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Research Study on Business Process Re-Engineering With Computational Intelligence in E-Commerce Systems

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Abstract – This research study is conducted in order to identify the various factors and impact of information technology in business process reengineering which are essential to make the rethinking and radical changes in the production and manufacturing industry, the main objective of this research study is to reduce the costs of the resources, improvement working style of employees and efficiency which leads to the organizational development to the be the world level competitors. In this research study the researcher developed the qualitative and quantitative distinction between business process reengineering parameters and information technology, there are number of benefits after successful implementation of this methodological concept in production and manufacturing industries such as empowering employees, eliminating waste and unnecessary management overhead and identification of inefficient processes which makes barriers in organizational development. Today the organizations have to consider about their structure and development in different dimensional phases, it is dynamically and rapidly changing environment, which uses new technology and resources at different significant level. Furthermore, outcome of business process reengineering future and appraisal can be more successful by combining with information technology and its advances for developing the business organization. The researcher strongly recommended that the role of information technology and technology advances in business process reengineering are significant and can be used for radical change, devise new ways of thinking, and better support the functionality of organization.

Keywords— Business Process, Re-engineering, Computational Intelligence, E-Commerce Systems etc.

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I. INTRODUCTION

A business process is an activity or collection of activities, which has an effect on the customer directly or indirectly. Every organization has many processes built in their systems. Manufacturing, order processing, invoice generation, bill payment and customer service are some of the business processes of current day organizations[1]. These processes can be reengineered. Hammer, M. and Stanton, S.A. defined reengineering as follows in their book The Reengineering[2]. “The fundamental rethinking and radical redesign of business processes to bring about dramatic improvements in performance.” According to this definition, we can expect the dramatic improvements as a result of our reengineering process in the business[3]. Also the definition talks about the radical redesign of the existing business processes in the organization[4]. There are many steps involved in business process reengineering effort. Those steps are given in the following figure[5].

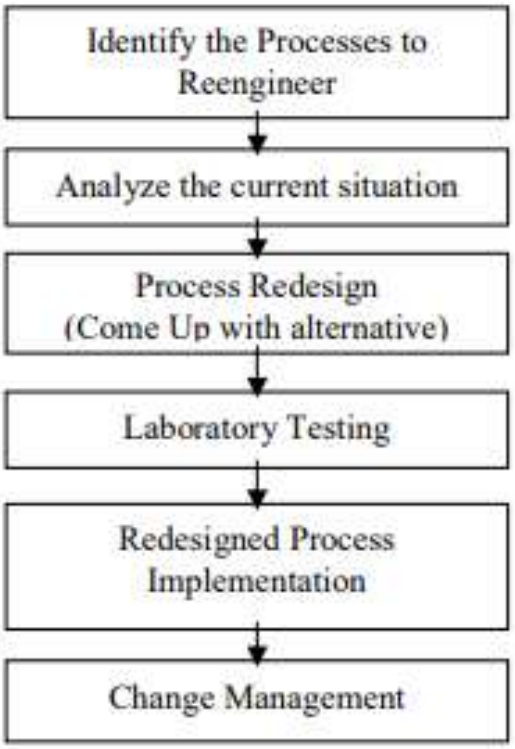

Figure 1. Steps in Business Process Reengineering

Figure 1 explains the steps involved in business process reengineering. For Business Process Reengineering, one should identify the processes in the organization to be reengineered. The outcomes expected from business process reengineering can be increase in profits, reduction in costs, improvement in quality, service or increment in turnaround time, etc [6]. There should be reengineering team assigned for this business process reengineering assignment purposes. Definitely there should be commitment from the top management such as CEO and COO for this business process reengineering purpose. Reengineering efforts are to be supported by the senior management in the organization [7]. The process owner and reengineering team work on reengineering of each identified processes of the organization. During this reengineering time, the top management should be committed to the BPR efforts in the organization[8]. Top management commitment is explained in the next paragraph[9].

II. LITERATURE REVIEW

Galliers RD, Baker BSH et al. (2019) in this paper, has attempted to show how socio-technical and soft OR concepts can be used to inform BPR projects. It has also shown how BPR might fit into our thinking and practice regarding business/IS strategy formulation and implementation, and what role IT might play in organizational change. It has cast doubt on the novelty of the BPR approach, classifying it with the more traditional strategic approaches that were popularized in the 1960s, having said that, it has not dismissed BPR out of hand but has attempted to incorporate some of its more useful features into current thinking on business strategy and the management of change. What is more, the paper identifies a common omission in much of the BPR literature, i.e., the lack of guidance regarding how one might go about implementing the conclusions drawn from the analysis [10].

