

An Empirical Analysis on Correlates of Information Technology, Business Process Reengineering and Organizational Culture

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Abstract:

The paper is an attempt to establish empirically the correlates of information technology (IT) and organizational culture (OC) and business process reengineering (BPR) and identify the vital enablers of business process reengineering. The purpose of this study is to assess factors that influence business process reengineering outcome in the context of four major industries in India. An assessment has been made on the impact of the independent variables Information Technology, Strategy, top management commitment and leadership, human resources and organizations culture on the dependent variable BPR outcome. It is found that IT has been extensively used by many firms/organizations as a major enabler of BPR implementation. The organizations which have undergone BPR program using IT as a major enabler has achieved business excellence in terms of lower operating costs, greater flexibility, increased efficiency, reduced cycle time, improved communication, better collaboration etc. It is established from the analysis that the organization culture particularly flexible culture is important for overall achievement through BPR implementation which is followed by awareness, task focused culture, innovative culture etc. The relationship between the role of top management commitment and leadership and outcome of BPR implementation is not found significant.

Key words: *Business Process Reengineering, Top Management, Information technology, Indian Industries, Organization Culture.*

Introduction:

In the present corporate world, the business environment is neither constant nor predictable. The market growth, customer's demand, product life spans, technological change, the nature of competition etc. are changing the world rapidly and in an unexpected way. As a result, customers, competition, and change have taken on

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entirely new dynamics in the business world. Several change agents, including globalization and increasingly sophisticated information technologies are causing organizations to review the essence of doing business. These change agents are forcing nations and their businesses to improve in order to become more competitive. To create an edge over competitors in the competitive business world, many organizations took shelter on different technologies from time to time. Information Technology tools such as databases, networking were used in the business world to automate the existing tasks, central record keeping, helping in making business decisions etc. In 1990, Michael Hammer, a former professor of computer science at the Massachusetts Institute of Technology (MIT), published an article in the Harvard Business Review, in which he claimed that the major challenge for managers is to obliterate non-value adding work, rather than using technology for automating it (Hammer, M.; 1994). This statement stated having focused on the wrong issues, namely that technology. The information technology has been used primarily for automating existing processes rather than using it as an enabler for making non-value adding work obsolete. In the light of the above, the paper attempted to study and to establish empirically the information technology (IT) and organizational culture (OC) as vital enablers of business process reengineering (BPR). The purpose of this study is to assess factors that influence business process reengineering outcome in the context of Indian industries. Specifically, an assessment was done on the impact of the independent variables Information Technology, Strategy, top management commitment and leadership, human resources and organizations culture on the dependent variable BPR outcome.

Conceptual Sketch:

Business Process Reengineering: Business Process Reengineering (BPR) is a method of improving the operation and the outputs of organizations. Usually Business Process Reengineering involves discovering how business processes currently operate, how to redesign these processes to eliminate the wasted or redundant effort, improve efficiently. In the second half of the 1980s companies such as Ford Motor Company and Taco Bell embarked on radical programs of business improvement never before seen in American industry. Faced with global competition and increasingly demanding customers, these companies realized that their old methods for developing, making, and selling products were no longer adequate and required some alternative thinking for survival in the competitive business world. Business process reengineering (BPR) has also become an increasingly significant and integral part of Indian industries. Lately in India, BPR has been implemented in both manufacturing and service industries and its role has grown and changed continuously in both the sectors.

Information Technology: Information Technology deals with the use of electronic computers and computer software to convert, store, protect process, transmit, and

securely retrieve information. Broadly, IT encompasses any information related technologies. These technologies include information processing, transformation of information from one format to the other; information storage related technologies, protection of stored information from unauthorized access, secure retrieval of stored information, and transmission of information from one place to another.

Organizational Culture: Organizational culture, the basic personality of the organization, shapes the behaviors of the people in the organization, which can affect decision making styles (Mack, Crawford and Reed, 2004). Organizational culture is formed by combination of environmental culture and constructed culture. Organizational culture is strongly influenced by the personality traits of most senior managers and stakeholders, who set the management style, with interpretation by managers and process experts at lower levels each wishing to make their mark on the company culture. Organizational culture is an important factor in developing an innovative organizational environment for successful BPR implementation. It is the organizational culture that gives identity, provides collective commitment, builds social system stability and allows people to make sense of the organization.

Literature Review:

Review of literature is carried out in such a way that on one hand it covers the major studies in the area of relevance and on the other hand it explains the various terms like IT, BPR and Organizational Culture etc. The first part exemplifies the need for changing the business process, followed by various definitions of different key terminologies used, the BPR initiatives and its various changing characteristics over the years, phases of BPR, the tools and technique used in BPR, major BPR enablers and various success and failure factors of BPR. The next part discusses how Information Technology is used as an enabler to accomplish reengineering of key business processes. The last part of this chapter discusses various studies in the area of culture/organizational culture and tries to find out if any relevant work has already been done or is being done taking into account the IT interventions in reengineering. This part further discusses the support organizational culture is successful BPR implementation using IT as a major enabler. This literature review also covers the relevant works in the context of Indian and global business organizations.

Call for Change:

In this pace of rapid changes in the markets, shorter product life cycles and consumers' high expectations and demands need basic changes within an organization's structure, culture and other management processes. For this changing market situation, organizations are seeking new management strategy, adopting new cutting edge technologies which ensure them of achieving competitive advantage and enhance profitability over the competitors. In 1989, (Dertouzos et al., 1989) pointed out the concern of North American leaders from business, government and academia of declining productivity leading to the eroding morale among industry. They sensed

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for the first time that something is woefully wrong in the entire business process and recommended for drastic measures in the tune of entire revamp of business process is needed.

