

The Impact of Implementing Quality Management Principles of ISO9000 on Business Effectiveness: An Applied Study at Palestinian Businesses

تحليل نتائج تطبيق مبادئ نظام إدارة الجودة الأيزو ٩٠٠٠ في مؤسسات الأعمال: دراسة في واقع المؤسسات الفلسطينية

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Abstract

The management of quality has received considerable attention in recent years and various studies have documented analysis and results of the impact of quality management models on organizational effectiveness. This research study provides details of an investigation of the impact of the principles of ISO9000 quality management system on improving organizational effectiveness in Palestine. Using a recent survey of ISO9000 implementing companies, data were collected and analysed about critical quality management principles: quality strategy, continuous improvement, leadership development, and customer satisfaction, and the impacts were assessed using key organizational effectiveness indicators: employee satisfaction, quality, and productivity. Basic hypotheses were formulated and tested and the results showed that companies have indeed made significant efforts towards establishing genuine quality systems and consequently attained benefits in terms of effectiveness indicators. Furthermore, correlation analysis confirmed suggestions in the literature that a company's performance is positively impacted by the establishment and implementation of quality principles and quality models.

ملخص

لقد ظهر الاهتمام في السنوات الأخيرة في موضوع إدارة الجودة وتناوله الباحثون بالتحليل حيث ظهرت الكثير من الدراسات التي توثق نتائج تطبيق إدارة الجودة على فعالية وأداء المؤسسات. تطرح هذه المقالة تحاليل ونتائج آثار تطبيق مبادئ نظام الأيزو ٩٠٠٠ على فعالية أداء المؤسسات الفلسطينية التي منحت شهادة هذا النظام. فباستخدام المسح الميداني لأربعين شركة تم جمع بيانات عن مبادئ نظام الأيزو ٩٠٠٠ المطبقة، وبالتحديد استراتيجية الجودة، التحسن المستمر، تطوير القيادات، ورضى العملاء، وتقييم آثار تطبيق هذه المبادئ من خلال مجموعة مؤشرات مهمة مثل رضى الموظفين، مستوى الجودة، ودرجة الإنتاجية. ولهذه الغاية يتم صياغة فرضيات إحصائية أساسية واختبارها وتشير النتائج إلى أن الشركات قد بذلت جهوداً فعلية من أجل تطبيق مبادئ الجودة وحقق ذلك بعض التحسن في معايير الأداء، وهذا يعزز النتائج المنشودة في الأدبيات حول وجود ارتباط إيجابي بين أداء الشركات وبين تطبيقها لمبادئ الجودة.

This article is devoted to investigating the impact of implementing the principles of the quality management system ISO9000 on the effectiveness of Palestinian organizations. A fundamental question is whether quality systems in Palestine have achieved stated objectives in influencing and enhancing organizational effectiveness.

Importance of the Study

While quality management systems in industrialized nations have been major focus of attention, implementation, and research for along time, the interest in the implementation of quality management systems in Palestine, like in most developing countries, has started only recently. Almost all quality related development efforts in Palestine have started after the arrival of the Palestinian National Authority. Much of these efforts was stirred up and encouraged by donors' projects that opened up opportunities for local businesses to learn from foreign experiences and use international benchmarks to improve the quality of their products and services with the hope of penetrating new local, regional or international markets^[9].

Despite the increasing stresses and economic hardships due to occupation, Palestinians are seeking continuous modernization and adaptation to ever-changing challenges and conditions with the purpose of improving organizational effectiveness. Political conditions combined with other typical difficulties such as scarce natural resources, limited internal and external markets, small-size organizations, problems of attracting new investment capitals, and very weak infrastructures, all require that efforts be seriously undertaken to investigate, scrutinize, and improve Palestinian quality as a viable means for securing markets and organizational stability and growth. These considerations establish a justifiable basis for this study that has been the first in Palestine in terms of objectives, methodology, and analysis.

