

The Impact of Quality Management Practices on Firm's Performance an Empirical Investigation of Associated Constructs in Palestinian Information and Communication Technology Firms

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Abstract: This study, aims to survey quality management practices in Palestinian Information and Communication Technology (ICT) sector. The research purpose is to provide reliable and valid constructs for measuring quality management practices depending on intensive research of literature review. The study tests the effect of quality practices implementation on firm's performance, such as quality, business and organizational performance by using web-based questionnaires. The data was obtained through a survey from 180 related quality managers from 60 Palestinian ICT firms. Confirmatory factor analysis and internal consistency tests were used to verify scales validity and reliability. The 2 independent samples t-test and regression analysis were utilized to investigate the statistical effects of quality practices implementation. This study supports the hypothesis that quality management practices positively affect firm's performance. The study finds that the successful adoption and implementation of TQM practices results in firm's performance improvement. The main proposition of the results intended for managers is that adopting TQM practices, ICT firms are more likely to accomplish better performance in customer satisfaction, employee relations and quality, business and organizational performance than without adopting TQM practices. The adoption of TQM practices within Palestinian ICT companies is poor ranging from limited to moderate level, therefore it is necessary for these firms to adopt best practices of TQM to improve organization performance for the best of these organizations.

Key words: Quality management, total quality management, organizational performance, business performance, ICT firms, Palestine

INTRODUCTION

Quality management is one of the major challenges that brought the attention of the research and business community in the last 3 decades (Noronha, 2002; Feng *et al.*, 2007). This is especially due to the growing need for well quality oriented organizations for continuous improvement of organization performance at various economic sectors, such as manufacturing, service, health care, banking, ICT and education (Feng *et al.*, 2007; Irfan *et al.*, 2009; Faganel, 2010; Khan, 2012). Due to the central role, Total Quality Management (TQM) plays in realizing the vision of the organizations, many researchers, businesses and awards proposed models and practices for quality management implementation. TQM is drawn from the principles endorsed by remarkable researchers such as Taylor, Deming, Juran, Crosby, Ishikawa, Shewhart and others (Black and Porter, 1996; Fisher and Nair, 2009). Other than the studies done for TQM adoption for the enterprises in developed

countries, there are many studies held for TQM adoption in various business sectors dominated for developing countries especially in the last 2 decades (Jaafreh and Al-Abedallat, 2013; Khan, 2012; Noronha, 2002; Hassan *et al.*, 2013).

In developing countries, ICT output gains are mainly obtained through the activities of the ICT sector, rather than using ICT. The development of ICT sector has an important role on employment both in the same sector and in contiguous and supporting industries. The ICT sector long-drawn-out, as organizations started to adopt technology to augment automation levels and reduce costs. The emergence and continuous growing of social networking and web 2.0 firms alongside with the rising status of smart phones and technology smart applications continue to force the development of the industry (Pena-Lopez, 2011; Dutta and Mia, 2010).

Palestine's ICT sector has grown in the last 2 decades, enabled by the availability of related infrastructure, such as computers, broadband, software,

maintenance and widely internet access. This infrastructure is necessary for preparing ICT sector as a driver for building a high tech market. Building a Palestinian competitive high tech market is necessary to enable Palestinian firms to compete the software firms in the region. But, the problem here is that Palestinian high tech firms are not at the level of quality needed to compete other high tech firms in the region, making these Palestinian firms lack the appropriate competitive advantage (White *et al.*, 2012). The study emerged from this point of view, where researchers need to highlight the implications of adopting TQM practices at Palestinian ICT firms. Effective adopting of ICT practices will raise the quality level of Palestinian ICT companies and enabling them to compete the region ICT firms. The extent to which TQM practices are adopted in Palestinian ICT companies has never been fully explored.

The increasingly evolving of competition between organizations, more informed customers, rapidly changing technologies and increasingly innovation driven work environment, in addition to the fact that the business environment is increasingly characterized by instability and uncertainty triggers the organizational needs for continuous performance enhancement in an innovative way (Hassan *et al.*, 2013), as a necessity issue. So for the company to be competitive, it must adopt flexibility into its operations and to increase its performance it must adopt Total Quality Management programs (TQM). The adoption of TQM programs must be involved within all management levels acting for different functions in integrated processes, informed and involved the totality of enterprise activity, organized in a system view approach, oriented toward exceeding the customers' and stakeholders' requirements.

As a consequence of the vital role quality management programs are playing in organizational performance enhancement, organizations must adopt best TQM practices. This research was carried out to answer the following research questions:

- What are the principles, models, standards, awards, practices and techniques related to quality management?
- What are the types of performance encountered with organization behavior?
- To what extend do Palestinian ICT companies adopt TQM practices?
- Is there a difference of adopting TQM practices for companies that have a formal TQM program and those without a formal TQM program?
- Is there a relationship between TQM adoption and quality performance?

- Is there a relationship between TQM adoption and business performance?
- Is there a relationship between TQM adoption and organizational performance?

In this study, researchers contribute to TQM adoption by providing empirical data investigating on TQM practices that work in Palestinian ICT business sector and empower awareness of how TQM can be employed to be a source of competitive advantage.

In the research study, researchers rely on extensive literature review methodology to investigate the impact of applying quality management practices on organization performance and an empirical study to evaluate the impact of TQM practices adoption on the performance of Palestinian ICT business sector.

Literature review: The concept of quality management is a modern management paradigm. The philosophy underpinning quality management depends on a set of ideas and principles where any organization management can adopt the quality management approaches to achieve the best possible performance. In what follows, we shed the light, analyze and discuss the issues related to quality, quality management, total quality management and its importance to institution performance. In addition the conceptual framework for TQM practices, models and awards are illustrated.

