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The Impact of Quality Practices on Productivity and Profitability in the Saudi Arabian Dried Date Industry

Abdulrahman Alsughayir

Faculty of Economics and Administrative Science, Dean of student affairs, Al Imam Muhammad ibn Saud Islamic University, Riyadh, Kingdom of Saudi Arabia

This paper examines the relationships among quality management, profitability, and productivity in Saudi Arabia's dried date industry. Analyzing the data using correlation, SEM, and regression analyses revealed that the factors with the greatest impact on productivity and profitability were quality measurement, benchmarking, employee focus, training, and supplier relations. The findings also indicate that productivity serves as a mediator for the link between profitability and quality management. Accordingly, Saudi date producers should consider paying more attention to quality management aspects of the manufacturing process and provide greater management support for quality measurement, benchmarking, and other quality programs.

Key Words: Saudi Arabia, quality management, productivity, profitability, dried date industry

Introduction

Many studies of Saudi Arabia's manufacturing sector have stressed the importance of producing high-quality products, while also looking at ways to improve productivity and profitability. An increasing number of Saudi manufacturing companies have embraced total quality management (TQM) to meet performance targets in areas such as productivity and profitability. Quality refers to the degree to which a product or service meets customers' specifications and needs. Organizations are now focusing on satisfying customers' needs. The strategy that many organizations have adopted to achieve customer satisfaction involves emphasizing quality products and services; this approach is unsurprising given that an organization hoping to achieve, enhance, and sustain competitiveness must provide superior quality products and services to its consumers (Lai et al., 2002).

Given that quality is a strategic competitive tool (Yong and Wilkinson, 2002; Hansen, 2001), an organization must acknowledge the strategic implications that quality will have on its competitive position. This has led to the emergence of numerous quality systems and initiatives, including just-in-time (JIT), total quality management (TQM), the Deming Prize, the Shying Prize, and the ISO standards.

QM is considered essential for an organization's success, as well as for its relationships and partnerships with its customers and suppliers. Quality management actually indicates the quality of a company's management, and quality assurance (QA) practices initiate and develop confidence among an organization's customers and its other stakeholders. The main instigator of QM implementation is senior management, which creates the values, goals, and systems needed to meet customers' expectations and improve the performance of the organization (Ahire et al., 1996). Focusing on customers helps a business remain cognizant of which changes are occurring in its environment and the knowledge that the business needs in order to develop the product or service. Similarly, benchmarking enables organizations to continuously compare and measure themselves against leading businesses around the world in order to obtain information and provide guidelines for rational performance goals (Boone & Wilkins, 1995).

A general consensus has emerged recently that a company's most valuable resource is its people. Accordingly, employees should receive adequate training regarding their company's policies and methods. The concept of quality commonly includes QM principles, teamwork-related skills, and problem solving (quality-related training). Setting a goal of reaching zero defects, and renewing the commitment to such a goal, will help the company approach perfection and meet their profitability (Richman & Zachary, 1993), which will effect in a positive way on the organization performance.

Saudi Arabia is among the largest non-OECD economies and the world's leading exporter of oil. Many Saudi Arabian companies currently face domestic and international competition. As a result of Saudi Arabia's open-door free-market policy, and the

growing disposable income of Saudi consumers, large multinational players have entered this market, which has increased the competitiveness and complexity of the market. Many Saudi companies have found themselves competing with high-quality output of countries such as the United States and Japan, which has led them to implement quality management initiatives.

The present study aimed to investigate the relationship between QM, profitability, and productivity, to examine how each QM indicator influences productivity and profitability, and to determine whether the link between QM and profitability is mediated by productivity. Specifically, we have explored whether QM could help enhance the productivity and profitability of Saudi Arabia's dried date industry. Saudi Arabia (formerly known as the Arabian Peninsula) is currently the second-largest producer of dates in the world and is the original home of the date palm tree, which is among the oldest trees in the world (its origins can be traced back over 10,000 years). Palm trees have been transferred from this region to many other locations. Dried dates have attracted more attention in Islam than any other fruit. During the month of Ramadan, for instance, Muslims should consume dried dates and water to break their fast at sunset. Muslim believe who have has been quoted as saying a man who has dried dates in his home will not be poor. Saudi dried dates are well known for their taste, although the presence of more than 300 types of dates in the country means that there is a wide variety of tastes and textures.

Theoretical Background

The wide TQM literature has not yet reached a consensus regarding the definition of quality. QM 'gurus' such as Garvin, Crosby, Ishikawa, and Deming have each provided different definitions of quality and TQM. Garvin et al. (1987) defined quality in terms of transcendent, user-based, product-based, and manufacturing- and value-based approaches. In defining quality as "fitness for use", Juran's focus was on the planning, control, and improvement of quality (Mitra, 1987). In a similar vein, Crosby's (1996) definition of quality was "conformance to requirements for specifications" based on customer needs. Crosby identified a 14-step zero-defect quality improvement plan in order to improve performance. Deming argued that quality involves a predictable degree of dependability and uniformity that has a low cost and is suited to the market.

