence of new needs for BPR projects, which differ significantly from traditional BPR projects. This means that the traditional BPR frameworks, which were developed for various business scenarios may not be applicable to some of the current projects and may need to be adjusted. BPR in its nature is triggered by different factors, and these factors vary over time and from one environment to another. BPR projects have become a necessity for any radical change in the mechanisms of operating an organization, including, for example, managerial and technical changes due to e-government implementations (Groznik et al. 2008). At the

same time, some BPR projects may still be initiated for the traditional reasons, such as increasing efficiency, decreasing cost, and implementing new developments in the organization (Hammer 1990; Markus, et al. 1995; King 1996).

Many researchers have pointed out the fact that with new technologies and with changes in the managerial perspective in today's environment, the traditional understanding of BPR and some of the traditional initiators of BPR have changed, and new ones have arisen in their place (Groznik et al. 2008; Jaklic et al. 2003). Therefore, we believe that there is a need for revisiting BPR concepts and to categorize BPR projects according to the current business needs, in order to gain a better understanding of BPR projects in today's environments. A comprehensive view of contemporary BPR projects and a new framework will help practitioners in better planning their BPR projects, i.e. choosing the right strategies, people, managerial approaches, structures, and technology dimensions. Furthermore, this proposed framework will allow researchers to reassess the relationship between BPR and information systems (IS) by appraising the business and IS interactions within the different types of BPR projects (Kettinger 1997).

Our methodology in this paper basically follows a design science approach (Hevner et al. 2004), where the new framework is the designed artifact. The relevance of the problem has been discussed above. The search process is primarily a review of the relevant literature to identify the current business needs that require BPR, and the appropriate BPR lifecycles and procedures. This review will allow us to classify BPR projects accordingly, and to develop the new framework.

The rest of the paper is organized as follows: We summarize the traditional BPR environment in the next section, and following that we discuss new BPR directions. This comparison will help in introducing the proposed classification of BPR projects in today's environment in the fourth section. Following that we present the new framework for BPR projects. Finally, we summarize the contribution of this paper and discuss future research in the conclusion section.

TRADITIONAL BPR

Traditionally, BPR has been considered a management approach aimed at improving efficiency and effectiveness of business processes within and across organizations (Boar 1993; Hammer 1990; Marcum 1993). Grover (1999) stated that BPR is used for fixing organizations' woes; BPR was largely seen as a panacea for dealing with organizational ills and the latest recipe for business survival. The purpose of BPR was confined to increasing performance and reducing cost (Markus 1995; Al-Mashari and Zairi 2000).

Traditional BPR projects commonly follow the waterfall life cycle approach consisting of four major phases: (1) identifying the current processes, (2) analysis, (3) design, and (4) implementation and testing (Dewalt 1999). Al-Mashari et al. (2001) proposed a similar life cycle approach with six phases: (1) envision, (2) initiate, (3) diagnose, (4) redesign, (5) reconstruct, and (6) evaluate. Both approaches assume that there is an immediate problem and the BPR project is initiated to fix it.

As with any organizational project, there are two dimensions in measuring the success of a BPR project. One dimension measures the execution the project itself, including the planned and actual time frame and the cost of the project (Freeman and Beal 1992). This dimension is related to project management and is out of the scope for this paper. The other dimension is evaluating the effectiveness of the project, which is related to the change resulting from the BPR project and is traditionally measured in terms of performance outcomes. Although evaluating the effectiveness of a project seems to be very subjective, it can be measured via several objective criteria such as cost and cycle time, serviceability, and resource utilization. These criteria can be measured before and after implementing the BPR project, and the results can be compared (Hammer 1990; Grover 1999; Harmon 2003). However, in any BPR project there is hidden cost, called "knowledge change cost," that needs to be included when calculating the new cost for any process, i.e. the cost required for employees to learn and perform the new process (Kelly and Mohan 2005).

NEW BPR DIRECTIONS

In addition to the traditional needs for carrying out BPR projects, the unprecedented changes that organizations have been facing in the last 20 years, including globalization, mobilization, political realignment, etc., have created new needs for BPR. Also, the rapid advances in information technology have led to new business environments, such as e-commerce, making BPR necessary. In this section, we will discuss some of these changes and their impact on BPR, in order to show the need for a new classification of BPR projects and a framework for BPR implementation.