(Johansson et al., 1993) demonstrated that since 1950, Western and Eastern countries have been in competition for market share. During the 1950s, Western firms increasingly enjoyed high production years. With "market-driven" philosophy Western firms began to pull away from the rest in the global competition for market share. In order to increase market share and to eventually catch up and overtake the Western firms in the global market, firms from Japan and other Pacific Rim countries began to seek "process excellence" to improve the quality of their products and their bottom line. (Hammer and Champy, 1993) suggested that call for the new competitive firm to be one that is lean, nimble, flexible, responsive, competitive, innovative, efficient, customer focused, and profitable. According to them, "If a company cannot stand shoulder to shoulder with the world's best in a competitive category, it soon has no place to stand at all". It is obvious that today's firms must become relentless in their attempts to delight their customers, to dominate the market in a specific niche, and to ensure profitability.

In competitive market, the change agents of business changes with time. There are several such agents other than the customer which are forcing change. Among these competition, costs, technology, and shareholders are the important ones. Competition can be local, national or global. Many might argue that with the arrival of ever-improving communication technology, there is little difference between global and local competition. The competitor on the other side of the globe is virtually down the Street.

BPR Enablers:

An enabler is a mediator that allows organizations to break their old rules and create new reengineered processes (Hammer & Champy, 1993). According to (Olalla, 2000), BPR is a method which requires change in existing processes and designation of radically new ones and it is expected that some convinced factors make this change possible. These factors are known as enablers and may be defined as elements that act as vehicles for processes to change.

According to (Love and Gunasekaran, 1997), there are four important enablers of BPR such as, IT, total quality management, human resources, and organization. Organizational enablers are categories in to two parts i.e., structural and cultural. Structural enablers are used to demand a change in human resources management, mostly in training areas and reward systems. Moreover, (Marchand and Stanford, 1995) propose that organizations undertaking BPR must look at six dimensions of its organization namely culture, configuration and coordination which represent the firms dynamics and people and information technology which represent the

resources to be redeployed in the engineering effort. According to (Davenport, 1993) Reengineering initiatives are affected by redesigned structures that are more appropriate for empowered employees, workgroups or teams, and employees working within the "virtual" designs of some organizations. Hence, organizational issues structural and cultural as well as human resource (HR) issues that comes with these changes; assume significance. (Love and Gunasekaran, 1997) states that among many structural changes that can facilitate process reengineering; the most effective is the organizing of functional tasks into group based units or teams. Teams perform better as they integrate cross functional skills in single work units. Moreover, teams give opportunities for small talk, development of friendships, social interaction and empathic reactions from other employees.

Information technology:

Information technology (IT) plays an important role in the business process reengineering initiative. Several BPR researchers (Hammer & Champy, 1993; Davenport & Short, 1990) regarded information technology as a crucial component of BPR. According to (Scott-Morton, 1991) IT plays an important role to promote changes in organizations, mostly changes in the nature of the work, the integration of business functions, and the transformation of competitive forces. According to (Hammer & Champy, 1993) Information Technology was originally considered as an enabler for BPR, and role of IT in process improvement has become much greater and more varied. (Kumar, D., Bhatia, A., 2012) states that IT is considered by some as a major enabler of BPR for new forms of working and collaborating within an organization and across organizational borders.

(Hammer 1990; Chan, 2000), states that IT is not only a key enabler of change, but also an initiator and a facilitator. (Broadbent et al., 1999) IT should be viewed as more than an automating or mechanizing force, it can fundamentally reshape the way business is done. It is considered as both a strategic catalyst and enabler of process reengineering. Information Technology that is commonly used in BPR programs includes workflow, automation, ERP, database and related technologies etc (Ahadi, 2004; Ranganathan and Dhaliwal, 2001) highlighted that there are some categories of information technologies that are frequently used in BPR implementation programs such as: Databases and related technologies, Networking and communication, Electronic data interchange (EDI), Workflow automation and GroupWare, Internet web based technology, Enterprise system and enterprise resource planning (ERP), Multimedia and interactive computing.

Organizational culture:

Organizational culture attracts attention from several researchers in recent time. Cultural enablers comprise person's norms, values, and beliefs about how things should be done. Business Process reengineering involves changes that simultaneously demand sharing, innovating, and giving new ideas. All this must be instilled

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gradually by the management so that at the time of redesigning the processes, employees could participate and accept it willingly. Some of the trends in organizational culture are greater empowerment and participation in decision making etc. According to (Love and Gunasekaran, 1997) by this way, employees involved in the process become decision makers through greater empowerment and consequently taking responsibility for the functional and operational procedure of the process. According to (Davenport, 1993a), communication is needed throughout the change process at all levels and for all audiences, even with those not involved directly in the reengineering project (Dixon et al., 1994). Farther more, (Love and Gunasekaran , 1997) highlighted that the best way of implementing BPR, the organizational culture and functional diversity should be fully understood and analyzed by the top management before carrying out any structural changes. (Herzog, et al., 2007) in their study states that education and training is important for any organization to incorporate any kind of change, modification, innovation or process improvement. Education and training in relation to BPR was assessed by them.

Strategy:

Strategy defines as a pattern or plan that integrates an organization's major goals, policies and action sequences into a cohesive whole (Quinn, 1980). (CSC Index, 1994) highlighted that successful BPR implementation is highly dependent on an effective BPR program management. According to (McDonald and Earl, 1995), "IT can best improve an organization's position by supporting a business thrust strategy which should be clear and detailed". Top management should be involved in strategy formulation, as well as providing a commitment for the whole process of redesign, while the IT manager should be responsible for designing and implementing the IT strategy. The degree of alignment between the BPR strategy and the IT infrastructure strategy is indicated by including the identification of information resource needs in the BPR strategy.

