Enhancing an Organization's Output through Re-engineering of Administrative Processes

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Abstract: This research implements a descriptive approach in preparing a theoretical framework for re-engineering administrative processes. The objective of this work is to identify the administrative processes to be considered and to quantify the benefits of applying the re-engineering processes. A field study was performed to determine the feasibility of applying the proposed framework in companies operating in Jeddah, Kingdom of Saudi Arabia. The study included a selected sample of projects from various service and manufacturing sectors. The results supported the need for re-engineering the administrative processes to help achieve tangible improvements in efficiency, productivity, and profitability.

1. INTRODUCTION

Process re-engineering is one of the best management methods to reduce cost, save time and improve quality of service because it embraces the idea of considering and rethinking the organization's organizational processes, structure, and engineering to achieve tangible improvements in efficiency, productivity, and profitability.

Organizations are one of the sectors recognized for their steady growth in the face of intense competition. As these organizations experience high costs, declining revenues, and administrative profits due to local, regional and global economic conditions, they must use modern methods to reduce cost and increase profitability, quality of services, and administrative products. This study seeks to know the impact of re-engineering processes on the performance of organizations.

The objective of this work is to identify the administrative re-engineering processes and to acknowledge the motivation for applying organizations to re-engineering processes. This research aims to produce results that are of importance to decision-makers in the banking field to benefit from findings regarding the direction and continuous improvement of services. This work also seeks to address the re-engineering of administrative processes as an administrative entry for the development of the banking sector.

The population of this study consists of a random sample to answer the questionnaire, which will be an essential tool for the study. The study sample consists of general managers, department managers, and employees in private organizations in Jeddah.

The boundaries of the study were chosen so that it is possible to obtain information, distribute the questionnaire, collect information, and analyze it to benefit from this information and reach the desired results of this work. The dependent variables represent the reduction of costs and the increase in profits; the independent variables represent the rebuilding of the organizational structure, organizational culture, empowering employees, and information technology.

2. LITERATURE REVIEW

Re-engineering derives its name from a process involving breaking an electronic product apart to redesign it into a superior version [1]. Therefore, re-engineering involves the dismantling of an electronic product to create a better version whose efficiency and effectiveness of operation exceeds that of the original

one. Japanese companies have, over the years, used this method to create and innovate technologies. Companies gathered ready-made goods that other countries developed and manufactured. After collection, the Japanese companies proceeded to dismantle and assemble them in diverse ways that ensured the products were simple to produce, cheaper to manufacture, and easy to use. Consequently, the process that Japanese firms embraced contributed to the development of the re-engineering concept in the manufacturing sector.

The business re-engineering concept extends and re-engineers radical and rapid administrative, strategic processes, core value-added and systems, structures of organizations, and policies in a bid to increase support to workflows in addition to increasing productivity in the organization [2]. It has been defined by [3] as "a radical way of thinking of the organization, translating to the performance of things, which can be equated to the concept of innovation." Another definition of the concept [4] is "the necessary work of the organization meant to internally restructure the operations."

Ozcelik (2010) [6] undertook an examination of business process re-engineering (BPR) projects to see whether it improves the performance of firms through the comprehensive analysis of a data set found on prominent businesses in the United States (U.S.). Some of the measures of performance used include return on equity, return on assets, and labor productivity. It is reported by the researcher that there is increased firm performance upon the BPR projects finalized as it remains constant in the process of execution. Further, the report shows that BPR projects that were functionally focused averagely contributed more to the performance than the larger cross-functional scope. This likely indicates that the BPR project's potential failure has the probability of increasing to surpass a given scope level. Altinkemer et al. (2011) [7] investigated whether BPR has an association with improved firm productivity and overall performance. They approached the task by analyzing firm-level panel data belonging to large firms in the U.S. and found in the Fortune 500 list between 1987 to 2008 through fixed effects as well as first differencing known to be standard methods in accounting for effects that are unobservable at the firm level. Standard variables were employed by the researchers to measure productivity and firm performance. They found that a performance variable had a significant drop in the process of project initiation. Moreover, the fixed effects results indicated that productivity and performance measures improve non-proportionally upon initiation of the project. The report also indicated that the projects of enterprise-wide BPR have an association with increased negative returns at the initiation period. However, there is a lack of evidence regarding their superiority against projects that are BPR focused in terms of performance improvement upon initiation of the project. They suggested that this is because big projects are riskier and sometimes lead to more failures.

2.1. Business Re-engineering

Business re-engineering is a technique aiming to create improvement in the way processes roll out, and the efficiency in the way processes occur, ensuring that the processes are effective in achieving goals. The necessary work of the organization is to restructure internal operations [4].