Quality: Before start talking about the related research concerning the effect of quality management on performance, researchers need to be aware of the semantic of quality. There are many definitions for quality from various perspectives (Hoyer and Hoyer, 2001). According to Crosby quality is conformance to requirements. Deming's definition of quality is multidimensional to produce a product and/or deliver a service that meets the customer's expectations to ensure customer satisfaction. Juran stated various aspects of quality; quality consists of those product features which meet the needs of customers and thereby provide product satisfaction and quality is apparently associated with customers' requirements and fitness suggests conformance to measurable product characteristics (Juran and Godfrey, 1999). Another definition of quality by American Society for Quality (ASQ): A subjective term for which each person has his or her own definition. In technical usage, quality can have 2 meanings; the characteristics of a product or service that bear on its ability to satisfy stated or implied needs and a product or service free of deficiencies.

The earlier mentioned definitions include 2 proportions of quality from the subjective perspective, meeting customer needs and conformance to

specifications. Also, researchers can find that these definitions concentrate in the product specifications and absence of errors rather than the customer. At the end of 1980's the concentration of quality has been shifted from product concentration to customer concentration (Oakland, 2003) where many organizations define quality as meeting or exceeding customer expectations (Evans and Lindsay, 2002). ISO 9001:2000 defined quality as the ability to meet customer requirements that have been specified quantitatively (Stracke, 2006).

Quality management: There are many definitions of Quality Management (QM). According to Kaynak and Hartley, QM can be defined as a holistic management philosophy that strives for continuous improvement in all functions of an organization. QM can be achieved only, if the quality concept is used in all organizational processes starting from the acquisition of resources to customer service after the sale (Kaynak and Hartley, 2005). Nanda definition of QM is all activities that are required to plan for quality in an organization and all activities that are required to satisfy quality objectives. Specifically, quality management comprises the following 4 elements: Quality planning; control; assurance and improvement (Nanda, 2005). Klefsjo *et al.* (2008) stated that quality management should be interpreted, as management of quality. All the mentioned definitions of QM define it from the system view, as set of processes managed in a system perspective and involved in all functions of the organization driven by customer needs and continuous improvements.

The approach used for practicing quality management is guided by the company's perspective of quality. Before World War 2 the concentration by the companies was on the production with absence of defects. As a consequence of this perspective the quality management was focused on analytical methods to measure, monitor and control specific process variables (Fisher and Nair, 2009).

After the war Juran and Deming developed quality tools and knowledge to rebuild Japan's economy where at that period the need to think about quality from the system view perspective comes up and the Japanese adopted the term total quality control stated by Feigenbaum. The Japanese applied this view and called it company wide quality control (Fisher and Nair, 2009). The adoption and development with continuous improvement of quality methods in Japan following the war had a constructive impact on the quality of Japanese goods.

Total quality management: Now-a-days, the focus is in Total Quality Management (TQM) (Fisher and Nair, 2009)

which was driven and blossomed, as a response of American corporations in 1980's to Japanese success in 1970's of quality management implementation and their ability to produce higher-quality exports with lower prices, encountered for customer advantage throughout the world. Various definitions of TQM have been developed by researchers. According to Flynn *et al.* (1994) TQM is an integrated approach to achieving and sustaining high quality output, focusing on the maintenance and continuous improvement of processes and defect prevention at all levels and in all functions of the organization, in order to meet or exceed customer expectations. Aized (2012) stated that total quality management is a philosophy of management for continuously improving the quality of products and processes. The definition of TQM according to the International Standard ISO 8402 (Juran and Godfrey, 1999) is: Management approach of an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction and benefits to all members of the organization and to society. As stated in these definitions the core concepts of total quality are continuous improvement, customer focus and function integration. Firms practically follow known, conventional and standard TQM practices for quality management implementation. TQM major practices are top management commitment, process direction, customer center of attention, supplier relationships, employee commitment, metrics, international standards and adopting problem solving approaches (Dale *et al.*, 2001; Mani *et al.*, 2003). Evans and Lindsay (2002) stated that total quality is based on 3 fundamental principles:

- Customers and stakeholders focus
- Participation and teamwork by everyone in the organization
- A process focus supported by continuous improvement and learning (Adam *et al.*, 1997; Evans and Lindsay, 2002)

The earlier 3 principles of TQM are simple and obvious but they are not sufficient to guide the needed practices for the organization to implement TQM. To overcome this drawback and address more detailed principles and practices of TQM researcher analyzed different standardized quality models illustrated in Appendix A.

One of the most known quality awards is the Malcolm Baldrige National Quality Award in the United States of America (MBNQA) which includes 7 criteria as follows (Pannirselvam and Ferguson, 2001; Sampaio *et al.*, 2012):

Leadership: How leaders direct, maintain and govern an organization.

Strategic planning: How strategic objectives and action plans are developed, deployed, measured and controlled.

Customer and market focus: How the needs and expectations of customers are determined and how the customer acquisition, satisfaction, loyalty and sustainability are achieved.

Measurement, analysis and knowledge management: How information and knowledge are collected, analyzed, managed and improved and how performance is investigated.

Workforce focus: How the effective use of employees takes place and predominant to strategic planning; how the organization develops and maintains a work environment for employee support that leads to performance excellence and to personal and organizational growth.

Process management: How to address the key product, service and organizational processes for creating customer and organizational value and organizational support.

Results: Examines performance and improvement in product and service outcomes, customer satisfaction, financial and marketplace performance, human resource outcomes, operational performance, leadership and social responsibility; performance is examined relative to competitors and other organizations with similar products and services. In order to correctly conduct, the research study of examining the effect of adoption TQM practices on business and organizational performance, researcher need to specify the best practices of TQM with the related variables for each construct where this investigation is done in this study.

QM techniques consist of set of processes with the involvement of leadership and workforce towards achieving the objectives of the organization and eliminating any waste processes and time. These techniques oriented to prevention rather than inspection and lean to design in quality initiatives in the system process, experimentally and statistically to avoid defects. These methodologies insist in continuous improvement without disturbing ongoing processes.