Top Management Commitment and Leadership:

Top Management Commitment and Leadership activity involved in establishing and communicating the organizations vision, goal, plans, and values for the quality program. (Belmonte and Murray, 1993), states that for the success of BPR it is important Top management be involved to support the process from the initiation of a project to its completion. Top management is an important enabler of BPR. According to Van De Ven (1986), Top management support is an important ingredient of an innovative organizational environment. Top management support must be obtained and sustained to successfully implement BPR. Since Top management and leadership are involved in BPR their role in the project becomes very important. Top management needs to communicate to its people why the change is necessary and how it will impact everyone's current job and future with the company.

Human resources:

Human resources are also an important enabler of BPR implementation. Hammer and Champy recognize the importance of the human resource when they state "companies are not asset portfolios, but people working together to invent, sell and provide service." Based on this statement, we can state that human factor plays an important role in the daily operations, performance and consequently in the success of organizations. When a company needs motivated employees who accept changes, propose ideas, share, and are able to vary their style of working, and then half of the effort should be centered on human resource management. Therefore, in depth training and motivation aspects must be studied.

Significance of the study:

Reengineering can generate a significant change in product and service requirements, a significant change in controls or constraints imposed on a business process, or a significant change in the technological platform that supports the business process. Implementation of a reengineering initiative usually has considerable impact across organizational boundaries, as well as impact on suppliers and customers. For this reason, it requires both sensitivity to employee attitudes as well as to the ramifications of change on their lives. While Information Technology is being used as a major enabler of BPR, the traditionally run Indian industrial Diaspora may face stiff challenge in coping up their employees with the technologies used.

This work, for the very first time have put forth an interesting interplay of three discrete variables viz. IT, BPR and organizational culture. This conundrum is interesting because it is first attempt to bring forward (i) Identification of the Enablers of BPR in Indian context (ii) The contribution of information technology as an enabler of BPR (iii) Organization culture and its various facilitating and impeding manifestations in Indian contexts especially concerning BPR (iv) To assess the relative role of IT and organization culture in BPR initiative. These relevant but slightly precarious issues have made the study worth doing and significant.

Objectives of the Study:

The aim of the study is to discuss the correlation of Information Technology (IT); Business Process Reengineering (BPR) and Organizational Culture (OC) through the development of an appropriate BPR methodology. The study objectives are -

1. To examine the correlates of information technology, organizational culture and business process reengineering in Indian context.
2. To comprehend the manifestations of organization culture in the backdrop of BPR initiative.
3. To establish the correlates of vital and complementary enablers with each other and their impact on BPR.

Hypotheses framed:

H1: Information technology is a vital enabler for determining the radical improvements in BPR.

H2: There is negative associationship among other complementary enablers of BPR

The Research Model:

The literature review reveals that a set of enablers are used in the implementation of Business Process Reengineering (BPR). It further reveals several paradigms in examining the impact of different enablers in BPR implementation. For major improvements BPR is seeking for, the change of structural organizational variables, and other ways of managing and performing work is often considered as being insufficient. For being able to reap the achievable benefits fully, the use of information technology (IT) is conceived as a major contributing factor of BPR. While IT traditionally has been used for supporting the existing business functions, i.e. it was used for increasing organizational efficiency; it now plays a role of enabler in new organizational forms.

This research has developed a model (Figure 1) which shows the relationship of IT, organizational culture and other complementary BPR enablers and their impact on BPR outcome. The proposed model indicates the different variables that help together in enabling Business Process Reengineering (BPR) in one hand, and the relationship of the vital enabler and complementary enablers on the other. In this study an important enabler IT is considered as the independent variable, organizational culture is considered as independent variable of the model and the dependent variable is business process reengineering outcome. The complementary enablers are considered as moderating variables in the model, the way they are implemented will influence the primary effects sought by information technology.

