

TQM and Product Innovation: Are These Influential Factors of Competitive Advantage? An Empirical Evidence

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Abstract

This study examines the impact of TQM and product innovation on competitive advantage. Correlation coefficient and regression analysis are used to examine the relationship between TQM, product innovation, and competitive advantage. The study is followed by a quantitative approach, and the sample of the study is drawn from the manufacturing and service industries located in the Sohar city of Oman. A total of 131 samples was analyzed to judge the hypotheses. The empirical results of this study confirm that TQM and product innovation are both significantly correlated to competitive advantage. Thus, to remain competitive in the marketplace, the management of organizations should give high priority to these influential factors. This empirical study is considered the first study investigating the impact of TQM and product innovation on competitive advantage, adding great value to existing literature from the perspective of Oman.

Keywords: TQM, Product Innovation, and Competitive Advantage.

Introduction

According to Chaghoushi et al. (2015), competitive advantage refers to an organization's capacity to enhance its standing in a competitive marketplace by offering value creation that sets its goods and services apart from those of competitors. It is the capacity of an organization to maintain its lead and advance, particularly when resource management is done well (Chen et al., 2020). A novel approach to the TQM philosophy's applied standards is what gives a company a competitive edge. The goal of both TQM and competitive advantage is to improve and provide value within the organizations. As a result, TQM concentrates on the revised processes that come from top management's leadership; these procedures must be continuously modified as doing so would improve sustainability (Sainis et al., 2022). On the other hand, competitive advantage mostly relates to development of product and process innovation. In this reality, value creation can be affected by the improved process of TQM.

In order to confidently join a competitive state in the market, firms that express that their competitors are far ahead of them begin working on upgrading their products and services. In the modern world of today, competitors compete not only on the business level but also on the degree of value creation and competitive advantage that the customer can have from both services and goods. TQM increases and improves work at all levels and integrates organizational processes with one another, notably in terms of competitive advantage. As a result, Bacq and Aguilera (2022) correctly noted that implementing the TQM concept within a company can result in value creation that gives the company a competitive edge.

TQM has been linked to competitive advantage, according to numerous research conducted from various angles. It refers to the application of high-quality procedures and methods that boost competitive advantage and satisfy client needs (Ruba, 2022). A new method, structure, managerial system, or product or service can all be developed by an organization in response to a competitive advantage. Customers and rivals of an innovative company, for example, believe that the company may implement any new administrative procedures and use the most recent versions of existing ones. Both directly and indirectly, this would foster an environment full with obstacles that would make it hard for the competitors to catch up. That is to say, differentiation is the capacity of an organization to concentrate on its primary product and the extent to

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which a customer considers an organization as a perfect provider, which would capture the customers' loyalty and support (Worlu et al., 2019).

Innovation and creativity give businesses a competitive edge by enabling them to better satisfy customers' needs than rivals. Companies must comprehend its customers in order for marketers to influence their selections and convince them to purchase goods. The secret to the business's success is developing product innovations that satisfy the demands and preferences of the target market. Product innovation, in general, refers to the process of developing new goods that are intended to satisfy consumer demands and preferences. This is so because product innovation is the process of applying fresh concepts to existing items to produce new ones that attract customers to purchase them. According to Hasnatika and Nurnida (2019), the process of creating new products involves collaboration and mutual impact.

Competitive advantage is measured using four factors: product uniqueness, which characterizes what makes a company's products different from those of its competitors or other items on the market. Customers may be drawn to a business's development that results from ideas or inventions to make something unique or different from others (competitors). The competitive pricing is the second. It highlights the company's ability to produce items at a price point that enables it to compete in the market. When a new and improved product is developed, the company needs to be able to adjust the price so that the customer can afford it. Rarely does one come across the third one. It explains the presence of uncommon products in order to outperform the competition. It is difficult to replicate the fourth one. It is a testament to the company's ability to select superior raw materials and create high-quality products that rivals are unable to imitate in the same way. The talks above help us understand how important it is for any business to have a competitive advantage in order to stay ahead of the competition.