Objectives of the Study

The objectives of this study can be summarized as follows:

- Assess the degree of implementing basic principles of ISO9000 quality management system in terms of key dimensions including presence of a clear organizational strategy, customer satisfaction, leadership development and continuous process improvement.
- Assess the impact of implementing the principles of the ISO9000 system on key organizational performance indicators. Such indicators include employee

that quality levels at printing industrial firms in Jordan were still moderate, thus warranting the immediate attention to quality matters as a major business dimension. Haj Ali ^[13], Shajrawi ^[14], and Sadder ^[15] conducted research studies at various Jordanian companies that implemented a form of ISO9000 in which authors revealed that implementation of the quality system actually improved, with varying degrees, the performance of organizations in terms of lower production costs, higher employee morale, improved customer loyalty, improved revenues and other related benefits. In the United Arab Emirates (UAE), Badri investigated the effect of quality management on firm performance using path analysis technique and concluded that top management support is a primary force behind creating a supporting environment for successful implementation of quality practices ^[17]. In Egypt, Farid examined the potential and impact of applying TQM principles to Egyptian garment and textile industries ^[18], and in Saudi Arabia, Khalaf illustrated the effect of quality as a component of the excellence triode represented by quality, productivity and cost ^[19].

Internationally, the interest in assessing the impact of ISO9000 and TQM initiatives had been overwhelming and very large number of research studies was conducted for this purpose in the United States of America, Europe, Japan, South America, and many other countries. In this article only a number of studies will be cited for reference.

Johnson indicated that American companies have realized many benefits as a result of implementing ISO9000 system standard such as changing organizational structures and cultures, increased interest in research and development, establishment of customer care centers, improvements in sales volumes, and increased profitability, just to name a few ^[20]. Mats and Carlson surveyed more than hundred firms that implemented ISO9000 system and found that areas mostly affected by the new system were production, marketing, and design ^[21]. Motwani et al examined the motivations of Japanese companies to implement ISO9000 system and concluded that entering new international markets and increasing market shares were among the main reasons for their initiatives ^[22]. In the retail banking sector in South Africa, Vermeulen and Edgeman presented a survey of key quality improvement strategies and assessed the performance of retail banks and South Africa with respect to these strategies and concluded that continuous quality improvement is a way of life and successes could be measured when organizations achieve full transformation towards a TQM culture ^[23]. McCracken and Haynak presented a simulation study to examine the impact of quality on productivity in which they proved that as

6. Formulate and generalize results and accordingly develop recommendations for improved implementation of ISO9000 quality management standard.

Model and Variables of the Study

According to the general framework above, two sets of variables were defined for this purpose; independent or control variables, and dependent or response variables. The first set of variables represented strategies, plans, and actions taken by management that translated the implementation of the basic quality principles and requirements of ISO9000 system. Dependent variables were those reflecting the outcomes of implementing ISO9000 quality principles and requirements. The two sets are defined and explained in Tables 1 and 2.

It should be noted that, on one hand, the selection of independent variables was guided the archived literature ^[1-2, 30-31], consultations with practitioners and experts in the fields, and by the principles of the ISO90001 system. The clauses of the system, for example, include management commitment to clear quality strategy, leadership and employee involvement, customers' satisfaction, and measurement and analysis.

On the other hand, the determination of the dependent variable set was guided by Likert's Organizational Characteristics and others ^[28, 31]. These characteristics, namely, quality, productivity, and employee satisfaction represented key performance indicators that were judged by firms' managers to measure business goals and hoped outcomes of ISO9000 implementation. It was obvious that such indicators took into account the interests of organizational stakeholders represented by customers, employees and shareholders ^[30].

Table 1: Model Variables

Independent Variables: ISO9000 Quality Principles	Dependent Variables: Business Performance Indicators
I. Adopted Strategy	I. Employee Satisfaction (ES)
1. Mission and quality objectives	1. Job suitability
2. Annual business planning	2. Fellow workers and superiors
	3. Pay and promotion
	4. Satisfaction with organizational growth
II. Customer Satisfaction Efforts (CS)	II. Productivity Level
3. Customer focus and feedback	5. Time utilization

...Continue table (2)

Variable	Explanations
	<ul style="list-style-type: none"> • <u>Continuous improvement</u> mandates quality planning, use of measurements and analysis techniques, and establishment of proper reporting and communications tools • <u>Leadership Development</u> is critical to the evolution of a quality culture in the organization. This requires unified goals, employee training and participation, and reward and recognition.
Employee Satisfaction	Defined as employees' and managers' satisfaction with fellow workers, jobs, superiors, their organization compared with others, pay, progress in the organization, and opportunities for advancement in the future.
Productivity Level	Defined as assessment by employees and managers of the efficiency of work done in the divisions or departments as well as the quality with which the work is done. Productivity is measured in terms of output production volume per unit time. Another indication for productivity used here is percent of time utilized of production resources including employee and equipment time
Quality Level	Defined as assessment of the quality of work done in their organizations according to the requirements set to meet customer needs and satisfaction; quality as conformance to specifications. Quality is measured in terms of volumes of product rework, scrap, process non-conformities, and number of customer complaints

