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The effect of Business Process Reengineering on the Organizational Performance of Constantine hospitals using stepwise regression

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Abstract:

The objective of this study is to measure the progressive effect of Business Process Reengineering on Organizational Performance and finding the best model that explains this effect. This paper was conducted between September the 3ed and November the 8th, 2022, and was applied on a sample of 40 individuals from 6 public hospitals in Constantine. We used the questionnaire to collect the data, as 40 items were returned from 50 distributed. We've followed three approaches for treating the data and reach the results and discussion, which are the descriptive, inductive and empirical approach. We developed a model that explains the paths of possible effects between the variables (Business Process Reengineering and Organizational Performance). Based on the survey method through collect and analyze the data using a set of descriptive statistical indicators and appropriate tests basically stepwise regression. The main finding of this study showed that some Business Process Reengineering dimensions as IT and Restructuring have a direct effect on the Organizational Performance.

Keywords : Engineering ;Business processes; Organizational performance; health sector; stepwise regression.

JEL Classification Codes:I15; C81; D23.

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1. INTRODUCTION

It aims to bring about a radical change in some or all of the organization's operations. It aims to achieve superior fundamental improvements in strategic and value-added operations, as well as systems, policies and organizational structures, with the aim of improving performance, improving service quality and productivity, reducing costs and completing operations speedily.

The health sector in Algeria is one of the important service sectors, as it allocated about $3.4 billion in 2020, as the interest in health services in terms of quality depends on the continuous development and improvement of administrative practice and work systems, and therefore it needs to think seriously to re-engineer business processes in line with practices and regulations And modern standards in this field, so hospitals are considered an important area for applying the business process re-engineering method.

The problematic of this study is an attempt diagnosis the indicators of business process re-engineering in some hospitals in Algeria, in terms of studying the factors affecting the business process reengineering; As awareness of the hospitals 's senior management to the concept of re-engineering, strategy, training and development of staff skills, information technology readiness for change, restructuring and communication.

Through the above, we can ask the following main question:

What are the indicators of business process re-engineering in Constantine hospitals?

This main question might to follow the next sub-questions:

1- What are the modern trends in management thought?

2- To what extent do organizations currently need to re-engineer business processes?

3- What are the requirements for business process re-engineering in Constantine hospitals?

2. Literature review

2.1. BPR: nature and evolution

The overall business process may have been improved to a more efficient level through the appropriate adoption of innovative technologies (Popovič, Puklavec, & Oliveira, 2019). However, one of the major issues in the industries is how to combine the current business process with emerging technologies (Chang, Chen, & Lu, 2019).

Dramatic changes in the business environment have forced organizations to significantly increase organizational awareness and responsiveness in internal and external environments. According to Hesson et al. (Hesson, Al-Ameed, & Samaka, , 2007), the efficiency of managerial processes has become a major concern for many organizations. Thus, traditional management tools and techniques can no longer help companies in the new conditions. Organizations should focus on developing more flexible, coordinated, team-based, and communication-based capabilities. Since the 1990s, organizations have paid special attention to "processes" (Valiris & Glykas, 2004). In the research to improve and accelerate organizational processes, various tools and techniques have been developed in the last two decades. One such tool is business process re-engineering, which has received widespread attention from academics and industry. BRP is a popular management approach, which enables organizations to handle business and rapid technological changes. Business Process Reengineering (BPR) can transform organizations radically for dramatic improvement (Salimifard, Abbaszadeh, & Ghorbanpu, 2010).

BPR was introduced as a savior for poorly performing organizations in the early 1990s by Hammer and Davenport and Short followed by Hammer and Champy, Davenport and Champy (Champy, 1995). Since its inception, business re-engineering has become a common management tool to deal with technological and business changes in the competitive environment. Hammer and Champy (Hammer & Champy, 1993) define performance re-engineering as a fundamental re-engineering of organizational processes to radically

improve critical areas such as cost, quality, service and speed. In another attempt, Manganelli and Klein (Manganelli & Klein, 1994) defined performance re-engineering as a systematic approach, which constantly improves the important activities of the organization such as marketing, production and communication.

