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Evaluation of Effective Factor in Implementation of Business Process Reengineering (BPR) Project

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ABSTRACT

This study was an attempt to identify, evaluate and prioritize the effective factors in implementation of BPR in Mazandaran Regional Electric Company. The data collected from 140 participants was coded and evaluated through SPSS and Excel. The reliability of connoisseurs' questionnaire which was estimated through Cronbach alpha was confirmed. AHP-FUZZY test identified the priority of each factor and options for each of them. Based on the results of this test, organizational factor take the first place of importance and human, technological and environmental factors acquired the second to the fourth place of importance. Among the options, the first, second and third place respectively were allocated to the lack of hierarchical power company, documenting processes and sub-processes, and concentration units involved in the process.

Keywords: Evaluation, BPR, Factors, Electricity Distribution Company, FUZZY Analytic Hierarchy Process (AHP-FUZZY)

1. Introduction

Business Process Reengineering (BPR) in a new approach which has different trend toward organizations. From the late 90_s with the help of this approach, various organizations in developed countries have managed to transform themselves and now they are trying to achieve continues transformation. To survive and compete in their presence, organizations are force to change and use the latest technology to achieve the highest level of achievement in their ability to improve their employees and themselves. Organizations that can successfully carry out BPR, can achieve fundamental results in short term as well as have the flexibility to be able to continuously change. Some of the achievements of this approach are to provide quality services to customers, reduce costs, speed up and improve the performance of the organization (Mohammadi & khoon Siavashi, 2009).The purpose of this study was to evaluate and prioritize the factors affecting the deployment of BPR in the Mazandaran regional electric company.

2. Literature Review

Bostanchi (2007) carriy out a study in Iran entitled "The Suitable Method of BPR". With the study of the ways of implementing BPR proportional to the Iranian cultural attitudes in organizations as well as implementation experience in industrial group and Pars Khodro Company, this research tries to introduce the best way" of BPR.

Behrouz and Albadvi (2006), carry out an article entitled "BPR in Governmental Organizations". In this article, they mention some suggestion to successful implementation of BPR which include:

1) Most of the governmental organizations are extremely resistance against the changes. So the most important lever of pressure for their BPR is political and social changes.
2) Advertising in the media along with informing the public, which occurs in response to public pressure, is beneficial way for government organizations to emphasize their employees on the importance of BPR.
3) Selecting neutral senior staff among other departments' experts provides an attractive combination in BPR team.
4) Government organizations suffer from the lack of a suitable imitation. The government sector should adopt quality indicators from private parts in line with its objectives.
5) Approval of redesign process is critical for government organizations. Among bureaucratic organizations, support of the senior management is the most important factor in project success. Because by doing so changes in the structure, human resource, human resource structure and incentive structure will be facilitating.

3. Methodology

First step: Identifying Criteria and Factors Affecting the Implementation of BPR

22 options were listed on the questionnaire to distribute among connoisseurs and experts, and then to integrate score their geometric mean was calculated. The options (from A1 to A22) are listed in Table 1:

Table 1: AHP- FUZZY Test Options

Options	Factors	name
Having adequate employees training	Human	A1
Employees' flexibility to changes		A2
Employees' confidence that these changes will lead to job security		A3
Having enough motivation due to receive feedback from their activities		A4
Employees' participation in all operation		A5
Employees' consideration to the result of the activity not doing		A6
Having decision-making power in respect of employees fulfilling the tasks required in their job	Organizational	A7
Having the program of continuous improvement process in company's strategy		A8
Lake of hierarchical in Electric Company		A9
Existing a process based thought in company's structure		A10
Documenting key processes and sub-processes Standardizing business processes		A11
Concentration of involved units in a process		A13
Applying laws and regulations with BPR in Electric Company		A14
easy and timely access to the accurate information	Technological	A15
Compatibility between company's culture and technology		A16
Benefit from new technologies and approaches in the existing working methods		A17
Adequate training of personnel on information	Environmental	A118
Compatibility between technology and business processes		A19
Company's consideration to the customers' satisfaction		A20
Paying attention to the strategies of competitor		A21
Paying attention to the company's limitation (economic crisis, opportunities and threats)		A22