Each of the study variables was measured directly through a questionnaire that was specifically designed and used to collect data from companies who were certified to an ISO9000 model or implemented a quality initiative having the same objectives. A 5-point scale system (1-5) was used to measure responses of companies to these questions. The 5- point scale system represented responses ranging from 'very high' (5), through 'high' (4), 'moderate' (3), 'low' (2), and finally 'very low' (1). The reliability of the scale in this study was estimated using Cronbach's alpha formula to determine mean interim correlation where a value of 0.7 or more represents a good criterion for scale reliability^[27].

using the 5-point scale system described above. This level was selected since the sample size is relatively large compared to population count and as such the chances of extreme random variations would be minimal. Therefore, the first general hypothesis was formulated in terms of average score (μ) as follows:

H_{0i} : $\mu < 2.5$), implying there is no genuine implementation of ISO9000 quality principle (i).

H_{1i} : $\mu > 2.5$), implying there is significant implementation of ISO9000 quality principle (i).

It should be noted that the above hypothesis was a general one relating to key variables in the independent variable list of Table 1. Consequently, a separate hypothesis test would be implemented for each key independent variable as shown in the coming sections.

Research Question II Hypothesis

This hypothesis test aimed at assessing the impact of implementing ISO9000 quality system principles on improving organizational effectiveness in terms of quality, productivity, and employee satisfaction. The assessment of this impact could be viewed from two perspectives, first, by assessing the significance of improvement on its own merit, and second, by examining the association between scores of implementing quality management principles and those relating to organizational effectiveness factors. Therefore, two types of hypotheses were formulated.

Question II Hypothesis (a)

This hypothesis test examined the degree of realizing actual benefits resulting from implementing basic ISO9000 quality system principles (i.e., dependent variables). The null hypothesis assumed that no such benefits were obtained, while the alternative hypothesis assumed that firms actually obtained real benefits in terms of employee satisfaction, quality and productivity.

Again, a significant degree of organizational benefits meant attaining a statistical average score of 2.5 or better is obtained using the 5-point scale system described above. Therefore, a general hypothesis was formulated in terms of average score (μ) as follows:

H_{0i} : ($\mu < 2.5$), implying that no significant effectiveness are obtained.

H_{1i} : ($\mu > 2.5$), implying that significant effectiveness are obtained.

It should be noted that the above hypothesis was a general one relating key organizational effectiveness factors in the dependent variable list of Table I, and consequently, a separate hypothesis test would be implemented for each key dependent variable.

Manager, Operations Manager, etc.) and other questions were presented to middle-level management (i.e., department or section heads) and employees. This method of data collection helped minimize inaccuracies in understanding and interpreting questionnaire statements while avoiding any biased influence. The scale reliability as computed using the Cronbach alpha test was 0.84.

Summary Demographic Information

The first portion of the questionnaire data provided general descriptive information about firms included in the study such as business sector, number of employees, legal form, approximate capital investment, year of establishment, and year of implementing the ISO9000 system. This demographic information is presented in Table 3.

Table 3: Demographic Information of Firms Included in the Study

Business Sector		Year of Establishment	
Engineering industries (metal wood, paper, plastics, leather)	13	Before 1980	9
Stone and Marble	2	1981-1990	22
Chemical and Pharmaceutical	2	1991-1997	9
Food	3	Number of Employees	
Garment and Textile	2	Less than 40	20
Contracting	7	40-100	10
IT and Telecommunications	2	101-200	7
Engineering Consulting and Material Testing laboratories	5	More than 200	3
Others	4	Year of ISO9000 Implementation	
Capital Investment		1997	8
Less than 0.5 million\$	5	1998	7
(0.5-1.0) million \$	15	1999	12
(1.0-5.0) million \$	14	2000	8
(5.0-10.0) million \$	4	2001	4
More than 10 million \$	2	2002	1

Summary Descriptive Statistics

The second and third portions of the questionnaire respectively provided data about the degree of implementing the quality management principles

2. Customer Satisfaction Requirements

$H_0: (\mu < 2.5)$, implying there is no genuine implementation of Customer Satisfaction.

$H_1: (\mu > 2.5)$, implying there is significant implementation of Customer Satisfaction.

3. Continuous Process Improvement (CPI)

$H_0: (\mu < 2.5)$, implying there is no genuine implementation of CPI.

$H_1: (\mu > 2.5)$, implying there is significant implementation of CPI.

4. Leadership Development

$H_0: (\mu < 2.5)$, implying there is no genuine implementation of Leadership Development.