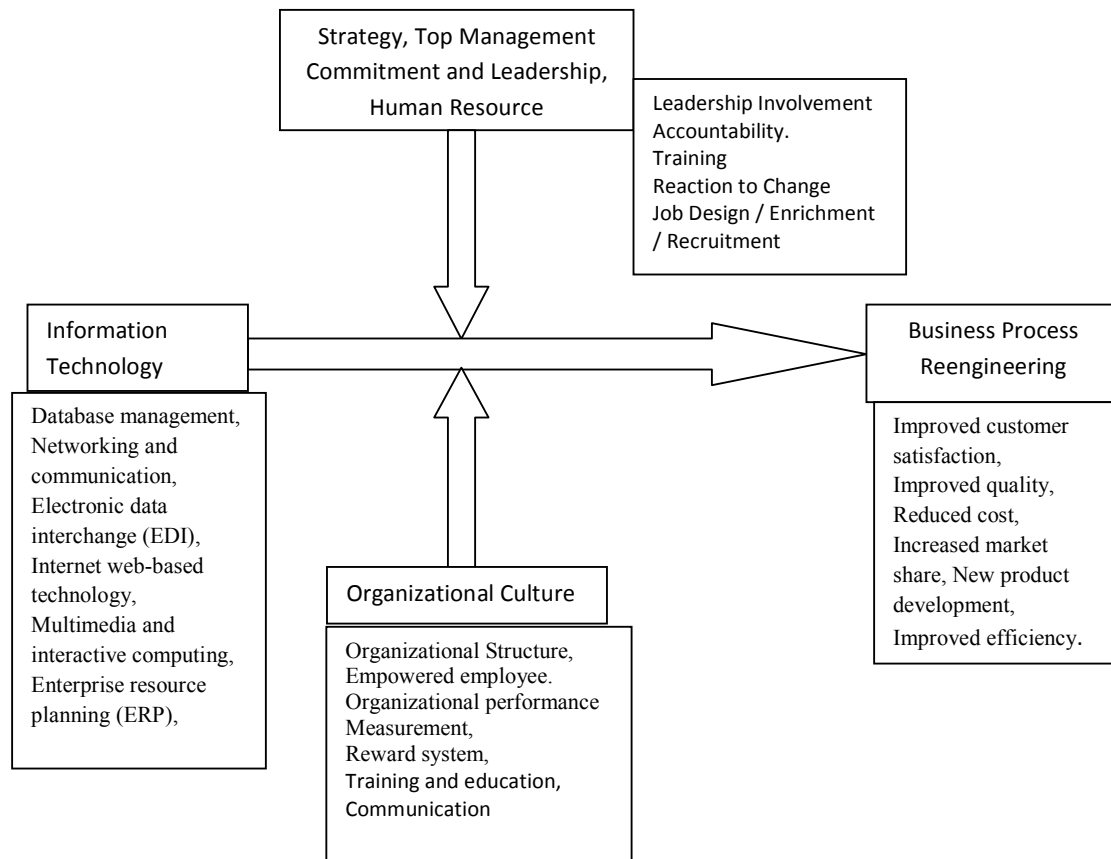


Figure 1: The Research Model

Research Design and Methodology:

This study followed a combination of qualitative and quantitative methods. The qualitative methods involve case studies and interviews; the quantitative method is based on questionnaire based survey. The use of questionnaire that was designed considering expert views on business process reengineering and its enablers. This study further employed personal interview to obtain additional information on the specific areas that the questionnaire instrument did not cover. The secondary data source is extracted from the company's annual report, journals, textbooks and other relevant publications. Face-to-face interviews represent a primary source of data collection (Davis & Cosensa, 1993). This key informant interview coupled with complementary interviews (were in-depth interrogations of individuals who were

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either front line personnel or managers who initiated the reengineering efforts) were the backbone of data amassing effort. These interviews lasted from 15 minutes to 2 hours.

Quantitative Approach Using Questionnaire Based Survey

The quantitative approach was conducted through a questionnaire based survey. Questionnaire based survey research is designed to ensure objectivity, generalisability and reliability by utilizing techniques for selecting participants randomly from the study population in a balanced way.

Selecting Organizations for Qualitative Research

For this study the researcher has selected four different firms/organizations from India, on the basis of some important criteria. These criteria were derived from the preliminary interview and based on the research objectives. The main criteria for choosing firm/organization are the following.

- a) The firms/organizations which have started/gone through Business Process Reengineering in recent past.
- b) The firms/organizations which have used Information Technology in BPR implementation program.
- c) The firms/organizations which having representation from all sectors of company.

As all the firms/organizations fulfil the criteria, a logical study may be built and the criteria are justified.

Participating Organizations:

Firm/Organization A (Mahindra & Mahindra)

A leading Indian automobile manufacturer of multi-utility vehicles (MUVs) and light commercial vehicles (LCVs), has plants in four locations, an extensive supplier base and a distribution and service network across India. Firm/Organization-A was started in 1945 by a famous industrialist of that time. In 1994, a major restructuring exercise was initiated as part of a BPR program in Firm/Organization-A. Firm/Organization-A outlined three broad phases the client would undergo during a Business Process Reengineering (BPR) program i.e.

- **Long-term Business Strategy:** Firm/Organization-A has been helped by another company to identify suitable business opportunities and craft strategies to capitalize on them, enabling it to achieve its business objectives, despite mounting competition.
- **Process-Centric Enterprise (PCE) Phase I - Preparation:** Firm/Organization-A created a plan for the client to migrate into a Process-Centric Organization.

- **Process-Centric Enterprise (PCE) Phase II – Transformation:** A specific company helped the client become a PCE by redesigning key business processes.

Firm/Organization B (Income Tax Department, GoI)

In recent time Firm/Organization-B has taken a number of initiatives and implemented projects aimed at providing better taxpayer service, reducing compliance burden on tax payers and improving enforcement. These initiatives have benefitted the taxpayers, there remained severe operational bottlenecks and fundamental issues of aligning people, processes and technology. The BPR project in the Firm/Organization-B commenced on 1st May, 2007 and was completed with finalization of 18 reports covering more than 2000 pages within a timeframe of eight months. The BPR project was undertaken in two phases- 'As-is' study phase and 'To-be' Model stage and was conducted at 15 locations which included metros (Delhi, Mumbai and Kolkata), mid-size cities (Hyderabad, Nagpur, Patna, Bhopal, Mysore, Lucknow, Guwahati, Ludhiana and Shillong) and moffusil areas (Hajipur, Mandya and Itarsi). The Business process Re-engineering of the Firm/Organization-B is first such project initiated by the Government of India.

Firm/Organization C (State Bank of India)

The Firm/Organization-C is the largest commercial bank in India. The Firm/Organization-C has started Business Process Reengineering in the mid-nineties and took nearly more than 5 years to implement the reengineered processes across its 9600 branches in India and abroad with McKinsey & Company as consultants. The basic goal of BPR was to create an operating architecture that would facilitate service delivery of international standards. The BPR team is simplifying and redesigning process to leverage the core banking solution platform. Strategies are being evolved for migrating transactions to full set of alternate channels namely, ATM, internet and call centers. After implementation of BPR the Firm/Organization-C has also introduced single window service in its 7,466 branches for increasing customer satisfaction. Moreover, by implementation of BPR the Firm/Organization-C has been given some strategic advantages i.e., lower operating costs, better collaboration, and greater flexibility, reduced cycle time, increased customer satisfaction, improvement in organizational culture etc.