Four common keywords in performance re-engineering definitions are “essential,” “drastic,” “dramatic,” and “process.” Business reengineering defines what a company must do and how to do it. In order to improve productivity and quality, the business process must undergo fundamental changes (Gunasekaran & Kobu , 2002). Radical changes are made (not superficial changes) to bring about significant improvements. Early advocates of business re-engineering have described it as the next revolution in obtaining impressive performance through process improvement and process change. Since 1990, different researchers such as Hammer, Harrington, Klein, Davenport and Johansson et al., Dixon et al. They developed various definitions of BPR (Dixon, Arnold, Heineke, & Kim, Business Process Reengineering: Improving in New Strategic Directions, 1994).

The essence of business reengineering is to bring about a systemic revolution in the organization. The primary objective is to redesign and restructure key customer-facing business processes that provide customers with value. Through drastic changes, the old processes were eliminated. An interesting word to achieve quantum leaps in performance. A process refers to a set of activities that obtain a set of inputs and create a set of outputs that are valuable to customers (Wu, 2003).

BPR focus on the whole process. With the help of Information Technology (IT), Process Reengineering (BPR) offers the opportunity to reengineer the process, radically reducing the number of activities to implement the process and finding new ways of doing things .Building reengineering helps organizations transform their legacy structures into cost-effective and innovative processes. Despite the many advantages of BPR, its implementation is seen as a challenging

task and many unsuccessful experiences have been reported in the literature. BPR is a risky process. According to Al-Mashari and others., Hall et al., Dennis et al., Holland, Kumar and Chiplunkar et al. 50-70 percent of process re-engineering efforts fail to achieve their intended results (Chiplunkar, Deshmukh, & Chattopadhya, 2003).

Business re-engineering has been carried out in both service and manufacturing companies in various countries around the world. The successful implementation of BPR brings many benefits to the organization. According to Farmer, customer satisfaction, increased productivity, increased flexibility, increased personnel, improved coordination and improved organizational performance are the main benefits of successful implementation of business reengineering. Business re-engineering helps organizations achieve new heights of success by dramatically changing existing business processes (Ranganathan & Dhaliwal, 2001). Accordingly, to successfully implement redesign of recycling processes, critical success factors must be identified and analyzed (Adigun & Biyela, 2003). With regard to BRP, critical success factors (CSFs) are the areas that an organization must achieve for successful implementation.

2.2. Organizational performance nature and concept

In recent years, the world has witnessed a surge of globalization as the economies of several countries are interconnected to promote foreign trade through technological advancement and communication (Carnevale & Hatak, 2020). This boom also led to increased competition in the national and foreign markets, which encouraged organizations to recruit and retain talented workers more. Many companies depend on their employees to gain an edge in a competitive marketplace. Therefore, it is closely related to the efficiency of its human resources and its human resource management (Collins, 2021)

Organizational performance is a subjective perception of reality, which explains many critical thinking about the concept and the tools for its measurement (Wholey, 1996). Nowadays, there are a variety of definitions attributed to the concept of organizational performance because of its subjective nature. Thus, the concept of organizational

performance has gained increasing attention in recent decades, and is prevalent in almost all areas of human activity. Organizations undertake various activities to achieve their organizational objectives.

Quantitative repeatable activities help leverage processes for an organization to be successful in order to ascertain the level of performance and management to make informed decisions about where, if necessary, within processes of action to improve performance (Robbins, 1987). Therefore, it is possible to claim a close relationship between organizational objective and the concept of organizational performance. However, organizational performance is one of the most controversial concepts for which there has been no agreement among many researchers and theorists (Selden & Sowa, 2004). Also, Cameron (1986) points out that there is insufficient understanding or interpretation in the definition of the concept of performance. In the absence of any working definition of performance on which the majority of the scholars concerned would agree, there will naturally be different explanations and conclusions which different persons will see according to their perceptions.

As a result, the recognized definition of the concept appears to be of various difficulties, which means that the possibility of any definitions and the creation of some criteria for arriving at the desired definition remain in doubt. Moreover, organizational performance has always had a significant impact on companies' actions (Crook , Bratton, & Street , 2006).

One of the interests of this influence is to increase the number and variety of means and methods for accurately measuring performance, and to gradually establish a vital field of research for both companies and academics. Unfortunately, there is no agreement in the literature about how to measure organizational performance, and the problem is multi-level (Lusthaus, Adrien, & Anderson, 2002). Hence, both academics and managers have continuously checked the performance. Although prescriptions for improving and managing organizational performance are widely available, issues of terminology, levels of analysis (eg, individual, business unit or

organization as a whole), and conceptual foundations for performance appraisal preoccupy the academic community (Venkatraman & Ramanujam, 1986). This article presents a comparison of several different concepts and viewpoints on organizational performance measurements.

