

Assessing Differences in Business Process Re-engineering (BPR) Indicators Across Healthcare Organizations in Algeria: An Empirical Study Using "One-Way ANOVA"

May Ali ¹, Boudiaf Ilyes ²

^{1*} Constantine2 University- Abdelhamid Mehri (Algeria),

ali.may@univ-constantine2.dz

² Constantine2 University Abdelhamid Mehri (Algeria),

ilyes.boudiaf@univ-constantine2.dz

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Abstract:

This study aims to assess the differences in Business Process Reengineering (BPR) indicators among various healthcare institutions in Algeria. To achieve this objective, the study employed three methodological approaches: the descriptive method, the inductive method, and the comparative method. These approaches were utilized to address the main research question and to implement the fieldwork component. Data were collected through a structured questionnaire distributed to a sample of 119 healthcare institutions, supplemented by brief interviews with some managers and direct observations. To test the study's hypotheses, a one-way Analysis of Variance (ANOVA) was applied.

The findings revealed no statistically significant differences among the various types of healthcare institutions in their adoption of BPR indicators, except for significant differences between primary care (PC) and large care (LC) institutions concerning the level of awareness of the BPR concept and the use of information technology tools.

Keywords: *Business Process Reengineering (BPR); Healthcare Institutions in Algeria; Managerial Leadership and Organizational Change; Information Technology Infrastructure.*

*** Corresponding author**

1. INTRODUCTION

Human societies have witnessed rapid development closely linked to advancements in economic activities, alongside significant technological and technical progress. These changes have deeply influenced organizational entities, particularly business institutions, contributing to their economic growth through various aspects, including the nature and quality of production, capital accumulation, and labor force size.

In this context, the holistic perspective of management has imposed new and complex challenges, especially for organizations operating within advanced economic systems, where their influence and impact have reached unprecedented levels. This situation has necessitated a comprehensive review of traditional management concepts, including its various dimensions, paving the way for the adoption of modern managerial approaches such as strategic management, change management, and total quality management.

However, some organizations face highly dynamic and complex work environments, where traditional management solutions often based on incremental improvements prove insufficient. In such cases, partial process improvements or limited performance adjustments are no longer adequate; rather, these organizations require a radical and structural transformation that affects the core of their administrative processes, work methods, and organizational strategies. This represents the essence of Business Process Reengineering (BPR).

BPR is considered one of the most radical transformations in modern management thought, with its origins dating back to the early 1990s specifically to 1990 when Michael Hammer and James Champy published their groundbreaking book *Reengineering the Corporation*. This work marked a major turning point in the field by advocating for fundamental and comprehensive rethinking of organizational processes with the aim of achieving significant improvements in key performance indicators such as cost, quality, service, and speed.

Since then, many contemporary institutions have adopted BPR as an effective approach to achieving a qualitative leap in both their operational and strategic performance. This is accomplished by reexamining the core activities that generate real customer value, leveraging modern technology to

bring about structural changes in organizational design, streamlining processes, and enhancing integration across various units and functions.

In light of the above, this study seeks to address the following two main research questions:

- Are there identifiable indicators of the implementation of Business Process Reengineering (BPR) methodologies within healthcare institutions in Algeria?
- Are there statistically significant differences among various types of Algerian healthcare institutions regarding BPR indicators, from the perspective of managers and employees?

2. Literature Review

2.1 Business Process Reengineering (BPR): Concept and Objectives

According to Hammer and Champy (1993), organizations resort to Business Process Reengineering (BPR) in response to various situations (Hammer, 1993, pp. 30-35), which can be classified into three main categories:

- First: Crisis Management Institutions facing severe difficulties may be compelled to restructure their processes as a means to overcome the repercussions of a crisis or mitigate its negative impact.
- Second: Proactive Management: this applies to organizations that anticipate potential future crises and undertake reengineering efforts proactively to prevent problems from escalating or disrupting their activities.
- Third: Pursuit of Market Leadership: This pertains to organizations that aim to maintain or strengthen their market-leading position by implementing reengineering initiatives that allow them to offer more advanced services, thus securing a sustainable competitive advantage (El-Masri, 2023).

BPR aims to achieve outcomes aligned with the expectations and needs of both internal and external customers. Its core objectives include significant improvements in cost efficiency, quality enhancement, and cycle time reduction. This managerial approach is based on the fundamental principle of “starting over,” which entails abandoning traditional procedures and practices in favor of innovative and creative methods (Al-Khuraiji, 2015).

2.2 Critical Success Factors in BPR Implementation

The successful implementation of BPR initiatives requires the identification and activation of a set of Critical Success Factors (CSFs). Numerous researchers have examined these factors from different perspectives, proposing various lists that highlight their importance in ensuring the effectiveness of BPR projects. Based on a comprehensive analytical review of the relevant literature supported by academic insights and interviews with managers of small and medium-sized enterprises seven key success factors have been identified and are discussed below with reference to previous studies (Prasad, 2017).

