

Determination of Key Factors for Total Quality Management Implementation for Airport using AHP

A. T. J. A. AlShamsi^a, S. Akmal^{b*}, M. Kamalrudin^c, S. H. Yahaya^d and M. Y. Yuhazri^b

^aUniversiti Teknikal Malaysia Melaka, Institute of Technology Management And Entrepreneurship, Melaka, Malaysia;

^bUniversiti Teknikal Malaysia Melaka, Faculty of Mechanical and Manufacturing Engineering, Melaka, Malaysia;

^cUniversiti Teknikal Malaysia Melaka, Faculty of Information and Communication Technology, Melaka, Malaysia;

^dUniversiti Teknikal Malaysia Melaka, Faculty of Manufacturing Engineering, Melaka, Malaysia

corresponding author: suriatiakmal@utem.edu.my

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Abstract

The aim of this paper is to identify analyse the factor of TQM implementation for the aviation industry in the UAE. Five factors of TQM implementation have been identified through existing literature. The Analytic Hierarchy Process (AHP) approach is applied for ranking these factors such as leadership, training and education, innovation customer focus, and continuous improvement. From the opinion of experts' that participated, this study found that leadership obtained the highest priority score of 49.7% and the least priority score was innovation (0.034). The results showed that leadership factor of TQM implementation would drive the aviation industry to provide satisfied service and would eventually become more competitive

Keywords: Total quality management; Analytical hierarchy process; airport; leadership; customer focus.

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Introduction

The airline industry has undergone rapid transformation as a result of liberalization and globalization, and it has become an essential contributor to the Middle East's prosperity and economic development. In the Middle East, such as Dubai airport, there were nearly 7.2 million passengers in 2017, a 1.7 percent increase from the previous year [1]. This is not the case at Abu Dhabi Airport, where there were 8,223,547 passengers from January to April 2017 and 7,333,956 from January to April 2018 [2]. The decrease in passenger numbers puts significant competitive pressure on airline carriers and airport companies [3].

Improper management of the aviation industry, specifically customer satisfaction, will have no added value to the organization and will make it difficult to retain customers as well as win new customers [3], [4]. It is necessary to establish a standard and reliable guideline to assist aviation companies in determining which aspects of a specific service define its quality [3]. The extent to which quality initiatives such as TQM are adopted and implemented determines the strength and development of many industries [5]. As a result, in order to ensure the company's survival in today's dynamic business world, today's service industries, such as the aviation industry, are gradually embracing Total Quality Management (TQM). This strategic approach is receiving positive feedback in terms of generating a new wave of service quality interest within the aviation industry and improving organizational performance [6].

Despite numerous research on TQM and its connection to performance, limited study has been carried out regarding the TQM implementation in the UAE aviation industry. The primary motivation for change is to ascertain whether it is an improved management mechanism or improved customer satisfaction. Quality is always the most important consideration, and poor service can lead to a loss of goodwill, which can be very costly for any airline. The objective of this paper is to investigate the factors that influence the successful implementation of TQM in the UAE

aviation industry. To determine the priority TQM success factor, the analytical hierarchy process (AHP) technique was used. The proposed selection factors would aid managers and decision makers in reaching the successful factors for TQM implementation at Abu Dhabi Airport.

Literature review

Theoretical framework

As the primary theory in strategic management, the resource-based view (RBV) theory has received a lot of attention [7]. According to the theory, organization's superior performance and sustainable competitive advantage are determined by its key resources. Also, the theory took into account the organizations' internal characteristics in order to explain its performance and sustainable competitive advantage [8]. Some study conform that, organizations that make use of valuable, rare, imperfectly imitable, and non-substitutable resources will achieve the superior performance and sustainable competitive advantage [9].

However, the theory has been criticized for its limited capability to discover organization's intangible resources [11] and to analyze the process to achieve organization's superior performance and sustainable competitive advantage [10].

TQM concepts and philosophy have been accepted by many successful organizations and are recognized as a tool that continuously generates quality improvements and thus provides the organization with a superior performance and competitive advantage [12], [13]. Organizations regard this tool as extremely valuable, despite the fact that it may be limited and difficult to replicate by competitors, and that non-substitutable intangible resources are nearly impossible to replace because each organization's needs for improvement vary. Furthermore, both theoretical and empirical evidence supports the notion that TQM-oriented organisations successfully create barriers to competitors copying or following TQM practises while gaining a sustainable competitive advantage [14]. The RBV theory was chosen as the underpinning theory for the current study based on the above description.

The definition of TQM

TQM practises have been adopted by organisations all over the world in order to remain relevant in today's volatile environment. TQM has been widely adopted by product-based or manufacturing companies for several decades [15]. TQM principles, according to Samat et al. (2006), are applicable to service companies [16]. TQM assists businesses in achieving a quality advantage [17]. It is said that organization that implements TQM will be beneficial in process operation and making a name for itself in the industry in which it operates [18]. Implementing TQM has significantly improved customer satisfaction and organisational performance [19].

In response to globalisation, the concept has emerged as one of the promising operational efficiency paradigms for improving organisational performance, incorporating a variety of technical and behavioural factors [20]. TQM, on the other hand, is a comprehensive management approach that focuses on providing superior customer value by reducing lead time and exceeding customer expectations [21], [22].

According to Hietschold et al. (2014) [23], the definition of TQM is shared in common in terms of: (1) meeting customer requirements, (2) focus on specific processes, products or services, (3) enhanced organizational performance and (4) minimizing errors. They conclude that the concept of TQM consists of total involvement of all stakeholder towards quality management, quality as the pillars and top management commitment. All these terms are aiming at improving organizational performance.

The implementation of TQM

The effectiveness of TQM for the manufacturing industry has been a long discussion and is undoubtedly the most prominent practice for companies to survive. Due to the rising importance of quality consciousness, the service sectors have widely embraced the concept of TQM [24].

According to Psomas and Jaca (2016), TQM implementation had a significant impact on multiple aspects of organisational performance for service companies, including employee participation, service quality, customer satisfaction, market share and financial performance [25]. Talib et al. (2011) stated that it is recognized that the successful implementation of TQM provides substantial and insubstantial advantages [26]. Similar to Pattanayak and Koilakuntla (2015), they agreed that TQM is a change management tool that helps banks achieve high levels of market orientation,

service quality, customer satisfaction and loyalty [24]. A recent study by Sadeh (2017) supports the argument that TQM assured customer satisfaction and loyalty through increasing the service quality of hospitals in Iran [27]. Some of the potential benefits of TQM are presented in Table 1.

