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Offering an Operational Framework for Measuring the Risk Level in the Implementation of Re-engineering Projects of Business Processes

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Abstract

The appearance of new technologies, increase in competition, and new economic challenges has forced the organizations to implement business processes re-engineering projects. Successful implementation of the re-engineering project is a difficult function and depends on different key factors. The present study seeks to offer a new framework for measuring the risk level in the implementation of re-engineering projects by analyzing its critical success and failure factors. These factors were identified through reviewing the research literature and exploring the expert's viewpoint. The framework that was offered in this study consists of five success factors and one failure one. The success factors include uniform leadership, cooperative workplace, senior management commitment, supportive management, and the use of information technologies. Also the failure factor includes resistance to change. Because this model identifies the risk level of the project failure before the implementation of re-engineering projects, it is a beneficial instrument for organizations that seek to re-engineer their business processes.

Keywords: Re-engineering, Business Processes, Risk Level

1. Introduction

With respect to the increasing global competition and changes in customer's needs, the organizations seek to improve their processes in the modern environment. In today's world, the

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organizations that still use their old processes, find it difficult to promote their performance levels. These old processes were created in a time and environment different from today's competitive and dynamic world conditions [1]. Different techniques and instruments have been applied by the organizations to promote their processes [2]. Re-engineering is one of the most appropriate approaches in terms of creating rapid changes for improving the business processes [3] that was developed by Hammer in 1990 [4]. Re-engineering separates the organizations from their old functions through re-organizing them, eliminating some processes, and discovering new methods of functioning [5]. In the re-engineering process, the managers should overview their old processes and identify which activities suits the customer's needs and then seek to satisfy their needs and wants [6]. There is significant difference between the re-engineering process and the other approaches of the process improvement. This does not seek to correct the existing processes in the organizations, but identifies the ineffective processes and, then, explores an appropriate method for tackling them [7]. Chan and Peel [8] introduced the improvement in efficiency and customer services as the main benefits of re-engineering and also Francis and McIntosh [9] identified that the following factors are the most important reasons of re-engineering projects in the organizations. These include change in the customer's expectations, technology and information technology development. Hammer believes that business processes re-engineering should start from the organization fundamental subjects and issues [5]. Successful implementation of re-engineering process needs many efforts, but, finally, it will result in drops in costs, increase in productivity and slowdown in processing time, quality improvement, drops in organization revolution time, increase in profitability, and also drops in responding time [7]. He also introduced three main cores in the re-engineering process for achieving these goals including the organization of the re-engineering project, using information technologies, and re-designing the organization [5].

Hammer focuses on the fact that process-oriented organizations have more opportunities to create improvement in their re-engineering processes than product-oriented ones, because the processes deal with the customer's needs [10]. He also defines business processes as a set of activities with their inputs and outputs leading to the creation of value for customers and states which many organizations concentrate on their processes rarely and, on the other hand, focus on their functions, employees, jobs, and structures whose results are not helpful in satisfying the customer's needs [5]. Re-engineering requires organizational re-construction, changing the employee behavior, education, job enrichment, job development and delegation so that radical changes are facilitated and create considerable improvements in the organizational performance [10]. This also is an up-down and process-oriented approach. This approach is administrated by executives for improving performance through rapid and short-term changes in the system [10].

2. Research background

2.1. Re-engineering definitions

Different definitions have been offered for re-engineering since its adoption and some of them are indicated in the following section.

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- Re-engineering is a structured approach that is used for analyzing and creating the continuous improvements in the basic organizational activities such as production, marketing, and communications [11].
- It is a radical and rapid re-designing of the strategic processes of organizations business, systems, policies, and structures for improving job processes and increasing productivity in the organization [12].
- It includes activities that the organization pursues in order to change its processes and internal controls so that its traditional vertical structures changes to the horizontal and flat ones based on the inter-functional teams. All of processes are done in such systems for satisfying the customer's needs [13].
- It is an improvement philosophy whose purpose is to achieve stage benefits in the performance by re-designing the processes. In these re-designing, the organization seeks to maximize its value-added efforts and minimize other activities [1].