Plenty of research exposed the relationship between TQM and organizational performance (Basu et al. 2018; Soares et al. 2017); TQM and innovation (Sciarelli et al. 2020; Miranda et al. 2014); TQM and competitive advantage (Addae-Korankye, 2013; Chen et al. 2020). Innovation and competitive advantage (Aprih and Ardiani, 2022; Porter, 1988). Our study presents two influential factors that contribute towards competitive advantage. It integrates TQM and product innovation as independent variables and competitive advantage as a dependent variable. To the best of our knowledge, this study is the first of its kind to explore the relationship between TQM, product innovation, and competitive advantage from an Oman perspective. Therefore, the intention of this study is to judge how these factors are statistically influencing competitive advantage from an Oman perspective.

Literature Review and Hypothesis Development

TQM and Competitive Advantage

Recently, El Hawi and Alzyadat (2019) have stated that to gain a competitive advantage, TQM is necessary. Ferdousi et al. (2019) also highlighted the benefits of TQM and competitive advantage.

The objective of Total Quality Management (TQM) implementation, according to Deming, is to create and preserve a competitive advantage by improving customer satisfaction and efficiency through cost reduction. This advantage can be gained by setting oneself apart from competitors through cost and differentiation advantages (Shenawy et al., 2007). One of the key initiatives to enhance product quality, production efficiency, profit margin, and corporate advantage is quality management practice. As a result, the company is expected to concentrate more on developing strategies that ensure quality improvement (Kafetzopoulos, Gotzamani, & Gkana, 2015). Masrom et al.'s (2022) study, which confirmed that there is a significant impact of TQM on the competitive advantage of manufacturers of electrical and electronic appliances in Malaysia. Ahmed and Ferdousi's (2020) study found that the adoption of TQM practices is responsible for obtaining a competitive advantage. Moreover, the results of Abimbola et al.'s (2020) study indicate that proper implementation of TQM practices along with employee commitment will ensure results of competitive advantages. Thus, the hypothesis is formulated in this manner:

H1: There is a statistical significance between TQM and competitive advantage.

Product Innovation and Competitive Advantage

Most people agree that product innovation is a crucial part of being competitive, and it affects a company's operations, services, operations, products, and organizational structure (Szymigim & Bourine, 2010; El Zuhairy et al., 2015). One of the key components of growth plans is product innovation, which helps companies gain a competitive edge, expand into new areas, and improve their current market share. Product innovation has a major impact on competitive advantage, according to recent empirical research by Aprih and Ardiani (2022). According to Porter (1988), companies can get and maintain "competitive advantages in international competition through improvement, innovation, and upgrading." More specifically, Porter (1988) defines innovation as "both technology and methods, encompassing new products, new production methods, new ways of marketing, identification of new customer groups, and the like." "Innovation creates opportunities to improve productivity, reduce waste, and thus improve competitive advantages," according to Siriram (2022). Typically, innovative businesses compete by exhibiting a clear competitive edge. According to findings from a study by Lestari, Budianto, and Setiawan (2020) on ornamental umbrella craft goods, competitive advantage is significantly impacted by product innovation to a somewhat significant extent. Product innovation is ultimately a tactic to raise a product's value as the secret to success that gives the business a competitive edge. Researchers Sugiyarti (2013) and Tung (2012) discovered that competitive advantage is impacted by product innovation. As a result, the hypothesis is stated as follows:

H2: There is a statistical significance between product innovation and competitive advantage.

Conceptual Framework

The conceptual framework of this study (see Figure 1) is based on the literature review above. This framework demonstrates that TQM and product innovation serve as independent variables and have a direct impact on the dependent variable, which is identified as competitive advantage.