Nowadays, based on Table 1, the effect of TQM on service quality is not new. From the results of the frequency, it shows that there is an increasing number of research focusing on this area. However, there are a limited number of comparative studies have been conducted in any Gulf country on the factor of TQM implementation in the perspective of the middle east, specifically for the aviation industry. Thus, it will be an interesting finding whether TQM can have various impacts on service quality, specifically in the aviation industry. Therefore, this study was conducted to fill the literature gap that still exists.

Table 1. TQM benefits for organization’s performance

TQM benefits	Frequency	Authors
Organizational performance	6	[19]; [25]; [28]; [29]; [30]; [31]
Organizational learning	2	[32]; [33]
Service quality	5	[23], [27], [34], [35], [36]
Market	4	[24], [25], [36], [37]
Operational	2	[25], [37]
Financial	4	[17], [24], [35]–[37]
Competitive	1	[25]
Employee participation and morale	3	[25], [31], [37]
Satisfaction of customer	6	[24], [25], [27], [39], [36]
Job satisfaction	1	[40]
Customer loyalty	3	[24], [27], [38]
Supplier management	2	[30], [34], [41]
Knowledge management	1	[42]

The factors of TQM

The dynamic and active nature of TQM requires organizations to identify the key success factors for assisting the implementation of TQM within their organization. There is a considerable literature available that investigates TQM practises and discusses the significance of key factors in achieving successful TQM implementation in various industries. Some of them are employee involvement, leadership, process management, employee training and supplier quality management [37], [43]. TQM has many critical success factors (CSF) that must be understood in terms of their interrelatedness as well as their driving and dependent power.

Valmohammadi (2011) investigated the success of TQM applications in Iran and found that the successful factors of TQM involve leadership, tools and techniques, process management, communication, employee management, customer focus, supplier, and quality information systems [44]. The limitation of this work is that the results are limited to the manufacturing SME industry and to studying traditional organizational performance.

Education institutions also embraced the TQM to remain competitive and survive in the long-term. A study at Saudi University conducted by Aldaweesh et al. (2013) [45] reported that human resource management, educational management, information management, and leadership are the CSFs for successful TQM practice. However, the results show that leadership style has the most significant relationship with educational institutional TQM performance.

Obeidat et al. (2018) studied the possible effects of TQM on Jordan banking [42]. They claim that TQM has a positive relationship with knowledge management, which is not the focus of this study. The CSFs of TQM identified in their study were data-driven management, top management commitment, employee’s involvement, customer focus and continuous improvement. Banna et al. (2018) measure the TQM for evaluating the relationship with bank loan quality [46]. However, the CSFs were limited to managerial ability in the successful implementation of TQM in the bank loan study.

A recent study by Nazar et al. (2018) involved TQM and bank performance (organizational performance) [29]. They employed critical factors that includes leadership, benchmarking, continuous improvement, customer focus, management of human resource, information and analysis, design of service and strategic planning. In their review of

service design, successful TQM implementation improves satisfaction of both employees and customers, which is caused by reducing repetitive work and irrelevant processes. As a result, TQM requires leaders and managers to stress high quality service provision to customers rather than stressing solely on service cost.

Also, research on TQM to date has been undertaken in a variety of healthcare institutions to improve service quality [30]. In their study, out of 10 CSFs of TQM, only five had the most positive effect on TQM success. The CSFs include process management, employee management, customer management, leadership and information management. An extensive review and analysis has been conducted on the above-mentioned studies by several industries worldwide and summarized in Table 2.

Based on Table 2, "customer focused" is the most considered influencing factor of TQM, which accounts for 20 studies. This was followed by "leadership" with 18 studies and "continual improvement & innovation" with 12 studies. This study will include at least 5 CSF (based on frequency of factors considered in literature). They are: customer-focused, leadership, continual improvement & innovation, process-centered, and training, knowledge, and education.

Table 2. TQM factors.

Factors	Focus in customer	Involvement of employee	Focus in process	Quality strategy and a systematic	Strategic planning	Continual improvement &	Fact-based decision making	Communications	Quality culture	Employee commitment &	Top management support	Leadership	Information and analysis	Training, knowledge and	Employees empowerment	Human resource management	Supplier management	Benchmarking	Product / service design
Authors	[4], [19], [25], [28], [29], [30], [30], [32], [30], [32], [33], [35], [37], [43], [47], [48], [49], [50], [51], [52], [42], [44]	[19], [25], [30], [32], [42], [43], [53], [54]	[19], [25], [30], [31], [32], [33], [43], [44], [49], [51]	[30], [37], [43]	[19], [29], [30], [41]	[4], [19], [25], [29], [32], [38], [41], [42], [43], [49], [50], [54]	[28], [42], [43], [50]	[43], [44], [48]	[19], [40], [30], [47], [50]	[4], [19], [40], [47], [54], [55]	[19], [28], [41], [25], [42], [49], [50], [54]	[4], [24], [25], [29], [49], [30], [31], [32], [36], [37], [41], [44], [49], [52], [54], [55]	[4], [19], [25], [28], [30], [31], [36], [37], [52], [54], [55]	[24], [32], [54], [55]	[19], [30], [45], [49], [51]	[4], [19], [25], [28], [36]	[19], [24], [29], [36], [49], [55]	[19], [24], [29], [51], [55]	
Frequency	20	8	10	3	4	12	4	3	5	6	6	18	5	11	4	5	5	6	5

Methodology

The research was carried out using a search engine such as Google Scholar's database. The search string used were (total quality management OR TQM) AND (success factor OR factor influencing) AND (aviation industry) to ensure that all relevant papers are included. The database was browsed for articles published between 2011 and 2019. 59 articles were chosen as relevant studies after reviewing the title and abstract of the primary identified studies. Furthermore, by reviewing the articles' content, this paper was able to access and evaluate them. At this point, irrelevant studies will be rejected, while related studies will be included. Only 51 of the 59 articles were considered for further review.

The questionnaire consisted of 40 questions in three parts were used as an instrument for this study. Three questions related to awareness and knowledge of section 2 and 31 questions related to the critical success factor of TQM that defined from literature (section 3): six for leadership (L1-L6) [56]; [57], eight for customer focus (CF1-CF8) [58]–[60], five for training and education (TE1-TE5) [59], [61], four for continuous improvement (CI1-CI4) [61], and eight for innovation (I1-I8) [59], [62].

This paper suggested AHP for selecting the critical success factor for TQM (section 3 in survey). The following are the method for AHP. The goal of ranking factors was determined and a multilevel hierarchy structure was developed. The respondents were asked to perform a pairwise comparison of the criteria based on the importance scale as shown in Table 3.

Table 3. Importance Description.