2.2. Advantages of re-engineering

Many authors believe that thought and redesign of business processes lead to considerable changes and improvements [14]. Business processes re-engineering are used in both service sectors [2, 6, 15] and product ones [17, 18]. Successful implementation of business processes re-engineering result in the improvement of processes and promotion of service offering level for customers [10]. Re-engineering strategy is based on the customer, high quality, low price, and offering appropriate services and keep the company competitiveness through this [19]. Re-engineering also improve the productivity through concentration on the product development cycle, market responding, and improvement in products and services quality [20]. Maull et al. [21] introduced the considerable improvements in time of process cycle, operations cost, and the customer's satisfaction as re-engineering benefit. Motwani [22] stated that re-engineering will results in decreasing wastes. He also pointed out that re-engineering eliminates which activities, reviews, stops, and supervisions that haven't any role in satisfying customer's needs.

3. Critical success and failure factors in re-engineering projects

Successfulness in the implementation of business processes re-engineering is depended on different factors [23]. Since now, different companies have implemented re-engineering projects and some of them were successful in this while others failed [7]. Re-engineering is very risky rather its time-consuming and high cost characteristics. This subject was confirmed in different studies and also different reports were published in terms of its failure in different organizations [24, 25]. The risky nature of re-engineering leads to conduct different studies in terms of its critical success and failure factors [26]. Many authors and researchers believe that the critical success and failure factors in the re-engineering projects can be used as an instrument for measuring risk level in re-engineering projects [3, 22, 27]. Indeed, it is supposed that the critical success and failure factors measurement can determine the risk level in the re-engineering projects implementation. The present study has been conducted based on the different studies such as Crowe et al. [3], Guimaraes [27], Motwani et al. [22], and Terziovski et

al. [28]. Crowe et al. [3] evaluate risk level in the re-engineering projects by examining the critical success and failure factors. They categorized the success and failure factors in four sets and 17 sub-factors. These include uniform leadership, workplace, senior management commitment, and management supportiveness. They also introduced failure factors in the title of resistance to change. Guimaraes [27], Motwani et al. [22], and Terziovski et al. [28] concentrated on the role of change management and information technology as critical success factor. This study seeks to integrate the previous studies so that offer more complicated method for evaluating risk level in the engineering projects. For this purpose, critical success and failure factors in the implementation of re-engineering projects were identified and shown in the more comprehensive framework that were indicated in figures 1 and 2. This figures show that which factors were indicated by the authors and researchers. Each of these factors was described in the following sections.