Aims of re-engineering [5] are to reduce cost performance, do away with old routine while encouraging flexibility and freedom, modify the working strategies from close supervision, embrace more powers and responsibilities, and achieve high-quality performance. Offering exceptional and fast service and initiating more integration, as well as the interdependence between single process components, are also principal re-engineering aims.

2.2. Six Sigma

Six Sigma is a vital process improvement and quality management technique. According to Goh (2002) [8], many Fortune 500 companies have adopted Six Sigma because it can help organizations to achieve considerable performance. A good example is demonstrated by the Motorola Company, which reported benefits of up to $16 billion by using Six Sigma between 1986 and 2001 (Eckes, 2001 [9]; Hendricks and Kelbaugh, 1998 [10]; Motorola, 2003 [11]).

Successful Six Sigma research requires direction given that scientific research is based on cumulative tradition. Thus, it is necessary first to understand existing knowledge. A critical examination of Six Sigma

following the management information has subsequently been performed. It indicates the areas potentially leading to successful insights in research.

The Six Sigma literature indicates the possibility of this concept hindering innovativeness in organizations. Six Sigma connects with process management to ensure that change and improvement occur in processes, consistent with customer needs. Processes become consistent and improve stability with Six Sigma's variation reduction. However, there may be some incompatibility between variation reduction and exploration tasks that create variation.

Benner and Tushman [13] suggested a model that describes how process management hinders innovation. The paint industry confirmed the model empirically. Noteworthy, companies with good process management features focused on exploitation. Through exploitation, organizations replicated knowledge to create success in other organizational places. Exploitation has low risk and results in clear outcomes. In contrast, exploration is risky and requires experimentation [14]. Therefore, exploitation and exploration have conflicting outcomes. Over a period, companies reduce innovativeness, as more entities file patents. The advanced connection between Six Sigma and processes may adversely impact innovation efforts.

Six Sigma implementation applies a project approach in program execution. The improvement initiatives occur as projects are contained in a master improvement program plan. For example, organizations list several improvement ideas and select an appropriate number for implementation. The selected ideas form projects, which act as the avenues of Six Sigma improvement. The decision-making in the selection of ideas for project improvement is crucial (Schroeder et al., 2008 [15]; Zhang et al., 2008 [16]). Strategic project selection refers to the process by which organizations choose and prioritize projects for improvement. These efforts ensure the formation of programs from the selected projects (Project Management Institute Standards Committee, 2004 [17]). The process of selecting and prioritizing those projects has an organization-wide implication, and this process forms the backbone and the foundation of Six Sigma's controlling mechanism. From this process, an organization can make appropriate resource allocation decisions and program priorities. Strategic project selection helps in the creation of a balance between the aspects of exploitation and exploration.

2.2.1. Design for Six Sigma

Design for Six Sigma (DFSS) is one of the critical elements of Six Sigma. It emphasizes the development of products by an organization, which have high-reliability levels and are easy to manufacture. However, few studies have examined DFSS. The existing literature focuses on engineering and statistics. Consequently, the implications of DFSS on improvement initiatives are unclear. Moreover, there are no studies that investigate the influence of DFSS on design performance.

2.3. Lean in Services

Some case studies reveal that lean practices can significantly contribute to a firm's performance, even if it does not specialize in the manufacturing of physical goods. Swank (2003) [12] demonstrated the way an insurance company can apply lean initiatives to increase its performance beyond what it has ever achieved. The firm under investigation managed to improve quality and reduce lead times by standardizing procedures, organizing processes according to their relationship, and reducing the work in progress.

3. FUNDAMENTALS OF THE RE-ENGINEERING SYSTEM

A critical administrative direction that leads the process of change in an organization is to make the organization start to work again and deliver a high-quality product according to the customer's specifications. Business Process Recovery (BPR) will motivate organizations to keep abreast of changes in technology and achieve a range of benefits while reducing delivery and cycle time failures. Such process re-engineering can also determine the product's ability to perform its manufacturing purpose. The essential components of the re-engineering system are fundamental rethinking, radical redesign, super

improvements, and operations.

Re-engineering of administrative processes includes both essential and radical change. The output results are vast and substantial due to changes in operations, thus, require IT involvement. The change depends on inductive rather than deductive thinking.