Hammer et al. (2019) in this paper, identified the input from employees and information on customers' requirements are essential in reengineering. IT applications allow organization to build a At Frito Lay each of the sales persons uses a handheld computer to record sales data on grocery product, reducing many commercial procedures. The data is transmitted to a central computer, which in turn, ends instruction to all sales persons through their hand held computers. This process greatly enhances collaboration between marketing and sales weekly summaries and analysis to seniors' managers. IT capabilities are used for information exchange and to improve inner organizational collaboration[11].

R.J. Reynolds et al. [2018] in this paper, used EDI technology in conjunction with varied technologies of electronic commerce such as document imaging with electronic work queues to reengineer its accounts payable function. IT can also be used to help identify alternative business processes. IT can help companies to achieve multiple objectives in redesigning processes. Expert systems and technological databases can provide information on current and future capabilities of technology, human resources and organization change. A fundamental source of difficulties is the fact that processes are reengineered but infrastructure is not. The rigid infrastructure of the organization must be altered to facilitate cooperation and to cross functional barriers between departments. Cross functional team must replace individuals working in isolated departments; there has been a significant growth in collaborative computing products in production and manufacturing industries. IT organization should be improved to meet their increasing needs. The main reason of the business improvement, major changes in business philosophy and technological improvement. It is based on business strategic, controlling functional and non functional requirement of the organization. Digital feedback loop makes it possible to have a specific definition of success, a specific beginning and end in terms of time and tasks, immediate milestone and finally a budget. IT is only useful if it helps employees do their work better and differently, organizations are not working with employees in the organization to infuse technology [12].

Sampler, Jeffrey , Short, James et al. (2018) in this paper, have also shown how BPR might fit into our thinking and practice regarding business/IS strategy formulation and

implementation, and what role IT might play in organizational change. It has cast doubt on the novelty of the BPR approach, classifying it with the more traditional strategic approaches that were popularized in the 1960s, having said that, it has not dismissed BPR out of hand but has attempted to incorporate some of its more useful features into current thinking on business strategy and the management of change. What is more, the paper identifies a common omission in much of the BPR literature, i.e., the lack of guidance regarding how one might go about implementing the conclusions drawn from the analysis. The researcher stated that dynamically changing as cloud providers come out with new offering focused on being competitive, increase market share, each with the aim to becoming one stop shop. Mainly, there are there cloud computing service based models. Enterprises have to select the right service model based on their specific requirements. The selection has to be done considering various factors such as cost benefits analysis, relevant risk, security and control and the critically of the data and services [13].

Nick et al. (2017). in this paper, in elaborating the framework, the researcher found that most of the popular reengineering "success stories" fell into one quadrant, long expertise half-life and long information half-life, and projects in this cell had only loose coupling with the firm's broader strategic and information systems planning agendas. We suggested that successful BPR projects tended to fall in this quadrant precisely because they focused principally on restructuring physical assets, and, with this emphasis, tight coupling with strategy and IS planning agendas was not required. Conversely, the "self-designing" organizations that tended to populate the upper right-hand quadrant, short expertise half-life and short information half-life, had little need for reengineering. Here the extreme volatility of the firm's environment and its internal allocation of tasks and work flows negated much of the logic behind reengineering[14].

Simpler et al., (2017). in this paper, cloud computing is basically the use of computing resources (hardware and software) next stage in the evaluation of the internet. It provides the means through which everything from computing power to business process to personal collaboration is delivered as a service wherever and whenever we need it. One of the most common example of cloud computing is web based e- mail services offered by various providers like Yahoo, Google etc. E-mail can be accessed on any time any where basis without knowing that where the data are stored. The clod computing environment in production and manufacturing industries consists of multiple types of clouds based on their development and usage [15].