Figure 1. Critical success factors in the re-engineering projects implementation

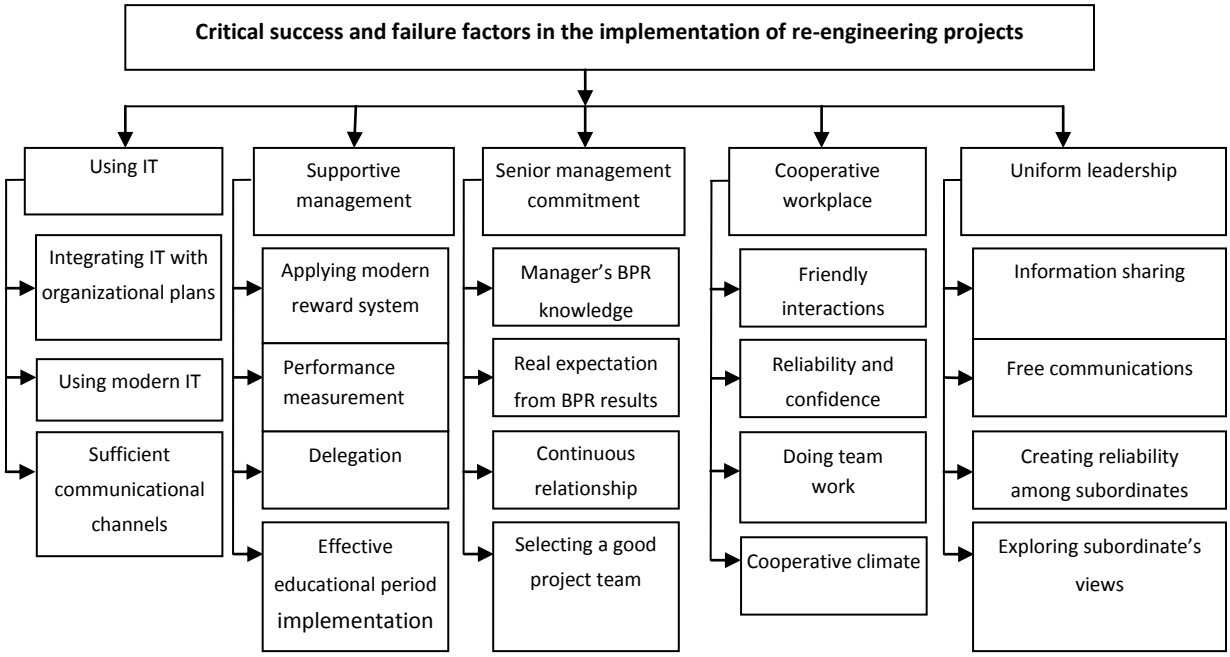

Figure 2. Critical failure factors in the re-engineering projects implementation

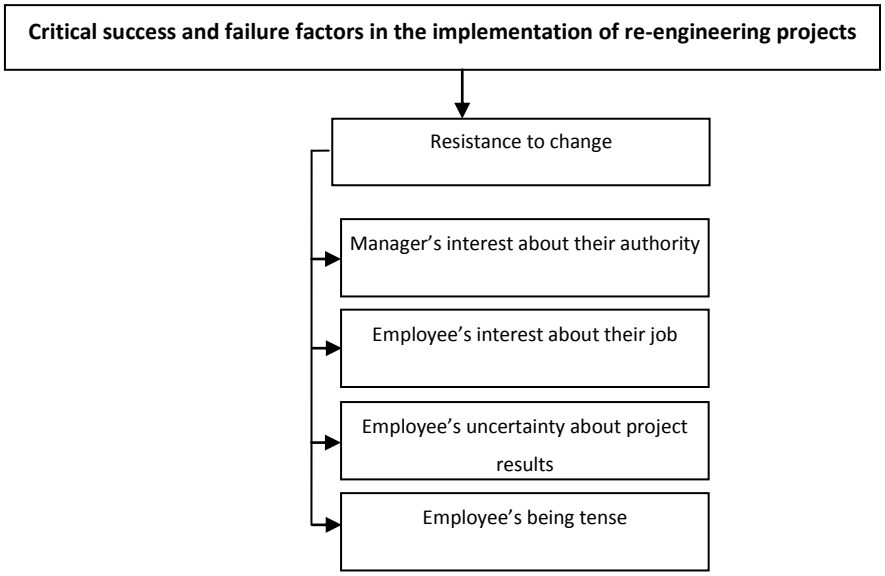

Table 1. The suggested critical success factors in the previous studies

	Uniform leadership				Cooperative workplace				Senior management supportiveness				Supportive-oriented management				Using information technology		
Resource	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
[3] Crowe et al.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			*
[25] Dennis et al.							*	*	*	*	*							*	
[29] Grant	*	*							*	*					*	*		*	*
[27] Guimaraes	*	*	*	*					*	*	*			*	*		*		
[21] Maull et al.		*		*			*	*	*	*				*					*
[22]Motwani et al.	*	*		*			*	*	*	*					*	*		*	*
Ranganathan et [30] al.		*					*	*	*	*	*							*	*	*
[26] Reijers et al.					*	*	*	*							*	*	*		
[28]Terziovski et al.	*	*		*			*	*	*	*				*			*	*	*

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Table 2. The suggested failure factors in the previous studies

				Resistance to change
Resource	1	2	3	4
[3] Crowe et al.	*	*	*	*
[25] Dennis et al.	*	*	*	*
[29] Grant			*	*
[27] Guimaraes	*	*	*	*
[21] Maull et al.	*	*	*	
[22]Motwani et al.			*	*
Ranganathan et al. [30]	*		*	
[26] Reijers et al.	*	*		*
[28]Terziovski et al.	*	*	*	*

3.1. Uniform leadership

Motwani et al. [22] introduced employee's participation, effectiveness communications, and efficient leadership as the most important and key factors in the re-engineering projects successfulness. The senior managers should provide climate for employee's participation in the change programs through offering the necessary information for them. They also should provide channels for employee's communications and interactions. Effective communication is necessary for organizational decision making process [22]. In order to provide employee's participation in the new system, senior managers should provide reliable climate in the organization's environment [29]. Group-based decision making process results in decrease decision making time in the evaluation and re-engineering steps analysis. Employee's participation and using their valuable viewpoints help senior management in achieving optimum operation process [3]. Uniform culture leads to change positive in the organizations and also decrease the employee's resistance to change [3].