When implementing e-commerce, many companies have found out the hard way that existing business processes must be seamlessly integrated with the new, electronic form of interaction with suppliers and customers to obtain real business value. Some statistics in 2000 showed that around 90% of corporate e-commerce Web sites were not even linked with their back-office processes (Krzywonos 2000), thus preventing the new technology to be truly effective. Jansen-Vullers et al. (2004) emphasized the process context of e-commerce, and provided guidelines to redesign business processes when e- commerce is introduced. Jansen-Vullers et al. based this need for BPR in e-commerce environments on the differences in the constraints

that are in place for e-commerce processes as compared to conventional business processes. As an example, consider the 24-hours/7-days-a-week availability that is often a requirement for an e-commerce process, compared to the required availability in a conventional business process, which is usually restricted to regular business hours.

E-government is another development that forces organizations dealing with the government to redesign their processes in order to facilitate working in this new environment. Groznik et al. (2008) state that administrations must redesign the processes in the public sector as well as the technology infrastructure for successful e-government execution. E-government projects integrate information systems and business processes throughout the value chain and have a large impact on organizational business models. Groznik et al. conclude that e-government projects will not be feasible unless introduced hand-in-hand with BPR.

Enterprise resource planning (ERP) implementations also lead to fundamental changes within the organization's structure, culture, and business processes, which create a need for BPR (Ribbers and Schoo 2002). Over the last several years a more integrated approach has evolved with respect to redesigning business processes and implementing ERP systems. BPR and ERP are not necessarily complementary, but they can be designed to support each other (Ziaul 2006).

Redesigning business processes has also become a necessity for any radical new systems development within an organization, which differs substantially from the traditional usage of BPR. Alter (2005) proposes the concept of a work system, which is not restricted to an information system or a hardware/software configuration, but rather a system that does work in an organization. In the work system life cycle, business process redesign and system development are integrated and collaborative efforts. This applies to any system development regardless of whether application software is purchased, developed from scratch, or developed by improving existing software (Alter 2009).

Finally, *business process management* (BPM), which focuses on aligning all aspects of an organization with the wants and needs of clients, may be an initiator for BPR projects. BPM is a holistic management approach that promotes business effectiveness and efficiency while encouraging innovation, flexibility, and integration with technology. BPM attempts to improve processes in an ongoing manner and may thus be described as a "process optimization process". It is argued that BPM enables organizations to be more efficient, more effective and more capable of change than a functionally focused, traditional and hierarchical management approach (Smart et al. 2008).

As we can see from the above examples, BPR projects are not always initiated just to reduce cost or to improve process performance, but rather process redesign becomes necessary for a variety of other reasons. BPR may be needed for internal systems development or because of external requirements such as e-government projects and e-commerce. In the latter cases, BPR projects may follow a different life cycle and use different procedures than in traditional BPR, and measuring the success of these projects may become very complicated and hard to quantify, as the process redesign is typically interrelated with other projects.

BPR CLASSIFICATION

In the previous sections, we have seen how some current BPR projects may differ from the traditional BPR paradigm. In this section, we will classify BPR projects from a business needs perspective. These business needs, which may initiate BPR, can be summarized as follows:

- E-government projects, which are initiated by the government and imposed on all government departments as well as all organizations that are involved in any kind of transactions with the government. This means that these organizations have to initiate their own BPR projects in order to make their processes compatible with the new requirements of e-government, although there is no performance or cost problem with the current organizational processes. The BPR team will not analyze the organization's processes for performance or cost efficiency, but rather look at how to convert processes to meet the requirements for e-government (Groznik et al. 2008; Abdolvand et al. 2008; Jaklic et al. 2003).

- E-commerce projects, which are initiated due to pressures in the market that force organizations to switch part or all of their business to e-commerce in order to remain competitive. Similar to e-government projects, organizations have to initiate BPR projects in order to modify their processes to fit the new requirements, rather than to increase performance or reduce cost. Also, as with e-government projects, the BPR team will start the project by looking at how to convert existing processes to meet the requirements of the new environment, in this case e-commerce (Krzywonos 2000; Jansen-Vullers et al. 2004).

