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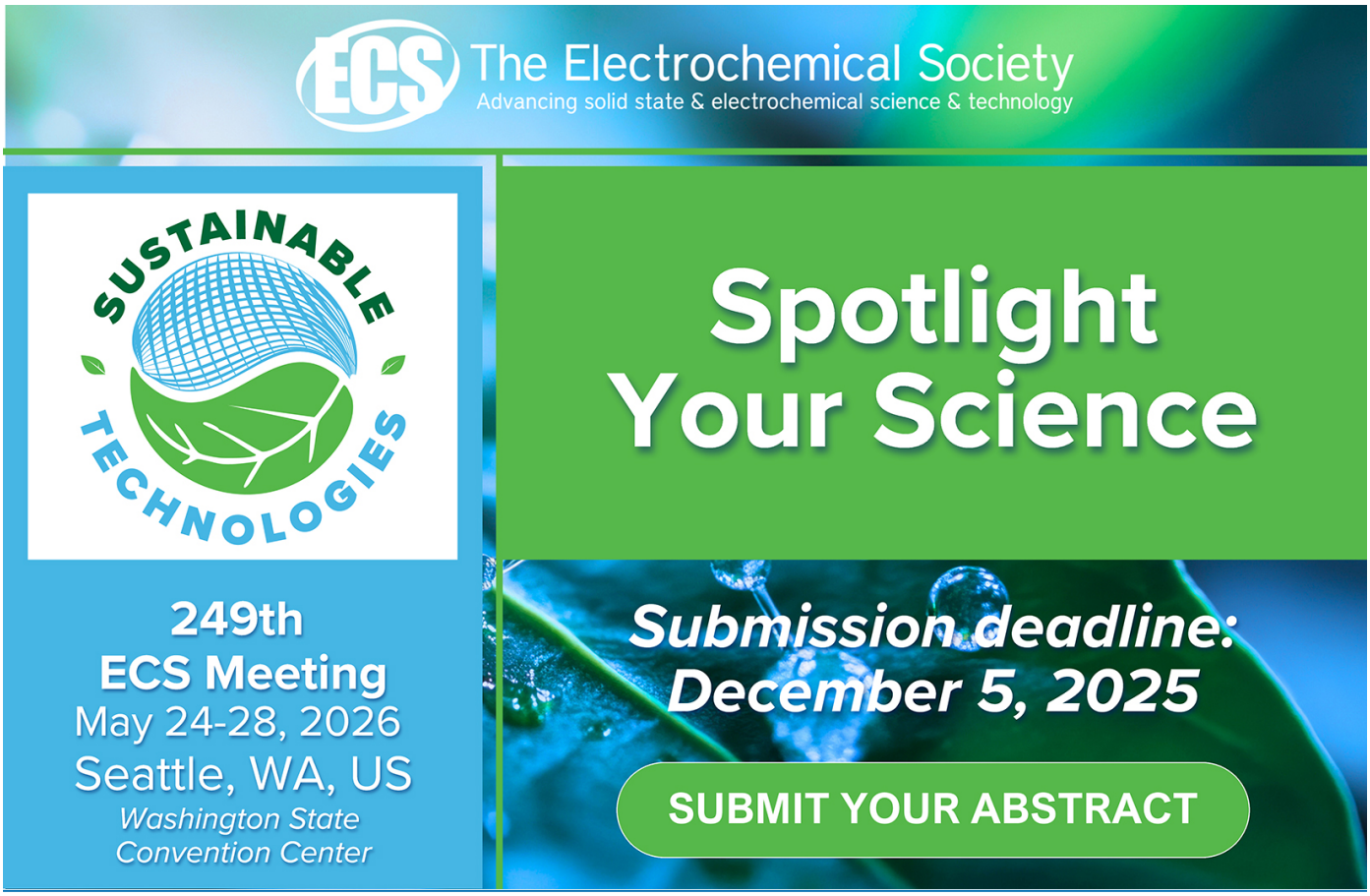

Proposing an integrated multi-criteria decision making approach to evaluate total quality management best practices in Malaysia hotel industry

K Y Sin[1], M S Jusoh[2] and A Mardani[3]

[1]Universiti Malaysia Sarawak, Faculty of Economics and Business, 94300 Sarawak, Malaysia.
[2]Universiti Malaysia Perlis, School of Business Innovation and Technopreneurship, 01000 Kangar, Malaysia.
[3]University of South Florida, College of Business Administration, Department of Marketing, Tampa, FL 33813, United States.