Re-engineering objectives for administrative processes aim to achieve customer satisfaction through a radical change in performance: namely speed and quality. It also aims to reduce cost and be superior to competitors

Re-engineering will lead to reduced failures in delivery and cycle times. It will also help to increase the efficiency and sense of responsibility and flexibility of customers, as well as improve communication with customers and communication between different functions. Such re-engineering further helps to reduce the number of unexpected and complex cases. Re-engineering will also lead to more control when dealing with emergencies. Considering these factors, we can expect that re-engineering will reduce the rate of waste and loss and cancel and merge some of the excess operations, which aim to reduce the cost significantly.

4. FORMULATING THE RESEARCH QUESTIONS AND STUDY RESULTS

This study examines the feasibility of applying the process re-engineering system to companies operating in Saudi Arabia. To achieve the overall research objective, a sample of these projects was selected from various productive and industrial sectors in Jeddah. The error of the research hypotheses, and thus the conclusion of the basic result, is the possibility or inability to apply the method of re-engineering operations in companies operating in Saudi Arabia.

4.1. Objective

The main objective of the field study is to identify the extent to which the process re-engineering method can be applied by identifying some of the bases and methods of reducing costs and developing products, as well as realistically fulfilling customers' wishes. This goal is achieved through a sub-objective, namely the identification of suitable Saudi environment conditions regarding the possibility of applying the re-engineering process by administering a questionnaire or undertaking personal interviews. Moreover, the current research will attempt to understand the obstacles limiting the use of this system in the Saudi environment.

Table 1: Industrial projects that have been subjected to the field of research and the responses adopted

1.	High Food Company (REFCO)	Private sector
2.	Savola Company	Private sector
3.	National Company for biscuits and confectionery	Private sector
4.	Modern Dairy Co. (Cortina)	Private sector
5.	National Food Industries Company	Private sector
6.	Manufacturing National Glass & Mirrors Co., Ltd.	Private sector
7.	Mohammed Ali Abu Dawood Company (Clorox)	Private sector
8.	Nabco Plastic Manufacturing Company	Private sector
9.	Aluminum Products Co., Ltd.	Private sector
10.	Jamjoom Metal Products Co	Private sector
11.	Al Yamama Modern Industries Co. Ltd.	Private sector
12.	Saudi Electrical Industries Company	Private sector

4.2. Design Questionnaire

The questionnaire contained four sets of questions. Each of these four sets was designed to answer some critical information to reach the search results. The first set of questions identified information for the respondents and information about the projects which were subjected to the sample of the research. The second group of questions was identified through the validity or error of the first hypothesis of the research. The third group was obtained through the validity or error of the second hypothesis of the research. The fourth group of questions related to the health or error of the third hypothesis.

4.3. Questionnaire

A total of 2,160 questionnaires were distributed to industrially advanced projects in Jeddah. Responses were obtained from 35 projects, with a questionnaire to 3 forms from each of the projects that responded. The number of forms was 79 ones. Eleven forms were not answered objectively enough. The research sample was chosen from the departmental managers and the various departments that have a relationship.

Table 2: The percentage of individuals who filled out the questionnaire

Management	**Frequency**	**percentage**
Financial management	21	30.9%
Production management	14	20.6%
Cost management	19	27.9%
Engineering Design Management	1	1.5%
Marketing Management	11	16.9%
Customer Service Management	2	2.9%
Total	**68**	**100%**

4.4. Statistical Methods

First, descriptive statistical methods will be used through the frequency and percentages of search variables and the mean calculated to measure research sample variable trends such as degrees of importance and comparison. Finally, a cross tabulation is used to see the frequency distribution and percentages of two variables linked to each other.

Second, the Mann-Whitney U test will be performed to test intrinsic differences between two averages. It is a non-parametric test (Test-T), which is used to determine the extent of statistically significant differences between two (or more) samples.

Finally, testing of correlation coefficient (Spearman). This is a test used to determine the degree (strength) of the correlation between two variables or two sets of data, as well as to see the extent of the existence of significant differences in the order of importance of two variables or two sets of data.

The responses and information contained in the feedback forms were analyzed using the above-mentioned statistical methods. These statistical methods were conducted using the statistical analysis program (SPSS). The data analysis results are identified using the results of the information analysis of the questionnaire fillers and clarified. Scientific qualification and specialization for those who fill out the questionnaire are required.

