

## Impact of BPR critical success factors on inter-organizational functions: an empirical study

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### Keywords

BPR critical success factors, Business process efficiency (BPE), Process conflict, financial performance, nonfinancial performance.

### Abstract

*This research paper investigates the impact of critical success factors for business process reengineering (BPR) on two internal organizational factors: business process efficiency (BPE) and process conflict. The paper further examines how these internal organizational factors affect the financial and nonfinancial performances of employees. Structured questionnaires were distributed among the employees of three recently privatized companies. The sample size was 300 companies, and we used a stratified random sampling method in the study. The research model was tested using AMOS version 16. This research finds that critical success factors of BPR increase business process efficiency (BPE) by reducing cost, cycle time, delays and duplications. These factors also affect the financial and nonfinancial performances of employees positively. But no relationship was found between BPR critical success factors and process conflict. This paper is one of the few empirical studies that investigate the relationship between BPR critical success factors and BPE. Our study further contributes to the existing literature by studying the consequences of BPR critical success factors on process conflicts and the effects of these factors on the performances of employees.*

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### 1. Introduction

Since 1990, there has been a paradigm shift from functional organizations to process-oriented organizations. Today, organizations focus on improving performance by increasing the flexibility and coordination of business processes (Ranganathan & Dhaliwal, 2001). Many researchers believe that organizations must switch from traditional business processes to nontraditional processes to ensure their survival amid changing business conditions and tough global competition (Hammer, & Champy, 1993; McCormick, 1999; Valiris, & Glykas, 2004; AlMashari et al., 2001; Attarna, 2003).

Business process reengineering (BPR) plays a vital role in helping organizations deal with changing economic conditions. BPR is defined as the radical redesign of business processes to generate dramatic improvements in critical performance measures such as cost, quality, services and speed (Hammer, 1990; Davenport, & Short, 1990). A business process is a logically related set of activities that must be executed to accomplish strategic goals (Guha & Kettinger, 1993;

Strnadl, 2006). In the BPR process, companies start with a clean slate and rethink existing processes to deliver more value to the customer. The driving forces behind this radical change are diverse customers, intense competition, change in demand, and quick responses. In the BPR process, organizations focus more on the core processes that create value for their customers (Hammer & Champy, 1993; MacIntosh, 2003)

Many empirical researchers argue that the relationship between business success and process management is positive (Skrinjar & Dimovski, 2007; McCormick & Johnson, 2001). However, practical experiences show that BPR is a risky operation, as 60-80% of BPR activities faced failure (Dennis et al., 2003; Abdolvand, Ferdowsi & Albadvi, 2008; Karim et al., 2007; Chiplunkar et al., 2003). Because of risky nature of BPR it becomes important to study all those critical factors that contribute towards its success. Few studies have been completed on the post hoc assessment of critical success factors (Bandara et al., 2005; Trkman, 2010). Before examining the CSF of business processes, we must define success properly: A business process is successful if it continuously meets predefined goals, both within a single project scope and over a longer period of time (Trkman, 2010). Previous studies show that BPRs have similar CSFs, which are considered to be positive readiness indicators and are categorized into five groups. These groups are egalitarian leadership, collaborative working environment, top management commitment, supportive management and use of information technology (Adigun et al., 2003; Reijers & Manras, 2005; Crowe et al., 2002; Gumiaras, 1990; Motwani et al., 2005; Terzioski et al., 2003; Abdolvand, Ferdowsi & Albadvi, 2008). Most of the literature uses these CSFs to measure the readiness of an organization to implement BPR. Past studies show that limited research has been done on the impact of these factors on internal organizational factors after the implementation of BPR (Abdolvand, Ferdowsi & Albadvi, 2008; Trkman, 2010).

Most of the organizations still depend on bureaucratic management style. Especially public sector organizations have more bureaucratic processes than private enterprises. Bureaucratic processes cause inefficiencies due to inescapable factors such as checking, rechecking, approving, authorizing, storing, and recording. These inefficiencies reduce employee performance and cause customer dissatisfaction. BPR plays a vital role in reducing these inefficiencies. Previous researchers have called for more empirical studies on business process efficiency (Zaher et al., 2008). This study contributes to the existing literature by studying the relationship between BPR and BPE.