Quality is now among the most important drivers of global competition. Thanks to increased global competition and consumer demand for quality, an increasing number companies to acknowledge the need to provide high-quality products and/or services if they are to be successful. According to the literature on this subject, TQM provides the basis for the most popular quality philosophies. This subject has attracted increasing attention in recent years, even in developing countries such as Saudi Arabia.

TQM is based on continuously improving the performance of an organization's processes and the quality of outputs of those processes; that is, the products and services. TQM is a team activity that requires a particular culture, discipline, and knowledge of quality. QM can help increase a company's competitiveness and organizational effectiveness, as well as improving its organizational performance and product quality (Ahire et al., 1996; Opara, 1996; Bayazit & Karpak, 2007; Ortiz et al., 2006).

According to Deming (1986), quality improvements reduce costs, rework, errors, and delays, thereby helping create corresponding productivity improvements. In contrast, Agus and Hassan (2000), Bayazit and Karpak (2007), Kaynak (2003), and Ortiz et al. (2006) found that the impact of training and commitment from senior management is very important in the implementation of TQM in publicly listed manufacturing companies. Overall, that study's findings indicate that QM has a significant positive impact on customer satisfaction and competitive advantage, which helps improve the companies' financial performance.

The present study also aims to produce empirical evidence regarding the relationships among QM, productivity, and profitability, which earlier researchers may have known about but described only implicitly. While some studies have suggested that QM helps to improve performance, few have used statistical evidence to back up such claims. The present study is one of only a few that has attempted to estimate the impact that the implementation of QM programs can have; it therefore fills a gap in the literature regarding quality management in the Saudi Arabian date industry.

Research Hypotheses

Based on the literature, we offer some hypotheses regarding the directional relationships among QM, productivity, and profitability. We also examine whether productivity acts as a mediator for the link between QM and profitability. Our three hypotheses are as follows:

H 1: QM practices have a positive relationship with productivity.

H 2: QM practices have a positive relationship with profitability.

H 3: Productivity is a mediator between QM and profitability.

Methods

The study used a structured survey questionnaire to assess Saudi date manufacturers. The sample companies were chosen at random from a list provided by the Saudi Chambers of Commerce in Riyadh during the first half of 2012. Two bilingual Arabian (Arabic/English) lecturers at the Al-Imam Language Center translated the questionnaire from Arabic into English and the double-translation method was used to avoid misinterpretation and to ensure that the Arabic version of the questionnaire instruments accurately represented the English version upon which it was based (Hair et al., 2006). We advised study participants that their participation was voluntary and that their responses would remain confidential and be analyzed only at the aggregate level.

We received a total of 139 useable responses and analyzed them using the SPSS software. Our primary objective was to measure the perceptions that senior quality managers and production managers had of quality management practices and the level of profitability and productivity in the Saudi date industry. We conducted face-to-face interviews with production managers and quality managers in order to ensure the accuracy of information, to validate the outcome of the analysis, and to develop an understanding of the practical aspects of adopting principles of quality management. The instrument that we developed in the present study has two main parts. The first part is made up of several constructs that measure QM practices, while the second part is comprised of performance measurements. We developed a questionnaire that was based on an extensive review of the QM-related literature and used seven-point interval scales. Altogether, nine widely referred constructs of QM were extracted.

We extracted a total of nine key QM indicators with 40 original items. The critical QM variables had content validity because we had conducted an extensive literature review to select the critical factors and measurement items, all of which were evaluated and validated by quality professionals. The QM variables were adopted from prominent studies or sources (Forbes et al., 2011; Powell 1995, Saraph et al. 1989, Deming 1986, Juran 1992, Crosby 1979 and Malcolm Baldridge 1992). The first step of data analysis involved subjecting each of the nine constructs to reliability and validity tests, and then calculating a single score to represent each construct.

Results

We coded and entered the data into the SPSS software (version 20) and then analyzed it using AMOS version 14. We conducted a confirmatory factor analysis (CFA) on the measurement and structural models. The uni-dimensionality of each construct was checked using Cronbach's alpha and principal component analysis in order to assess validity and reliability of each construct. The Cronbach's alpha for each construct exceeds Nunnally's (1978) suggested threshold of 0.70. Once the alpha maximization process has been completed, the alpha coefficients for the QM scales ranged between 0.811 and 0.971, which indicates high internal consistency levels and high reliability among the scales, given the Cronbach's alpha values are higher than 0.70 (Nunnally, 1978). Therefore, all of the constructs and variables in the present study are based on established instruments that have high reliability scores.