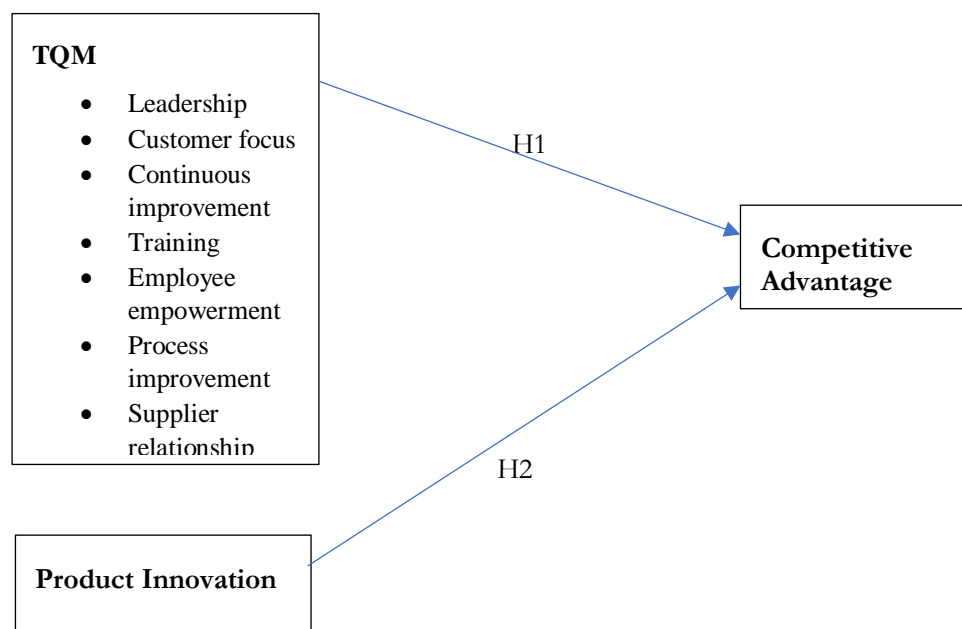


Figure 1. Conceptual Framework of Competitive Advantage

Research Method

Research Design

This study has adopted a quantitative approach using a survey instrument to test the formulated hypotheses. Convenience and snowball sampling approaches were adopted for the collection of quantitative data. According to Creswell, Plano Clark, Gutmann, and Hanson (2003), this research design must begin with quantitative data collection and analysis followed by the collection and analysis of qualitative data to obtain in-depth information. Hence, quantitative research was conducted to explore the relationship between the study variables and to identify any correlations between the dependent variable and the independent variables. A multiple linear regression technique was applied to determine whether the independent variables explained the variance in the dependent variable.

Participants

The questionnaires were distributed to 200 respondents (executive and above positions) from 20 small and medium-sized manufacturing and service industries in Sohar, Oman, in order to measure TQM, product innovation, and competitive advantage. Finally, a sample size of 131 was utilized for the data analysis to reach the status of hypotheses. Data were collected in a face-to-face manner, and proper instructions were given to respondents to avoid respondents' bias. The purpose of the study was explained, and they were informed that their participation was voluntary and their response would be kept confidential.

Research Instruments

In this study, a closed-ended instrument on competitive advantage was designed and applied for employees of various industries in Sohar, Oman, using a five-point Likert scale (where 1 = strongly disagree and 5 = strongly agree). The instrument was designed based on literature on competitive advantage, TQM, and product innovation to suit the local context. The survey used scale items with the five-point Likert scale mentioned earlier as they allowed for more streamlined analysis (Sekaran, 2000). The content validity is also checked through the average variance extracted (AVE). The questionnaire consists of 39 items, of which 28 are related to TQM and its seven dimensions like leadership, customer focus, continuous improvement, training, employee empowerment, process management, and supply chain management adopted from the EFQM model (www.mindtools.com). To measure product innovation, 5 items were taken from Prajogo and Hong (2008). Finally, to measure competitive advantage, six items were adopted from Vorhies et al. (2009) and Sigalas et al. (2013).

Data Analysis

The IBM SPSS software version 20 was used to analyze the collected data. Table 1 provides the descriptive analysis of TQM, product innovation, and competitive advantage. Cronbach's alpha was used for testing the reliability of the instrument. A minimum threshold value is 0.60 and above for ensuring reliability of the instrument, according to Hair et al. (2010), which is completely achieved in this study. The normality test was conducted through the skewness and kurtosis and found the results satisfactory. A multiple regression was run to examine the hypothesis testing.

Results and Discussion

It is clear from Table 1 that the average value for TQM amounted to 2.16, the average value of product innovation is 2.109, and the average value for competitive advantage is 2.644. All values of TQM and product innovation are not strong indicators of their performance, which means that they are not seriously practicing TQM and product innovation principles.