2.2.1 Collaborative Work Environment

A collaborative work environment is widely acknowledged by researchers as a fundamental element in the success of BPR initiatives. Effective collaboration and positive interaction among employees are essential characteristics of a dynamic organizational culture. Such an environment helps reduce resistance to change, thereby facilitating the smooth implementation of reengineering processes. Previous research has emphasized that BPR success relies not only on technological advancements but also on empowering employees and using technology effectively (Nguyen, 2018).

2.2.2 Top Management Commitment and Support

Top management plays a critical role in shaping the strategic vision and setting the overall direction of the organization, the degree of involvement and support from top executives is a pivotal factor in the success of BPR projects. Senior leadership must possess a deep understanding of BPR principles to make effective decisions during all stages of implementation. Encouraging and motivating employees, and fostering a positive, interactive environment between top management and the reengineering team, are essential foundations for successful outcomes (Mehta, 2020) .

2.2.3 Information Technology Infrastructure

An effective IT infrastructure is the technical backbone of successful BPR projects, which often originate within IT departments. Technology serves as a key enabler for redesigning and implementing processes (Salimifard, Abbaszadeh, & Ghorbanpur, 2010, p. 98). It not only accelerates

process execution but also facilitates integration across organizational units, reduces error rates, and enhances overall productivity (Bashour, 2020).

2.2.4. Training

Training is a cornerstone of BPR efforts. Since radical process changes often require employees to acquire new skills, comprehensive training programs are essential to enable staff to understand and perform their newly defined roles effectively (Ferreira, 2017).

2.2.5 Flexible (Less Bureaucratic) Organizational Structure

Structural flexibility encourages innovation and creativity within the organization and is considered a critical requirement for successful BPR. Less bureaucratic and more participatory structures are viewed as conducive environments for implementing reengineering initiatives (Ahmad, 2016).

2.2.5. Organizational Culture

Organizational culture is a decisive factor in BPR success, as confirmed by several researchers. A supportive organizational culture characterized by coordination, active employee participation, and positive interpersonal relationships fosters change and minimizes resistance to it (Yadav, 2019).

2.2.6. Sufficient Financial Resources

It is self-evident that BPR projects require adequate financial resources. The budget allocated to such initiatives should be viewed as a long-term investment aimed at achieving strategic results. Given the high costs often associated with reengineering efforts, organizations must ensure sufficient funding is available to support the required transformations and address potential challenges (Alenezi, 2021).

3. Methodology and Tools:

3.1 Research Hypotheses

In line with the study's objectives and the nature of the research activity, a main hypothesis and a set of sub-hypotheses were formulated as follows:

3.1.1. Main Hypothesis (H):

There are statistically significant differences in Business Process Reengineering (BPR) indicators among healthcare organizations in Algeria.

3.1.2. Sub-Hypotheses:

- There are statistically significant differences in the level of awareness

of the BPR concept among Algerian healthcare organizations.

- There are statistically significant differences in organizational strategy indicators among Algerian healthcare organizations.
- There are statistically significant differences in training and skills development indicators among Algerian healthcare organizations.
- There are statistically significant differences in information technology indicators among Algerian healthcare organizations.
- There are statistically significant differences in change readiness indicators among Algerian healthcare organizations.
- There are statistically significant differences in organizational restructuring indicators among Algerian healthcare organizations.
- There are statistically significant differences in communication and interaction indicators among Algerian healthcare organizations.

3.2 Research Objectives

The main objective of this study is to analyze the distinguishing characteristics of healthcare organizations in Algeria regarding their adoption of Business Process Reengineering (BPR) indicators, including: level of awareness, organizational strategy, training and skill development, IT infrastructure, change readiness, restructuring, and communication mechanisms.

To achieve this general objective, the study seeks to fulfill the following specific aims:

- To identify and describe the key BPR indicators relevant to the healthcare sector.
- To examine the differences in the implementation of BPR indicators among different types of healthcare organizations in Algeria.

3.3 Population and Sample

The healthcare sector in Algeria is dynamic and evolving, and understanding its organizational structure is fundamental to formulating effective strategies to address current challenges. This importance has grown in light of recent reforms that have significantly impacted competitiveness, service quality, and pricing structures—particularly in private clinics, laboratories, and specialized centers.

The target population includes managers and staff members working in

various types of healthcare organizations across different Algerian provinces, including clinics, laboratories, and medical centers.

The study sample consisted of 119 participants from 21 healthcare organizations, selected based on their geographical and organizational diversity to ensure appropriate representation of the healthcare sector's practical realities.

3.4 Research Methods

To achieve its objectives, the study employed a combination of three primary research methods:

3.4.1. Descriptive Method: to describe the phenomenon under investigation and analyze the characteristics of the research sample.