An organization is a deliberately simultaneous social unit, consisting of a group of people who work together on common goals on a relatively continuous basis. Examples, schools, hospitals, churches, manufacturing and service companies, retail stores, police departments, military units, volunteer organizations, start-ups, and local, state, and federal government agencies are organizations (Robbins S. , 2005). It is necessary to have knowledge of organizational theories and concepts of organizational performance, to have a clear picture of the nature of the organization.

Organizational theory has produced a large number of models that explore organizational functioning; In fact, some scholars have stated that there are as many models as organizational performance studies. Currently, there are a variety of definitions attributed to the concept of organizational performance because of its subjective nature. Because of the subjective nature of the definition of organizational performance, there is no general agreement in the literature about the criteria used to measure organizational performance (Scott & Davis, 2015). However, organizational performance has been identified in the following six main methods.

3. Material and Method:

Data analysis is important stage of the Methodology, as it is crucial in any study through research activities that controlled to reach the result related to the study path. The approach used in our study is mainly descriptive, and then the inductive approach to generalizability of sample results. We have also depended on the empirical study. We based on questionnaire for collecting data basic of a five-point Likert scale. The population of our study includes all hospitals in Constantine. We also depend on multi-stage random sample, and the sample size was calculated according to the specific population size, that is, 40 respondents

from 6 hospitals. The variables of our study were defined as follows: Independent variable: includes business process reengineering (Leadership awareness of BPR concept; Hospital strategy; Training and skills development of employees; Information Technology; Readiness for change; Restructuring; communication). The dependent variable: organizational performance (Financial performance; knowledge performance) as shown in Table 1

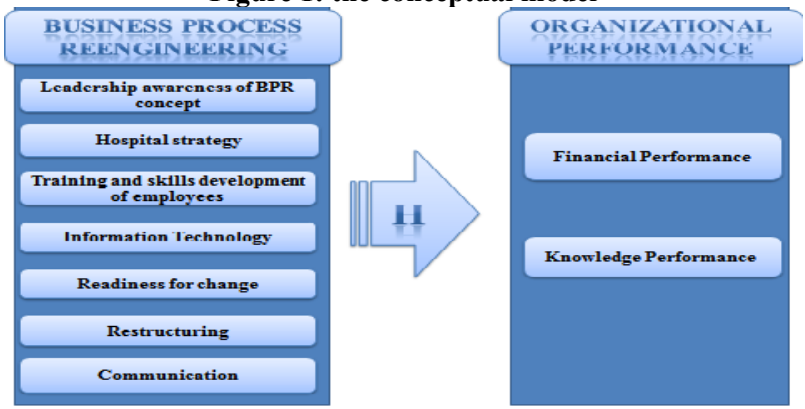
Table 1: The Dimensions of BPR and OP

Dimensions	**number of Indicators**
Leadership awareness of BPR concept	5
Hospital strategy	3
Training and skills development of employees	8
Information Technology	5
Readiness for change	5
Restructuring	6
Communication	6
Financial performance	5
knowledge performance	5
Total	**48**

Source: By researcher

We design a model that explains the correlation between the variables, as shown in the following figure 1: In order to describe the data, we used the metrics of descriptive statistics: (mean, standard deviation, mean standard error). The Pearson correlation coefficient and stepwise regressions were used to test the hypotheses.

Figure 1: the conceptual model



Source: By researcher based on the foregoing concepts

The conceptual model that explains the correlation that can be measured statistically in the following steps.

4. Results and Discussion:

4.1. Reliability Statistics BPR and OP:

At this stage, we're trying to prove the reliability of the questionnaire to measure the different dimensions

Table 2 : Case Processing Summary& Reliability Statistics

S	Variables	Valid	%	Excluded[a]	%	Total	%	N of Items	Cronbach Alpha	Guttman Split-Half
X	BPR	40	100	0	,0	40	100	5	.894	.869
Y	OP	40	100	0	,0	40	100	5	.874	.862
	Total	40	100	0	,0	40	100	10	,884	,867

Source: By researcher based on the outputs of SPSS.V28

The table shows the number of respondents, the missing values and their ratio, from the result shown in Table (2) the coefficient of the Cronbach alpha value is higher than

0.6 for all parts of the questionnaire: business process reengineering and organizational performance, and this indicates the reliability thus that the questionnaire is able to treat the statistics results

.