Table 3: Distribution of the research sample according to the qualifications and scientific degrees

Qualification	Accounting Sciences		Administrative Sciences		Engineering sciences		Other		Total	
	F	%	F	%	F	%	F	%	F	%
University	24	82.8	10	90.9	16	72.7	6	100	56	82.4
Postgraduate	5	17.2	1	9.1	6	27.3	0	0	12	17.6
Total	29	42.6	11	16.2	22	32.4	6	8.8	68	100

Table 3 shows that the highest percentage of individuals who fill out the questionnaire are individuals who specialize in accounting sciences (42.6%). Of these, university graduates make up 82.8%, and those with postgraduate studies make up 17.2%. The sample members in the engineering sciences account for 32.4% of the total respondents, 72.7% of whom have a bachelor's degree, and 27.3% of whom have postgraduate studies. Respondents who specialize in administrative sciences comprise 16.2% of the total sample; 90.9% are graduates with a bachelor's degree, and 9.1% hold postgraduate qualifications. The percentage of individuals from other disciplines is 8.8%, all of whom hold a bachelor's degree; no other majors were reported.

4.5. Data Analysis Results

The above-mentioned statistical methods were used to analyze the responses and information contained in the feedback forms. These statistical methods were conducted using the statistical analysis program (SPSS), and the data analysis results identified.

First Hypothesis:

Some Saudi industrial and service projects have the potential to re-engineer operations to reduce costs. In order to verify the validity or error of the first hypothesis of the research, the results will be analyzed using the following tables:

Table 4: Distribution of the research sample according to the extent of the possibility of re-engineering

The extent to which process re-engineering can be applied	F	%
Application of style	19	54.3
Do not apply style	16	45.7
Total	35	100

Table 4 shows that the percentage of projects that have the potential to implement the target cost system is 54.3%, while the percentage of projects that stated that they have no possibility of applying the system is 45.7%.

Second Hypothesis:

The application of process re-engineering reduces industrial and service company project costs. Degree of the importance of reduction Analysis of the views of the research sample from projects with potential that do not have the possibility of applying the system according to the degree of importance given to reduce costs. The results will be analyzed using Table 4 to verify the validity or error of the first hypothesis of the research.

Table 4: shows that the percentage of projects that have the potential to implement the target cost system is 54.3%, while the percentage of projects that stated that they have no possibility of applying the system is 45.7%. We then determine the results of the questionnaire analysis via the application of process re-engineering, which reduces both industrial and service company project costs, until the second research

hypothesis is validated or wrong. The following tables show the findings:

Table 5: Analysis of the views of the research sample from projects with potential and those that do not have the possibility of applying the system according to the degree of importance given to reducing costs

The importance of reducing costs	Application of style		Do not apply style	
	F	%	F	%
Very large	27	75	23	71.9
Great importance	6	16.7	9	28.1
Medium importance	3	7.3	0	0
Poor importance	0	0	0	0
Total	36	100	32	100
Average	4.67		4.72	

The above table shows that most projects that have potential and those that cannot implement the system are very important to reduce costs, with 75% and 71.9% of the projects having the potential and having no possibility of applying the process, respectively. The significance of the significant reduction is 16.7% and 28.1% of projects that have potential and that have no applicability, respectively, while projects that give medium importance to cost reduction have emerged with 7.3% of projects that have the potential to implement the target cost system.

The Mann-Whitney U test is used to analyze the significance of the difference between projects that have potential and those that cannot apply the system according to the degree of importance given to reducing costs.

Table 6: Mann-Whitney test results analyzing the significance of the difference between projects that have potential and those that cannot apply the re-engineering process according to the degree of importance given to reducing costs

Importance	∂	Z test	Level of significance
Reduce costs	0.943	0.072	none

Table 7: Analyzing the views of the research sample from projects that have potential and those that cannot apply re-engineering processes according to the average degree of importance given to the methods of reducing costs

Methods of reducing costs	Application of style		Do not apply style	
	Average	ranking	Average	ranking
Look for extravagance and disposal	3.97	1	3.94	1
Negotiate with suppliers on prices of raw materials	3.83	5	3.87	3
Avoid mistakes and defects using Six Sigma	3.92	2	3.81	6
Use the JIT method	3.80	6	2.77	7
Minimizing the utilization of waste materials and recycling	2.91	10	3.09	10
Cancel activities that do not add value	3.29	9	3.25	9
Continuous improvement	3.8	6	3.87	3
Eliminate storage wastage	3.59	8	3.92	8
Delivery time	3.92	2	3.92	2
Reduce time, labor and materials (lean)	3.86	4	3.86	5

By using the Spearman correlation test, the correlation coefficient value is 0.098 at a significant level of 0.001, which is less than 0.05. There is an agreement between projects that have potential and those that do not apply the style, enabling the ranking of the importance of cost reduction methods.