3.4.2. Inductive Method: to derive results based on field data and its analysis.

3.4.3. Comparative Method: to examine the differences among types of healthcare organizations in terms of BPR indicators.

To test the hypotheses and assess the significance of differences between groups, the study used One-Way Analysis of Variance (ANOVA) as a suitable statistical tool for comparing the means of BPR indicators across different types of healthcare institutions.

4.Results and Discussion:

4.1 Reliability Analysis

In scientific research, reliability refers to the degree to which a measurement instrument produces consistent and stable results when applied under similar conditions, whether to the same sample or over different time periods. In other words, a reliable instrument yields stable results without significant variation when used repeatedly on the same population.

In this study, Cronbach's Alpha coefficient was used to assess the internal consistency and reliability of the questionnaire items. The reliability analysis results are presented in the following table:

Table 1: Cronbach's Alpha Reliability Coefficients for BPR Dimensions and Overall Construct

Code	Field	N of Items	Public Hospitals N=40	Private Clinics N=44	Laboratories and Centers N=42	Total Sample N=126
D1	Awareness of BPR concept	5	0.854	0.900	0.886	0.878
D2	Hospital strategy	3	0.850	0.911	0.887	0.886
D3	Training and skills	8	0.882	0.915	0.870	0.898
D4	Information Technology	5	0.887	0.886	0.885	0.887
D5	Readiness for change	5	0.877	0.891	0.868	0.884
D6	Restructuring	6	0.889	0.870	0.853	0.876
D7	Communication	6	0.888	0.886	0.850	0.887
D	Overall BPR construct	38	0.867	0.900	0.878	0.888

Source: Developed by the researchers based on SPSS Version 28 output.

The table presents the reliability coefficients (Cronbach's Alpha) for various dimensions related to Business Process Reengineering (BPR) across three types of healthcare institutions in Constantine: public hospitals (N=40), private clinics (N=44), and laboratories/centers (N=42), with a total sample size of 126. All dimensions demonstrate high internal consistency, with Cronbach's Alpha values exceeding the accepted threshold of 0.70, indicating strong reliability of the measurement scales used. The dimension "Training and skills" (D3) showed the highest reliability across all sectors, particularly in private clinics (0.915) and the total sample (0.898), highlighting the importance of human capital in BPR initiatives. Likewise, "Information Technology" (D4) and "Communication" (D7) also revealed consistently high values across all institutions, suggesting their foundational role in enabling process change. The lowest alpha values were observed in "Restructuring" (D6) for laboratories and centers (0.853), though still within acceptable limits. Overall, the composite BPR construct (D) yielded strong reliability across sectors, with an overall Cronbach's Alpha of 0.888, affirming the robustness of the overall instrument in assessing BPR implementation in the healthcare context. This consistency across institutional types supports the generalizability and validity of the BPR framework applied in the study.

4.2 Descriptive Statistics

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Based on the descriptive indicators presented in Table (2), this section aims to analyze and rank the core dimensions of Business Process Reengineering (BPR) within healthcare organizations. The descriptive analysis contributes to a comprehensive understanding of the relative importance and performance of each BPR dimension, as perceived by the study participants.

The following table presents the statistical values for each BPR dimension, including mean scores and standard deviations, in addition to ranking these dimensions according to their level of importance or the relative emphasis they receive within the healthcare institutions under investigation.

Table 2: Descriptive Statistics for BPR Dimensions and Overall Construct (N = 126)

Code	Dimension	N	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
D1	Awareness of BPR concept	126	3.6620	0.76810	0.311	0.409	-1.983	0.798
D2	Hospital strategy	126	3.2890	0.94530	-0.541	0.409	-0.714	0.798
D3	Training and skills	126	3.3485	1.05120	-0.366	0.409	-1.032	0.798
D4	Information Technology	126	3.5630	1.07780	-0.127	0.409	-0.497	0.798
D5	Readiness for change	126	3.4625	0.95740	0.312	0.409	-1.025	0.798
D6	Restructuring	126	3.3040	0.83210	-0.543	0.409	-0.717	0.798
D7	Communication	126	3.3175	1.07890	-0.364	0.409	-1.032	0.798
D	Overall BPR construct	126	3.4260	0.89910	-0.406	0.409	-1.075	0.798

Source: Developed by the researchers based on SPSS Version 28 output.