Past studies have done a lot of work on inter-functional conflicts and the effects of business process orientation on the incompatibilities and tensions among the employees of different departments (McCormack, 1999; Kohli & Jaworski; 1993). Modern organizations are becoming more horizontal and team-oriented after implementing BPR (Hammer, & Champy, 1993). Thus, there is a crucial need to study the conflicts that occur among team members. This empirical study bridges the gap in the existing literature by studying intergroup process conflicts instead of interdepartmental conflicts. We investigate how BPR critical success factors affect the process conflicts that occur among team members.

Furthermore, we study the relationship between process conflicts and the performances of employees. This study covers the following points:

- How BPR critical success factors influence business process efficiency.
- How changes in business process efficiency affect organizational performance.
- Whether BPR critical success factors decrease process conflicts in organizations.
- How these critical success factors affect the financial and nonfinancial performances of organizations.

This study should help organizations assess their performance after implementing

BPR, especially in developing countries such as Pakistan, where privatization is a growing trend in the banking and telecommunication sectors. After privatization, the Pakistani organizations made radical changes in their structures and became more process-oriented to achieve improvements in their products, services and employees' performances.

## 2. Literature Review

### 2.1 Impact of BPR Success Factors on Business Process Efficiency

A detailed review of the past literature offers fairly similar success factors for BPR across different studies. The following factors are almost always included in the list: egalitarian leadership, collaborative work environment, top management commitment, supportive management, and use of information technology (Ariyachandra & Frolick, 2008; Trkman, 2010). Egalitarian leadership is often considered the most important critical success factor for BPR. Because of the radical redesign generated by BPR, the leadership must facilitate positive communication, equal distribution of knowledge and information among employees to make them empower and confident about their jobs. Egalitarian leadership ensures successful implementation of these changes by minimizing resistance and ambiguity about the task. It encourages a democratic system that fosters interaction among the members of the chain of command and makes the organization more conducive to change (Lee, 1995; Cameron and Quinn, 1988). The major components of egalitarian leadership include involvement of employees in all decision making processes and use their ideas and suggestions in the formulation of new processes. This kind of employee's involvement increase their confidence and trust on the top management (Tatsiopailos and Panayiotu, 2000; Crowe et al., 2002). During the implementation process for BPR, commitment and support from the top management helps employees define and identify the different business units. For these employees, the mechanisms of the daily operation become more understandable. More specifically, employees can better understand the decision-making mechanism, the organizational purpose, and the base of power, evaluation and motivation (Cameron and Quinn, 1988).

Supportive management helps create a collaborative work environment, which is another critical success factor. A collaborative work environment promotes the active flow of information and empowers the employees. In addition, a collaborative work environment facilitates the employees' adjustments to the new system (Grant, 2002). This environment fosters a culture that encourages interaction among employees and makes it easy to effectively learn from each other's ideas. A collaborative work environment increases an organization's ability to adopt changes and increase business process efficiency (Grant, 2002; Tatsiopailos and Panayiotu, 2000; Crowe et al., 2002). Information technology (IT) is a natural partner for BPR, and covers the areas of hardware, information system, and communication technology. Information technology strengthens the effectiveness of critical success factors (Carr, 2003; Abdolvand, Ferdowsi & Albadvi, 2008). Successful BPR results in efficient business processes and can be ensured by reducing the time and cost of the processes (Hammer, & Champy, 1993). In general, the efficiency parameters of BPR include the time required to execute the process, the ratio of electronic and paper work, the human resources required to execute and complete the process, process standardization and the output quality desired by internal or external customers (Arveson, 1999). In this study, we propose that all CSF -: egalitarian leadership, collaborative work environment, top management commitment, supportive management, and use of information technology - make business processes efficient at implementing BPR. Thus, we propose the following hypothesis.

**H1:** BPR critical success factors increase business process efficiency.

## 2.2 Impact of BPR Success Factors on Process Conflict and Organization Performance

Previous studies have proposed that a negative correlation between business process orientation and business process conflicts exists (McCormick, 1999, Kohli & Jaworski, 1993). These studies focus on the tension arising among the different departments of an organization because of the incompatibility between the desired and actual responses. This study proposes that BPR has caused organizations to become more horizontal and team-oriented, and hence, it has become important to study intragroup conflicts instead of interdepartmental conflicts. Reengineering encourages organizations to work in the form of process teams that are created logically to accomplish task. BPR give more emphasis on process teams rather than artificial departments that create hindrance and constrains in the accomplishment of task (Hammer and Champy, 1993). Recent studies have identified three types of intragroup conflicts: task conflict, process conflict, and relationship conflict (Jehn, 1995, 1999; Jehn & Elizabeth, 2001).