3.2. Cooperative workplace

Friendly and hearty relationships among employees in a cooperative workplace are considered as one of the critical success factors in re-engineering projects [3]. The employees in an organization should have friendly interactions with each other [31]. In order to doing activities in a cooperative environment, it is necessary to provide a reliable climate other than friendly interactions among employees. They also should believe that the senior management appreciates their efforts [3]. A cooperative environment based on the group working will result in positive changes in organization's performance [21]. Successful re-engineering project implementation requires change in the employee's attitudes, participation, and also professional teams for creating rapid changes [10]. Because human resource is one of the most

important aspects of re-engineering, organizations should ensure that employees have appropriate motivation and necessary educational technologies [10].

3.3. Senior management commitment

The necessary of clear strategic vision in re-engineering process is an undeniable fact [3]. Strategic management is in the highest level of organizational hierarchy and determines organization's strategic direction [29]. Also senior management should be aware of organizational conditions. Additionally, management knowledge about re-engineering projects and real expectations from its results is necessary [3]. In order to achieve successfulness in the re-engineering projects implementation, senior management should have relationship with employees and motivates them and also monitors its executive team [21]. If the senior management doesn't be aware of the present processes and ideal organizational processes characteristics, its effort for implementing re-engineering projects failed [32].

3.4. Supportive management

Human resource plays a critical role in the organizational processes improvement. Undoubtedly, they are primary decision makers and considered as an important component in every system [29]. Human resource structure should be designed openly so that supports information sharing in the organization and finally results in decision making process improvement [33].

3.5. Using information technology

Information technology is considered as one of the most important factors in re-engineering projects. It plays an important role in re-engineering projects [34]. Many authors state that applying information technology results in successful re-engineering projects implementation and also decreasing its failure [3, 10, 22, 35]. Information technology also involves some aspects such as software, information systems, and communicational technologies so that the necessary information is offered for employees [19]. Information technology leads to improve life effectiveness through integrating human, business, and organizational activities [33].

3.6. Resistance to change

Re-engineering creates comprehensive changes throughout the organization and then employees resist such changes. This resistance is one of the most important reasons of re-engineering projects failures [36]. Successful re-engineering project implementation requires changing employee's attitudes, their participation, and also professional teams [24]. The employees resist re-engineering projects because of uncertainty about future changes that are the results of re-engineering projects implementation. Fear of losing their job and organizational status are the most important reasons of why employees resist changes [37]. Maull et al. [21] pointed out that the organizations face a series of fundamental issues in the re-

engineering project implementation. They also considered the role of information technology important in the successful re-engineering project implementation.

4. Research methodology

This study was conducted in two steps. The first was identifying and determining the extent of critical success factors importance in the re-engineering projects implementation and the second was analyzing risk level in its implementation in our case study. These steps were described in the following sections.

4.1. Identifying and determining the extent of critical success and failure factors importance in the re-engineering project implementation.

The critical success factors in the re-engineering project implementation were identified based on the reviewing literature and exploring expert's viewpoints. The results of this review and explore leads to achieve the 19 success factors and the four failure ones in the re-engineering project implementation. The key factors were categorized in five sets and failure factors in one set. These findings were indicated in the figures 1 and 2. In order to determine the extent of each factors importance, 11 faculty member's opinions and also 14 industrial expert's views were explored. For this purpose, a self-administered questionnaire was developed and indicated by them. This questionnaire was developed based on the Likert five point scale (very low, low, moderate, high, and very high). The respondents were asked to indicate the questionnaires based on the offered scale and so determine the extent of the success and failure factors importance. In order to determine the extent of these factors importance, their average was calculated. Then the average of every group was calculated for determining every group importance. The results of averages were indicated in the tables 3 and 4.

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Table 3. The importance of every critical success factors in the re-engineering project implementation

Weights	Critical success factors	Weights	Groups
2.343	Information sharing	2.274	Uniform leadership
2.421	Free communications		
1.895	Creating trust among subordinates		
2.473	Using subordinate's constructive feedbacks		
1.680	Friendly interactions	2.555	Cooperative workplace
2.316	Trust and reliability		
3.541	Doing team works		
2.683	Cooperative climate		
3.254	Manager's knowledge about BPR	2.997	Senior management commitment
2.889	Real expectation from BPR results		
3.327	Continuous relationships among manager, employees, and project users		
2.521	Selecting a powerful team for BPR		
2.413	Using modern reward systems	2.629	Supportive management
2.337	Performance measurement		
2.649	Authority delegation		
3.120	Conducting effective educational periods		
2.752	Integrating information technologies with organizations plans	2.240	Using information technology
2.114	Sing modern information technologies		
1.856	Communicational channels		