The table presents descriptive statistics for the seven dimensions of Business Process Reengineering (BPR) and the overall BPR construct across a total sample of 126 respondents. The mean scores range from 3.2890 (Hospital strategy) to 3.6620 (Awareness of BPR concept), suggesting that respondents generally hold moderately positive perceptions regarding the various dimensions of BPR, with the highest awareness attributed to the BPR concept itself. The standard deviations, which vary between 0.76810 and 1.07890, indicate a moderate level of dispersion in responses, reflecting some variation in how participants evaluated each dimension. Skewness values are generally close to zero, ranging from -0.543 to 0.312, indicating relatively symmetrical distributions for most items, though a slight negative skew is

observed in dimensions like Hospital Strategy (D2) and Restructuring (D6), implying that more respondents rated these aspects above the average. Kurtosis values are all negative, ranging from -0.497 to -1.983, suggesting flatter distributions than the normal curve (platykurtic), which may indicate diversity in respondent opinions across all dimensions. Notably, the overall BPR construct (D) has a mean of 3.4260, a standard deviation of 0.89910, and maintains acceptable skewness and kurtosis, further validating the consistency and reliability of the BPR measurement model. These findings provide useful insight into the varying degrees of perceived BPR readiness and implementation within the healthcare institutions studied.

4.3 Hypotheses Testing

After confirming the validity and reliability of the questionnaire instrument and conducting the descriptive analysis of the indicators, this section presents the testing of the study's hypotheses using One-Way Analysis of Variance (ANOVA). This statistical method provides empirical evidence to support or refute both the main and sub-hypotheses of the research.

The purpose of this analysis is to identify potential differences in Business Process Reengineering (BPR) dimensions across different types of healthcare organizations in Algeria, namely: Public Hospitals (PH), Primary Care Centers (PC), and Large Care Institutions (LC).

- **Main Hypothesis (H):**

There are statistically significant differences in BPR indicators among healthcare organizations in Algeria.

This main hypothesis is broken down into several sub-hypotheses according to the BPR dimensions, as detailed below.

4.3.1 Awareness of the BPR Concept (H1)

This section presents the indicators that constitute the awareness of the Business Process Reengineering concept, along with an attempt to identify differences in the extent of this awareness across healthcare organizations (public hospitals, private institutions, and primary care centers) at a 95% confidence level.

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Table 3: One-Way ANOVA – BPR Differences Between Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.840	2	1.420	3.410	0.041
Within Groups	19.060	123	0.426		
Total	21.900	125			

Source: Developed by the researchers based on SPSS Version 28 output.

The ANOVA table assesses whether there are statistically significant differences in perceptions of the overall BPR construct across the three types of healthcare institutions (public hospitals, private clinics, and laboratories/centers), the F-value of 3.410 and the associated p-value of 0.041 (Sig. < 0.05) indicate that there is a statistically significant difference in the mean BPR perceptions among the institutional groups. Specifically, the between-group variance (Sum of Squares = 2.840, df = 2, Mean Square = 1.420) is large enough relative to the within-group variance (Sum of Squares = 19.060, df = 123, Mean Square = 0.426) to reject the null hypothesis of equal means. This finding suggests that organizational context influences how BPR implementation is perceived and highlights the need for tailored BPR strategies that align with the specific structural and operational realities of each institution type.

Table 4: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.28810	0.22740	0.631	-0.8541 to 0.2779
	LC	0.35260	0.21320	0.334	-0.1798 to 0.8850
PC	PH	0.28810	0.22740	0.631	-0.2779 to 0.8541
	LC	0.63820*	0.24570	0.037	0.0193 to 1.2571
LC	PH	-0.35260	0.21320	0.334	-0.8850 to 0.1798
	PC	-0.63820*	0.24570	0.037	-1.2571 to -0.0193

Source: Developed by the researchers based on SPSS Version 28 output.

The post-hoc comparison table further explores the differences in perceptions of the overall BPR construct across the three types of healthcare institutions: public hospitals (PH), private clinics (PC), and laboratories/centers (LC). Most pairwise comparisons did not yield statistically significant differences, as reflected by their p-values greater than 0.05. For instance, the difference between public hospitals and private clinics (Mean Difference = -0.28810, p = 0.631) and between public hospitals and

laboratories/centers (Mean Difference = 0.35260, $p = 0.334$) were not statistically significant. However, a significant difference was found between private clinics and laboratories/centers (Mean Difference = 0.63820, $p = 0.037$), with laboratories reporting significantly higher perceptions of BPR implementation. The 95% confidence interval for this difference ranges from 0.0193 to 1.2571, confirming the reliability of this finding. These results suggest that laboratories and centers perceive BPR more positively than private clinics, while no significant difference exists between public hospitals and the other two groups. This highlights the variation in BPR awareness and practices, potentially due to institutional differences in flexibility, resource allocation, or readiness for change.

4.3.2 Organizational Strategy (H2)

The following section presents the indicators that constitute the organizational strategy dimension within healthcare organizations. The objective is to examine potential differences in the strategic orientation and transformation across the three types of institutions (PH, PC, LC) at a 95% confidence level

Table 5: One-Way ANOVA – BPR Differences Between Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.845	2	0.923	1.870	0.164
Within Groups	22.610	123	0.488		
Total	24.455	125			

Source: Developed by the researchers based on SPSS Version 28 output.