This research focuses on the impact of CSFs on the process conflicts in organizations. Process conflict is defined as disputes and disagreements about resource delegation and job responsibilities (Lindred and K.A Jehn , 2007). Past literature has revealed a strong relationship between a collaborative work environment and intragroup process conflict. However, a cooperative work environment with friendly interactions among the members of the team decreases process conflict and increases organizational performance (Lindred and Jehn , 2007; Jehn, and Mannix , 2001; Crow et al., 2002; Green and Roseman, 2000; McCormack, Johnson and Walker, 2003; Hammer and Champy, 1993; Kohli and Jawarski, 1990). Groups manage scarce resources efficiently when all of the members have well articulated roles and everyone is clear about their tasks and responsibilities (Peterson, Mitchell, Thompson, & Burr, 2000; Firestone, Lichtman, & Colamosca, 1975). An effective structure that increases coordination among the group's members is likely to be quite stable. Such a structure increase performance of employees and help to achieve their goals (Harris, 2006).

This analysis leads us to the following hypotheses:

**H2:** BPR critical success factors decrease intragroup process conflict.

**H3:** Process conflicts decrease performance.

## 2.3 Business Process Efficiency and its Impact on Organizational Performance

Business process efficiency is defined as the levels of performance for business processes. There are number of factors that affect efficiency of business process such as cost and time involved in the execution of the process and number of people and departments involve in the accomplishment of task and the ratio of electronic work to manual process. This study measures the business process efficiency construct through the following variables.

*Cost:* This term refers to the cost incurred by the various activities undertaken for the completion of business processes. Business processes that take a longer time to complete are considered inefficient. Organizations that move towards process reengineering can efficiently execute their work and experience more cost savings. This reduced cost improves customer focus and generates better integration across the organization. (Sikavica & Novak, 1999; Škrinjar, Štemberger, & Hernaus, 2007; Zaheer et al., 2010).

*Time:* This term refers to the amount of time business processes require to deliver results to the customers. Business processes are said to be inefficient if they take a long time to complete. The main advantages of process-based organizations are reduced cycle times and improved customer services (Škrinjar, Štemberger, & Hernaus, 2007, Zaheer et al., 2010; Muenstermann et al., 2009).

*Paperwork:* This term refers to the amount of paperwork involved in the execution of business processes. More paperwork affects the performances of business processes (Hammer & Champy, 1993; Zaheer et al., 2010).

*People:* This term refers to the number of individuals involved in business processes. If a large number of people are involved in a business process, then the process efficiency is adversely affected, especially if the people come from various locations (Zaheer et al., 2010).

*Approvals:* This term refers to the level of authentication required from the different levels of an organization before business process activities can proceed further. A business processes is inefficient if more approvals are required at various points of the process (Zaheer et al., 2010).

Business process efficiency is an important determinant for measuring how well a process performs. Business process efficiency depicts the performance of a business process and can be improved by minimizing costs, reducing variability and reducing cycle time. Cost indicators refer to efforts to minimize resources of money and time as well as material and human resources (Tenner, & Detoro, 2000). Process efficiency is affected by the number of people and departments, the signoffs and cross-functional handoffs, and the cycle paybacks that take place among the departments and geographic transfers during the life cycles of business process (Stalk, & Hout, 1993).

Arveson (1999) recommends certain actions to improve the efficiency of the process trends that generally prevail in organizations. If organizations are full of outmoded processes that require large amounts of paperwork, then the work processes must be reengineered using information technology. If these organizations are deprived of good leaders and experts, then the task of redesigning business processes should be outsourced to consultants to ensure full organizational participation and cooperation. Even if the work patterns of a firm are highly efficient, the management still needs to be watchful to sustain the processes' efficiency in the future. Cycle time is the time required to complete a business process. The term refers to the actual amount of time required to convert inputs into desired outputs (Tenner, & Detoro, 2000; Harrington, 1991). Cycle time is composed of processing time and non-processing time. Processing time comprises the activities that add value to the process by converting input to output and contributing to meeting customer expectations.