III. PROPOSED METHODOLOGY

Research plan is a systematic investigation to find answers to a problem. Research in the professional social science areas, like in other subjects, has generally followed the traditional objective scientific method. Since the 1960s, however, a strong move towards a more qualitative, naturalistic and subjective approach has left social science research divided between two competing methods: The scientific empirical tradition, and the naturalistic phenomenological mode which are adapted for selecting the sample, data collection method, and statistical method, finally to generate the inferences to achieve the objective of the research work on exploration of information technology and its advances in methodology of business process reengineering that were derived from literature and meant to answer the research question which is to investigate, what extend towards the research study. The researcher designed the framework of research study and established the correlation between dependent and independent variables, on the basis of that researcher identified the variables and affecting factors in business process reengineering and developed the questionnaire for data collection. Questionnaire is the structured approach of primary data collection, which was collected from the different industries and organizations. In this research study the researcher used the SPSS software for data testing and all prominent data has been tested at 0.05 level of significance and 95% confident interval. In research materials means data which are essentials for the research study and implemented to design the proposed research work. In this section data are collected through the specific method which would be implemented to collect the data. The research materials are based on primary and secondary data, primary data are collected through the questionnaire and secondary data are collected from research journal, article, books, thesis etc. questionnaire is the process to collect the primary data and on interviewers and nature of organization where data are collected. In some organization they are not able to disclose their valuable information and their job insecurity. In that case it is responsibility of the researcher to collect valuable data through their tools and techniques. The researcher has to give assurance that valuable information can not be disclosed to any other purpose except the research analysis. In some case research got the false information which pertinent wrong analysis and whatever report will be regenerated through the SPSS software that would be the significant for the research work. The different researchers are having different perception their research work on the basis of their trueness data and others factors which are essential for the research work. Moreover, for a given general approach, there are a number of different ways in which data are

collected and implemented to solve the research problem.

a) Method of Research

In this section, the researcher specified the method of research for the proposed study. The method of research defines the conceptual structure within which the research is conducted. Bernard Philips has described the research design as a "Blue print for collection, measurement and analysis of data". The researcher stated the following steps which are the primarily to define the research design and method and it is stated that:

b) Methodology

Adapted for Selecting the Sample Random sampling method will be adapted to select the sample size from the leading production and manufacturing industry from Mumbai those who are practicing and having information technological infrastructure for BPR initiative. The most of the social scientist argue that the random sampling is the best technique to obtain data. "A sample drawn at random is unbiased in the sense that no member of the population has anymore chance of being selected than any other members". He continues "Random sampling is an objective which produced divorce from our own predilections and biases". The researcher contacted the representation of each company and asked for name and address of the employees from different department and branches. The representatives of each company are given the information keeping their confidentiality due to organizational constraints and privacy. The researcher was unable to send a copy of questionnaire to all employees due to time and costs constraints. In this section the researcher described the population from which sample for the study is to be drawn. The nature of sample, the procedure of drawing sample and the justification for selecting the sample must be indicated so that the results of the study may be critically examined and interpreted. Description of tools and techniques, whether standardized or self- made and which will be used for data collection, constitutes the present section. In case you plan to develop tool/tools on your own, the entire procedure followed for the development including the test properties ought to be described. In case of standardized tests, the properties of the tests can be obtained from the test agency and mentioned in the proposal. The researcher needs to describe the procedure of collecting data with the help of tools and techniques in this section. In case of experimental research, how the experimentation is carried out, or in case of survey research, how survey is conducted have to elaborate. The empirical data have collected from the Mumbai and suburban from production and manufacturing industries through the proper questionnaires and conducted the interview with the company representative. The research also specified the source of data and procedure for data collecting. It is stated that the following procedure: As the study is exploratory and empirical in nature, both primary as well as secondary sources of data collection shall be tapped.

- Primary Source: Primary data are collected from the enterprises / organizations through the structured questionnaire, interview, discussion with company representative etc.
- Secondary Data: Secondary data have collected from the research paper and dissertations, scholar's books of references, standard publication by institutes and organizations, report, internet etc.

The researcher is used the statistical analysis procedure to test the data and its significant level during the research study. The researcher used the 0.05 level of significant to test the hypothesis at 95% confident interval (CI), which is commonly used in the qualitative research study. It is step by step procedure as follows:

1. State the Null Hypothesis.
2. State the Alternative Hypothesis and decide one tailed and two tailed tests.
3. Select the desired level of significance, the most common level is 0.05 and 0.01 and the exact level to choose is largely determined by two much α risk one is willing to accept and effect that this choice has on β risk. The larger the, lower is the β. In this research thesis the researcher fix the 0.05 level of significance to test the null hypothesis.
4. Choose the statistical test.
5. To test a hypothesis researcher must choose an appropriate statistical test. There are various criteria for choose the test. One is power efficiency, nature of population, method of sampling, type of measurement scale used and so on.
6. Obtain the critical test value. for specified level of significance.
7. Compute the value of test statistics.
8. Interpret the result and draw conclusion.