Quality, business and organizational performance: Scholars use different performance types such as

business, financial, operational and quality performance while investigating the relationship between TQM practices and performance (Adam *et al.*, 1997; Hendricks and Singhal, 2001; Hassan *et al.*, 2013). Quality performance includes several indicators such as reduction in customer complaints, cycle time, defect rate, delivery time and rework. Organizational performance indicated by several indicators, such as increase in quality of product from department to department, employee attitude towards quality, teamwork, communication and flow of information between departments and different levels of management and employees, quality of services provided by employees to customers and in employee pride of one's work (Kaynak, 2003; Kumar *et al.*, 2009; Abusa and Gibson, 2013).

Business performance is defined, as how well an organization achieves its market-oriented goals as well as its financial goals (Li *et al.*, 2006). Business performance includes several outcomes, such as increase in market share, total sales and net profits. The concept of business performance is illustrated in 2 ways: Short-term and long-term business performance (Kaynak, 2003). Short-term business performance concentrate on operational/product performance toward fewer defects, reduced production time with quality consistency maintaining and lower manufacturing costs. This performance is addressed by internal process quality and product quality and measured by indicators, such as time, cost and product quality. Long-term business performance is related to the financial/market performance which indicates the fulfillment of economic goals (Fons, 2011) and market value. The indicators of financial performance are sales, market share, profit and Return on Investment (ROI) (Eriksson and Hansson, 2003). As achieving long-term business performance implies achieving short-term business performance, such as process operation and product quality, the long-term ones (e.g., financial and market performance) are critical outcomes of QM practices. In addition, long-term business performance represents competitive advantage in the market, such as higher customer satisfaction (Angelova and Zekiri, 2011).

The impact of TQM practices on performance: Quality management systems and techniques have a positive impact on economy, through its effects on productivity and advancing success of private and public sectors (Leonard, 2006; CQI, 2012). Applying TQM programs effectively lessens waste, increases productivity and achieves competitive advantage. Increasing firm's productivity and improving product or service quality increase the firm's market share and enable charging

higher product prices, resulting in increasing firm's profitability. Quality in its holistic philosophy is a robust strategic tool in international competition and trade.

Statistically significant relationship was found between core QM practices and business performance by some researchers in a subjective measure approach. Agus *et al.* (2009) acknowledged the positive impact of core QM practices, such as employee focus on productivity and profitability of companies in electrical and electronic industry. Other researchers found that both process management QM practices and information and analysis QM practices influence financial performance (e.g., growth of market share and growth of ROI) (Eriksson and Hansson, 2003; Kumar *et al.*, 2009; Pannirselvam and Ferguson, 2001).

Other researchers have inspected the statistically significant relationship between infrastructure QM practices and perceived financial performance. They have shown the positive impact of assured infrastructure practices (e.g., empowering employees, top management commitment) on perceived financial performance such as sales growth, profitability and competitive position. Other researchers identified that some infrastructure practices, such as customer focus have a positive impact on performance such as productivity (Stiles and Kulvisaechana, 2003; Goncalves and Peuckert, 2011).

Hendricks and Singhal (2001) investigated stock price performance of firms with effective TQM programs. Stock price performance is considered for 5 years before winning the awards and compared with performance the first 5 years after winning the award. There was no difference in stock price performance for the firms in the period before receiving the award. However after winning the award, firms significantly returns range from 38-46%. Therefore, the study showed a positive correlation between quality management and profitability.

Jaafreh and Al-abedallat investigated 6 QM practices (top management, strategic planning, customer focus, employee relation, supplier quality and process management) depending on the analysis of the most occurrences in QM studies. Questionnaire is used for collected data from the banking sector in Jordan. As a result of this research 4 (top management, strategic planning, customer focus and employee relation) out of 6 QM dimensions are highly positively interrelated to the organizational behavior (Jaafreh and Al-abedallat, 2013).

Theoretically, the results were consistent with the theories of QM. Managerially, the results showed that the overall QMPs have a positive and significant correspondence with organizational performance.

Hassan *et al.* (2013) study focuses on 7 TQM practices after investigating them from previous studies. The 7 TQM practices are top management's commitment to quality employee involvement, customer focus, fact-based management, incentive and recognition system process, monitoring and control and continuous improvement. The study finds a positive impact of TQM practices on business (increase in total sales, market share and net profit of the organization), quality and organizational performance of the organization. This research, examined that organizations with high level of quality control implementation showed a higher level of quality performance (Hassan *et al.*, 2013). The study investigated that the greater degree of TQM practices implementation results in higher-quality performance, business performance and organizational performance. This effort supports that all types of industries use TQM practices on common intention. The results of this research show that the extent of implementation of quality management practices increases as the size of organization increases. This research, finds that the organizations dealing in international businesses willingly adapt quality management practices in comparison to the local business organizations as a result of intense competition.

Levine and Toffel (2010) used a sample of 1,000 companies in Californian to investigate the relationship between QM and per worker accident costs by exploring the effects of adopting ISO 9001 on the job quality of employers and employees of these firms. They find that ISO adopters have higher increase rates for employment, payroll and average annual earnings. The results come from a precise application of statistical methods. The firms which have adopted ISO 9001 had lower per worker wound costs than firms not adopting the quality standard. Firms which adopted ISO 9001 report that no worker injuries or lower per worker injury costs comparable to other firms not adopting quality standard in the years after adoption (Levine and Toffel, 2010).

Cole and Flynn investigated the relation between QM practices' impacts on product reputation, revenues and market share. The study was examined on US and Japanese automobile manufactures. The researchers found that inducing reputation for high quality using QM practices resulted in improving brand equity and market share. The researchers noted that higher revenues achievement was driven by market share increase, as a result of increase in purchasing from a manufacturer by the customer, higher resale car value driven from higher quality car and the reputation of quality facilitates the sale of an entry level car. Cole and Flynn (2009) found that QM has a positive impact on financial outcomes in a related

sequence improvement process where QM improves the reputation for quality which increases market share which improves financial outcomes.