Second step: the Implementation on AHP-FUZZY to Ranking Factors

To evaluate the factors of assessment criteria should be defined and should be prioritized. Since in this study, evaluation and quality indicators take place in multi-step, AHP (Analytic Hierarchy Process) is a suitable method for this purpose. Most of managers offer their opinions in linguistics form rather than numerical values, so an AHP-FUZZY framework was used for prioritization of factors. The selected method for using AHP-FUZZY technique was Extent Analysis method (EA) in order to make parameters and options more valuable (Chang, 2001).

A) Formation of Hierarchical Model

In this study, according to this method, first hierarchy of decision-making for prioritizing is drawn. For the hierarchical model, it is required to determine its three main levels. The first level, which represents the highest level of the hierarchical model, is the purpose of deciding or ranking the importance of affective factors in implementation of BPR (A_1- A_{22}).

B) Matrix design of paired comparisons: The purpose of this step is to determine the weights of criteria and rating factors. Therefore, paired comparisons tables are made by the use of the research hierarchical model. At the first step, connoisseurs' comments and preferences about the amount of importance of indicators and options in terms of natural language in the form of paired comparison matrix is collected..

C) Calculation of Coefficient of the Paired Comparison Matrix

After forming of the paired comparisons matrix and collecting data, weights of the element is calculated. To estimate the weights, coefficients of each paired comparison matrix and magnitude of each element compared to each other should be calculated. According to EA, the coefficient of the matrixes is calculated by the following equation (Asqarpour, 2004).

$$S_K = \sum_{j=1}^{n} M_{KL} \times \left[\sum_{j=1}^{m}\sum_{j=1}^{n} M_{ij}\right]^{-1} \quad \textbf{(1)}$$

K stands for number of row and ***i*** and ***j*** indicate options and indicators.

$$V(M_1 \geq M_2) = 1 \qquad m_1 \geq m_2$$

$$V(M_1 \geq M_2) = hgt(M_1 \cap M_2) \qquad \text{Otherwise} \quad (2)$$

$$hgt(M_1 \cap M_2) = \frac{u_1 - l_2}{(u_1 - l_2) + (m_2 - m_1)}$$

D) Calculation Weights of Indicators and Options:

In order to estimate weight of element, after finding the magnitude, we should do as follow in paired comparison matrix:

$$W'(x_i) = \text{Min}\{V(S_i \geq S_k)\}, \quad K = 1, 2, ..., n \quad K \neq i \quad \textbf{(3)}$$

The options of the above equation are extracted from Table 6 which calculated the lowest amount of magnitude.

So the vector of weight of elements will be as follow:

$$W' = [W'(c_1), W'(c_2), ..., W'(c_n)]^T \quad \textbf{(4)}$$

Then the vector of coefficient of the abnormal AHP-FUZZY will convert to the normal weight based on the below equation:

$$w_i = \frac{w'i}{\sum w'i} \quad \textbf{(5)}$$

Finally the sum of them is calculated and then by dividing each option by the sum.

4. Finding

At the end, the results of calculation of human, organizational, technological and environmental indicators and also results of calculation of 22 options related to the BPR (from A1 to A22) are integrated in order to obtain the relative importance of options

Table 2: Ranking of Options of Effective Factor in Implementation of BPR

Initial weight of human factors option	Initial weight of organizational factors option	Initial weight of technological factors option	Initial weight of environmental factors option		Infrastructures' Weight		The final ranking of human factor	The final ranking of organizational factor	The final ranking of technological factor	The final ranking of environmental factor
0.2262	0.1599	0.2623	0.6142				0.0555	0.1058	0.0184	0.0133
0.2020	0.1661	0.2481	0.2289	×	0.2456	=	0.0496	0.1099	0.0174	0.0049
0.2180	0.0356	0.2623	0.1569		0.6622		0.0535	0.0235	0.0184	0.0034
0.1959	0.1607	0.0211			0.0704		0.0481	0.1064	0.0014	
0.0560	0.1602	0.2061			0.0218		0.0137	0.1060	0.0145	
0.0586	0.1605						0.0143	0.1062		
0.0433	0.1569						0.0106	0.1038		

In Table 2, the effective factors and options with their scores and ranks in implementation of BPR in Mazandaran Electric Company are shown.