**H4:** Business process efficiency increases performance.

### 3. Research Model and Rationale

Different terms (Business process management, Business process orientation, and business process change) are used to explain similar concepts in the literature. Because of the complex nature of this field, most research papers are not able to develop new theories, as the BPR challenges span across organizational, informational, managerial and even social problems (Trkman, 2010; Hung, 2006).

The proposed study will further examine the impacts of business process efficiency and process conflict on the financial and nonfinancial performances of an organization. There is rare evidence from an empirical study examining such relationships (Zaheer et al., 2010).

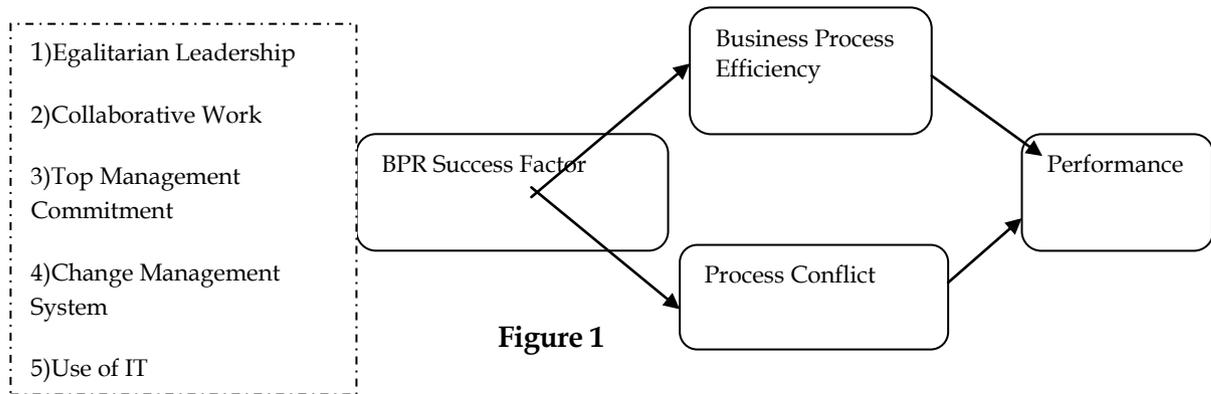


Figure 1

## 4. Methodology

### 4.1 Participants and Procedure

For this study, the employees of a recently privatized bank in Pakistan were selected as the total population. According to the Privatization Commission of Pakistan (2004), seven state-owned banks with a total population of 99869 people have been privatized to date.

These recently privatized banks have made radical changes in their business operations and have successfully implemented BPR after privatization. A stratified random sampling method was used in this study, and the 3 most populated privatized banks were selected (SBP, 2005). We distributed 1200 questionnaires to all of their branches across the country in accordance with the respective populations of the banks. We also distributed 600 questionnaires in the 1st bank, 360 questionnaires in the 2nd bank, and 240 questionnaires in the 3rd bank. We received 315 questionnaires in total, but we used only 300 questionnaires (15 incomplete questionnaires were discarded). The average lifespan of the work units was 3 years, and the units primarily consisted of respondents between the ages of 26 and 38 years.

### 4.2 Measures

Our study was based on a questionnaire with two sections. The first section collected the demographic data. The second section focused on the data we collected on the variables: BPR critical success factors, process conflict (PC), business process efficiency (BPE), financial performance (FP) and nonfinancial performance (NFP). All questions were measured on a 1-5 Likert scale, where 1= —Strongly disagree and 5= —Strongly agree.

The scale was adapted from a study by Abdolvand, Ferdowsi & Albadvi, (2008). They developed and validated the scale of BPR critical success factors by aggregating and categorizing the factors and sub-factors addressed in the studies of Crowe et al. (2002), Dennis et al. (2003), Grant (2002), Guimaraes (1999), Maull et al. (2003), Motwani et al. (2005), Ranganathan and Dhaliwal (2001), Reijers and Mansar (2005), and Terziovski et al. (2003). Our research team conducted informal interviews with a panel of bank employees and experts to incorporate their opinions into the development of the questionnaire. Accordingly, a few changes were made to the items and the item wording to ensure that the concepts articulated in the questions were clear and understandable to the respondents.