- System developments projects, which include all radical internal developments. The goal of these developments may include increasing performance, reducing cost, or expand the functionality of the system. BPR projects may need to be initiated in these circumstances in order to align and integrate the business processes with the new technology. The early tasks of the BPR team in these projects are to investigate the effects of these changes in technology and to redesign the

affected business processes to maintain the integrity of the systems within the organization (Alter 2009; Grover 1999; Kelly and Mohan 2005; Joachim and Alexander 2005; Freeman and Beale 1992).

- Enterprise systems projects, i.e. commercial-of-the-shelf (COTS) systems implementations that involve more than one business process, such as ERP packages, workflow systems, etc. Typically these systems require specific business processes in order to perform effectively and efficiently, and thus require initiating a BPR project in order to convert current business processes to meet the new requirements (Joachim and Alexander 2005; Rajiv et al. 1997; Grover 1999; Ziaul et al. 2006; Ribbers and Schoo 2002)

- BPM and traditional BPR projects, which include all BPR projects that are initiated directly to increase the performance or decrease the cost of a business process or group of processes. This type of BPR is not associated with other changes imposed on the organization, such as e-commerce, e-government, or enterprise system implementations; (Hammer 1990; Champy and Hammer 1993; Al-Mashari and Zairi 2000).

The above list of BPR project types shows that the business needs that trigger BPR projects may originate within the organization, or may be due to outside developments. Based on these business needs identified above, we group the BPR project types into three classes, as listed below.

1) **Externally initiated**: As discussed above, e-government and e-commerce implementations are examples where the initiation for BPR may come from outside the organization, without an internal need to fix or improve the organization's processes. In fact, the actual reason for initiating BPR projects in these cases is to allow the organization and its processes to be able to work with the new requirements in the new environment that has been imposed externally on the organization. In this class of BPR projects, the life cycle of the project starts by gathering the requirements from the external party, rather than investigating the current business processes for weaknesses. Next, the BPR team will start investigating the applicability of the current business processes for the new environment, and thereby determine the required modifications in these processes. Past experience in working in the new environment (e.g. e-commerce) will be most helpful for the team in this type of BPR.

2) **Internally initiated**: As we have seen above, internal systems development projects as well as large COTS systems implementations are examples where the need for BPR comes from initiatives inside the organization. Similar to externally initiated PBR projects, the BPR life cycle starts with investigating the expected changes in requirements due to the new organizational systems, rather than examining the current business processes for potential to increase performance or reduce cost. After determining these requirements, the BPR team will need to redesign the affected processes to fit the changes.

3) **Traditionally initiated**: Though new types of BPR have emerged, conventional BPR continues to be relevant for keeping businesses competitive. These BPR projects are initiated by the same factors, as has been the case in the past 20 years, i.e. increase performance and decrease cost. Project team members in this type of BPR start the life cycle by identifying and analyzing the current business processes in order to find ways to increase performance or decrease cost. After that, they need to redesign these processes accordingly.

BPR FRAMEWORK

Expanding on the classification above, we now introduce a basic framework for BPR. This framework shows the various workflows for each class of BPR projects and should be useful in terms of planning and managing the implementation of future BPR projects. The workflows suggested for the different classes of BPR projects can be incorporated into different lifecycle models, e.g. a waterfall lifecycle or an iterative and incremental life cycle, and different methods and tools can be used within these workflows.

Numerous researchers have discussed the phases or workflows of the traditional BPR project lifecycle. These phases are shown in figure 1, and usually start by identifying and gathering information about the current business processes, then analyzing them to find out how to improve them. After the analysis, the BPR team will redesign the processes to increase performance and decrease cost (Hammer 1990; Champy and Hammer 1993; Al-Mashari and Zairi 2000).