4.2. Normality Test Business Process Reengineering:

In this stage, we're trying to test the normality of the statistical distribution of the observations in order to determine the measurement required tests.

Table 3 : One-Sample Kolmogorov-Smirnov Test of BPR

		L A BPR concept	Hospital strategy	Training and skills	Information Technology	Readiness for change	Restructuring	Communication
N		40	40	40	40	40	40	40
Normal Parameters[a,b]	Mean	4.071	4.014	4.009	4.287	4.069	4.077	4.009
	Std. Deviation	.509	.592	.611	.444	.556	.533	.612
Most Extreme Differences	Absolute	.195	.151	.125	.203	.112	.126	.125
	Positive	.195	.122	.089	.139	.103	.105	.089
	Negative	-.166-	-.151-	-.125-	-.203-	-.112-	-.126-	-.125-
Kolmogorov-Smirnov Z		1.119	.866	.718	1.165	.641	.725	.718
Asymp. Sig. (2-tailed)		.159	.392	.701	.141	.796	.679	.701

a. Test distribution is Normal.

b. Calculated from data.

Source : By researcher based on the outputs of SPSS.V28

All the significant coefficients 'Business Process Reengineering 'is superior than 0.05. This shows that the distribution of variables is normal according Kolmogorov-Smirnov test, thus it could be used parametric tests of Business

Process Reengineering part.

4.3. Normality Test of Organizational performance dimensions:

In this stage, we're trying to test the normality of statistical distribution of the observations in order to identify the required tests for measure.

Table 4 : One-Sample Kolmogorov-Smirnov Test of OP dimensions

		Financial performance	Knowledge performance
N		40	40
Normal Parameters[a,b]	Mean	4.012	3.951
	Std. Deviation	.425	.594
Most Extreme Differences	Absolute	.184	.149
	Positive	.184	.108
	Negative	-.149-	-.149-
Kolmogorov-Smirnov Z		1.058	.853
Asymp. Sig. (2-tailed)		.211	.454

a. Test distribution is Normal.

b. Calculated from data

Source : By researcher based on the outputs of SPSS.V28

All the coefficients of 'Organizational performance 'is superior than 0.05. This illustrate that the distribution of indicators is normal according Kolmogorov- Smirnov test, thus it could be used parametric tests of Organizational performance part.

4.4. Hypotheses Test:

We're trying to test the main Hypotheses

H0: Leadership awareness of BPR concept and Hospital strategy are not the best model that can explain the development of

Organizational performance based on the business process reengineering of hospitals in Constantine.

H1: Leadership awareness of BPR concept and Hospital strategy are the best model that can explain the development of Organizational performance based on the business process reengineering of hospitals in Constantine.

In order to test the above hypothesis, we're going to use the Stepwise Regression model, Organizational Performance as dependent variable and Business Process Reengineering as independent variables, as follows.

Table 5 :Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	**IT**	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	**Restructuring**	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: Organizational performance

Source : By researcher based on the outputs of SPSS.V28

The table shows the variables included in the equation as the Information Technologies is in the first degree, the Restructuring in the second degree, and the Stepwise is treatment method. It is clear that the two variables, Information Technologies and Restructuring, are the only two variables that have been entered into the regression equation because they have the strongest correlation coefficient with Organizational performance and thus the highest value of F = 469.313 and 328.657 respectively with the level of significance estimated at 0,000 from the following tables.

Table 6 : Summary of the model BPR and OP

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.969a	.938	.936	.14998
2	.978b	.956	.953	.12796

a. Predictors: (Constant), Information Technologies

b. Predictors: (Constant), Information Technologies, Restructuring

Source: By researcher based on the outputs of SPSS.V28

The table above shows all of the Pearson correlation coefficient R between the two independent variables Information Technologies and Restructuring and the dependent variable Organizational performance which is a positive very strong correlation explains the strong direct relationship between the independent and dependent variables in addition to the high R Square determination coefficient which indicates the suitability of the model for estimating The direction of the relationship between the variables. Plus the adjusted coefficient of determination resulting from the error in the estimation, with .14998 and .12796 as standard errors of estimation, shows the quality of the representation of the regression trend in the estimation of the relationship between Information Technologies, Restructuring, and Organizational performance.