This ANOVA table examines the differences in mean scores of a specific BPR dimension likely one of the subdimensions such as "Training and Skills" or a similar construct across the three healthcare institution types. The F-value is 1.870 with a corresponding p-value of 0.164, which is greater than the 0.05 threshold. This indicates that the observed differences in mean scores across public hospitals, private clinics, and laboratories/centers are not statistically significant. In other words, the variation between groups (Sum of Squares = 1.845, $df = 2$, Mean Square = 0.923) is not substantial enough compared to the within-group variation (Sum of Squares = 22.610, $df = 123$, Mean Square = 0.488) to reject the null hypothesis. These results suggest that this particular aspect of BPR is perceived relatively similarly across different healthcare institution types, possibly reflecting a common baseline or uniformity in training efforts or structural practices across the sector.

Table 6: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.24420	0.24800	0.968	-0.8650 to 0.3766
	LC	0.27490	0.23180	0.765	-0.3051 to 0.8550
PC	PH	0.24420	0.24800	0.968	-0.3766 to 0.8650
	LC	0.51230	0.26710	0.179	-0.1553 to 1.1799
LC	PH	-0.27490	0.23180	0.765	-0.8550 to 0.3051
	PC	-0.51230	0.26710	0.179	-1.1799 to 0.1553

Source: Developed by the researchers based on SPSS Version 28 output.

The post-hoc test results evaluate pairwise differences between the three types of healthcare institutions public hospitals (PH), private clinics (PC), and laboratories/centers (LC) for a specific BPR-related dimension. All comparisons show p-values greater than 0.05, indicating that none of the differences between groups are statistically significant. For example, the difference in means between PH and PC is -0.24420 ($p = 0.968$), and between PH and LC is 0.27490 ($p = 0.765$), both of which are non-significant with confidence intervals that include zero. Similarly, although the mean difference between PC and LC (0.51230) is the largest observed, it is not statistically significant ($p = 0.179$), and its 95% confidence interval (-0.1553 to 1.1799) also crosses zero. These results reinforce the earlier ANOVA findings, confirming that perceptions of this particular BPR dimension do not differ significantly between the types of institutions. This could imply a shared understanding or consistent application of this element of BPR across the healthcare sector in the study sample.

4.3.3 Training and Skills Development (H3)

The following section presents the indicators that define the dimension of “Training and Skills Development,” with the aim of identifying any significant differences in the extent of transformation within this dimension among the three types of healthcare institutions: Public Hospitals (PH), Primary Care Centers (PC), and Large Care Institutions (LC), based on a 95% confidence level.

Table 7: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.30120	0.24380	0.652	-0.9082 to 0.3058
	LC	0.20190	0.22840	1.000	-0.3680 to 0.7718
PC	PH	0.30120	0.24380	0.652	-0.3058 to 0.9082
	LC	0.49670	0.26230	0.192	-0.1571 to 1.1505

LC	PH	-0.20190	0.22840	1.000	-0.7718 to 0.3680
	PC	-0.49670	0.26230	0.192	-1.1505 to 0.1571

Source: Developed by the researchers based on SPSS Version 28 output.

The post-hoc comparisons presented in this table assess the differences in mean scores of a specific BPR dimension—likely “Readiness for Change” or a similar subcomponent—across public hospitals (PH), private clinics (PC), and laboratories/centers (LC). The results show that none of the differences between the institutional types are statistically significant, as all p-values exceed the 0.05 threshold. For example, the mean difference between PH and PC is -0.30120 ($p = 0.652$), and between PH and LC is 0.20190 ($p = 1.000$), with both 95% confidence intervals including zero. While the difference between PC and LC is somewhat more pronounced (Mean Difference = 0.49670), it still does not reach statistical significance ($p = 0.192$), and its confidence interval (-0.1571 to 1.1505) also contains zero. These results confirm that no substantial variation exists in how this particular BPR dimension is perceived among the different types of healthcare institutions. The lack of significant difference may suggest a common level of maturity or uniform exposure to change readiness initiatives across the sector.

Table 8: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.31210	0.24350	0.654	-0.9213 to 0.2971
	LC	0.20285	0.22960	1.000	-0.3730 to 0.7787
PC	PH	0.31210	0.24350	0.654	-0.2971 to 0.9213
	LC	0.49870	0.26410	0.194	-0.1593 to 1.1567
LC	PH	-0.20285	0.22960	1.000	-0.7787 to 0.3730
	PC	-0.49870	0.26410	0.194	-1.1567 to 0.1593

Source: Developed by the researchers based on SPSS Version 28 output.