Other researchers investigated further have gone further the effect of both soft and hard TQM factors on, organizational performance. They resulted that it is essential to combine soft and hard aspects of QM practices to advance the whole performance of an organization. They also reported that the TQM issues of employee training, employee participation and customer have an important role in maintaining customer satisfaction (Kumar *et al.*, 2009).

Conceptual framework and hypotheses: The objective of this study is to examine the relationship between TQM practices and performance. In the 1st stage of this study, researchers need to clarify TQM adoption and implementation to develop an accepted framework which will include the most important critical TQM success factors. There are several methodologies and approaches that have been used to implement TQM. Some of these approaches are developed and accredited by National Quality Awards developed by various governments belonging to different countries, some developed by quality experts Juran *et al.* (1974), Juran and Godfrey (1999), Ishikawa (1976), Crosby (1979a), Nanda (2005), Feigenbaum (1983), Anderson *et al.* (1994) and others developed by individual remarkable researchers. Each award, expert or research approach has its own set of success practices needed to be implemented to adopt TQM within the concerned organization. As there are many awards, experts and researchers approaches for TQM implementation, it is confusing for the organizations to adopt which practices of these approaches. For the study, researcher analyzed different approaches (Appendix A and B) depending in different previous related studies (Black, 1995; Powell, 1995; Black and Porter, 1996; Kaynak, 2003; Talavera and Gloria, 2005; Ronnback and Witell, 2008; Jaafreh and Al-abedallat, 2013; Hassan *et al.*, 2013) in addition to researchers investigation, to select the best TQM practices and to use these practices in questioning managers at Palestinian ICT companies. In this way, researcher drive a guided feedback about the extent to which these practices are adopted in Palestinian ICT companies and the correlation between these practices and performance, in addition researcher shed the light for these companies about the best practices of TQM.

There are several standardized quality models used by the firms to carry out the guidance of TQM implementation. The most known national quality awards

are the European Quality Awards (EFQM) in Europe were established in 1992 (Sampaio *et al.*, 2012), the Malcolm Baldrige National Quality Award (MBNQA) in the United States of America which was created in 1987 by an act of Congress (Pannirselvam and Ferguson, 2001), the Deming Prize (DP) in Japan, 1996, the Australian Business Excellence Award (ABEA) in 1988 emerging largely from initiatives by business and industry (<http://www.iannapier.com.au/quality-abef-history-norbert-vogel.pdf>) the German Quality Award (GQA) (Zink and Voss, 1998), Japan Quality Award (JQA), the Rajiv Gandhi National Quality Award (RGNQ) was launched in 1991 where the award is promoted by the Indian government and administered by the Bureau of Indian Standards (Juran and Godfrey, 1999) and ISO 9000:2000, 9004:2000 standards (Stracke, 2006; Juran and Godfrey, 1999). These awards focus on multidimensional activities of management, processes and behavior that influence quality outputs. EFQM does not remark to the application of statistical methods or variation understanding where these topics are not regarded as important in management context. In contrast, MBNQA and ABEA frameworks give high importance on these facets and related principles (Fisher and Nair, 2009).

Appendix A illustrates the different TQM practices developed by the National Awards. Researchers investigated the highest frequent TQM practices which are shown in Table 1. These high ranked TQM factors are considered in the study.

The most known researchers based frameworks are Saraph *et al.* (1989) who developed 8 TQM success factors with 76 variables; Flynn *et al.* (1994) who developed 11 TQM critical success practices; Ahire *et al.* (1996) who developed 12 TQM critical success practices; Tamini who investigated 7 TQM critical success factors; Black and Porter (1996) where they proposed 9 TQM critical success factors; Rao *et al.* (1999) who proposed 11 TQM critical success factors and others.

Table 1: List of best TQM practices according to award based analysis

Variables	Factors No.	List of best TQM factors getting highest score	Score out of 8
Enablers	1	Customer focus	8
	2	Employee empowerment and involvement	8
	3	Process management	8
	4	Top management commitment	7
	5	Strategic quality management	7
	6	Education and training	6
	7	Information and Analysis	4
	8	Reward and recognition	4
Results	1	Internal quality results	6
	2	External quality results	6
	3	Business results	5

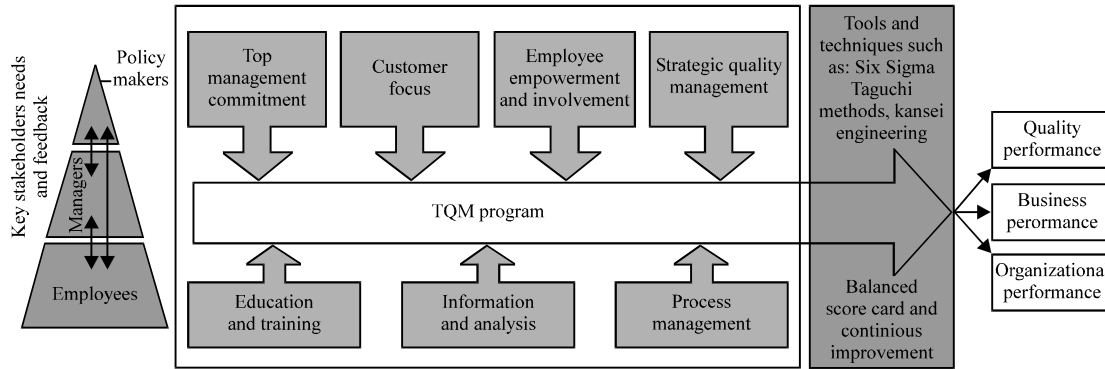


Fig. 1: Conceptual framework

Table 2: List of best TQM practices according to researchers based analysis

Factors No.	List of best TQM factors getting highest score	Score out of 17
1	Top management commitment	15
2	Education and training	11
3	Customer focus	11
4	Employee empowerment and involvement	10
5	Information and analysis	9
6	Supplier quality management	8
7	Strategic quality management	7
8	Design quality management	7
9	Role of quality department	7