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Table 4. The importance of every critical failure factors in the re-engineering project implementation

Weights	Critical failure factors	Weights	Groups
2.965	Middle manager's interest from losing their authority	2.901	Resistance to change
2.544	Employee's interest from losing their job		
3.424	Employee's uncertainty about project results		
2.673	Employee's being tense		

4.2. Analyzing risk level in the re-engineering projects

In this step, the authors seek to determine risk level in the re-engineering project implementation. For this purpose, a self-administrated questionnaire was distributed in a public service company. In this questionnaire, the respondents were asked to answer these questions in the Likert five point scales. For example, this questions was asked from the respondents about using subordinate's constructive feedbacks that "managers use their subordinate's feedbacks and viewpoints in constructive manner" and then the respondents should indicated their answers in the Likert five point scales. So, score of every factor is determined based on the respondent's answers. Also, this questionnaire was offered for senior managers, middle managers, supervisors, and expert employees that have participated in the re-engineering project in their organization. For this purpose, 118 questionnaires were distributed among them that 121 of them were indicated by the respondents that 12 questionnaires were unusable and finally 109 questionnaires (58%) were used in the final analysis. Every factors score in terms of success and failure factors were indicated in the tables of 5 and 6.

Table 5. The scores of every critical success factors in the re-engineering project implementation

Scores	Critical success factors	Scores	Groups
0.932	Information sharing	1.122	Uniform leadership
1.212	Free communications		
1.227	Creating trust among subordinates		
1.119	Using subordinate's constructive feedbacks		
1.365	Friendly interactions	1.211	Cooperative workplace
1.029	Trust and reliability		
1.358	Doing team works		
1.094	Cooperative climate		
1.966	Manager's knowledge about	1.969	Senior management

	BPR		commitment
1.235	Real expectation from BPR results		
2.569	Continuous relationships among manager, employees, and project users		
2.108	Selecting a powerful team for BPR		
1.065	Using modern reward systems	2.254	Supportive management
2.58	Performance measurement		
2.417	Authority delegation		
2.955	Conducting effective educational periods		
0.412	Integrating information technologies with organizations plans	0.534	Using information technology
0.213	Sing modern information technologies		
0.976	Communicational channels		

Table 6. The scores of every critical failure factors in the re-engineering project implementation

Scores	Critical failure factors	Scores	Groups
2.035	Middle manager's interest from losing their authority	2.127	Resistance to change
1.065	Employee's interest from losing their job		
3.021	Employee's uncertainty about project results		
2.388	Employee's being tense		

After determining the extent of every critical success and failure factors importance and their scores in the studied company, the risk level of every factor in the re-engineering project implementation was calculated. For this purpose, the total score was calculated based on the formula 1. Also in this study, risk level analysis was performed based on the total risk level score.

Formula 1: $$S = \sum_{i=1}^{19} W_i.P_i - \sum_{j=1}^{4} W_j.P_j$$

In this formula, s in indicator of total score, Wi refers to the extent of every critical success factors importance, Pi refers to the score of every critical success factor, Wj refers to the extent of every critical failure factor importance, Pj refers to the score of every critical failure factor. With respect to the formula 1, the total score was calculated in this company that is 48.563. In order to analyze the risk level in the re-engineering project implementation, a range of five

points was used. If the total score is less than 0, re-engineering project implementation is very high risky; if this score is between 0 and 50, re-engineering project implementation is high risky, if this score is between 51 and 100, re-engineering project implementation is moderate risky; if this score is between 101 and 150, re-engineering project implementation is low risky, and finally if this score is more than 151, re-engineering project implementation is not risky. The summary of these scores were indicated in table 7.