Firm/Organization D (Oil and Natural Gas Corporation)

In 2000, Firm/Organization-D started project ICE (Information Consolidation for Efficiency) with an aim to achieve global standards in operations and introduce new business processes. This was called One Organization, One Data, One Information. The move towards ERP package was to enable the availability of information on a real time basis and the elimination of duplicate activities across business processes by capturing data at the source point. This will, in turn, facilitate decision support, better operation control, and efficient cost management. Firm/Organization-D is a public

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sector enterprise and India's highest profit making corporate, achieving the record of being the first Indian corporate to register a five digit profit figure of Rs.10,529 Crore in the year 2002-03.

Variables selected:

From the literature review, it is observed that there are some variables that would significantly affect a BPR initiative. The variables considered in our study are explained below. The independent variables identified are Information Technology, Organizational Culture, Top Management Commitment and Leadership and Human Resources on the dependant variable i.e., BPR outcome for the purpose of the analysis.

Questionnaire Development:

For this study a questionnaire was developed which is based on literature review. The questionnaire contained a thorough brief and clear instruction, and was arranged to facilitate ease of response, where the respondents were advised by cover letter of the nature of the research, the researcher's background and education, and why the research was being carried out. Respondents were informed that they would need a maximum of 30 minutes time to answer the complete questionnaire. They were further assured about confidentiality of the information provided by them. The survey questionnaire was created to obtain the necessary data that were used to analyze the hypotheses. The questionnaire was mainly divided into two parts. The first part asked the basic information about the interviewees and their organization while the second part asked the respondents on their views on the different relevant constructs of the research such as use of Information Technology in business, Outcome of BPR, Organizational Culture, role of other BPR enablers like Strategy, top management and leadership and human resource. All variables were measured with multiple questions using a five point Likert scale. Most of the questionnaires were sent by post and e-mail. For some organizations the questionnaires were distributed in person to the respondents. After answering the questions, the questionnaires were either returned by post, e-mail or asked to collect. For this study, a total number of 400 questionnaires were sent to five organizations. From one organization the researcher has received very less responses (only 4 numbers), so that organization has been dropped for further study. And remaining four organizations were used for further study. From those four organizations the researcher has received 92 number of responses used for analysis.

Sampling Technique

This study involved companies/organizations from India which have gone through the process of BPR using IT as an enabler. Initially, with the help of Prowess database, a set of top fifty companies/organizations was selected. A questionnaire was floated among the selected companies to get some basic information. After receiving the replies, a group of four experts have checked the veracity of claims made by the firms.

Only on becoming reasonably sure that the firm has undergone reengineering through sustained interface with IT; it was selected for our study. As per the suggestions of the group of experts, a set of four companies were finalized from divergent sectors. The set included private sector, government sector, financial sector and manufacturing sector.

This study required at least two in-depth informant interviews per firm followed by interviews using open-ended questionnaires with several other individuals. A non-probability sampling approach was used for the selection of participants. Every effort is made to ensure that informants represented a cross section of those involved in the reengineering process at various levels in the organizations. It was also ensured that the informants are representative mix of senior, middle and front-line staff.

Reliability and Validity of the questionnaire

Questionnaire validation is a great concern for the researcher because validity permits the researcher to find out if the research fits the reality and if the researcher is measuring what the researcher really wants to measure, in accordance with his/her research questions, objectives and purpose of the study. Validity and reliability are properties of a measurement questionnaire that gives the research community confidence in the results of the study. For this study, the construct reliabilities (Cronbach's alpha) are computed based on the several questions that were asked to measure each construct and all the values were found greater than 0.7.

Data Analysis and Results:

Demographic Statistics:

The respondents were asked to furnish information about their gender, designation, age group and length of service. For this information, the researcher used descriptive statistical analysis, such as frequencies, percentage, valid percent and cumulative percent so as to present the data systematically and meaningfully with the aim of emphasizing any characteristics and trends of the questionnaires, while at the same time providing sufficient statistical support to the findings. Moreover, the researcher presents the results by using the Statistical Package for Social Science (SPSS v 17.0). The descriptive statistics on the respondents' gender is shown in Table 1. The results indicate that there is a good representation of male and females in the sample, although there are more male than there are females. Out of 92 respondents 71 are male (77.2%) and female respondents are 21 (22.8%).

Table 1: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	21	22.8	22.8	22.8
	Male	71	77.2	77.2	100.0
	Total	92	100.0	100.0	

Source: Self calculated on the basis of primary data collected.

Designation of the respondents:

The descriptive statistics for the designation of the employees are shown in the Table 2. The results indicate that out of 92 respondents the majority of respondents are Staff (48), the valid percentage is 52.2 percent. Total numbers of 22 Assistant Managers has given the replies and their valid percent is 23.9 percent. From Deputy Director the researcher has received 5 responses and their valid percent is 5.4 percent. The researcher has received 17 responses from Manager of various organizations; the valid percent is 18.5 percent.

Table 2: Designation of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asst. Manager	22	23.9	23.9	23.9
	Deputy Director	5	5.4	5.4	29.3
	Manager	17	18.5	18.5	47.8
	Staff	48	52.2	52.2	100.0
	Total	92	100.0	100.0	

Source: Self calculated on the basis of primary data collected.

Age Group:

The responses of the participants on the age group are shown in Table 3. The number of responses were received from less than or equal to 30 age group is 17 numbers (18.5%), the valid percentage is 18.5 percent, the highest numbers of responses were received from 31 to 40 age group, 42 numbers (45.7%), the valid percent is 45.7 percent. From the age group of 41 to 50 the total number of 25 (27.2%), valid percent is 27.2 percent and from more than 50 ages group total number of 8 (8.7%), valid percent is 8.7 percent responses were received.