Score	1	3	5	7	9	2,4,6,8
Importance description between “i” and “j”	equal	moderate	strongly important	very strongly important	extreme importance	intermediate

A preliminary study was conducted and a survey was disseminated to employees at Abu Dhabi Airport. The data for the preliminary study was collected from an online survey using Google form. The purpose of this research activity is to determine the understanding of employee the TQM practices at Abu Dhabi airport. Also, the survey was to investigate the factors that drives the TQM practices at Abu Dhabi airport. The questionnaire was distributed to 108 respondents with the permission of the management. A total of 61 responses were received, representing a 56.5 percent response rate. After removing surveys with missing responses, 49 questionnaires were left for data analysis. One extreme outlier was excluded from the pool of 49 usable responses. Finally, 48 feedbacks were deemed appropriate for further analysis. This survey was participated by employee who has position as manager and above at Abu Dhabi airport and all respondents were treated anonymously. The alpha coefficient was used to calculate the reliability of the scale used in this study. The overall alpha coefficient for all items was 0.943.

Results and Discussion

Respondents profile

The analysis started with the demographic and behavioural profile of the respondents. As shown in Table 4, the sample was relatively unevenly split between males and females. This is common in Arab culture where most employees are males. There are 85.4 percent are male respondents and 14.6 percent are female respondents which indicates that males make the higher percentage of employee at Abu Dhabi airport. Half of the respondents are working as top managers (50.0). Most respondents (50.0%) had a Bachelor’s degree and had more than 20 years of working experience.

Table 4. Respondent’s Background.

	N	%
Gender		
Male	42	85.4
Female	7	14.6
Position		
Top manager	24	50.0

Middle manager	14	29.2
Junior manager	10	20.8
Education		
Diploma	4	8.3
Higher Secondary Diploma	1	2.1
Bachelor Degree	24	50.0
Master Degree	14	29.2
Doctoral degree	5	10.4
Working experience		
Less than 5 years	4	8.3
6 - 10 years	3	6.3
11 - 15 years	7	14.6
16 - 20 years	10	20.8
more than 20 years	24	50.0

TQM Awareness and knowledge

The respondents were asked about their knowledge and understanding related to TQM. The first question in this section related to quality definitions. The first question in this section revealed that fifteen managers understand quality is equivalent to customer satisfaction (N=15) and followed by quality is doing things right at the first time (N=14). This is shown in Figure 1.



Figure 1. Employee understanding on quality definitions

Figure 2 shows the feedback on their understanding of the TQM concept. Almost 40 managers at Abu Dhabi Airport mostly agreed that TQM is a management system that consists of tools, techniques and values, with the overall goal of increasing value to customers by continuously improving the organisational process. For the third question in this section, they were asked about the benefits that a company would gain by implementing TQM. As the nature of the airport is to ease the traveler's journey, most managers believe that TQM will help them to improve the service quality of their customers (N = 36) and is closely followed by TQM for improving the company's entire performance (N = 34). The next most beneficial aspect of TQM implementation is satisfaction and reduce time, cost and waste with (N = 31). From the perspective of managers at Abu Dhabi Airport, the lease benefit of TQM is company's reputation as shown in Figure 3.

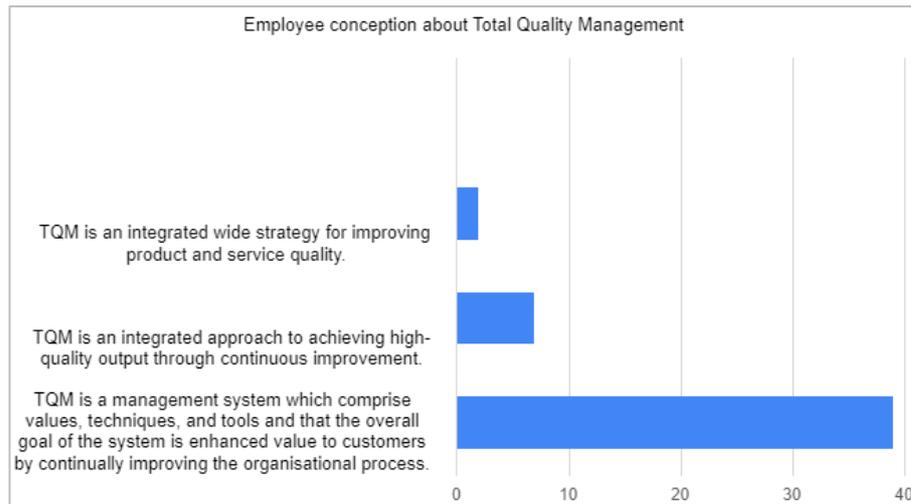


Figure 2. Employee understanding on TQM concept

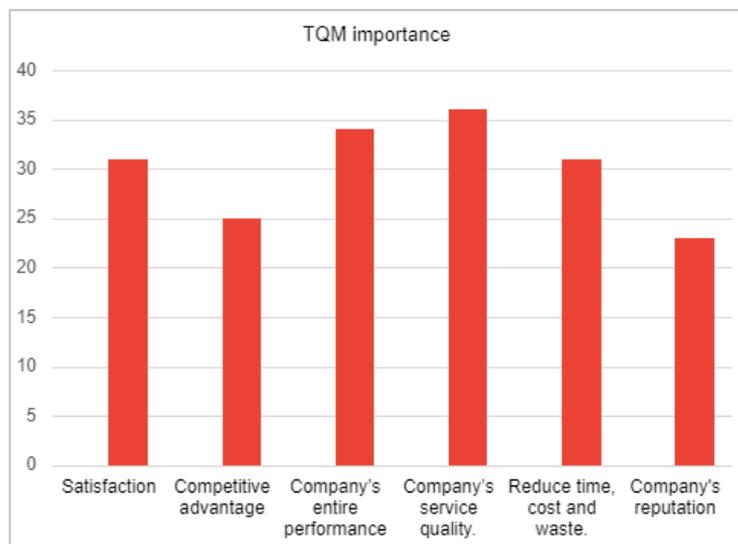


Figure 3. Employee understanding on TQM benefit.

Based on the survey results, this study defined TQM as (1) 'total,' which assumes that all stakeholders in an organisation contribute to process quality management. (2) 'Quality' is an essential component of the corporate philosophy, and (3) 'Environmental' refers to top management responsibility and the importance of managerial commitment. This work is related to [23], [63]. All of these terms are intended to improve organisational performance, customer satisfaction, and societal impact.