Table 1. Results of Descriptive Statistics

Constructs	Items	N	Minimum	Maximum	Mean	Std. Deviation
Independent variable: TQM	Leadership	131	1	5	2.086	1.0427
	Customer focus	131	1	5	2.178	1.0688
	Continuous improvement	131	1	5	2.209	1.0600
	Training	131	1	5	2.258	1.1548
	Employee empowerment	131	1	5	2.150	1.0970
	Process management	131	1	5	2.107	1.0956
	Supply Chain Management	131	1	5	2.112	1.1236
Independent variable	Product innovation	131	1	5	2.109	1.1053
Dependent variable	Competitive Advantage	131	1.17	4.83	2.644	0.8080

Table 2 indicates that 58 percent are male and 42 percent are female respondents participated in this study. According to the job position, 50.38 percent are management-related positions and 49.20 percent are non-managerial positions. In terms of job experience, 32.82 percent is the highest job experience, which is 11–15 years, and the lowest percentage is 12.98, which is connected to 16–20 years. That means more experienced employees are less in percentage, and less experienced persons are highest in percentage.

Table 2. Respondents' Characteristics

Variable	Frequency	Percentage (%)
Gender	Male	58
	Female	42
Job Position	Management	50.38
	Non-management	49.62
Job Experience	1-5 years	29
	6-10 years	25.20
	11-15 years	32.82
	16-20 years	12.98

Table 3. Factor Loading, Reliability and Average Variance Extracted (AVE)

Construct	Items	Factor Loading	Cronbach's Alpha	AVE
TQM	Leadership	0.942	0.887	0.823
	Customer focus	0.912		
	Continuous improvement	0.921		
	Training	0.865		
	Employee empowerment	0.936		
	Process management	0.910		

	Supply Chain Management	0.862		
Product innovation (PI)	PI1	0.855	0.936	0.799
	PI2	0.936		
	PI3	0.872		
	PI4	0.877		
	PI5	0.930		
Competitive Advantage (CA)	CA1	0.944	0.802	0.772
	CA2	0.923		
	CA3	0.930		
	CA4	0.931		
	CA5	0.741		
	CA6	0.779		

According to Table 3, Cronbach's alpha is more than 0.70 and above, thus the constructs' internal consistency is achieved, according to Hair et al. (2010). In this study, validity is ensured through convergence. The convergent validity can be measured through average variance extracted (AVE), and according to Fornell and Larcker (1981), the value must be at least 50 percent. According to Table 3, the study achieved convergent validity. It is necessary to have at least 0.60 factor loading for ensuring uni-dimensionality (Awang, 2012). The study also concluded that criteria and uni-dimensionality are achieved.

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.927
Bartlett's Test of Sphericity	Approx. Chi-Square	1437.871
	Df	36
	Sig.	.000

Table 5. Pearson Correlation

	CA	PI	LD	CF	CI	TR	EMP	PR	SC
Correlation CA	1.000								
PI	0.757**	1.000							
LD	0.769**	0.837**	1.000						
CF	0.661**	0.785**	0.845**	1.000					
CI	0.728**	0.830**	0.910**	0.824**	1.000				
TR	0.690**	0.755**	0.746**	0.752**	0.760**	1.000			
EMP	0.712**	0.831**	0.833**	0.814**	0.815**	0.825**	1.000		
PR	0.673**	0.823**	0.834**	0.821**	0.756**	0.732**	0.846**	1.000	
SC	0.636**	0.711**	0.801**	0.729**	0.777**	0.633**	0.757**	0.786**	1.000

**Correlation is significant at the 0.01 level.

Table 4 demonstrated the Kaise-Meyer-Olkin Measure of sampling adequacy statistic value close to 1 and generally close to 1 value indicates the suitability of factor analysis. Table 4 also shows that the Barlett's Test of Sphericity with small value (less than 0.05) of the significance level indicates that a factor analysis is useful with this data (George & Mellery, 2010). The study performed a Pearson correlation test and revealed a significant and positive correlation between TQM dimensions, product innovation, and competitive advantage in Table 5.

Table 6. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.787 ^a	.619	.613	.50281

a. Predictors: (Constant), TQM, PI
b. Dependent Variable: CA

Table 6 expresses that independent variables (TQM and product innovation) explain 61.9 percent variation in competitive advantage (dependent variable) because adjusted R² is 0.619. The correlation coefficient (R) of 0.787 indicates there is a strong positive relationship between TQM, product innovation, and competitive advantage. Thus, organizations must be careful about TQM and product innovation to enhance competitive advantage, and these independent variables have a positive impact on competitive advantage.