Table 3: Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than or equal to 30	17	18.5	18.5	18.5
	31 to 40	42	45.7	45.7	64.1
	41 to 50	25	27.2	27.2	91.3
	More than 50	8	8.7	8.7	100.0
	Total	92	100.0	100.0	

Source: Self calculated on the basis of primary data collected.

Length of Service (Years):

The descriptive statistics on the respondent's years of experience is shown in Table 4. In the table it is shown that total number of respondents are 92, missing value is zero, mean is 13.66 and standard deviation is 6.172.

Table 4: How long in this role (Years)?

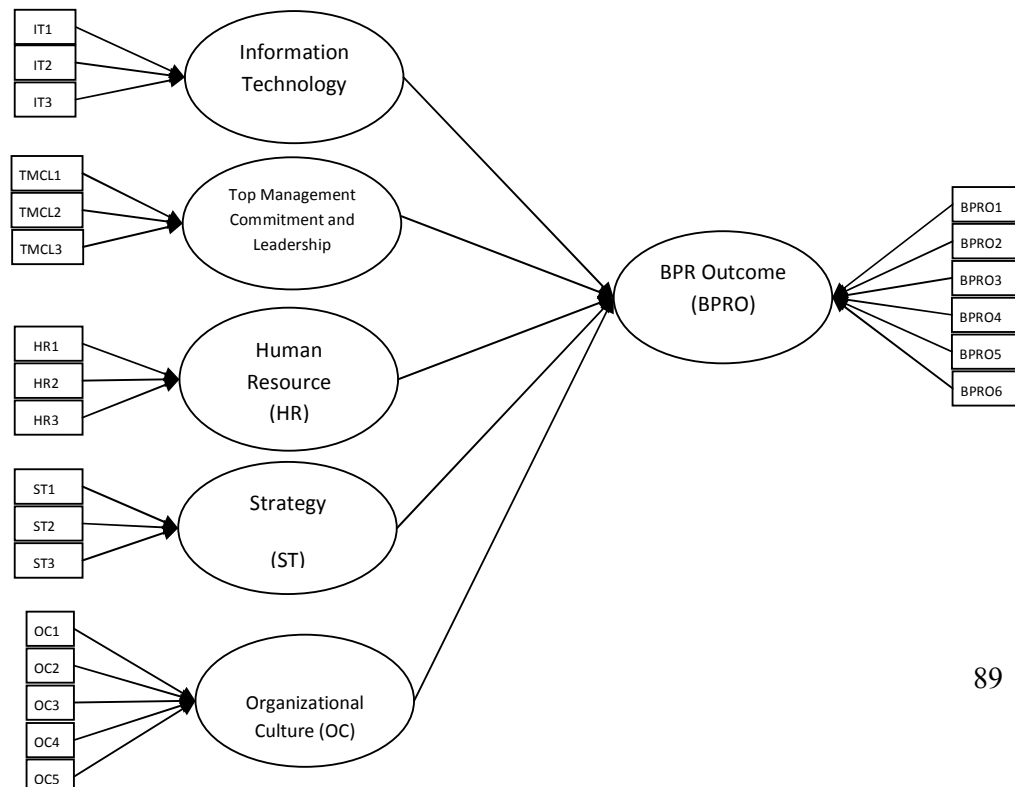
N	Valid	92
	Missing	0
Mean		13.66
Std. Deviation		6.172
Minimum		4
Maximum		30

Source: Self calculated on the basis of primary data collected.

Construct Validity and Reliability Analysis:

The conceptual framework is pictorially presented in the figure 2. The model depicts the relationship between the latent constructs and their associative measurements including correlation among them.

Figure 2 : The measurement and structural Model of the Research



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An exploratory factor analysis was conducted to confirm the construct validity. The exploratory factor analysis used Principal Component Analysis with Varimax rotation and Kaiser Normalization. The results (factor loadings and cross loadings) obtained in the experiment is presented in Table 5. All factor loadings were found to be greater than .5, with 21 of the 23 factors being greater than .5. All the items perfectly load on the correct latent constructs, supporting the good factorial validity of the measurement instruments. Table-5 shows the factor loadings, cross loadings and reliability constructs.

Table 5: Factor Loadings, Cross Loadings, and Reliability of Constructs

	Component of Construct					
	BPRO	IT	HR	ST	TMCL	OC
OC1	.264	-.189	.609	.235	.033	.551
OC2	-.055	-.429	-.256	-.372	.107	.518
OC3	.257	.041	.677	.069	.143	.330
OC4	.199	.179	-.044	.123	-.077	.722
OC5	-.329	.101	.187	-.101	-.050	.730
BPRO1	.681	.105	.297	-.049	-.002	-.064
BPRO2	.619	.386	.069	.166	.183	.060
BPRO3	.467	.577	.151	-.079	.102	-.097
BPRO4	.750	.260	-.003	-.010	.021	-.019
BPRO5	.592	.163	.235	.304	-.038	.095
BPRO6	.820	.087	.022	.105	-.062	.013
IT1	.232	.769	.014	-.183	.026	.042
IT2	.077	.820	.036	-.005	-.108	.140
IT3	.335	.813	.048	-.030	.079	.046
TMCL1	.072	-.147	.100	.157	.804	-.107
TMCL2	-.070	.350	-.056	-.066	.734	.066
TMCL3	.029	-.061	.029	-.032	.879	-.018
HR1	-.048	.042	.815	-.012	.042	-.178
HR2	.103	.528	.707	.097	-.007	-.006
HR3	.226	.067	.729	.339	-.077	-.005
ST1	.320	.025	.022	.788	.142	-.012
ST2	-.038	-.131	.109	.836	-.208	.048
ST3	.001	-.150	.355	.665	.291	-.040

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

*Rotation converged in 7 iterations.