AHP for determining the best critical factors

The managers' opinion of the pairwise comparison using Table 3 is summarized and shown in Table 4. An open access website from Goepel (2018) was used to compute the associated normalized matrix to determine the weighted score of each criterion to be used in related AHP model. The results of priority vector (PV) of evaluation criteria with respect to the overall objectives for selection of the critical success factors were shown in Table 5. The PV was calculated using equation (1).

$$W_i = \frac{1}{n} \sum_{j=1}^n \frac{LQ_{ij}}{\sum_i LQ_{ij}}, i, j = 1, 2, 3, \dots, n \tag{1}$$

$W = (0.498, 0.236, 0.171, 0.069, 0.036)^T$ is the weight of the primary factor relative to the overall objectives.

Table 4. Managers' opinions for pairwise comparison.

Criteria	Leadership	Customer focus	Training and education	Continuous improvement	Innovation
Leadership	1	3	4	7	8
Customer focus	0.333	1	2	4	7
Training and education	0.250	0.5	1	4	6
Continuous improvement	0.143	0.25	0.25	1	3
Innovation	0.125	0.143	0.167	0.333	1

Table 5. Managers' opinions for pairwise comparison.

Criteria	Leadership	Customer focus	Training and education	Continuous improvement	Innovation	Priority vector
Leadership	0.540	0.613	0.539	0.429	0.320	0.498
Customer focus	0.180	0.204	0.270	0.245	0.280	0.236
Training and education	0.135	0.102	0.135	0.245	0.240	0.171
Continuous improvement	0.077	0.051	0.034	0.061	0.120	0.069
Innovation	0.068	0.029	0.022	0.020	0.040	0.036
sum	1	1	1	1	1	1

Also, the priority vector within sub-criteria were calculated and results presented in Table 6 as it was a lengthy calculation.

Table 6. Weights for secondary factors

Leadership		Customer focus		Training and education		Continuous improvement		Innovation	
L1	0.339	CF1	0.247	TE1	0.560	CI1	0.587	I1	0.215
L2	0.251	CF2	0.215	TE2	0.159	CI2	0.272	I2	0.320
L3	0.163	CF3	0.149	TE3	0.159	CI3	0.094	I3	0.125
L4	0.118	CF4	0.147	TE4	0.090	CI4	0.048	I4	0.095
L5	0.067	CF5	0.085	TE5	0.032			I5	0.066
L6	0.063	CF6	0.067					I6	0.088
		CF7	0.065					I7	0.046
		CF8	0.027					I8	0.047

To validate the judgement in the previous step, a consistency of the pairwise comparison called consistency ratio (CR) should be performed. A consistency ratio of less than ten percent (0.10) is considered as a satisfactory degree of consistency. The overall CR is 0.052 and for each individual criteria is leadership (0.066), customer focus (0.078), training

and education (0.058), continuous improvement (0.055) and innovation (0.075). The CR values show that the judgments are consistent and all critical success factors are acceptable.

Fig. 4 shows the ranking of primary criteria to the overall objective. Interestingly, the finding in this study is different with literature found in Table 2. The results show that the top-ranked TQM factor is leadership which has a priority value significantly higher (0.497) than customer focus, with a priority value of 0.236. Next in order are training & education, continuous improvement and innovation with priority values of 16.7%, 6.5% and 3.4%.

The overall priority weighting and ranking of factors for TQM implementation at Abu Dhabi airport is shown in Table 7. Leadership has received the highest global rank and innovation has received the lowest global rank and they are given first and fifth position accordingly.

The highest score of the leadership criterion is that leader are actively involved in communication and planning of organizational goals (0.339). The second highest factor is that leaders provide significant resources to improve and maintain quality (0.251) and followed by leaders responsible toward quality improvement (0.163). The results show that in successfully implementing the TQM, active involvement of leaders is necessary for communicating and planning the TQM. The results are aligned with [31], [64] [65], [66], [67]. Also, the results emphasized that being actively involved is not only the factor for successful TQM implementation. Leaders are required to provide significant resources to improve and maintain quality. The resources refer to man, machine, material and budget. All the activity for improving and maintaining the quality should be controlled and monitored by the leaders. Leaders as a steering committee should be competent to link mission, vision, values and make decision in strategically implementing the TQM in the long-term [64]. Another critical success factor for TQM described in literature is customer focus. This factor is about understanding customer requirements and must respond to the customer requirements [52] and subsequently to increasing customer satisfaction [26].

Airports can be considered as a service sector and are much dependent on customer focus [68]. For the customer focus criterion, the highest factor is that the company has a program / system to improve customer service (0.247), followed by customer feedback serves as an important input in improving the quality of the company's products / services / processes (0.215) and customer requirements are disseminated and understood (0.149).

According to Sushil (2013), training and education of employees is vitally important to ensure TQM success [55]. Employees must acquire specific knowledge and work-skills to improve their proficiency in their tasks [28], [37]. In long-term, it will provide sustainability of quality management in the organization. Further, they defined that effective training for all levels of employees will make them understand the structure of the organization and make them loyal and motivated to produce high quality products/services [37], [68]. The results show that the factor of specific work-skills training given to hourly employees throughout the organization has the highest ranking with a weightage of 0.560 and it is supported by the previous studies [37], [55], [68].

The term "continuous improvement" refers to the ongoing process of improving workflow for the benefit of the organizations. Furthermore, leaders pursue continuous quality improvement through small changes as a means of improving TQM rather than radical changes [65]. Continuous improvement consists of various steps in which team members examine each step to determine when bottlenecks occur, then reduce defects and improve customer satisfaction. Table 6 shows that the factor of many of our products/services have been improved in the recent past has the highest weightage with 0.587 for the continuous improvement criterion.

Several studies have acknowledged the positive relationship between TQM, innovation and organizational performance [69], [70]. The airport is a place where technological innovations take place to improve the passenger experience. The use of the latest technological innovations in our new product/service is high is the highest factor with 0.320. This shows that TQM has become the basis for technological innovation at Abu Dhabi airport.

This paper may provide a great help in understanding the various factors of TQM concept at airport. The proposed factors will surely provide help to researchers in developing a conceptual framework for TQM implementation at airports. Due to the rapid change in customer demands and technology, the airport industry and organizations experience a tremendous need to implement TQM that satisfy customer and improve the organizational performance. Proper selection of the TQM factor will help organizations to enjoy better customer satisfaction and a sustainable image.