$H_1: (\mu > 2.5)$, implying there is significant implementation of Leadership Development.

The value of the t statistic was computed for each hypothesis and compared with the t value obtained from the t Table at $df=39$ and $\alpha=0.05$. This t value is approximately 1.68. The computed values of the t statistic and the results of the one-sided hypotheses tests are given in Table 5, where null hypotheses were rejected when computed t value exceeded 1.68 ^[29].

Table 5: Computed t Values and Results of Hypothesis Test I

Hypothesis	Computed t- value	Decision on H_0	Interpretation of decision
Strategy	9.14	Reject	Quality is considered as a strategy dimension by top management
Customer satisfaction	9.42	Reject	Customer satisfaction and related system are implemented
Continues process improvement (CPI)	1.41	Accept	No significant continuous improvement efforts are actually implemented
Leader ship development	4.96	Reject	Efforts are some what made to develop leader ship

It is quite clear from the results of Table 5 that ISO9000 certified companies in Palestine were actually implementing certain important quality principles as they strongly emphasized quality strategies and customer satisfaction principles. This is reflected by the fact that such companies have embarked on quality initiatives such as the ISO9000 quality management with a

The value of the t statistic was computed for each hypothesis and compared with the t value obtained from the t Table at $df=39$ and $\alpha=0.05$, where t value is approximately 1.68. The computed values of the t statistic and the results of the tests are given in Table 5, where null hypotheses were rejected when related computed t value exceeded 1.68.

Table 6: Computed t Values and Results of Hypothesis Test II (a)

Hypothesis	Computed t- value	Decision on H_0	Interpretation of decision
Employee satisfaction	1.89	Reject	Employee satisfaction was observed but very weak
Productivity Level	4.79	Reject	Significant productivity improvement
Quality Level	1.69	Reject	Quality improvement observed but very weak

It can be seen from the results of Table 6 that companies have achieved certain benefits especially in terms of productivity improvements. Although improvements in quality level and employee satisfaction were observed, it was clear that such improvements were still very weak and barely significant. These results reflected the fact that firms still emphasized productivity as a profound measure of effectiveness, thus taking actions towards increasing production outputs. The weak significance of effectiveness as measured by quality and employee satisfaction should not be surprising too since these two aspects require more focus on continuous improvements, use of quantitative measurements techniques, and investments in leadership development. However, as shown by the results of Hypothesis I (Table 5), these aspects have not yet received significant attention.

Testing Hypothesis II (b)

This test dealt with examining the association, if any, between implementing quality management principles and realized effectiveness in terms of quality, productivity, and employee satisfaction. Quality management principles considered in this case were those that proven to be significantly implemented according to Hypothesis Test I above. As such, this hypothesis test examined the relationships between main organizational effectiveness performance indicators, on one hand, and the significant ISO9000 quality principles, on the other hand, namely, strategy, customer satisfaction, and

relationships between each effectiveness factor and other three quality principle factors, In this case, using $\alpha = 0.05$ and number of independent variables = 3, $F_{0.05,3,36} = 2.85$ implying that there were certain positive regression coefficients.

Table 9: Results of Multiple Regression Analysis

Dependent variables: effectiveness factors	Computed F – ratio
Productivity	7.25
Quality	4.10
Employee satisfaction	5.30

Discussion and Conclusions

The statistical analysis showed that significant efforts were actually made to improve quality levels, productivity and employee satisfaction; however, the realized benefits of organizational effectiveness as a result of these efforts were still moderate. Further efforts are needed especially in continuous process improvement and leadership development fields. Development efforts would need to capitalize on existing successes and future improvement programs must be streamlined with basic quality management principles so that ISO9000 certification becomes no longer an objective by itself.

In light of the presented analysis, statistically valid correlations between implementing quality principles and organizational effectiveness existed. Nevertheless, it should not be understood that the moderate associations established between implementing quality principles and organizational effectiveness meant that quality management systems had reached a state of maturity and pushed quality levels to their boundaries. Instead, it only established a strong conclusion that efforts made have actually led to certain improvements, and that further investments in continuous quality improvement and leadership development would be justified and would pay off in the long run.

The following areas of development should receive emphasized attention:

- *Clearer top management vision and support.* A major quality principle is management commitment and dedication to quality. Management must demonstrate its commitment through deeds, personal involvement, and maintaining close contact with those responsible for producing quality service and products.
- *The need to innovate and explore new ideas.* Palestinian firms must emphasize continuous improvement and explore new ways of doing things.

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