Source: Self calculated on the basis of primary data collected.

In this study, the researcher implemented analysis for reliability testing and assessment after collecting the questionnaires and used the test for Cronbach's alpha, which is one of the most commonly used reliability coefficients among researchers. The construct reliabilities (Cronbach's alpha) based on the several questions that were asked to measure each construct, which is presented in Table 6. The Cronbach's alpha values were all greater than 0.7. The reliability statistics are presented in table-6.

Table 6: Reliability Statistics of Instruments

Constructs	Questions	No. of Questions	Cronbach's alpha
BPR outcome (BPRO)	2.1	5	.786
Information Technology (IT)	2.2	3	.816
Organizational culture (OC)	2.3	4	.655
Strategy	2.4	3	.707
Top Management commitment and Leadership (TMCL)	2.5	3	.747
Human Resources (HR)	2.6	3	.729

Source: Self calculated on the basis of primary data collected.

The reliability of these constructs was also confirmed by the results of a confirmatory factor analysis done using AMOS, and is consistent with the good Cronbach's alpha values obtained in the exploratory factor analysis presented earlier. The confirmatory factor loadings and their significance for the six constructs are shown in Table- 7. All of the factors loading estimates are greater than .5 and most of them greater than .7.

Table 7: Confirmatory Factor Loading and Significance

Constructs	Components	Factor Loading	Significance
BPR outcome(BPRO)	BPRO 1	.691	Yes
	BPRO 2	.625	Yes
	BPRO 3	.451	No
	BPRO 4	.765	Yes
	BPRO 5	.602	Yes
	BPRO 6	.841	Yes
Information Technology (IT)	IT1	.784	Yes
	IT 2	.854	Yes
	IT 3	.823	Yes
Organizational Culture (OC)	OC 1	.542	Yes
	OC 2	.521	Yes
	OC 3	.321	No
	OC 4	.745	Yes
	OC 5	.731	Yes
Strategy (ST)	ST 1	.812	Yes
	ST 2	.845	Yes
	ST 3	.671	Yes
Top management commitment and leadership (TMCL)	TMCL 1	.8211	Yes
	TMCL 2	.772	Yes
	TMCL 3	.892	Yes
Human Resources (THR)	HR 1	.842	Yes
	HR 2	.728	Yes
	HR3	.719	Yes

Source: Self calculated on the basis of primary data collected.

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Furthermore, the factor loading estimates were found to be statistically significant ($p < .05$) except the factors ie, greater flexibility and innovative culture to support BPR program. The relatively high ($> .7$) significant factor loadings suggest good convergent validity. The good construct reliability and validity obtained in this study suggest that the measurement model is adequate, and therefore the descriptive statistics of the six constructs can now be meaningfully presented.

Descriptive statistics for latent constructs:

The latent constructs statistical descriptions are shown in the following Table 8. The results show that for the respondents mean of BPR Outcome, IT, Top Management Commitment and Leadership, Human Resource, Organizations Strategy, Organizational Culture are 4.3013, 4.4420, 4.1014, 3.6486, 3.9710 and 3.8406. The standard deviation in the given sequence are .38089, .55494, .39761, .58547, .40040 and .24324.

Table 8: Descriptive Statistics for Latent Constructs

Constructs	Questions	N	Mean	Std. Deviation
BPR Outcome	2.1	92	4.3013	.38089
IT	2.2	92	4.4420	.55494
Top Management Commitment and Leadership	2.3	92	4.1014	.39761
Human Resource	2.4	92	3.6486	.58547
Organizations Strategy	2.5	92	3.9710	.40040
Organizational Culture	2.6	92	3.8406	.24324
Valid N (listwise)		92		

Source: Self calculated on the basis of primary data collected.

In order to analyze the enabling factors of BPR, regression analysis have been employed considering the independent variables as IT and IC and BPR as dependent variable. The ANOVA result found is displayed in table-9

Table-9: ANOVA^c

	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.352	2	2.176	21.886	.000 ^b
Residual	8.849	89	.099		
Total	13.202	91			

b. Predictors: (Constant), IT Use, Organizational Culture

c. Dependent Variable: Mean BPR Outcome

The statistically significant F ratio indicates that the correct enablers of BPR chosen in the model. It appeared from the analysis that both IT and Organisational culture are the enablers of BPR outcome. The higher 't' value of IT use, however, indicates that use of IT is the major enabler of BPR. This requires a further enquiry on the relationship of IT use with components of the BPR outcome. For this purpose, we have employed correlation matrix analysis. The result of the analysis are shown in table-11.

The other regression results may be had from table-10

Table-10: Regression Coefficients^a

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.831	.538		1.545	.126
IT Use	.696	.141	.444	4.924	.000
Organizational Culture	.179	.062	.261	2.897	.005

a. Dependent Variable: Mean BPR Outcome

Table-11: Correlations of IT and BPR components							
Variables	IT Use	BPR Advantages - Low Operating Cost	BPR Advantages - Better Collaboration	BPR Advantages - Greater Flexibility	BPR Advantages - Increased Efficiency	BPR Advantages - Reduced Cycle Times	BPR Advantages - Improved Communication
IT Use	1						
	.92						
BPR Advantages - Low Operating Cost	.301**	1					
	.91	.91					
BPR Advantages - Better Collaboration	.392**	.377**	1				
	.89	.88	.89				
BPR Advantages - Greater Flexibility	.330**	.350**	.377**	1			
	.90	.89	.87	.90			

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BPR Advantages - Increased Efficiency	.458**	.392**	.494**	.427**	1		
	88	87	86	86	88		
BPR Advantages - Reduced Cycle Times	.404**	.305**	.433**	.271**	.387**	1	
	90	89	87	90	86	90	
BPR Advantages - Improved Communication	.404**	.424**	.529**	.322**	.495**	.503**	1
	90	89	87	88	86	88	90

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Self calculated on the basis of primary data collected.