Table 7. Weights and rank for all factors

No	TQM factor	Weights	Ranks	Sub-factors	Weights	Rank	Global weights	Global rank
1	Leadership	0.497	1	L1: actively involved in communication and planning of organizational goals.	0.339	1	0.168	1
				L2: provides significant resources to improve and maintain quality.	0.251	2	0.125	2
				L3: responsible toward quality improvement	0.163	3	0.081	4
				L4: routinely interact with concerned departments	0.118	4	0.058	5
				L5: evaluated on quality performance	0.067	5	0.033	11
				L6: anticipate change and make plans to accommodate it	0.063	6	0.031	12
2	Customer focus	0.236	2	CF1: The company has a program / system to improve customer service	0.247	1	0.058	5
				CF2: Customer feedback serves as an important input in improving the quality of the company's products / services / processes.	0.215	2	0.051	7
				CF3: Customer requirements are disseminated and understood.	0.149	3	0.035	9
				CF4: Frequently are in close contact with our customers.	0.147	4	0.035	9
				CF5: company conducts Customer satisfaction survey to determine and measure external customer satisfaction (current and future) about its products and services	0.085	5	0.020	15
				CF6: managers and supervisors encourage activities that improve customer satisfaction	0.067	6	0.016	17
				CF7: A wide variety of mechanisms for customers to contact the company easily and effectively are available.	0.065	7	0.015	18
				CF8: Satisfying our customers, and meeting their expectations, is the most important thing we do.	0.027	8	0.006	22
3	Training and Education	0.167	3	TE1: Specific work-skills training given to hourly employees throughout the organization.	0.560	1	0.094	3

No	TQM factor	Weights	Ranks	Sub-factors	Weights	Rank	Global weights	Global rank
				TE2: Quality-related training given to hourly employees throughout the organization	0.159	2	0.027	13
				TE3: Quality-Related training given to managers and supervisors throughout the organization	0.159	2	0.027	13
				TE4: Continuous learning is provided through education and training	0.090	4	0.015	18
				TE5: Training in the “total quality concept” (i.e. Philosophy of company-wide responsibility for quality) throughout the organization.	0.032	5	0.005	24
4	Continuous Improvement	0.065	4	CI1: Many of our products/services have been improved in the recent past.	0.587	1	0.038	8
				CI2: Our organization has received recent compliment and recognition for improving its products/services/processes	0.272	2	0.018	16
				CI3: The office has records management system that allow for easy location and retrieval of needed documents	0.094	3	0.006	22
				CI4: Each department in the company has on-going plans and programs to identify and eliminate all possible sources of wastes in the company’s operations.	0.048	4	0.003	26
5	Innovation	0.034	5	I1: The number of new products/services in our firm has increased in the last 5 years .	0.215	2	0.007	21
				I2: The use of latest technological innovations in our new product/service is high	0.320	1	0.011	20
				I3: The speed of new product/service development of our firm is high.	0.125	3	0.004	25
				I4: The number of our new product/service that are first-to-market is high.	0.095	4	0.003	26
				I5: Our organization introduced minor or incrementally improved information technologies for producing products / services.	0.066	6	0.002	29

No	TQM factor	Weights	Ranks	Sub-factors	Weights	Rank	Global weights	Global rank
				I6: Our organization implemented new or improved existing computer-based administrative applications.	0.088	5	0.003	26
				I7: Our organization implemented new or improved existing employee reward/training schemes.	0.046	8	0.002	29
				I8: Our organization implemented new or improved existing structures such as project team or departmental structures, within or in-between existing structures.	0.047	7	0.002	29

Conclusion

In this paper, an attempt has been made to understand the factors of TQM that may influence and how it may help to achieve the customer satisfaction and enhance customer value by continually improving the organizational process. Using the Analytic Hierarchy Process (AHP) method with experts' opinion, this work identified leadership as the most influence factor and innovation as the least factor for successful TQM implementation at Abu Dhabi airport. This result differs from the findings of literature in this present study. However, it is relevant to the middle east, as the leader of the Arab culture is respected without any challenge. Abu Dhabi airport must pay a lot of attention to the role of leader, which could help in the success of TQM implementation. Also, the role of leadership is a necessary process for communicating and planning the organizational goals in adding value to the TQM process. Leaders are responsible for providing tangible and intangible resources to improve and maintain the quality of their organizations. Leaders not only providing tangible resources such as employees and money, but also provide work-skills training to employees.

The feedback from the questionnaire in section 2 demonstrated that a quality system exists at present. What is required is the participation and responsibility for improving the quality by leaders and employees. The respondents are aware of the participation of team work, thus leaders are required to routinely interact with the connected department and the customers.

Customer focused was given the second higher priority by the respondents. Leaders may think possible programs as a way to focus on customers' requirements and to close the gap between the organization and customers, as TQM advocates the importance of customer support. Recently, Abu Dhabi won the awards of 'The voice of the Customer's recognition, which shows that the management is serious about the activity on understanding the customer's requirement for better performance.

Innovation is given a low priority by the respondents. Due to the region's culture and in parallel with the findings of this study, the leader has a greater role in the TQM process at Abu Dhabi airport as employee will act according to the leader's instructions with less questioning. Subsequently, employees think less on innovation. Similar to the case of continuous improvement that should be given priority by the airport. The respondents were not aware of the importance of these two factors in TQM implementation. Top managements must consider the strategic importance of continuous improvement in quality for better organizational performance. A proper system should be integrated into the quality system for better document management and to succeed in their ambition of positioning the Abu Dhabi airport as a world's leading airports group. In this way, the results of the present study will be used to develop a framework for modelling the organizational performance and access different factors for improving it.

This study is conducted using AHP methodology, which using experts' opinions. Therefore, there are chances for the experts' opinions to be biased. Further, the dimensions of TQM for this present study are limited to five dimensions and 31 items. The present study did not focus on the impact of demographic parameters. Future research can be carried

out including others dimensions. A framework with statistical analysis for investigating the relationship should be presented in future study.