Appendix B illustrates the different TQM practices investigated by the 5 experts of TQM and the notable researches of TQM. From Appendix B, researchers investigated the highest frequent TQM practices. These high ranked TQM factors are shown in Table 2 where these factors are considered in the study. According to the investigation of TQM best practices which are shown in Table 1 and 2 researchers used the following high scored best practices:

- Top management commitment
- Customer focus
- Employee empowerment and involvement
- Education and training
- Process management
- Information and analysis
- Strategic quality management

Figure 1 represents the proposed framework used in the study. Based on the above research literature review; this framework demonstrates the relationship between TQM practices (independent variables) and performance (dependent variable). The framework illustrates in a systematic approach a set of components interacting with each other to achieve the needed outcomes in terms of improving performance level which is measured in quality, business and organizational provisions. These

components, include the TQM practices integrated through a TQM program and implemented on various organization activities using needed tools and techniques and driven by stakeholders' requirements. The inputs of the system include company's resources such as manpower, knowledge, technology, information and measurement system.

According to the related literature review studied in this research researchers propose the following main hypotheses:

- H₁: Companies with a large degree of TQM adoption have better quality performance
- H₂: Companies with a large degree of TQM adoption have better business performance
- H₃: Companies with a large degree of TQM adoption have better organizational performance
- H₄: Companies with formal quality programs have better performance than companies without formal quality programs

MATERIALS AND METHODS

A total of 60 companies work in the field of information and/or communication technology was targeted and selected from the index of PITA (PITA is Palestinian information technology association, <http://www.pita.ps/directory>). A structured questioner was adapted from a previous similar study (Talavera and Gloria, 2005). The survey was developed electronically in a web basis and loaded in a link (<https://docs.google.com/forms/d/1hJmBqIbDvUUIQhfBi9q-rSIsUzOqfojiAbxEeJvdKhI/viewform>) using Google docs. Data were collected through survey questionnaires which were sent to the concerned companies by email. Follow-up was taken place with the targeted surveyed managers who did not respond after 2 weeks. Of 60 targeted companies,

52 respond to the study with a response percent of 80%. Within the 60 companies 180 managers were targeted where 151 managers responded to the survey, representing 83.9%. The 9 questionnaires were rejected due to incomplete responses. The 142 useable and valid questionnaires have been used for the final data study analysis. The level to which the 31 TQM strategies are executed was rated by the study survey respondents. The targeted managers represent any of the quality, marketing, finance, HR and operation departments. The managers were asked about their perception on their company's quality, business and organizational performance from year 2009-2013 as a result of implementing TQM strategies. The managers were asked to specify the percentage improvement in specified performance measures during the determined 4 years period.

The used study sample of the ICT firms, varied in size (as measured by the number of employees, ranging from <30 to >500 employees) and assets (<1 to >300 million Jordanian Dinar).

The percent responses from the firms, according to their TQM adoption levels of the 31 TQM strategies are shown in Table 3. The t-test and regression analysis were done to test the proposed study hypotheses. For the

measures TQM adoption was the independent variable which has been measured by computing the TQM adoption index. The index represents the total average scores for the 31 served constructs. The considered dependent variables are quality, business and organizational performance indices. Business performance was computed by calculating the average of 4 business performance measures (increase in market share, total sales, net profits and decrease in total production costs). The performance organizational index was calculated by computing the average firm score of 10 organizational performance measures. The organizational performance measures, include on one hand the reduction in absenteeism rate and employee turnover in the other hand they include the improvement in skills level of employees, treatment and cooperation among employees within the same team or department and among different teams or departments, communication between management and rank and between departments, employee's attitude towards quality and employee's pride in one's work, flow of information among departments, quality of services provided by one department to another department and quality of services provided by firms employees to firms customers and provided to firm by firms suppliers.

Researchers used principal component analysis and varimax rotation with the help of SPSS 21 to represent variable loadings of TQM practices and performance measures as illustrated in Table 4 and 5. Table 4 shows the various factor solution of 7 TQM practices that were used in this study which explained 68.15% (for top management commitment), 69.21% (for customer focus a), 59.11% (for customer focus b), 61.35% (for employee

Table 3: Breakdown of respondent ICT companies according to TQM adoption

TQM adoption (%)	N	Total (%)
<50	14	26.9
51-60	19	36.5
61-80	9	17.3
81-90	7	13.5
91-100	3	05.8
Total	52	100.0

Table 4: Varimax rotation component analysis matrix factor of independent variable

Factors	Factors' name	Description	Factors loading	Scale reliability (Cronbach alpha)
1	Top management commitment (KMO = 0.711) (variance explained = 68.15)	The company prioritizes quality considerations as early as the service/product development phase	0.751	0.839
		Inputs from the technical experts are solicited in the service/products development phase	0.788	
		Top management is personally involved in planning quality management programs	0.732	
		Top management provides substantial financial support for the company's quality management programs	0.416	
		Top management is involved in the implementation and follow-up of its quality management program	0.722	
2 (a)	Customer focus (KMO = 0.644) (variance explained = 69.21)	Program/system to improve customer service	0.815	0.708
		Customers' requirements feedback is incorporated in product/service improvement	0.812	
		Increases personal contacts between the organization and customers	0.674	
2 (b)	Customer focus (KMO = 0.704) (variance explained = 59.11)	Support activities improving customer satisfaction	0.612	0.690
		Measure for external customer satisfaction: Customer feedback system	0.804	
		Customer satisfaction survey	0.753	
		Market researches/surveys	0.697	
3	Employee empowerment and involvement (KMO = 0.609) (variance explained = 61.35)	Customer dialogues	0.687	0.632
		Organize regular meetings and information campaigns	0.815	
		Organize cross-functional teams	0.793	
		Clear and formal quality goals written in a quality policy	0.714	
		Organize cross-functional teams for programs to improve quality	0.678	
Quality circles are in place for workers	0.595			