Table 7. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.514	2	26.257	103.856	.000 ^b
	Residual	32.361	128	.253		
	Total	84.876	130			

a. Dependent Variable: CA
b. Predictors: (Constant), TQM, PI

The ANOVA Table 7 shows that F = 103.856, and it is statistically significant at the < 0.001 level, which signifies all predictors predicted a significantly dependent variable (competitive advantage). Thus, management of the organization should give more priorities to achieve competitive advantage in the context of Oman because they have more predictive power to explain competitive advantage.

Table 8. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.294	.106		12.237	.000
	PI	.266	.083	.364	3.204	.002
	TQM	.365	.093	.447	3.930	.000

Dependent Variable: CA

The hypothesis 1(H1) is supported as the result shows that the TQM has a standardized coefficient value of 0.447 and is significant at the $p < 0.001$ level, according to Table 8. It means that if TQM changes one unit, then competitive advantage will change 0.447 units, which means that there is a significant positive effect between TQM and competitive advantage. Practically, this means that the higher the TQM practices, the higher the competitive advantage. This finding is consistent with several scholars such as El Hawi and Alzyadat (2019); Ferdousi et al. (2019); and Kafetzopoulos and Gkana (2015). Thus, authority should focus on TQM and its dimensions in improving competitive advantage.

Hypothesis 2 is also supported by the study because product innovation has a standardized coefficient value of 0.364 and is significant at the $p < 0.01$ level. It means that if product innovation changes one unit, then competitive advantage will increase 0.364 units. This finding is consistent with several studies, such as Aprih and Ardiani (2022) and Siriram (2022). The results of this study are in accordance with the research of Gunawan & Wachyun (2020), which shows that innovation affects competitive advantage. However, this result contradicts Minoja et al. (2010), which show that product innovation has no effect on competitive advantage. Ofori & Ato-Mensah (2015) stated that innovation involves creativity and involves creative actions or ideas to make some real difference in the domain in which innovation is made. Innovation is beneficial for companies to create new value propositions through offering new products or services, adopting new organizational and operational practices, providing solutions for technology, or creating new skills and competencies. Innovation can also grow the skills and knowledge needed to effectively realize, master, and improve existing technology and create something new

Conclusion

The effect of TQM and product innovation on competitive advantage in the Omani manufacturing sector was investigated in this study. TQM has a statistically significant effect on competitive advantage, according to the study. Therefore, the study supports hypothesis 1 (H1). Additionally, the study shows that competitive advantages are statistically significantly impacted by product innovation. Thus, the data also supports hypothesis 2 (H2). To maintain and grow competitiveness both domestically and globally, Oman's industry management should prioritize Total Quality Management (TQM) and product innovation. This study contributes to the theoretical framework by offering a thorough grasp of the roles that product innovation and Total Quality Management (TQM) play in enhancing competitive advantage in the Omani industrial sector. Practically speaking, this research should alert industry executives to the significance of Total Quality Management (TQM) and product innovation as possible sources of competitive advantage.

Implications

The results of this study have contributed substantially to understanding the relationship between TQM practices, product innovation, and competitive advantage in the context of Omani industries. This study has confirmed the positive relationship between TQM, product innovation, and competitive advantage. It is therefore suggested that the influence of decision-making at the managerial level be compared with TQM and product innovation that have led to better and increased competitive advantage. The outcomes of this study are also beneficial to the manufacturing and service industries in Oman because they can help organizations identify the needs of TQM and product innovation to improve competitive advantage. A future study would aim at validating such a conceptual model of this study with larger sample size in both manufacturing and service organizations.

Limitations

This study has some limitations. Firstly, a sample size is not quite big to generalize the results of the study. Secondly, the current study is conducted based on industries located in Sohar, Oman. A wide range of area is not covered. Thirdly, cross-sectional data is used to test the hypothesis; thus, it is not wise to generalize the results. For future research, more cities of Oman should be included. Other studies may compare these findings with other findings in other industrial sectors in Oman, such as tourism and hotels.

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