Table 3: Ranking of Priority of Options

priority	Score	Options	Num	priority	Score	Options	Num
4	0.1060	Standardizing business processes	12	7	0.0555	Having adequate employees Training	1
3	0.1062	Concentration of involved units in a process	13	9	0.0496	Employees' flexibility to changes	2
6	0.1038	Applying laws and regulations with BPR in Electric Company	14	8	0.0535	Employees' confidence that these changes will lead to job security	3
12	0.0184	easy and timely access to the accurate information	15	10	0.0481	Having enough motivation due to receive feedback from their activities	4
13	0.0174	Compatibility between company's culture and technology	16	16	0.0137	Employees' participation in all operation	5
12	0.0184	Benefit from new technologies and approaches in the existing working methods	17	15	0.0143	Employees' consideration to the result of the activity not doing	6
21	0.0014	Adequate training of personnel on information	18	18	0.0106	Having decision-making power in respect of employees fulfilling the tasks required in their job	7
14	0.0145	Compatibility between technology and business processes	19	5	0.1058	Having the program of continuous improvement process in company's strategy	8
17	0.0133	Company's consideration to customers' satisfaction	20	1	0.1099	Lake of hierarchical in Electric Company	9
19	0.0049	Paying attention to the strategies of competitor	21	11	0.0235	Existing a process based thought in company's structure	10
20	0.0034	Paying attention to the company's limitation (economic crisis, opportunities and threats)	22	2	0.1064	Documenting key processes and sub-processes	11

Based on the results of the Table 9, the first to third places belong respectively to: lack of hierarchical power in company, documenting key processes and sub-processes, and Concentration of involved units in a process. The nineteen to twenty-one places is devoted respectively to paying attention to the strategies of competitor, paying attention to the company's limitation (economic crisis, opportunities and threats), and adequate training of personnel on information.

5. Discussion & Conclusion

The result of factors ranking by the use of AHP-FUZZY indicated that organizational, human resource, technological, and environmental factors take the first to fourth places, respectively. The result of option ranking of human factor by the use of AHP-FUZZY showed that options including : having adequate employees' training, employees' confidence that these changes will lead to job security, employees' flexibility to changes, having enough motivation due to receive feedback from their activities, employees' consideration to the result of the activity not doing, employees' participation in all operation, and having decision-making power in respect of employees were at the first to seventh places. The result of option ranking of organizational factor by the use of AHP-FUZZY indicated that the first to seventh places is belonged respectively to options including: lake of hierarchical in Electric Company, documenting key processes and sub-processes, concentration of involved units in a process, having the program of continuous improvement process in company's strategy, applying laws and regulations with BPR in Electric Company, and existing a process based thought in company's structure. The result of option ranking of technological factor by the use of AHP-FUZZY expressed that the first to fifth places were devoted respectively to options including: easy and timely access to the accurate information, benefit from new technologies and approaches in the existing working methods, compatibility between company's culture and technology, compatibility between technology and business processes, and adequate training of personnel on information. The result of option ranking of environmental factor by the use of AHP-FUZZY indicated that the first to third places belonged respectively to options including: company's consideration to customers' satisfaction, paying attention to the strategies of competitor, paying attention to the company's limitation (economic crisis, opportunities and threats).The result of option ranking of the four factors by the use of AHP-FUZZY showed that the first to third places among total of options were belonged to the options including: lake of hierarchical in Electric Company, documenting key processes and sub-processes, and concentration of involved units in a process. The nineteenth to twenty- first places were devoted to options including: paying attention to the strategies of competitor, Paying attention to the company's limitation (Economic crisis, opportunities and threats), and adequate training of personnel on information.

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