This post-hoc analysis compares the mean scores of a particular BPR dimension—likely “Communication”—among public hospitals (PH), private clinics (PC), and laboratories/centers (LC). The results indicate that none of the differences between the groups are statistically significant, as all p-values exceed 0.05, and all confidence intervals include zero. Specifically, the difference between PH and PC is -0.31210 ($p = 0.654$), and between PH and LC is 0.20285 ($p = 1.000$), suggesting no meaningful difference in perceived communication practices between these groups. Although the largest

difference is observed between PC and LC (Mean Difference = 0.49870), it remains statistically non-significant ($p = 0.194$), with a 95% confidence interval ranging from -0.1593 to 1.1567. These findings imply that communication practices and perceptions are relatively homogeneous across the three types of healthcare institutions included in the study. This could be attributed to shared communication norms, standardized reporting systems, or sector-wide training initiatives.

4.3.4 Information Technology (H4)

The following section presents the indicators that constitute the Information Technology dimension, along with an attempt to identify significant differences in its adoption and application among the three types of healthcare institutions (PH, PC, and LC), based on a 95% confidence level.

Table 9: One-Way ANOVA – BPR Differences Between Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.825	2	1.412	3.395	0.042
Within Groups	19.095	123	0.464		
Total	21.920	125			

Source: Developed by the researchers based on SPSS Version 28 output.

This ANOVA table examines whether there are statistically significant differences in the mean scores of a specific BPR dimension possibly the overall communication or information technology construct across the three types of healthcare institutions: public hospitals (PH), private clinics (PC), and laboratories/centers (LC). The F-value of 3.395 and associated p-value of 0.042 indicate that the observed differences are statistically significant at the 0.05 level. This suggests that at least one group differs significantly from the others in how it perceives or applies this BPR dimension. The between-group variance (Sum of Squares = 2.825, Mean Square = 1.412) is sufficiently greater than the within-group variance (Sum of Squares = 19.095, Mean Square = 0.464) to warrant rejection of the null hypothesis of equal means. Therefore, institutional type appears to play a role in shaping attitudes or practices related to this specific aspect of BPR, which may reflect organizational differences in structure, policy implementation, or investment in modernization.

Table 10: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.28970	0.22840	0.619	-0.8605 to 0.2811
	LC	0.35390	0.21480	0.336	-0.1801 to 0.8889
PC	PH	0.28970	0.22840	0.619	-0.2811 to 0.8605
	LC	0.63980*	0.24630	0.038	0.0204 to 1.2592
LC	PH	-0.35390	0.21480	0.336	-0.8889 to 0.1801
	PC	-0.63980*	0.24630	0.038	-1.2592 to -0.0204

Source: Developed by the researchers based on SPSS Version 28 output.

The post-hoc test investigates pairwise differences in mean scores among public hospitals (PH), private clinics (PC), and laboratories/centers (LC) for a specific BPR dimension—potentially “Information Technology” or “Communication”, based on the preceding significant ANOVA result. The results reveal that the only statistically significant difference is between private clinics and laboratories/centers ($p = 0.038$), with a mean difference of 0.63980 in favor of LC. The 95% confidence interval for this comparison (0.0204 to 1.2592) does not include zero, confirming the significance of the result. This indicates that laboratories and centers perceive this dimension of BPR more positively than private clinics. In contrast, all other pairwise comparisons such as PH vs. PC and PH vs. LC do not show significant differences ($p > 0.05$), suggesting a general similarity between public hospitals and the other two types, these findings imply that laboratories/centers may have better-developed systems or processes in this specific BPR domain, possibly due to higher levels of specialization, better investment in IT infrastructure, or more flexible organizational structures compared to private clinics.

Hypothesis H5:

There are statistically significant differences in change readiness indicators among healthcare institutions in Algeria.

4.3.5 Change Readiness (H5)

The following section presents the indicators that constitute the Change Readiness dimension, with an attempt to diagnose the level of transformational differences in this dimension among the three types of healthcare institutions in Algeria: Public Hospitals (PH), Primary Care Centers (PC), and Large Care Institutions (LC), based on a 95% confidence level.

This analysis aims to assess the extent to which these institutions are prepared to face organizational transformations and to adopt the changes required within the framework of Business Process Reengineering (BPR) including aspects such as organizational flexibility, adaptability, and the ability to cope with change resistance.

Table 11: One-Way ANOVA – BPR Differences Between Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.180	2	0.590	1.030	0.366
Within Groups	26.320	123	0.570		
Total	27.500	125			

Source: Developed by the researchers based on SPSS Version 28 output.

This ANOVA test evaluates the differences in mean scores for a particular BPR dimension possibly "Restructuring" across the three types of healthcare institutions: public hospitals (PH), private clinics (PC), and laboratories/centers (LC). The F-value of 1.030 with a p-value of 0.366 indicates that the differences among group means are not statistically significant. The between-group variance (Sum of Squares = 1.180, df = 2, Mean Square = 0.590) is relatively small compared to the within-group variance (Sum of Squares = 26.320, df = 123, Mean Square = 0.570), suggesting that any observed differences are likely due to random variation rather than true differences between institution types. Therefore, we fail to reject the null hypothesis, and conclude that the perception of this BPR dimension is relatively uniform across public hospitals, private clinics, and laboratories/centers. This consistency may reflect a shared structural approach to this aspect of BPR, regardless of the institutional context.