Table 7. The scores and risk levels

Risk levels	Total scores
Very high risky	Less than 0
High risky	0-50
Moderate risky	51-100
Low risky	101-150
No risk	More than 150

5. Discussion and conclusion

Re-engineering the business processes refer to risky efforts that creates rapid and radical changes in human resources, processes, and technology areas of the organizations. Risk level analysis results in examining each of these areas and also offer the appropriate perception of the present conditions. This also leads to analyze the present conditions and achieve the solutions that ensure successful re-engineering project implementation. The results of this study indicated that re-engineering project implementation in this company is risky and likely this project fails in this company. The results of this study also refer to the company's weakness in terms of using information technology so that these factors have the minimum scores in our study. The results also indicated that there is a deep gap between senior managers and employees in this company that prevents collective behaviors, information sharing, and interaction with senior managers. Additionally, these results indicated that there are low trust and intimacy among employees. In order to decrease risk level, all of the new professional teams should be defined based on the business processes. This can leads that the organization be process-oriented in the future. The innovative results of the teams should be used and offered for senior managers to resolve their problems so that they can use these results in their decision making. This leads to reinforce reliability and trust among employees and management. In addition, implementation of the cultural-educational periods such as seminars, workshops, and educational journeys will decrease employee's resistance to change.

Re-engineering requires changing employee's culture and behaviors in all of the organizational levels. As indicated, management performance is a key factor in the successfulness of re-engineering project implementation. The managers should follow some principles for achieving considerable improvements. Developing a strategic planning can help the managers to have good perception of the present conditions, business processes, and organization's future. Strategic planning also is effective in the re-engineering project implementation. Additionally,

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an operational plan that is derived from the strategic planning prepares the organization with rapid changes before implementation step. Creating uniform society in the organizations can leads to make the sustainable constructive interactions and also improve reliability and trust level among the employees. Implementation of friendly session with employees in the workplace and education culture can facilitates the structural changes and also leads to employee's more and more participation. Applying performance measurement and creating reward system based on the performance leads to encourage the employees and finally increasing productivity.

References

1. Rowland. P, and Repard.j "The Essense of Business Proess Reengineering", Harper Collins, New York, (1995).
2. Shin, N. and Jemella, D.F., "Business Process Reengineering and Performance Improvement", Business Process Management Journal, Vol. 8 No. 4, (2002), pp. 351-63.
3. Crowe, T.J., Fong, P.M. and Zayas-Castro, J.L., "Quantative risk level estimation of business process reengineering efforts", Business Process Management Journal, Vol. 8 No. 5, (2002), pp. 490-511.
4. Cheng, M.Y., Tsai, M.H., and Xiao, Z.W., "Construction Management Process Reengineering: Organizational Human Resource Planning for Multiple Projects", Automation in Construction, Vol. 15, No. 1, (2006), pp. 785-799.
5. Hammer, M., and Champy, J., "Reengineering the Corporation-A Manifesto for Business Revolution", Harper Collins, New York, 1993.
6. Lindsay, A., Downs, D. and Lunn, K., "Business Processes –Attempts to Find a Definition", Information and Software Technology, Vol. 45, (2003), pp. 1015-9.
7. Samia M. Siha, and Germaine H., "Business Process Improvement: Empirical Assessment and Extensions", Business Process Management, Vol. 14 No. 6, (2008), pp. 778-802
8. Chan, P.S. and Peel, D., "Causes and impact of reengineering", Business Process Management Journal, Vol. 4, No. 1, (1998), pp. 44-55.
9. Francis, A. and McIntosh, R., "The Market, Technological and Industry Context of Business Process Rre-engineering in the UK", International Journal of Operations & Production Management, Vol. 17, No. 4, (1997), pp. 344-364.
10. Gunasekaran, A. and Kobu, B., , "Modelling and analysis of business process reengineering", International Journal of Production Research, Vol. 40, No. 11, (2002), pp. 2521-2546.
11. Elzinga, J., Horak, T., Lee, C.-Y. and Bruner, C., "Business process management: survey and methodology", IEEE Transactions on Engineering Management, Vol. 42, No. 2, (1995), pp. 119-128.
12. Klein,M.A., "step by Step Guide to Business Transforvation, Manganelli,r", AMACO, new York: (1994).
13. Schniederjans, M.J. and Kim, G.C., "Implementing enterprise resource planning systems with total quality control and business process reengineering – survey results", International Journal of Operations & Production Management, Vol. 23 No. 4, (2003), pp. 418-29.
14. Revere, L., "Re-engineering Proves Effective for Reducing Courier Costs", Business Process Management Journal, Vol. 10 No. 4, (2004), pp. 400-14.