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References

- [1] A. Jahmani, "The effect of Royal Jordanian Airline Service Quality on Passengers' Satisfaction," *Int. J. Bus. Soc.*, vol. 18, no. S3, pp. 519–530, 2017, [Online]. Available: <http://eds.a.ebscohost.com.libezp2.utar.edu.my/eds/detail/detail?vid=2&sid=ab7f47fb-6dad-4c49-82dc-533d2e993917%40sessionmgr4006&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3D%3D#AN=128134233&db=bth>.
- [2] Ministry of Economy, "Statistical Reports for Year 2017," Abu Dhabi, 2017.
- [3] R. Wang, Shu-Li, Hsu, Y. H. Lin, and M.-L. Tseng, "Evaluation of customer perceptions on airline service quality in uncertainty," *Procedia - Soc. Behav. Sci.*, vol. 25, no. 2011, pp. 419–437, 2012, doi: 10.1016/j.sbspro.2012.02.054.
- [4] M. T. Al Nahyan and S. F. Abdel All, "Key Enablers of Effective Implementation of TQM in Royal Jet Airways," *Adv. Decis. Sci.*, vol. 2017, pp. 1–10, 2017, doi: 10.1155/2017/3197585.
- [5] H. J. Harrington, F. Voehl, and H. Wiggin, "Applying TQM to the construction industry," *TQM J.*, vol. 24, no. 4, pp. 352–362, 2012, doi: 10.1108/17542731211247373.
- [6] M. S. Farooq, M. Salam, A. Fayolle, N. Jaafar, and K. Ayupp, "Impact of service quality on customer satisfaction in Malaysia airlines: A PLS-SEM approach," *J. Air Transp. Manag.*, vol. 67, no. September 2017, pp. 169–180, 2018, doi: 10.1016/j.jairtraman.2017.12.008.
- [7] K. Almarri and P. Gardiner, "Application of Resource-based View to Project Management Research: Supporters and Opponents," *Procedia - Soc. Behav. Sci.*, vol. 119, pp. 437–445, 2014, doi: 10.1016/j.sbspro.2014.03.049.
- [8] S. Schiller and H. Perera, "Importance of managing intangible assets in enhancing dynamic capabilities of firms: cases from Sweden and Germany," *Ann. Innov. Entrep.*, vol. 3, no. 1, p. 17292, 2012, doi: 10.3402/aie.v3i0.15762.
- [9] P. M. Wright, G. C. McMahan, and A. McWilliams, "Human resources and sustained competitive advantage: A resource-based perspective," *Int. J. Hum. Resour. Manag.*, vol. 5, no. 2, pp. 301–326, 1994, doi: 10.1080/09585199400000020.
- [10] A. Risfandini, A. Thoyib, N. Noermijati, and M. Mugiono, "Competitiveness of Tourism Destinations: An Extended Criteria of Resource-Based View," *J. Asian Financ. Econ. Bus.*, vol. 8, no. 5, pp. 253–263, 2021, doi: 10.13106/jafeb.2021.vol8.no5.0253.
- [11] R. Kamasak, "The contribution of tangible and intangible resources, and capabilities to a firm's profitability and market performance," *Eur. J. Manag. Bus. Econ.*, vol. 26, no. 2, pp. 252–275, 2017, doi: 10.1108/EJMBE-07-2017-015.
- [12] A. Androniceanu, "The Three-Dimensional Approach of Total Quality Management, an Essential Strategic Option for Business Excellence," *Amfiteatru Econ. J.*, vol. 19, no. 44, pp. 61–78, 2017.
- [13] K. B. Ooi, "TQM: A facilitator to enhance knowledge management? A structural analysis," *Expert Syst. Appl.*, vol. 41, no. 11, pp. 5167–5179, 2014, doi: 10.1016/j.eswa.2014.03.013.
- [14] A. A. Homaid, M. S. Minai, and H. A. Rahman, "TQM and performance linkage in the microfinance institutions: The mediating role of IT capability," *Asian Soc. Sci.*, vol. 11, no. 21, pp. 213–230, 2015, doi: 10.5539/ass.v11n21p213.
- [15] S. P. Saeidi, S. Sofian, P. Saeidi, S. P. Saeidi, and S. A. Saeidi, "How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer

- satisfaction,” *J. Bus. Res.*, vol. 68, no. 2, pp. 341–350, 2015, doi: 10.1016/j.jbusres.2014.06.024.
- [16] N. Samat, T. Ramayah, and N. Mat Saad, “TQM practices, service quality, and market orientation: Some empirical evidence from a developing country,” *Manag. Res. News*, vol. 29, no. 11, pp. 713–728, 2006, doi: 10.1108/01409170610716025.
- [17] F. Talib, Z. Rahman, and M. N. Qureshi, “The relationship between total quality management and quality performance in the service industry: a theoretical model,” *Multicr. Int. J. Business, Manag. Soc. Sci.*, vol. 1, no. 1, pp. 113–128, 2010.
- [18] T. Ahmed and M. S. Lodhi, “Effectiveness of TQM Philosophy at Operational Level for Quality Product in Pakistan: Empirical Study of Textile Dyeing Industry,” *IOSR J. Bus. Manag. III*, vol. 17, no. 4, pp. 2319–7668, 2015, doi: 10.9790/487X-17434559.
- [19] F. Talib, Z. Rahman, M. N. Qureshi, and J. Siddiqui, “Total quality management and service quality: an exploratory study of quality management practices and barriers in service industry,” *Int. J. Serv. Oper. Manag.*, vol. 10, no. 1, p. 94, 2011, doi: 10.1504/ijssom.2011.041991.
- [20] R. Y. Y. Hung, B. Y. H. Lien, B. Yang, C. M. Wu, and Y. M. Kuo, “Impact of TQM and organizational learning on innovation performance in the high-tech industry,” *Int. Bus. Rev.*, vol. 20, no. 2, pp. 213–225, 2011, doi: 10.1016/j.ibusrev.2010.07.001.
- [21] C. H. Wang, K. Y. Chen, and S. C. Chen, “Total quality management, market orientation and hotel performance: The moderating effects of external environmental factors,” *Int. J. Hosp. Manag.*, vol. 31, no. 1, pp. 119–129, 2012, doi: 10.1016/j.ijhm.2011.03.013.
- [22] A. E. Akgün, H. Ince, S. Z. Imamoglu, H. Keskin, and I. Kocoglu, “The mediator role of learning capability and business innovativeness between total quality management and financial performance,” *Int. J. Prod. Res.*, vol. 52, no. 3, pp. 888–901, 2014, doi: 10.1080/00207543.2013.843796.
- [23] N. Hietschold, R. Reinhardt, and S. Gurtner, “Measuring critical success factors of TQM implementation successfully—a systematic literature review,” *Int. J. Prod. Res.*, vol. 52, no. 21, pp. 6254–6272, 2014, doi: 10.1080/00207543.2014.918288.
- [24] D. Pattanayak, M. Koilakuntla, and P. Punyatoya, “Investigating the influence of TQM, service quality and market orientation on customer satisfaction and loyalty in the Indian banking sector,” *Int. J. Qual. Reliab. Manag.*, vol. 34, no. 3, pp. 362–377, 2017, doi: 10.1108/IJQRM-04-2015-0057.
- [25] E. L. Psomas and C. Jaca, “The impact of total quality management on service company performance: evidence from Spain,” *Int. J. Qual. Reliab. Manag.*, vol. 33, no. 3, pp. 380–398, 2016, doi: 10.1108/IJQRM-07-2014-0090.
- [26] F. Talib, Z. Rahman, and M. N. Qureshi, “Total quality management in service sector: a literature review,” *Int. J. Bus. Innov. Res.*, vol. 6, no. 3, p. 259, 2012, doi: 10.1504/IJBIR.2012.046628.
- [27] E. Sadeh, “Interrelationships among quality enablers, service quality, patients’ satisfaction and loyalty in hospitals,” *TQM J.*, vol. 29, no. 1, pp. 101–117, 2017, doi: 10.1108/TQM-02-2015-0032.
- [28] K. Mahmood, I. M. A. Qureshi, and A. Nisar, “An empirical study on measurement of performance through TQM in Pakistani aviation manufacturing industry,” *Int. J. Qual. Reliab. Manag.*, vol. 31, no. 6, pp. 665–680, 2014, doi: 10.1108/IJQRM-03-2012-0041.
- [29] N. Nazar, S. R. Ramzani, T. Anjum, and I. A. Shahzad, “Organizational Performance: The Role of TQM Practices in Banking Sector of Pakistan,” *Eur. Sci. Journal, ESJ*, vol. 14, no. 31, p. 278, 2018, doi: 10.19044/esj.2018.v14n31p278.
- [30] A. M. Mosadeghrad, “Developing a Total Quality Management Model for Health Care Systems,” *Iran. J. Public Health*, vol. 34, no. 5, pp. 544–564, 2015, [Online]. Available: <https://search.ebscohost.com/login.aspx?direct=true&db=edsdoj&AN=edsdoj.3ee41c86ef4641419e3e299d57b0d2c6&lang=tr&site=eds-live>.
- [31] M. Amin, A. M. Aldakhil, C. Wu, S. Rezaei, and C. Cobanoglu, “The structural relationship between TQM, employee satisfaction and hotel performance,” *Int. J. Contemp. Hosp. Manag.*, vol. 29, no. 4, pp. 1256–1278, 2017, doi: 10.1108/IJCHM-11-2015-0659.
- [32] B. Yazdani, A. Attafar, A. Shahin, and M. Kheradmandnia, “The impact of TQM practices on organizational learning case study: Automobile part manufacturing and suppliers of Iran,” *Int. J. Qual. Reliab. Manag.*, vol. 33, no. 5, pp. 574–596, 2016, doi: 10.1108/IJQRM-05-2014-0061.