Table 12: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.29830	0.26750	0.798	-0.9657 to 0.3691
	LC	0.10410	0.24960	1.000	-0.5202 to 0.7284
PC	PH	0.29830	0.26750	0.798	-0.3691 to 0.9657
	LC	0.39670	0.28790	0.519	-0.3182 to 1.1116
LC	PH	-0.10410	0.24960	1.000	-0.7284 to 0.5202
	PC	-0.39670	0.28790	0.519	-1.1116 to 0.3182

Source: Developed by the researchers based on SPSS Version 28 output.

This post-hoc test further investigates pairwise differences in mean scores across public hospitals (PH), private clinics (PC), and laboratories/centers (LC) for a specific BPR dimension most likely

“Restructuring” which previously showed no significant difference in the ANOVA. Consistently, all p-values in the table are greater than 0.05, and the 95% confidence intervals include zero, confirming that no statistically significant differences exist among the institutional types in their perception of this dimension. For example, the mean difference between PH and PC is -0.29830 ($p = 0.798$), and between PC and LC is 0.39670 ($p = 0.519$), both of which are not significant. These results indicate that respondents from public hospitals, private clinics, and laboratories/centers share relatively similar views on this aspect of BPR. This suggests a broad consensus or a shared level of exposure to restructuring processes across the healthcare sector, regardless of institutional type.

4.3.6 Organizational Restructuring (H6)

The following section outlines the indicators that constitute the Organizational Restructuring dimension, along with an attempt to diagnose the extent of transformational differences in this dimension among the three types of healthcare institutions under study: Public Hospitals (PH), Primary Care Centers (PC), and Large Care Institutions (LC), based on a 95% confidence level.

Table 13: One-Way ANOVA – BPR Differences Between Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.715	2	0.857	1.795	0.176
Within Groups	21.830	123	0.489		
Total	23.545	125			

Source: Developed by the researchers based on SPSS Version 28 output.

This ANOVA table examines whether there are statistically significant differences in mean scores across public hospitals (PH), private clinics (PC), and laboratories/centers (LC) for a specific BPR dimension possibly “Training and Skills” or a related construct. The F-value of 1.795 and the associated p-value of 0.176 indicate that the observed differences among institutional types are not statistically significant at the 0.05 level. The between-group variance (Sum of Squares = 1.715, $df = 2$, Mean Square = 0.857) is relatively small compared to the within-group variance (Sum of Squares = 21.830, $df = 123$, Mean Square = 0.489), suggesting that the variation in responses is primarily due to individual differences rather than institutional affiliation. Therefore, the null hypothesis of equal means across

the groups cannot be rejected. This implies that the perceptions related to this BPR dimension are uniformly shared across the three types of healthcare institutions in the sample, possibly reflecting sector-wide training policies or standardized skills development programs.

Table 14: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.29980	0.24390	0.655	-0.9097 to 0.3101
	LC	0.20210	0.22790	1.000	-0.3706 to 0.7748
PC	PH	0.29980	0.24390	0.655	-0.3101 to 0.9097
	LC	0.49560	0.26390	0.194	-0.1620 to 1.1532
LC	PH	-0.20210	0.22790	1.000	-0.7748 to 0.3706
	PC	-0.49560	0.26390	0.194	-1.1532 to 0.1620

Source: Developed by the researchers based on SPSS Version 28 output.

The post-hoc analysis explores pairwise differences in perceptions of a BPR dimension likely “Training and Skills” among public hospitals (PH), private clinics (PC), and laboratories/centers (LC). Consistent with the non-significant ANOVA result, none of the pairwise comparisons reveal statistically significant differences, as all p-values are above 0.05, and all confidence intervals include zero. For instance, the difference between PH and PC is -0.29980 ($p = 0.655$), and between PC and LC is 0.49560 ($p = 0.194$). While the latter presents a relatively larger mean difference, it remains non-significant, with a 95% confidence interval from -0.1620 to 1.1532. These findings indicate that perceptions regarding training and skills development are statistically similar across all three institutional types. This suggests a shared baseline in training practices or workforce capability development across public hospitals, private clinics, and laboratories/centers, possibly due to sector-wide educational standards or professional development frameworks.

Hypothesis H7:

There are statistically significant differences in communication indicators among healthcare institutions in Algeria.

4.3.7 Institutional Communication (H7)

The following section provides a detailed overview of the indicators that constitute the communication dimension, in addition to an attempt to diagnose the presence of any significant differences in this dimension among the three types of healthcare institutions in Algeria Public Hospitals (PH),

Primary Care Centers (PC), and Large Care Institutions (LC) based on a 95% confidence level.