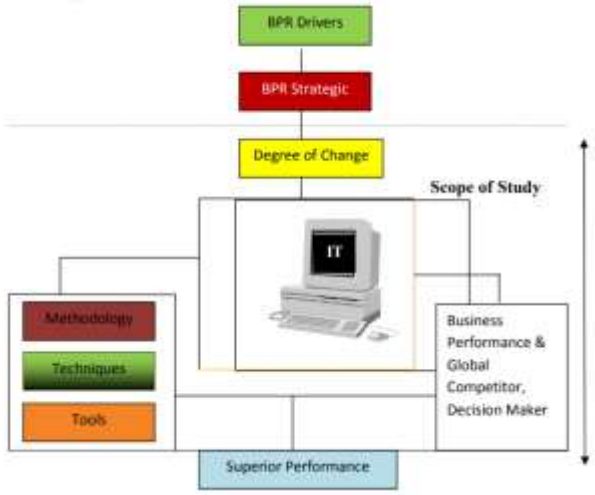

Figure 1.2 Proposed Research Study

The proposed research study is the structure of work flow and organizational structure, so that generalization of the findings could be established in production and manufacturing industries. It developed towards a new management philosophy at different perspective in business process reengineering. It is multi faceted structure of Multinational Corporation, which has rapidly development towards a new management philosophy. It contributed to the performance evaluators and generates new process design:

1. Selection of strategic - Processes of redesign
2. Simplify new processes – Minimizing steps and optimizing efficiency of development model. BPR Drivers BPR Strategic Degree of Change Business Performance & Global Competitor, Decision Maker Methodology Techniques Tools Superior Performance
3. Organize a team of employees with their work responsibility
4. Organize the work flow model
5. Automate processes using information technology.
6. Introduce the redesign processes into business organization structure.

Table 1.1 Awareness of Business Process Reengineering

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	47	85.5	94.0	94.0
	No	3	5.5	6.0	100.0
	Total	50	90.9	100.0	
Missing	System	5	9.1		
Total		55	100.0		

Table 1.2 Descriptive Statistics of BPR

	N	Minimum	Maximum	Mean	Std. Deviation
BPR	50	1.00	2.00	1.0600	.23990
Valid N (list wise)	50				

Table 1.3 Test Statistics of BPR

	BPR	Statistical Analysis
Chi-Square(a)	38.720	
df	1	
Asymp. Sig.	.000	Rejected

The data are analyzed by the chi-square test at the 0.05 level of significant. The probability of the statistics of chi-square is 38.720 and its P_value is 0.000 which is less than the 0.05, so the null hypothesis is rejected and variable is not independent. The statistical analysis is concluded that there is a significant relationship between working employees of production and manufacturing in Mumbai and business process reengineering. The awareness of business process reengineering was conducted in the IT based organization , some of the organization were not aware about the BPR methodology due to their organizational constraints and they do not want to disclose their information to the others who are authorized for the organization. But a large number of organizations are very much aware about BPR and their methodlogical concept for the development. The problem is that awareness of BPR is not the implementation of that technology and its significant contributions towards development. The researcher found that there are some organizational barriers where people are thinking beyond their positions and previleges.