BPR critical success factors were measured by the following indicators: egalitarian leadership, cooperative work environment, top management commitment, change in management system, and use of information technology. The sample items for egalitarian leadership included —Managers share vision and information with their subordinates, “Managers place confidence between supervisors and their subordinates, and “Managers constructively use their subordinates idea. The coefficient alpha of the scale was 0.785. The sample items for

top management commitment were –Top management generally has realistic expectation of projects, –Top management usually has sufficient knowledge about the projects, and –Top management frequently communicates with projects team and users. The coefficient alpha of the scale was 0.791. The sample items for change in management system were –The reward system adjusts to serves the employees after the changes, –The performance measurements adequately corresponds to the changes, –The employees are empowered to make decisions, –There are training and educational programs to update employees skills. The coefficient alpha for the scale was 0.791. The sample items for change in management system are –The reward system adjusts to serves the employees after the changes and –The performance measurements adequately corresponds to the changes and –The employees are empowered to make decisions and –There are training and educational programs to update employees skills. The coefficient alpha for the scale was 0.733. The sample items for use of information technology were –Information technology is integrated in business plan of the organization, –The organization extensively uses the information system, and –There is efficient communication channel in transferring information. The coefficient alpha for the scale was 0.849.

Three items for the scale of process conflict were adapted from Jenn and Mannix (Jehn and Mannix, 2001). The sample items were –How often are there disagreements about who should do what during in your workgroup, –How much conflict is there in your group about task responsibilities, and –How often do u disagree about resource allocation in your work group. The coefficient alpha for the scale was 0.630.

Business process efficiency was measured by using the scale developed by Zaher et al. (Zaher et al., 2010). The indicators for BPE were paperwork, duplication, approval, time and cost. The items were evaluated on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sample items for paper work were –Business Processes involve large amount of paperwork, –Extensive file work is involved in the processes, and –Most of the work is done manually to complete business processes. After reverse scoring these three items, we found that the coefficient alpha was 0.876. The three sample items of duplication were –Same activities are performed in different manners, –Business processes involve duplication of work, and –Business processes involve unnecessary activities. After reverse scoring these three items, we found that the coefficient alpha was 0.876. The sample items for approvals were –Businesses processes require multiple approvals, –Business processes require excessive signatures on documents, and –Business processes include a lot of checking and controls. The coefficient alpha of the scale was 0.695. The sample items for time were –Business processes take longer time for completion, –Backlogs/arrears frequently occur in processes, –Business processes result in unwanted delays, and –Business processes are completed within set target|| . After reverse scoring the first three items of time, the coefficient alpha of the scale was 0.783. The three items of cost were –Business processes incur higher costs, –Business processes mostly require heavy budgets due to higher cost|| , and –Business processes lack value addition resulting in higher costs|| . These three items were reverse coded, and the coefficient alpha was found to be 0.897. Two items of people were excluded from further analysis because of the low coefficient alpha of this scale (0.327).

The performance scale was adopted from Škrinjar, Štemberger, & Hernaus (2007). It was categorized under financial and nonfinancial performance. The items that measure nonfinancial performance were –To what extent customers and employees are satisfied, –To what extent there is quality in service and production, –To what extent there is growth in number of customers, and –To what degree organization reputation is improved. The coefficient alpha for the scale of nonfinancial performance was 0.903. The sample items for financial performance were –Are you satisfied with sales growth and profitability of the organization and

—Are you satisfied with improvement in work productivity and production cost. The coefficient alpha for the scale of financial performance was 0.825. A factor analysis test was used to measure construct validity, and the computation produced a single factor solution accounting for 65% of the average extracted variance.

## 5. Results and Analysis

### 5.1 Model testing using structural equation modeling (AMOS)

To analyze the fitness of model structural equation modeling (AMOS) was used. However before hypothesis testing the researcher checked the reliability and validity of the constructs. Reliability was checked through the Cronbach's alpha test and validity was measured by applying confirmatory factor analysis on the data.

As Table (1) shows most of the values of Cronbach's alpha are above cut-off point of 0.60. Values less than .6 were excluded from further analysis. However cut-off value for confirmatory factor analysis is 0.50 as suggested in past studies and results in Table (1) show that all factor loadings fulfill this minimum criterion (Hair et al., 1998; Prajogo & McDermot, 2005).