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January 2013, Vol. 3, No. 1
ISSN: 2222-6990

15. Hall, G., Rosenthal, J. and Wade, J "How to make reengineering really work", Harvard Business Review, (1993).
16. Attaran, M. and Wood, G.G., "How To Succeed at Reengineering", Management Decision, Vol. 37 No. 10, (1999), pp. 752-757.
17. Zairi, M., "The Integration of Benchmarking and BPR: A Matter of Choice or Necessity?", Business Process Re-engineering & Management Journal, Vol. 1 No. 3, (1995), pp. 3-9.
18. Tonnessen, T., "Process Improvement and the Human Factor", Total Quality Management, Vol. 11 No. 4, (2000), pp. 773-8.
19. Al-Mashari, M. and Zairi, M., "Revising BPR: a holistic review of practice and development", Business Process Management Journal, Vol. 6 No. 1, (2000), pp. 10-42.
20. Palmer, B., "Overcoming resistance to change", Quality Progress, Vol. 37 No. 4, (2004), pp. 35-40.
21. Maull, R.S., Tranfield, D.R. and Maull, W., "Factors characterising the maturity of BPR programmes", International Journal of Operations & Production Management, Vol. 23, No. 6, (2003), pp. 596-624.
22. Motwani, J., Subramanian, R. and Gopalakrishna, P., "Critical factors for successful ERP implementation: exploratory findings from four case studies", Computers in Industry, Vol. 56, (2005), pp. 529-44.
23. Marchland, D.A. and Stanford, M.J. "Business process redesign: a framework for harmonizing people, information and technology", IDEA Group Publishing, (1995), pp. 35–56.
24. Chiplunkar, C., Deshmukh, S.G. and Chattopadhyay, R., "Application of Principles of Event Related Open Systems to Business Process Reengineering", Computers & Industrial Engineering, Vol. 45, (2003) pp. 347-374.
25. Dennis, A.R., Carte, T.A. and Kelly, G.G., "Breaking the Rules: Success and Failure in Groupware-Supported Business Process Reengineering", Decision Support Systems, Vol. 36, (2003), pp. 31-47.
26. Reijers, H.A. and Mansar, S.L., "Best Practices in Business Process Redesign: An Overview and Qualitative Evaluation of Successful Redesign Heuristics", Omega, Vol. 33 No. 4, (2005), pp. 283-306.
27. Guimaraes, T., "Field testing of the proposed predictors of BPR success in manufacturing firms", Journal of Manufacturing Systems, Vol. 18 No. 1, (1999), pp. 53-65.
28. Terziovski, M.E., Fitzpatrick, P. and O'Neill, P., "Successful predictors of business process reengineering (BPR) in financial services", International Journal of Production Economics, Vol. 84, (2003), pp. 35-50.
29. Grant, D., "A wider view of business process reengineering", Communications of the ACM, Vol. 45 No. 2, (2002), pp. 84-92.
30. Ranganathan, C. and Dhaliwal, J.S, "A survey of business process reengineering practices in Singapore", Information & Management, Vol. 39, (2001), pp. 125-34.
31. Tatsiopoulos, I.P. and Panayiotou, N., "The integration of activity based costing and enterprise modeling for reengineering purposes", International Journal of Production Economics, Vol. 66, (2000), pp. 33-44.
32. Sulaiman A. Al-Hudhaif, " Process Redesign: Reengineering Core Process at Computer Department – a Case of SWCC", Business Process Management, Journal Vol. 15 No. 2, (2009), pp. 184-200.

33. Mansar, S.L., Marir, F. and Reijers, H.A., "Case-based reasoning as a technique for knowledge management in business process redesign", Electronic Journal on Knowledge Management, Vol. 1 No. 2, (2003), pp. 113-24.
34. Attaran, M., "Information technology and business-process redesign", Business Process Management Journal, Vol. 9 No. 4, (2003), pp. 440-58.
35. Shin, N. and Jemella, D.F., "Business process reengineering and performance improvements – the case of Chase Manhattan Bank", Business Process Management Journal, Vol. 8 No. 4, (2002), pp. 351-63.
36. Maull, R.S., Childe, S.J., Smar, P.A. and Bennett, J., "Current Issues in Business Process Re-engineering", International Journals of Operations & Production Management., Vol. 15, No. 11. (1995), pp. 778-802.
37. Abdolvand, N. Albadvi, A & Ferdowsi, Z. "Assessing readiness for business process reengineering", Business Process Management Journal, Vol. 14, No. 4, pp. 497-511, 2008.