- [33] S. Sahney, "Use of multiple methodologies for developing a customer-oriented model of total quality management in higher education," *Int. J. Educ. Manag.*, vol. 30, no. 3, pp. 326–353, 2016, doi: 10.1108/IJEM-09-2014-0126.
- [34] A. M. Karim, M. F. Saad, and M. Haque, "Development of a Prospective Web-Based Inventory System for Management of Lab Facilities," *J. Emerg. Trends Eng. Appl. Sci.*, vol. 2, no. 1, pp. 36–42, 2011.
- [35] T. Jeeradist, N. Thawesaengskulthai, and T. Sangsuwan, "Using TRIZ to enhance passengers' perceptions of an airline's image through service quality and safety," *J. Air Transp. Manag.*, vol. 53, pp. 131–139, 2016, doi: 10.1016/j.jairtraman.2016.02.011.
- [36] M. T. Ngambi and A. G. Nkemkiefu, "The impact of Total Quality Management on Firm's organizational performance," *Am. J. Manag.*, vol. 15, no. 4, pp. 69–85, 2015.
- [37] E. Sadikoglu and H. Olcay, "The Effects of Total Quality Management Practices on Performance," *Lab. Manag. Inf. Syst. Curr. Requir. Futur. Perspect.*, vol. 2014, pp. 996–1027, 2014, doi: 10.1155/2014/537605.
- [38] A. AlQahtani, Norah; Abd. Aziz, "The impact of total quality management on organizational performance," *Eur. J. Bus. Manag.*, vol. 7, no. 36, pp. 119–127, 2015, doi: 10.1108/02656710610704230.
- [39] A. M. Mosadeghrad, "Developing a Total Quality Management model for health care systems Article information :," *TQM Journalv*, vol. 27, no. 5, pp. 544–564, 2018.
- [40] I. Hasan, K. C. P. Low, I. Hasan, and M. M. Hossain, "Total Quality Management and Job Satisfaction among the Bank Employees," *Int. J. Learn. Intellect. Cap.*, vol. 1, no. 1, p. 1, 2017, doi: 10.1504/ijlic.2017.10006900.
- [41] A. C. Fernandes, P. Sampaio, M. Sameiro, and H. Q. Truong, "Supply chain management and quality management integration: A conceptual model proposal," *Int. J. Qual. Reliab. Manag.*, vol. 34, no. 1, pp. 53–67, 2017, doi: 10.1108/IJQRM-03-2015-0041.
- [42] B. Obeidat, L. Hashem, and R. Masa'deh, "The Influence of Knowledge Management Uses on Total Quality Management Practices in Commercial Banks of Jordan," *Mod. Appl. Sci.*, vol. 12, no. 11, p. 1, 2018, doi: 10.5539/mas.v12n11p1.
- [43] A. Madar, "Implementation of total quality management Case study: British Airways," *Bull. Transilv. Univ. Braşov Ser. V Econ. Sci.*, vol. 8, no. 57, pp. 125–132, 2015, [Online]. Available: http://webbut.unitbv.ro/Bulletin/Series V/BULETIN I PDF/16_Madar_A.pdf.
- [44] C. Valmohammadi, "The impact of TQM implementation on the organizational performance of Iranian manufacturing SMEs," *TQM J.*, vol. 23, no. 5, pp. 496–509, 2011, doi: 10.1108/17542731111157608.
- [45] M. Aldaweesh, W. Al-Karaghoul, and D. Gallea, "The effective implementation of total quality management and leadership in Saudi Universities: A Review and framework to enhancing HE strategy," *Eur. Mediterr. Middle East. Conf. Inf. Syst.*, vol. 2013, pp. 1–13, 2013.
- [46] H. Banna, R. Ahmad, and E. H. Y. Koh, "How does total quality management influence the loan quality of the bank?," *Total Qual. Manag. Bus. Excell.*, vol. 29, no. 3–4, pp. 287–300, 2018, doi: 10.1080/14783363.2016.1180954.
- [47] N. Sumathi, R. Muralitharan, and K. Venkatramana, "Total Quality Management in Airline Industry," *Int. J. Latest Technol. Eng. Manag. Appl. Sci.*, vol. VII, no. IV, pp. 153–156, 2018.
- [48] A. K. Singh, "Competitive service quality benchmarking in airline industry using AHP," *Benchmarking An Int. J.*, vol. 23, no. 4, pp. 768–791, 2016, doi: 10.1108/BIJ-05-2013-0061.
- [49] B. Aquilani, C. Silvestri, and A. Ruggieri, "Sustainability, TQM and value co-creation processes: The role of critical success factors," *Sustain.*, vol. 8, no. 10, 2016, doi: 10.3390/su8100995.
- [50] S. Pradhan, "Total Quality Management in Service Sector: Case Study of Academic Libraries," *J. Bus. Manag. Sci.*, vol. 2, no. 3A, pp. 29–32, 2014, doi: 10.12691/jbms-2-3a-4.
- [51] J. Iqbal, M. S. SHABBIR, H. Zameer, M. S. Tufail, M. Ahmad, and W. Ali, "TQM practices and firm performance of Pakistani service sector firms," *Paradigms*, vol. 11, no. 1, pp. 87–96, 2017, doi: 10.24312/paradigms110114.
- [52] R. A. Saleh, R. J. Sweis, F. I. M. Saleh, A. M. Sarea, I. M. S. Eldin, and D. N. Obeid, "Linking soft and hard total quality management practices: evidence from Jordan," *Int. J. Bus. Excell.*, vol. 14, no. 1, p. 49, 2017, doi: 10.1504/ijbex.2018.088315.
- [53] Z. J. Yong, M. J. K. Bashir, C. A. Ng, S. Sethupathi, J. W. Lim, and P. L. Show, "Sustainable waste-to-energy development in Malaysia: Appraisal of environmental, financial, and public issues related with energy recovery