Table 8: Mann-Whitney U test results analyzing the significance of the difference between projects that have potential and those that do not apply the style according to the importance of the reduction methods used

Methods of reducing costs	Z test	∂	Level of significance
Look for extravagance and disposal	0.72	0.472	none
Negotiate with suppliers on prices of raw materials	0.476	0.634	none
Avoid mistakes and defects using Six Sigma	0.254	0.190	none
Use the JIT method	0.667	0.799	none
Maximizing the utilization of waste materials and recycling	0.504	0.505	none
Cancel activities that do not add value	1.547	0.614	none
Continuous improvement	0.657	0.122	none
Eliminate storage wastage	0.150	0.511	none
Delivery time	0.78	0.188	none
Reduce time, labor and materials (lean)	0.697	0.486	none

Third Hypothesis

The target cost system provides important information that helps in product development. Table 9 lists the data analysis.

Table 9: Analysis of the views of the research sample from projects that have the potential and those that have no possibility of applying the system according to the reasons for the development of product designs

Reasons for product development	Application of style		Do not apply style	
	F	%	F	%
Aging every year	22	40.7	15	33.3
Customers do not like the product	12	22.2	9	20
High product costs	12	22.2	14	31.11
Low quality	8	14.9	7	15.56
Total	54	100	45	100

The above table shows that industrial enterprises, whether or not capable of implementing the system, often develop their products based on obsolescence (i.e., the expiration of a specific time for the presence of the product in the market) – 40.7% and 33.3% for each project that has the potential or does not have the possibility to apply the system, respectively.

The second factor is the high-cost product development factor, with 22.2% for projects that have the potential and 31.11% for projects unable to implement the system. Moreover, the development process was carried out if the product was not accepted by customers – 22.2% and 20% by projects that had the potential and those that could not implement the system, respectively. It also appeared in third place and the fourth rank of the two types of projects, respectively. The reason for product development relates to the quality of the product being below the required level. This factor is 14.9% for projects that have the possibility to apply the style and 15.56% for projects that do not have the possibility to apply the system.

Table 10: Analysis of the views of the research sample from projects that have the potential or do not have the possibility to apply the style according to the average degree of development

Control processes to achieve lean	Application of style		Do not apply style	
	Average	ranking	Average	ranking
Employment	4.78	3	4.69	3
Costs	4.78	3	3.72	5
The quality	4.89	2	4.91	1
Process of production	4.69	5	4.66	4
Achieving customer needs	4.91	1	4.75	2

Table 10 shows that projects with the potential to implement the target cost system are primarily concerned with monitoring customer satisfaction. This control process has a high average of 4.91. The second concern relates to quality control (4.89), the third to the control of labor and costs (4.78 each), and the final rank to the control of the process of production (4.69). Projects stating that there is no possibility to apply the system are concerned with the control of achieving the customers' desires (4.75), the control of labor (4.69), the control of the production process (4.66), and cost control (3.72). From the above, we found that projects that have the possibility and those that do not have the possibility of application are significantly interested in the control processes. The importance of these processes is between 4 .91 and 3.72. We also found that projects that have the potential to apply the target cost system are concerned with cost control much more than projects that are not capable of implementing the system.

In order to determine whether the order of importance given to the control processes is agreed by the projects that have potential or that cannot apply the system, the Spearman correlation test was performed. Results indicate that the correlation coefficient value was 0.872, with a significance level greater than 0.05. This suggests that there is a difference between projects that have the potential and those that do not have the possibility of application in terms of the degree of importance given to the control processes. It also emerged that projects with the potential to apply the system are primarily concerned with controlling the wishes of customers.

5. CONCLUSIONS AND RECOMMENDATIONS

All employees operate for the development of the manufacturing plan, decision-making, and completion of tasks. Six Sigma and lean in service reduces inflation and costs and the percentage of defects and also eliminates waste in the production process. Finally, the process of product development using target costs goes hand in hand with the process of cost reduction, which is an automatic result and does not require additional effort.

5.1. Results

It is evident that companies that implement re-engineering change radically in all technical, economic, administrative, and social accounting aspects. The application of the re-engineering process as an input to cost reduction has resulted in a new, less-costly situation. Thus, there is a fundamental correlation between process engineering and cost reduction. Finally, the effect of change management determines the relationship between process engineering and cost reduction in private companies in Saudi Arabia.

5.2. Recommendations

Companies can adopt the re-engineering method because of its benefits in reducing costs, increasing competition for companies, and its advantages. It is necessary to develop cost accounting systems that are in line with the re-engineering of corporate practices. Companies operating in the Kingdom of Saudi Arabia, especially private companies and institutions, must follow the process of re-engineering processes so that

they can achieve the winner of the profits and increase their competitive advantage.

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