Pearson correlation between constructs

As shown in Table 1, we used Pearson's correlations coefficient to describe the relationship among TQM practices, profitability, and productivity. As the results show, there was a significant correlation among the tested relationships. These findings concur with the numerous studies that have shown that TQM initiatives help improve organizational transformations (Agus et al. 2009; Bayazit & Karpak, 2007; Forbes et al., 2011; Ortiz et al., 2006; Kaynak, 2003).

Table 1. Correlation coefficients of the constructs

Quality management practices	Productivity	Profitability
Commitment of senior management	0.551**	0.484**
Training	0.609**	0.471**
Zero defects	0.436**	0.522**
Benchmarking	0.389**	0.531**
Supplier relations	0.411**	0.442**
Employee focus	0.392**	0.437**
Process improvement	0.388**	0.373**
Customer focus	0.432**	0.438**
Quality measurement	0.699**	0.581**

* P≤0.05, ** P≤0.01 (all t-tests are one-tailed).

Quality management towards productivity and profitability

We conducted multiple regression analyses in order to identify which quality management practices were most important and study the relationship between a dependent variable and a set of predictor variables. Although we could have constructed composite null hypotheses, the null hypothesis will always be a simple hypothesis in the context of the regression model. In other words, we consistently use the "equality" operator in order to formulate a null hypothesis, referred to as *H*0. Each "equality" implies that a restriction has been imposed on the model's parameters. In the present study, we conducted two models to examine the association that QM has with productivity and profitability.

Table 2. Summary of regression results.

Model	Dependent Variable	R	R^2	Adjusted R^2	Std error	F.	Sig.
Model 1	Productivity	0.804	0.632	0.619	0.938	54.11	0.00
Model 2	Profitability	0.698	0.511	0.498	0.984	28.93	0.00

As Table 2 indicates, at least one predictor variables gives the dependent variable a significant level of predictability. We conducted multiple linear regressions in order to investigate the relationship that the independent SBP and DBP control variables had with the dependent variables. From the multiple stepwise regression analyses, we observed that both models had strong relationships between constructs. The first model (Table 2) highlights the impact that quality management practices have on productivity; this model has good fit and significantly high values for R (0.804) and *R*2 (0.632), as well as a significant F-value of 54.11. The model has a significant F value and suggests that as much as 62 percent of the variation in the dependent variable (productivity) could be explained by quality measurements, training benchmarking, and training. The second model concerns the relationship between profitability and quality management practices; this model has a good fit and significantly high values for both R (0.698) and *R*2 (0.511), and has a significant F-value of 28.93 and a standard error of 0.984. Over half (51 percent) of the variation in the dependent variable (profitability) can be explained by four quality management practices (that is, quality measurements, employee focus, benchmarking, and supplier relations).

Testing the Individual Regression Coefficients

As Abbas et al. (2013) noted t-tests of the regression coefficients aids in the assessment of the individual predictor variables' strength in terms of estimating the dependent variable. Table 3 shows that regression coefficients, or the slopes of QM variables (in particular, quality measurement, benchmarking, and training), impact productivity significantly.

Table 3. Relationship between quality management practices and productivity: A stepwise regression analysis (The first model).

Quality Management practices	Standardized coefficients		Std.	t-value	p-value
	Beta	S. Error			
Constant	0.351	0.512		0.497	0.524
Quality measurement	0.498	0.083	0.504	5.661	0.001
Training	0.301	0.071	0.293	2.991	0.004
Benchmarking	0.288	0.085	0.188	2.457	0.022

Dependent variable = productivity.

Table 4 shows that the regression coefficients (or slopes of quality measurement, employee focus, benchmarking, and supplier relations) are significant contributors to profitability. This provides further support for the alternate hypotheses, which state that these regression coefficients (or slopes) differ significantly from zeros and can help predict profitability or productivity.

Table 4. Relationship between profitability and quality management practices: A stepwise regression analysis (second model).

Quality Management Practices	Standardized coefficients		Std.	t-value	p-value
	Beta	S. Error			
Constant	1.334	0.604		1.662	0.078
Quality measurement	0.612	0.146	0.512	5.618	0.000
Supplier relation	0.432	0.192	0.401	3.441	0.001
Employee focus	0.521	0.138	0.339	3.308	0.001
Benchmarking	0.319	0.111	0.324	3.244	0.004

***p <0.01, **p <0.05; Dependent variable: Profitability.

Productivity is a mediator between QM and profitability

Having identified the significant relationships that exist between QM and productivity and between QM and profitability, we now turn our attention to whether productivity acts as a mediator in the relationship between QM and profitability (Judd & Kenny, 1981). The structural model was run using the AMOS 14.0 Graphics program, which was also used to test the relationship we had hypothesized between the constructs.