	Factor Loadings					Alpha
	1	2	3	4	5	
BPR critical success factors						
Egalitarian leadership	0.523	0.673	0.901	0.698		0.785
Cooperative work Environment	0.529	0.677	0.887	0.71	0.494	0.913
Top management commitment	0.403	0.977	0.766			0.791
Change in management system	0.872	0.709	0.756	0.672		0.733
Information technology	0.403	0.977	0.766			0.849
Business process efficiency & process conflict						
business process efficiency						
Paperwork	0.762	0.921	0.837			0.876
Duplication	0.573	1	0.699			0.789
Approvals	0.592	0.576	0.868			0.695
Time	0.91	0.694	0.829			0.783
Cost	1	0.858	0.53			0.897
Information system	0.718	1	0.0565			0.766
Process conflict	0.699	0.712	0.992			0.630
Performance						
Nonfinancial performance	0.817	0.895	0.6	0.792	0.928	0.903
Financial performance	0.783	0.687	0.845	0.621	0.842	0.825

Table 1: Confirmatory Factor Analysis/Estimates & Cronbach's Alpha

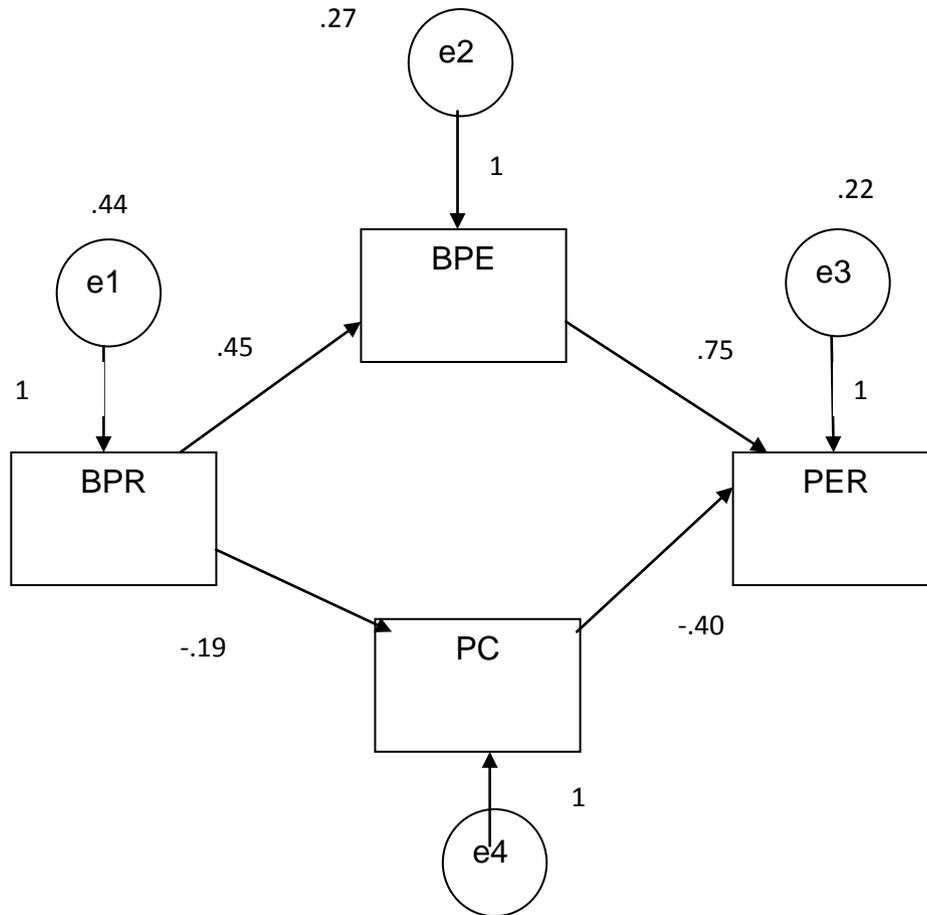


Figure 1.1 Path Analysis

Table 1.2 shows seven model fit indices of the model. These indices were derived from the AMOS output. The model fit indices include (GFI= Goodness of Fit Index, NFI, Norms Fit Index, CFI= Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, AGFI= Adjusted Goodness of Fit Index). As results show that all fit indices fulfill the minimum acceptance criteria that is equal to or greater than .90 for GFI, AGFI, CFI and NFI, while less than 0.05 for RMSEA (Schumacker and Lomax, 2004).