On the other hand, as discussed above, the phases for other types of BPR are somewhat different. In BPR initiated by external factors, the BPR project usually starts by gathering the externally prescribed requirements, which necessitates having some experience in the environment to which the business processes need to be adapted. In a subsequent phase the BPR team will gather information about the current business processes in order to analyze them for compatibility with the new requirements and determine how they may be redesigned to meet the requirements. The redesigned processes then need to be tested and finally, put into production (Groznik et al. 2008; Abdolvand et al. 2008; Krzywonos 2000; Jansen-Vullers et al. 2004) (see Figure 1).

The phases or workflows for BPR projects that are initiated by internal factors are very similar to the ones initiated by external factors. They differ in that the initial phase for internally initiated projects is to gather information on and analyze the

changes that are expected as a result of the new system, rather than externally imposed requirements. The BPR team will analyze the impact of the expected changes on the current business processes, and redesign the processes as needed. The other phases are typically the same as with BPR projects that are initiated by external factors (Kelly and Mohan 2005; Joachim and Alexander 2005; Joachim and Alexander 2005; Rajiv et al. 1997; Ziaul et al. 2006).

Figure 1 shows the workflows or phases for the three classes of BPR projects. Though these phases are shown in the sequence that would typically be followed if a waterfall life cycle approach is chosen, they can also be repeated in an iterative project approach.
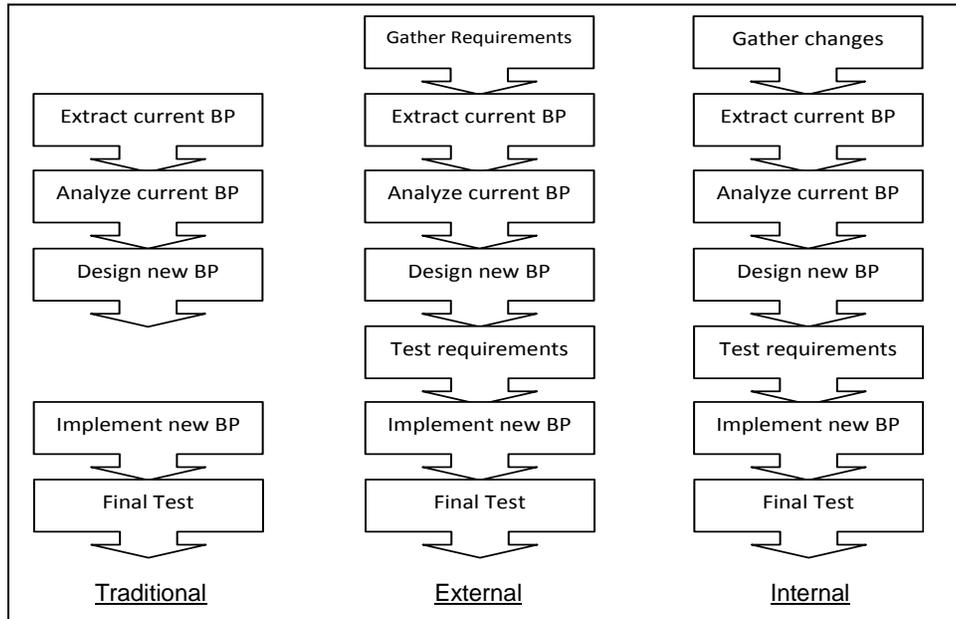

Figure 1: BPR Framework

CONCLUSION

The concept of BPR first appeared around 1990 and since that time has taken on new forms or interpretations. In this paper we investigated the literature of BPR to determine the current state of BPR and the various forms it assumes in today's business environment. The purpose was to determine if the concept of BPR is still relevant today, and if so, to come up with a simple framework that classifies, explains, and describes the various types of BPR according to how these BPR projects are initiated: i.e. by externally prescribed circumstances such as e-commerce or e-government initiatives; by internal changes in the organization due to new systems implementations; or due to the traditional reasons, that is, increase performance and decrease cost.

Our classification and framework differentiates between various types of BPR projects with respect to project motivation, lifecycle workflows, and requirements. This framework may help practitioners in planning future BPR projects by giving them a better understanding of what is involved in these various BPR initiatives. In addition, the proposed classification and framework may serve as a basis for future work by researchers in the area of business process redesign.

Future work may include refining and expanding the framework, and testing the framework for its applicability and usefulness.

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