Table 7 : ANOVA BPR and OP

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.556	1	10.556	469.313	.000[b]
	Residual	.697	31	.022		
	Total	11.253	32			
2	Regression	10.762	2	5.381	328.657	.000[c]
	Residual	.491	30	.016		

	Total	11.253	32			

a. Dependent Variable: OP

b. Predictors: (Constant), Information Technologies

c. Predictors: (Constant), Information Technologies, Restructuring

Source: By researcher based on the outputs of SPSS.V28

From the ANOVA table we find the value of Sig. = 000, which is less than the level of 0.05 significance for both Information Technologies and Restructuring, so we reject H0 and accept H1, which is that the regression is significant and therefore there is a linear relationship between the variables that is predictable towards developing the Organizational performance in terms of the two variables Information Technologies and Restructuring.

Table 8: coefficients BPR and OP

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.590	.172		3.438	.002
	IT	.892	.041	.969	21.664	.000
2	(Constant)	.175	.188		.931	.359
	IT	.622	.084	.675	7.423	.000
	Restructuring	.346	.098	.323	3.548	.001

a. Dependent Variable: OP

Source: By researcher based on the outputs of SPSS.V28

The first model: The regression model between Information Technologies and Organizational performance can be written as follows

$$\mathbf{OP = .590 + .892\ IT}$$
$$(.172)\quad (.041)$$

Through the value of sig in the table above, we find that both independent variables (Information Technologies and the constant coefficient) are significant, since the sig is less than 0.05, which explains that the best organizational performance regression model in terms of Information Technologies activities that are included in procedures of develop the organizational performance.

The second model: The regression model between Information Technologies, Restructuring and cost reduction can be written as follows

$$\mathbf{OP = .175 + .622\ IT + .346\ Restructuring}$$
$$(.188)\quad (.084)\qquad (.098)$$

Through the value of sig in the table above, we find that both independent variables (Information Technologies, Restructuring) are significant, as the sig is less than 0.05, while the constant coefficient is not significant, which indicates that the variables included in the model (Information Technologies and Restructuring) are the reason for the significant organizational performance development, Which explains that the best regression model of organizational performance in terms of Information Technologies and Restructuring activities that are included in procedures of develop the organizational performance.

5. Conclusion

The public administration has inherited of practices and ideas is a gain that must be valued because it is a summary of historical experiences, but the thing that we should stand on after this study is that the public and private administration must benefit from scientific developments, practices and successful scientific experiments in business management and optimal use of technology it has become necessary for a modern administration to be concerned with studying, analyzing and designing the development of integrated processes and how to manage them and to develop financial, material, human and informational resources.

The approach of re-engineering is one of the most important approaches adopted in the field of change, as well as it represents one of the basic treatments adopted in the field of increasing the effectiveness of the organization, which carries within it the process of radical change, because it builds a fundamental rethinking of operations, organizational structure, information technology, job content and flow Work to achieve tangible improvements in performance and quality, especially in government sectors.

Through the previous literature, framework presentation and the statistical results analysis, the most important results of this study can be summarized in the following points:

- Getting to know the most important modern management and administrative thought.
- Awareness of the hospital's top management with the concept of business process re-engineering.
- The strategy is not clear and incomprehensible to all hospital staff, but its decision is due to the higher leadership and those in charge of the hospital's strategy.
- Training and development of the skills of workers in the city hospitals.
- It notices the presence of important technology requirements for hospital administration devices that are used in business process re-engineering.
- The study showed the readiness of top management to radically change administrative processes by spreading a culture of change among employees, in addition to creating administrative units to keep pace with the necessary changes.
- The existence of an organizational structure that defines the internal structure of the organization as it clarifies the divisions, organizations and sub-units that carry out the various work and activities necessary to achieve the hospital's goals, as well as achieve communication and its flow between administrative levels.
- The study showed that communication channels and tools in the hospital are ineffective between the different administrative

levels to deliver decisions and instructions in a timely manner to make correct decisions.

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