Chi	df	Sig.	Chi/df	GFI	AGFI	CFI	NFI	RMSEA
0.802	2	0.670	0.401	0.99	0.993	1.000	0.997	0.000

Table 1.2 Model Fit Indices

Variables	Estimates	S.E.	Critical ratio	p-value	Results
BPE→ PER	0.75	0.047	15.96	0.000	Accepted
PC →PER	-0.40	0.064	-6.25	0.000	Accepted
BPR →BPE	0.45	0.045	10.0	0.000	Accepted
BPR →PC	-0.19	0.37	-0.53	0.598	Rejected

Table 1.3 Hypotheses testing based on Regression weights

Table (1.3) show relationship between independent and dependent variables on the basis of regression weights: Business Process Reengineering (BPR), Business Process Efficiency (BPE), Process Conflict (PC), and Performance (PER) as shown in figure 1.1 and table 1.3

Table 1.3 shows the hypotheses testing based on regression weights. The beta value between business process efficiency (BPE) and performance (PER) is 0.75. The results show significant relationship and makes hypothesis acceptable ( $p < 0.05$ ). While the value of beta between process conflict (PC) and performance (PER) is -0.40 thus making relationship between process conflict and performance significant ( $p < 0.50$ ). So the hypothesis that process conflicts decrease both the financial and nonfinancial performances of employees is accepted. The relationship between business process reengineering (BPR) and business process efficiency (BPE) is significant because  $p < 0.05$  and the beta value is 0.45. These results support the hypothesis that the critical success factors of BPR increase business process efficiency. However, the relationship between business process reengineering and process conflict is rejected because  $p > 0.05$  and the beta value is -0.19. The proposed hypothesis that the critical success factors of BPR increase process conflict is rejected.

## 6. Discussion

Table 1.2 shows a strong relationship between the BPR critical success factors and BPE ( $\beta = 0.45$ ). As H1 is accepted, business process efficiency increases when BPR is implemented. Critical success factors such as a supportive and egalitarian leadership, implementation of IT, and a collaborative work environment increase business process efficiency. These critical success factors decrease cost, paperwork, duplications and time. Thus, BPR increases the business process efficiency of an organization.

H2 is rejected, although a negative relationship between BPR critical success factors and process conflict exists ( $P > 0.05$  &  $\beta = -0.19$ ).

The results support the strong relationship between BPE and performance. Hypothesis H3 is accepted because  $P < 0.05$  and  $\beta = 0.75$ . Previous studies have also shown that a significant relationship between BPE and performance exists. This study covers both the financial and nonfinancial aspects of performance and found a positive correlation between BPE and performance. In accordance with previous studies, this study shows a significant positive relationship between business process efficiency and employee performance (Hammer and Champy, 1993; Pangarkar and Kirkwood, 2008; Škrinja et al., 2007; Zaher et al., 2010; Roy, 2005).

H4 is also accepted ( $P < 0.05$  &  $\beta = -0.40$ ). Process conflicts decrease both the financial and nonfinancial performances of employees. Jehn and Mannix (2001) found a negative relationship between process conflict and performance ( $\beta = -.27$ ) and ( $P < .05$ ).

## 7. Practical Implications and Future Research

From a practical perspective, our study offers insight into the BPR process and the critical factors that make it successful. Most importantly, our work helps top managers to understand that the involvement, support and participation of senior management helps create a collaborative work environment and facilitate changes in the business process. It provides good top-down communication of BPR strategy, and employees at all levels of the organizational hierarchy work in the form of team. This team-building approach increases citizenship behavior among an organization's employees and tremendously reduces intragroup conflicts. The employees have well-defined roles, and the performances of routine activities become more effective. Coordination of these work activities also increases business process efficiency and enhances the financial and nonfinancial performances of employees.

This study has some limitations, as it focuses only on internal organizational factors while ignoring the importance of horizontal participants, i.e., the customers and suppliers of the process who are also affected by change. Another limitation of the study is that it did not find

a significant relationship between BPR critical success factors and process conflict. More research work is needed to analyze how these factors affect intragroup conflicts, such as task conflict, process conflict and relationship conflicts.

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