Table 4: Continue

Factors	Factors' name	Description	Factors loading	Scale reliability (Cronbach alpha)
4	Education and training (KMO = 0.740) (variance explained = 61.903)	Training programs on problem solving techniques	0.922	0.898
		Lessons learned from are integrated in the work processes	0.894	
		Training programs on quality control	0.783	
		Develop an environment helping towards on-the-job training	0.679	
		Managers and supervisors participate in specialist training	0.527	
5	Process management (KMO = 0.663) (variance explained = 74.253)	Adopt regular process evaluation	0.984	0.875
		Regularly monitor and evaluate the employees' compliance with the company rules and regulations	0.927	
		Periodic quality audits are regularly conducted	0.897	
		Quality targets and strategies are regularly reviewed and monitored	0.884	
		Continuous control and improvement of key processes	0.546	
6	Information and analysis (KMO = 0.634) (variance explained = 66.528)	Company continuously evaluates its different policies and strategies	0.931	0.859
		Company continuously evaluates its functions performance towards quality adoption	0.906	
		Supplier selection is primarily based on quality	0.544	
7	Strategic quality management (KMO = 0.625) (variance explained = 55.365)	Develop/implement long-term plans/strategies focused on quality	0.784	0.832
		Top managers commit to quality	0.754	
		Assure shared vision for quality adoption between management and employees	0.692	

Table 5: Varimax rotation component analysis matrix factor of dependent variables

Factors	Factors name	Description	Factors loading	Scale reliability (Cronbach alpha)
1	Quality performance (KMO = 0.842) (Variance explained = 64.831 %)	Rework	0.895	0.852
		Cost per product/service	0.819	
		Customer complaints	0.789	
		Cycle time	0.786	
		Delivery time	0.699	
2	Business performance (KMO = 0.640) (Variance explained = 52.33)	Market share	0.692	0.798
		Total sales	0.836	
		Net profits	0.819	
		Production costs	0.810	
3	Organizational performance (KMO = 0.644) (Variance teamwork and cooperation explained = 51.32%)	Absenteeism rate	0.811	0.756
		Employee turnover between employees within a same team/department or between different teams/departments	0.786	
		Communication between management and employees of different levels	0.742	
		Information flow between departments	0.724	
		Employees' attitude towards quality	0.699	
		Employee's pride in one's work	0.667	
		Quality of product/service provided by one to another department	0.633	
		Quality of product/service provided by our employees to our customers	0.607	
		Quality of product/service provided to us by our suppliers	0.532	
			0.501	

empowerment and involvement), 61.90% (for education and training), 74.25% (for process management), 66.53% (for information and analysis) and 55.37% (for strategic quality management) of total variance, respectively. Table 5 presents 3 aspect solution of performance measures (quality performance (5 items), business performance (4 items) and organizational performance (10 items) where these measures explain 64.83, 52.33 and 51.32% of total variance, respectively. In addition as illustrated in Table 3 and 4, Kaiser-Meyer-Olkin (KMO) test of sample adequacy ranges from 0.625-0.842 for all dependent and independent factors.

Additionally, Table 3 shows individual TQM practices values of Cronbach's alpha where these values indicate adequate reliability of the scale. Correspondingly, Table 4 shows Cronbach's alpha values of dependent

variables such as quality performance ($\alpha = 0.852$), business performance ($\alpha = 0.798$) and organizational performance ($\alpha = 0.756$) indicating satisfactory trustworthiness of the scale.

RESULTS AND DISCUSSION

The early on years of quality profession, the main measures were objective and dominated toward conformance to specifications. As time passed, researchers have increasingly recognized the multidimensionality of quality with the need of subjective measures. The concentration of quality has shifted from an internal and product-oriented view of quality, such as defects to an external focus and customer-oriented view for meeting customer requirements and going further to

exceed customer expectations with continuous improvement. QM practices can directly and indirectly affect a number of different outcomes for an organization where the direct effect can induce an indirect one, such as QM practices can increase employee satisfaction and consequently making employees more productive resulting in profit increasing.

As shown in Table 5, the mean values for 7 TQM practices which are needed to adopt TQM within ICT companies are relatively low (average of 3.37) where it is between limited and moderate level, especially for the practices of employee empowerment and involvement, education and training and process management. Therefore, there is a need to highlight the importance of adopting TQM practices for Palestinian ICT companies and raise the awareness about their important role in enhancing company's performance. There is a need for Palestinian ICT companies to involve employees in quality adoption, educate and train the employees and managers in how to implement TQM practices efficiently and restructure the management processes within the companies to be adapted with best TQM practices. Quality management is an essential system oriented approach to be adopted in all kinds of organizations, especially ICT ones in the case, to maintain the feasibility of them, so quality is not an option; it must be embodied and integrated in every process of the organization. As competition facing Palestinian ICT companies is global and increasing, marketplace is getting so saturated and customers are getting more informed, now-a-days Palestinian ICT organizations must adopt quality management programs to achieve each cost reduction, productivity increasing and competitive advantage in an efficient and effective way.

The correlation matrix of all the study variables is shown in Table 5. Pearson's correlation is a measure through which the strength of a linear relationship between 2 variables is indicated. As indicated in Table 6, there are a high degree of significance correlations between TQM practices and performance measures of

quality, business and organizational ones (Pearson's correlation is significant at 0.01 level); however correlation coefficient is <0.8 which eliminates the possibility of multi-colinearity. Table 6 presents the overall regression analysis of research's variables. In what follows researchers discuss the study's hypotheses which are confirmed through the test of the significant standardized beta coefficients values ($p < 0.01$) between TQM practices and quality, business and organizational performance.