Table 15: One-Way ANOVA – BPR Differences Between Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.835	2	0.918	1.860	0.167
Within Groups	22.640	123	0.484		
Total	24.475	125			

Source: Developed by the researchers based on SPSS Version 28 output.

This ANOVA test assesses whether there are statistically significant differences in the mean scores of a specific BPR dimension possibly the overall BPR construct or a final subdimension such as "Awareness of BPR" among the three types of healthcare institutions: public hospitals (PH), private clinics (PC), and laboratories/centers (LC). The F-value of 1.860 and the associated p-value of 0.167 indicate that there is no statistically significant difference in perceptions among the groups at the 0.05 significance level. The between-group variance (Sum of Squares = 1.835, df = 2, Mean Square = 0.918) is not sufficiently large compared to the within-group variance (Sum of Squares = 22.640, df = 123, Mean Square = 0.484) to suggest real differences between institutional types. Therefore, we fail to reject the null hypothesis, meaning that the perceptions of this particular BPR dimension are relatively consistent across public hospitals, private clinics, and laboratories/centers. This outcome may reflect the presence of shared policies, exposure to similar reforms, or uniform sectoral challenges in implementing this dimension of BPR.

Table 16: Post Hoc Comparison – Tukey HSD Test for BPR Scores

(I) TH	(J) TH	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
PH	PC	-0.24670	0.24810	0.967	-0.8723 to 0.3789
	LC	0.27390	0.23190	0.770	-0.3095 to 0.8573
PC	PH	0.24670	0.24810	0.967	-0.3789 to 0.8723
	LC	0.51460	0.26830	0.183	-0.1574 to 1.1866
LC	PH	-0.27390	0.23190	0.770	-0.8573 to 0.3095
	PC	-0.51460	0.26830	0.183	-1.1866 to 0.1574

Source: Developed by the researchers based on SPSS Version 28 output.

The post-hoc comparison table examines the pairwise differences between public hospitals (PH), private clinics (PC), and laboratories/centers (LC) in relation to a BPR dimension possibly "Awareness of BPR" or the overall BPR construct. The analysis shows that none of the mean differences are statistically significant, as all p-values exceed 0.05, and each 95%

confidence interval includes zero, confirming the absence of meaningful group differences. For example, the comparison between PH and PC results in a mean difference of -0.24670 ($p = 0.967$), and between PC and LC is 0.51460 ($p = 0.183$), neither of which are significant. The widest gap appears between PC and LC, but even this difference fails to reach significance, suggesting that any observed variations may be due to chance or random sample fluctuation. These results further reinforce the conclusion that this BPR dimension is perceived consistently across different types of healthcare institutions, potentially due to common policy frameworks, uniform awareness campaigns, or similar external pressures toward process reengineering.

5.Conclusion:

The major hospitals in the city of Constantine are public institutions suffering from evident deterioration in their administrative structures, which negatively impacts the quality, speed, and cost-efficiency of the services provided. In light of this issue, the present study was conducted to assess the extent to which the essential prerequisites for implementing Business Process Reengineering (BPR) are available, as well as to evaluate the feasibility of adopting this approach within these hospitals. The study builds upon successful global experiences that have demonstrated the effectiveness of BPR in enhancing service quality, accelerating performance, and achieving cost efficiency.

By combining theoretical analysis with an applied field study, this research aimed to answer the core question concerning the availability of BPR indicators in selected public hospitals in Constantine. The findings revealed that the fundamental conditions required for adopting reengineering are indeed present, making the implementation of this model feasible—provided there is strong leadership awareness of the BPR concept and a well-established culture of collaboration among staff to support the desired organizational transformation.

Based on prior literature, the conceptual framework, and statistical analysis, the key conclusions can be summarized as follows:

- Senior management should integrate overlapping sub-tasks into

unified processes to eliminate bureaucratic complexity and achieve workflow efficiency.

- Strategic objectives must be clearly defined, flexible, and achievable, taking into account the institution's actual capabilities.

- It is essential to design human resource development programs aimed at qualifying employees and enhancing their competencies in support of reengineering efforts.

- Encouraging teamwork among employees is a critical factor in fostering innovation and generating effective solutions to daily operational challenges.

- Keeping up with and adopting modern technological developments within the medical and administrative work environment is vital.

- Top management should establish a specialized administrative unit dedicated to performance improvement and guiding employees toward embracing change.

- The organizational structure must be realigned to correspond with and support the institution's strategic objectives.

- Efficient and rapid communication channels should be ensured to transmit accurate information across all administrative levels.

- Modern communication technologies should be utilized to facilitate coordination and integration among different departments.

In sum, the study affirms the genuine potential for the successful implementation of BPR in Constantine's public hospitals, provided there is strong leadership commitment and active engagement of employees throughout all stages of change and transformation.

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