- from municipal solid waste,” *Processes*, vol. 7, no. 10, pp. 1–29, 2019, doi: 10.3390/pr7100676.
- [54] S. Khanam, J. Siddiqui, and F. Talib, “Role of Information Technology in Total Quality Management,” vol. 2, no. 8, pp. 2433–2445, 2013.
- [55] A. K. Singh and Sushil, “Modeling enablers of TQM to improve airline performance,” *Int. J. Product. Perform. Manag.*, vol. 62, no. 3, pp. 250–275, 2013, doi: 10.1108/17410401311309177.
- [56] M. W. Raja, M. A. Bodla, and S. A. Malik, “Evaluating the Effect of Total Quality Management Practices on Business Performance : A Study of Manufacturing Firms of Pakistan,” *Int. J. Bus. Soc. Sci.*, vol. 2, no. 9, pp. 110–117, 2011.
- [57] V. Singh, A. Kumar, and T. Singh, “Impact of TQM on organisational performance: The case of Indian manufacturing and service industry,” *Oper. Res. Perspect.*, vol. 5, no. August 2017, pp. 199–217, 2018, doi: 10.1016/j.orp.2018.07.004.
- [58] R. Saravanan and K. S. P. Rao, “The impact of total quality service age on quality and operational performance: An empirical study,” *TQM Mag.*, vol. 19, no. 3, pp. 197–205, 2007, doi: 10.1108/09544780710745621.
- [59] E. Sadikoglu and C. Zehir, “Investigating the effects of innovation and employee performance on the relationship between total quality management practices and firm performance: An empirical study of Turkish firms,” *Int. J. Prod. Econ.*, vol. 127, no. 1, pp. 13–26, 2010, doi: 10.1016/j.ijpe.2010.02.013.
- [60] A. P. Anil and K. P. Satish, “Enhancing customer satisfaction through total quality management practices—an empirical examination,” *Total Qual. Manag. Bus. Excell.*, vol. 30, no. 13–14, pp. 1528–1548, 2019, doi: 10.1080/14783363.2017.1378572.
- [61] M. Mar Fuentes-Fuentes, C. A. Albacete-Sáez, and F. J. Lloréns-Montes, “The impact of environmental characteristics on TQM principles and organizational performance,” *Omega*, vol. 32, no. 6, pp. 425–442, 2004, doi: 10.1016/j.omega.2004.02.005.
- [62] D. Schniederjans and M. Schniederjans, “Quality management and innovation: new insights on a structural contingency framework,” *Int. J. Qual. Innov.*, vol. 1, no. 1, pp. 1–20, 2015, doi: 10.1186/s40887-015-0004-8.
- [63] T. L. H. Nguyen and K. Nagase, “The influence of total quality management on customer satisfaction,” *Int. J. Healthc. Manag.*, vol. 12, no. 4, pp. 277–285, 2019, doi: 10.1080/20479700.2019.1647378.
- [64] A. Chiarini and E. Vagnoni, “TQM implementation for the healthcare sector: The relevance of leadership and possible causes of lack of leadership,” *Leadersh. Heal. Serv.*, vol. 30, no. 3, pp. 210–216, 2017, doi: 10.1108/LHS-02-2017-0004.
- [65] V. Kumar and R. R. K. Sharma, “Leadership styles and their relationship with TQM focus for Indian firms: An empirical investigation,” *Int. J. Product. Perform. Manag.*, vol. 67, no. 6, pp. 1063–1088, 2018, doi: 10.1108/IJPPM-03-2017-0071.
- [66] F. A. A. Sawaeen and K. A. M. Ali, “The mediation effect of TQM practices on the relationship between entrepreneurial leadership and organizational performance of SMEs in Kuwait,” *Manag. Sci. Lett.*, vol. 10, no. 4, pp. 789–800, 2020, doi: 10.5267/j.msl.2019.10.018.
- [67] A. Daragmeh and J. Bárcki, “Assessing the Degree of Compliance with TQM Practices : Study of Banking Sector in Palestine,” *Hungarian Agric. Eng.*, vol. 7410, no. 39, pp. 5–10, 2021, doi: 10.17676/hae.2021.39.5.
- [68] B. A. Puthanveetil, S. Vijayan, A. Raj, and S. MP, “TQM implementation practices and performance outcome of Indian hospitals: exploratory findings,” *TQM J.*, 2020, doi: 10.1108/TQM-07-2020-0171.
- [69] R. Y. Y. Hung, B. Y. H. Lien, S. C. Fang, and G. N. McLean, “Knowledge as a facilitator for enhancing innovation performance through total quality management,” *Total Qual. Manag. Bus. Excell.*, vol. 21, no. 4, pp. 425–438, 2010, doi: 10.1080/14783361003606795.
- [70] A. Honarpour, A. Jusoh, and K. Md Nor, “Total quality management, knowledge management, and innovation: an empirical study in R&D units,” *Total Qual. Manag. Bus. Excell.*, vol. 3363, no. January, pp. 1–19, 2017, doi: 10.1080/14783363.2016.1238760.