Hypothesis H_1 is supported and confirmed through the results of survey correlation analysis. As shown in Table 6, there is a positive significant relationship between TQM adoption and quality performance with $r = 0.330$ and $p < 0.01$. In addition, the regression analysis which is illustrated in Table 6 verifies the high effect of TQM practices on quality performance. So, researchers can result that TQM with its various proportions explained 13.8% of the variance in quality performance. Also, the models respective F ($F = 17.87$), β coefficient ($\beta = 0.364$) and t-values ($t = 4.757$ and $p < 0.001$) are significant which confirm that there is strong relationship between level of implementation of TQM practices and quality performance. So, hypothesis H_1 is confirmed, as it states that there is a positive impact of TQM practices on quality performance.

Hypothesis H_2 is supported and confirmed through the results of survey correlation analysis. As shown in Table 6, there is a positive significant relationship between TQM adoption and business performance with $r = 0.405$ and $p < 0.01$. In addition, the regression analysis which is illustrated in Table 6 verifies the high effect of TQM practices on business performance. So, researchers can result that TQM with its various proportions explained 12.3% of the variance in business performance. Also, the models respective F ($F = 19.67$), β coefficient ($\beta = 0.346$) and t-values ($t = 4.542$ and $p < 0.001$) are significant which confirm that there is strong relationship between level of implementation of TQM practices and

Table 6: Correlations

Factors	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
TQM practices (average of them)	3.369	0.767	1										
Top management commitment	3.778	0.615	0.605**	1									
Customer focus	4.131	0.688	0.310**	0.435**	1								
Employee empowerment and involment	3.042	1.086	0.242*	0.431*	0.522**	1							
Education and training	2.788	0.835	0.639**	0.156**	0.366**	0.766**	1						
Process management	2.908	0.866	0.311**	0.271**	0.291**	0.469**	0.502**	1					
Information and analysis	3.380	0.662	0.299**	0.137	0.423**	0.347**	0.431**	0.412**	1				
Strategic quality management	3.560	0.621	0.294**	0.405**	0.321**	0.411**	0.501**	0.356**	0.712**	1			
Quality performance	3.910	0.651	0.330**	0.298**	0.406**	0.278**	0.337**	0.153**	0.298**	0.353**	1		
Business performance	3.912	0.486	0.405**	0.321**	0.233**	0.437**	0.133	0.310**	0.434**	0.274**	0.322**	1	
Organizationa performance	13.810	0.464	0.297**	0.311**	0.283**	0.379**	0.358**	0.504**	0.312**	0.297**	0.367**	0.286**	1

*. **Correlation is significant at the 0.05 and 0.01 level (2-tailed)

Table 7: Regression analysis

Model	Independent variable	Dependent variable	Standardized β coefficient		t-value	R ²
			SE	β		
1	TQM practices	Quality performance	0.125	0.364	0.757	0.138
2	TQM practices	Business performance	0.087	0.346	4.542	0.123
3	TQM practices	Organizational performance	0.076	0.478	6.256	19.400

business performance. So, hypothesis H₂ is confirmed as it states that there is a positive impact of TQM practices on business performance.

Hypothesis H₃ is supported and confirmed through the results of survey correlation analysis. As shown in Table 6, there is a positive significant relationship between TQM adoption and organizational performance with $r = 0.297$ and $p < 0.01$. In addition the regression analysis which is illustrated in Table 7, verifies the high effect of TQM practices on organizational performance. So, researchers can result that TQM with its various proportions explained 19.4% of the variance in organizational performance. Also, the models respective F ($F = 21.23$), β coefficient ($\beta = 0.478$) and t-values ($t = 6.256$ and $p < 0.001$) are significant which confirm that there is strong relationship between level of implementation of TQM practices and organizational performance. So, hypothesis H₃ is confirmed as it states that there is a positive impact of TQM practices on organizational performance.

For hypothesis H₄, the result shows that companies with formal quality programs have higher TQM adoption indices (78.33 average) with comparison of 63.67 average index of companies without formal quality programs and this support H₄. This is anticipated because companies with formal quality programs are more organized and planned toward adopting TQM procedures within comprehend TQM strategies (Table 8).

As shown in Table 9, researchers performed one-way ANOVA to see to what extent TQM adoption varies according to company size, assets possession and ownership structure in Palestinian ICT sector. The results shows that as the size of company (in terms of employee) increases, the implementation level of TQM also increases, also ANOVA analysis disclose that company size (in terms of assets possession) can obstruct successful TQM implementation, as larger firms were more likely to adopt TQM than smaller firms. As the ownership structure of company goes from completely local to completely foreigner, the implementation level of TQM also increases which indicates that there is a gap of the level of TQM implementation between locals and

Table 8: Breakdown of respondent ICT companies according to TQM adoption

Classification	N	Mean	SE	t-value	Prob.
With formal quality management program	18	78.33	4.87	3.37	0.011
Without formal quality management program	34	63.67	11.45	2.03	-

Table 9: List of sampled ICT sector

ICT sector classification	N	Mean
No. of employee		
<100	38	3.03
101-500	11	3.36
>500	3	3.72
Total (ANOVA Sig. ($p < 0.001$))	52	3.37
Assets (total assets in million JD)		
<1 M	13	2.61
1-10M	19	3.24
10-100M	13	3.43
100-300M	4	3.65
>300M	3	3.92
Total (ANOVA Sig. ($p < 0.001$))	52	3.37
Ownership structure		
100% locally-owned	39	3.11
Combination of local and foreign ownerships	8	3.38
100% foreign-owned	5	3.63
Total (ANOVA Sig. ($p < 0.001$))	52	3.37

foreigners, so it is important to shed the light for local companies about the importance of adopting TQM practices as do foreign ones.

CONCLUSION

The objective of this study is to understand the holistic philosophy underpinning quality management, investigate in depth relying on state of the art and empirical study of associated constructs in Palestinian ICT firms the impact of QM on firm's performance.

In this study, researchers investigated the effects of applying QM practices on the performance of the organization. Researchers started from defining the quality, exploring quality management meaning and practicing and emerging the modern perspective of total quality management. After this depending in literature review that examines individual organizations or groups of organizations within various sectors, researchers reached a result that successful implementation of QM systems and techniques and gaining awards and certification of QM, improves outcomes for private and public organizations. The outcome improvements apply for quality, business and organizational performance issues. As a consequence of this the effective implementation of QM practices can directly and indirectly affect positively a number of different outcomes, creating more productive and successful organizations. Therefore, for performance improvements organizations must adopt best QM practices and techniques.