We compared the structure coefficients between the latent variables using a maximum likelihood (ML) estimation. SEM was used to simultaneously examine the strength of the relationships between profitability, productivity, and QM practices. The first step in SEM is to estimate the CFA measurement model, which determines whether the number of factors and the item loadings on each factor conform to expectations based on the pre-established scale assessment model. Using SEM techniques to perform the CFA on each variable (see Table 5) revealed that all of the goodness-of-fit (GOF) indices showed what is traditionally considered an acceptable fit (Hair et al., 2006).

Table 5. Goodness–of-fit indices (model fit statistics)

Measures		Fit Indices	Threshold Values
Absolute Fit Level	RMSEA	0.039	Less than 0.08
	GFI	0.981	0.90 and above
	P- Value	0.059	P- Value ≥0.05
Incremental Fit Level	AGFI	0.901	0.90 and above
	CFI	0.988	0.90 and above
	NFI	0.976	0.90 and above
	CFI	0.977	0.90 and above
Parsimonious Fit Level	CMIN/df	1.621	Less than 2.0
	SMC (R^2)	0.603	0.5≤ better

As Table 6 shows, the intervention of a third variable/construct between two other related constructs creates a mediating effect. Our test of the mediating effects that productivity had on profitability and quality Measurement showed that productivity is in fact a mediator between the exogenous and quality measurement variables; the significant indirect effect of 0.219 supports the hypothesized model.

Table 6. Direct, indirect, and total effects of the hypothesized model

Endogenous Variable (profitability)			
Quality Measurement	Indirect effect	Direct effect	Total effect
	0.219	0.383**	0.602**

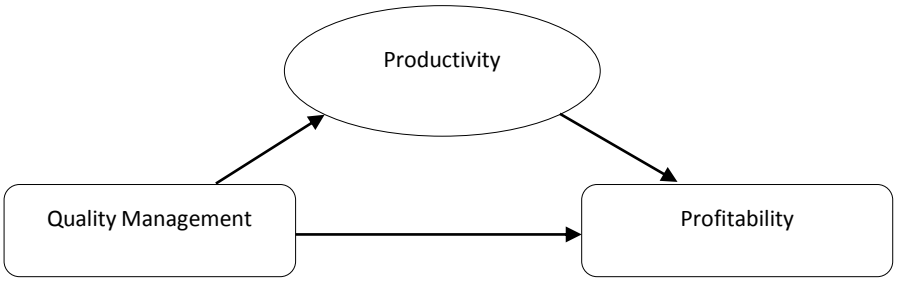

Figure 1. Conceptual model

Conclusion and implications

The present study has produced several conclusions indicating that productivity acts as a mediator for the link between quality management and profitability. The study's results confirm that the quality–productivity relationship and profitability are both situation-dependent. The results help us understanding the influence that QM variables and productivity, both individually and together, have on profitability. The effects of profitability and productivity can help an organization respond with an appropriate management strategy. In other words, higher-level QM implementation leads to greater productivity and, ultimately, greater profitability. Quality measurement, benchmarking, supplier relations, employee focus, and training all contribute strongly to the implementation of QM. In the context of the Saudi date industry, QM has a significant impact on both productivity and profitability.

Quality can affect the competitiveness of a company, both locally and globally. QM can help develop a vision that enables all members of an organization to focus on quality improvement.

The results of the study indicate that companies in the Saudi date industry should focus on the QM aspects of their manufacturing processes and provide more management support for such quality programs as benchmarking and quality measurement. Furthermore, education and training are important aspects of an organization's preparation for change, both with regard to the change itself and its permanent institutionalization within the organization.

This study has contributed to resolving the controversy regarding measuring the performance gains that result from the implementation of QM. The result that performance is likely to be improved when QM practices are strengthened indicates that the improvement of internal practices has a positive impact on the most important measures of performance. Global competition and reduced trade barriers have made it increasingly difficult for organizations to maintain market share. The break-down of traditional geographical and trade barriers to entry provides other countries access to the Saudi market, but also offers the domestic Saudi date industry the opportunity to access new international markets. The present study has attempts attempted to enrich the quality-related literature and suggests which factors practicing managers should emphasize in order to stimulate the adoption of QM concepts despite limited resources.

This study has certain limitations. Firstly, it used convenience sampling, due to the fact that it was self-financed and also due to time constraints. This is only a minor drawback, and we believe that the convenience sampling method can still make a significant contribution, at least at exploratory level. For future studies, different sampling methods will help advance the usefulness and generalizability of the findings.

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