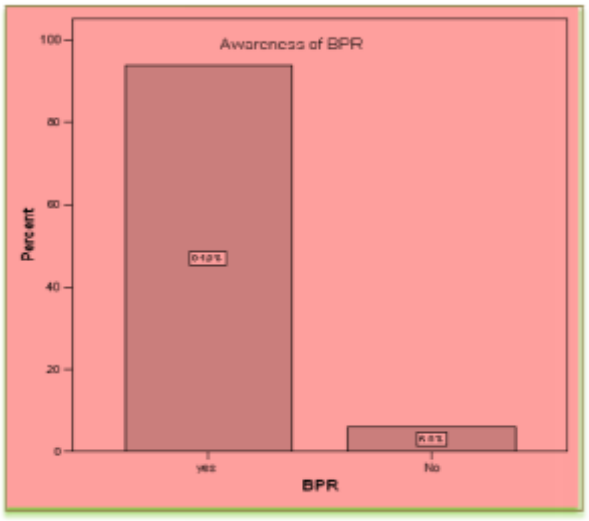

Figure 1.3 Awareness of Business Process Reenginnering

The above graph is the statistical report of chi which have been collected from the different production manufacturing organization or enterprises from Mumbai. This relationship between the awareness of employees and business process reengineering. The 94% employees are aware of the business process reengineering and 6% are not. The probability of the statistrics shows that the employees of the organization is aware to re their working style, restructuring and redesigning structure of their organization. contributions towards development. The researcher found that there are some organizational barriers where people are thinking beyond their positions and previleges Awareness of Business Process Reenginnering The above graph is the statistical report of chi-square test of goodness of fit and the data which have been collected from the different production manufacturing organization or enterprises from mumbai. This statistical report is showing the significant level of relationship between the awareness of employees and business process reengineering. The 94% employees are aware of the business process reengineering and 6% are not. The shows that the employees of the organization is aware to re their working style, restructuring and redesinging structure of their organization.

Table 1.4 Organizational Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Small	2	4.0	4.0	4.0
	Medium	24	48.0	48.0	52.0
	Large	24	48.0	48.0	100.0
	Total	50	100.0	100.0	

Table 1.5 Descriptive Statistics of Organizational Size

	N	Minimum	Maximum	Mean	Std. Deviation
Organization Size	50	1.00	3.00	2.4400	.57711
Valid N (list wise)	50				

Table 1.6 Test Statistics of Organizational Size

	Organization Size	Statistical Analysis
Chi-Square(a)	19.360	
df	2	Rejected
Asymp. Sig.	.000	

The data is analyzed by the chi- square test and analysis report is generated at 0.05 level of significance level. The probability of the chi-square test statistics is 19.360 and the P-value is 0.000 which very less than 0.05.Hence the null hypothesis is rejected and relationship between organization size and business process reengineering is significant. It is proved that the organization's size variables are not independent and these are significantly related to business process reengineering. The organizational size is the important factors for the implementation of BPR strategic and degree of changes. If small organizations are in process to implement the BPR concept for the radical and dramatic improvement of business organization that means it is not only for large industries, in this research size of organization is not importance for the successful implementation of BPR.

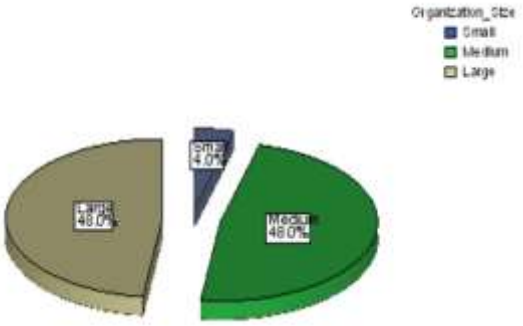

Figure 1.4 Performance of Organizational Size in BPR

The above graph is showing the analyzing report of chi square goodness of fit which is based on data that has been collected from the different production and manufacturing organization or enterprises in Mumbai. In this research 48% organizations belong to large in size,48% belong to the medium size and remaining 4% belong to small in size. The probability of the statistics showing the variables are organizational size are not independent and its play very significant role for redesign, restructuring in production and manufacturing organizations.

IV. CONCLUSION AND FUTURE WORK

In this research study, the researcher covers the all possible components and its impact of information technology in business process reengineering, this reseach study is done on the basis of organization and technology level of the

organization for the successful implementation of BPR for the dramatic improvement and radical changes of the business processes to control the operational work of business organization. During the research study, the researcher faced many difficulty to find out data, valuable information about the organization who are working on business process reengineering concepts. It was very difficult for the researcher to get exact idea about the implementation ob BPR methodology for radical changes and dramatic improvement of the organization due to the organizations conbstraints and organization's business policy and data security.

FUTURE WORK

Today the organizations have to consider about their structure and development in different dimensional phases, it is dynamically and rapidly changing environment, which uses new technology and resources at different significant level. The rapid development is new technology and modernization of resources which gives the successful working environment for the employees in production and manufacturing organizations at various levels it supported to organizational development. With business process reengineering, the entire method and concept is to break down the current business processes. This allows the business to start with new processes to allow enterprises or organization to cut costs, and improve productivity through newer and more efficient processes.

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