In this study, researchers sought to examine the impact of adopting TQM practices on quality, business and organizational performance of Palestinian ICT firms located in West Bank. The study results hold up our hypotheses that greater degree of implementation of TQM practices results in higher-quality performance (H₁), business performance (H₂) and organizational performance (H₃). Also the results of this study support that companies with formal TQM adoption programs have better performance than companies without formal TQM adoption programs (H₄).

The results of the study support that all ICT firms use TQM practices on general intention hereafter substantiating the evidence, however >59% of the surveyed companies have TQM adoption level of <60%. This indicates that these ICT companies have to some extent poor adoption of TQM practices which is reflected in less performance and less capability of applying needed quality standards and gaining competitive advantage to compete other region ICT companies. Therefore, it is necessary to increase the awareness of these ICT companies toward the importance of adopting TQM practices in high levels and applying formal quality programs in order to be able to reach a high level of quality standardization to compete other region and global ICT firms.

The study results show that adopting TQM practices has positively significant influence by 13.8% changes in quality performance, by 12.3% changes in business performance and by 19.4% changes in organizational

performance where these results are compatible with the results of preceding researches illustrated in section 2.

The results of this study shows that as size of business increases in the form of number of workers and amount of total assets, level of TQM implementation increases.

As a result, this study reveals that TQM certainly offers a strong foot for ICT dynamic organizations to manage the total quality way of life that can endorse their competency and talents, as well as other strategic priorities to gain competitive advantage which is necessary to compete other ICT organizations regionally and globally through outsourcing and exporting information technology solutions, in order to enable these Palestinian ICT firms to enhance their quality, business and organizational performance to be reflected positively on employment and local economic growth.

In future, it is helpful to conduct a research to reveal the TQM best practices which has major effect in improving the business performance of ICT organizations. The expected results will be good guidelines for Palestinian ICT companies to adopt the combination results of TQM best practices to accommodate with the international standardized quality of global ICT organizations.

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APPENDICES

Appendix A: Analysis of TQM practices for quality awards

Parameters	MBNQA	EFOM ^a	DPJ ^b	GQA	ABEA	JOA	RGNO	ISO ^c	Frequency
Enablers									
Top management commitment	x	x		x	x	x	x	x	7
Strategic quality management	x	x	x	x	x	x	x		7
Process management	x	x	x	x	x	x	x	x	8
Reward and recognition	x	x	x	x					4
Education and training	x	x	x	x	x	x			6
Supplier quality management	x		x					x	3
Customer satisfaction	x	x	x	x	x	x	x	x	8
Employee empowerment and involvement	x	x	x	x	x	x	x	x	8
Information and analysis	x		x		x	x			4
Benchmarking	x								1
Resources		x		x			x		3
Product design			x		x				2
Market focus			x			x			2
Unity of purpose			x						2
System approach to management								x	1
Factual approach to decision making			x					x	2
Organizing	x		x						2
Standardization	x		x						2
Maintenance	x		x						2
Quality system improvement			x						1
Providing assurance to employees			x						1
Future plans	x		x						2
Continuous improvement								x	1

Appendix A: Continue

Parameters	MBNQA	EFQM ^a	DPJ ^b	GQA	ABEA	JQA	RGNQ	ISO ^c	Frequency
Results									
Customer outcomes	x	x					x		3
Workforce-focused outcomes	x						x		2
People results		x							1
Product outcomes	x				x				2
Business results	x	x	x				x	x	5
Leadership outcomes	x								1
Process effectiveness outcomes	x								1
Internal quality results	x	x	x	x	x	x			6
External quality results	x	x	x	x	x	x			6
Society results		x		x			x		3

^a<http://www.efqm.org>; ^b<http://www.juse.or.jp/e/publications>; ^c<http://www.iso.org/iso/home.htm>

Appendix B: Analysis of TQM practices

TQM practice	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Top management commitment	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
Strategic quality management	x		x		x	x				x	x							7
Process quality management	x	x	x	x	x	x												7
Design quality management	x	x	x	x	x	x				x								7
Education and training	x	x	x		x	x	x	x			x	x	x					11
Supplier quality management	x			x	x		x	x	x	x	x	x						8
Customer satisfaction	x				x	x	x		x	x	x	x		x	x	x		11
Employee empowerment and involvement	x	x	x	x		x	x		x	x	x							10
Business results	x		x		x	x												4
Information and analysis						x			x	x	x	x	x	x	x	x		9
Benchmarking					x		x		x	x	x							5
Resources										x								1
Statistical process control						x	x		x									3
Vision and plan statement													x					1
Process flow management					x	x		x										4
Reward and recognition							x											2
Product design				x			x		x		x	x						5
Product quality									x									1
Perceived quality market outcome					x													1
Unity of purpose							x					x						2
Internal quality results											x							2
External quality results											x							2
Innovation and technology									x									1
Role of quality department	x	x	x		x	x						x		x				7
Continuous improvement														x				2
Communication to improve quality							x				x	x	x					4
Providing assurance to employees							x											1
Quality policy											x							1
Impact on society and environment									x									1
Culture			x															1

1) Juran *et al.* (1974); 2) Ishikawa (1976); 3) Crosby (1979a, b); 4) Feigenbaum (1983); 5) Deming (1986); 6) Saraph *et al.* (1989); 7) Flynn *et al.* (1994); 8) Tamini; 9) Ahire *et al.* (1996); 10) Black and Porter (1996); 11) Rao *et al.* (1999); 12) Motwani (2001); 13) Rungtusanatham *et al.* (2002); 14) Antony *et al.* (2002); 15) Seetharaman *et al.* (2006); 16) Mady (2009); 17) Frequency

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