The component wise analysis of variables also shows that the correlation values of components of BPR with IT are significant indicating that IT becomes a major enabler of all the component of BPR. In order to assess the association ship between organizational culture and BPR, the correlation analysis has been employed. The result obtained is presented in table-12

Table-12: Correlations

		Organizational Culture	BPR Outcome
BPR Outcome	Pearson Correlation	.383**	1
	Sig. (2-tailed)	.000	
	N	92	92

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Self calculated on the basis of primary data collected.

The significant 'r' value (0.383) indicates that organizational culture as push factor affecting the BPR process. A further analysis has been done to examine impact each individual factor of organizational culture in the BPR process. For this purpose multiple regression model has been fitted over the independent variables ie, on the factors of OC viz, Task focused culture, Flexible Culture, Innovative Culture, Awareness about Organizational Culture Importance and Sharing Culture considering BPR outcome as dependant variables.

The ANOVA result found are given in table-13.

Table-13: ANOVA^e

	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.146	5	1.029	11.366	.000 ^e
Residual	7.243	80	.091		
Total	12.389	85			

e. Predictors: (Constant), Task focused culture, Flexible Culture, Innovative Culture, Awareness about Organizational Culture Importance, Sharing Culture

Dependent Variable: Mean BPR Outcome

The regression co-efficients found are presented in table-14

Table-14: Regression Coefficients^a

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.953	.589		1.618	.110
Task focused culture	.207	.087	.266	2.389	.019
Flexible Culture	.366	.083	.427	4.425	.000
Innovative Culture	-.033	.088	-.043	-.377	.707
Awareness about Organizational Culture Importance	.267	.099	.252	2.680	.009
Sharing Culture	.036	.098	.033	.367	.715

Dependent Variable: Mean BPR Outcome

Source: Self calculated with SPSS on the basis of primary data collected.

The above analysis shows that all the components of are significant except innovative culture ($t = -0.377$) which is not statically significant. The flexible culture appeared to be the important parameter for BPR outcome followed by awareness about organizational culture and task focused culture.

Taking queue from earlier analysis, an attempt has been made to examine the impact of other complementary factors such as top management commitment, human resources, organizational strategy etc on BPR outcome. For this purpose, regression analysis has been employed over all the variables. The ANOVA results found are presented in table-15.

Table-15: ANOVA^e

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.455	5	1.091	12.112	.000 ^e
Residual	7.747	86	.090		
Total	13.202	91			

e. Predictors: (Constant), IT Use, Organizational Culture, Top Management Commitment, Human Resource, Organizations Strategy

Dependent Variable: Mean BPR Outcome

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The other regression coefficients are exhibited in table-16.

Table-16: Regression Coefficients^a

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.128	.673		-.190	.850
IT Use	.654	.135	.418	4.831	.000
Organizational Culture	.157	.061	.228	2.587	.011
Top Management Commitment	.054	.080	.056	.675	.501
Human Resource	.156	.057	.240	2.734	.008
Organizations Strategy	.109	.081	.114	1.333	.186

a. Dependent Variable: Mean BPR Outcome

Source: Self calculated with SPSS on the basis of primary data collected.

The F ratio indicates that all the identified factors put in the model is accurate. The 't' values of each individual factor indicates that apart from IT and organizational culture, all other factors like top management commitment , human resources and organizational strategy used to influence the BPR outcome.

Empirical Findings

1. IT has been extensively used by many firms/organizations as a major enabler of BPR implementation. In this research, we have attempted to find the relationship between use of IT and BPR in the context of Indian firms/organizations. The correlation study explored that the use of IT is closely associated with achieved BPR outcome.
2. The firms/organizations which have undergone BPR program using IT as a major enabler has achieved business excellence in terms of lower operating costs, greater flexibility, increased efficiency, reduced cycle time, improved communication, better collaboration etc. The study revealed that increase in business efficiency is a major achievement for Indian firms/organizations.
3. The organization culture is considered to be an important facilitator for process changes. Innovative culture helps in understanding the technology used and gains the maximum out of it. The study found that a flexible culture is important for overall achievement through BPR implementation. This is followed by awareness, task focused culture, innovative culture etc.
4. The relationship between the role of top management commitment and leadership and outcome of BPR implementation is not found significant. The

5. Correlation between the top management commitment and leadership and BPR outcome signifies less association. The result suggests that there is a lapse in motivating of employees from the top level management of a firm. The result further indicates that the top level managers should increase the frequency of communication with the employees to achieve the goal of BPR implementation.
6. Human resource plays a critical role in the success of any organization. This study also hints the same as the obtained relationship between the BPR outcome and human resource is high. Training of employees emerges out as a very important factor in human resource.
7. This study shows that the role of strategy in successful implementation of BPR program is significant. The analytical result explains that for successful implementation of BPR program having a right strategy is very important.

Direction for Future Research

A study considering specific type of firms/organizations may be taken up so that the result can be a well representative of the considered type. This study only considered the significant enabler of BPR. However few more enabling factors such as worker productivity increase, defect reduction, customer satisfaction etc. could have been also considered. An extensive study involving the entire BPR enabling factor would have revealed more interesting and realistic result.

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