E-mail: kysin@unimas.my

Abstract. Although numerous studies have focused on significant role of total quality management (TQM) in literature, little attention has been paid to using the multi-criteria decision making (MCDM) approach for analysis of TQM practices especially in the context of hospitality. The purpose of this study is to identify, prioritize and evaluate the TQM best practices in hotel industry by integrating the DEMATEL and ANP approaches. DEMATEL is employed to determine the interrelationships among the main practices and sub-practices while ANP is employed to examine the weights of main practices and sub-practices. The results of this study indicated that employee management had the first rank among other practices whereas the second and third rank encompass customer relationship management and leadership respectively. The findings of this study has shown guidance to practitioners to implement proper TQM in their organizations, effectively by using the suggested set of identified TQM best practices.

1. Introduction

Total Quality Management (TQM) plays a vital role not only focuses on improving service quality and reducing management costs but also has a goal of providing exceptional merits to customers by constantly ameliorating process efficiency [1]. Furthermore, TQM allows hotels to achieve an increased level of differentiation from its competitors, customer satisfaction, brand recognition, and cost savings associated with waste reduction [2]. As such, the question of how the execution of TQM practices would have an impact on hotel performance is of great significance or value not only to academic researchers but also policymakers and practitioners. Nevertheless, empirical investigation of TQM practices in various industries has become saturated [3]. It is arguably that there is inconsistency in the literature regarding certain TQM practices that yield exceptional outcomes. For instance, quality performance [4,5]; innovation performance [6, 7]; and customer satisfaction [8-10]. Moreover, TQM has been evolving in the hotel sector to meet the requirement outside of the organisational boundaries and constitution, to achieve development in production and sales with an advanced level of contentment among customers and other correlative stakeholders [11].

On the other hand, selection of an appropriate TQM best practices for each hotel is a very complex task due to difficulties pertaining to data collection, diversity of practices and their features, and the large number of subjectivity concerning practices that need to be taken into

account [12]. Decision makers must decide on the most appropriate TQM practices for their hotels, among a set of possible practices such as leadership, employee management, process management, customer relationship management, product and service design, etc. Some of these practices cannot be expressed in fiscal terms and thus, it is rather difficult to quantify them [13]. Therefore, TQM best practices selection is scrutinised as an intricate multiple-criteria decision making (MCDM) problem [14]. In a complex system, all practices are directly or indirectly related to each other [15]. Hence, it is very difficult for a decision maker to analyse them separately [16]. Regarding this matter, it is essential for decision makers to separate practices into a cause and effect group to better understand causal relationships, which are also known as interdependency relationships [17]. This study proposed the MCDM measurement approach for evaluating the effectiveness of selecting TQM, which assists decision makers by providing a clear vision to identify the best practices and create their interdependences in multi-attribute decision analysis.

As such, an essential focus of this research was to explore how effective and useful the MCDM approach is in the evaluation and selection of a proper TQM best practices within the context of the Malaysian hotel industry, using Decision-Making Trial and Evaluation Laboratory (DEMATEL) and Analytic Network Process (ANP). The DEMATEL method was introduced to adjust the evaluation items' importance and consider the impact of its causal relationship, as well as to puzzle out the intricate and strenuous practical causation matter [18]. Meanwhile, the ANP model was employed to compute the importance of the evaluation criteria as well as to prioritise the groupings involved in project selection and scheduling problems [19]. The integration of DEMATEL and ANP methods produced more normal and proportionate weight values, compared to traditional methods that ignore the existence of interrelations among TQM practices [13].

2. Review on TQM Practices

TQM is an important philosophy utilised by both manufacturing and service organisations to enhance their business performance, and it is a contemporary management philanthropy and a sequentially management approach that addresses the competitive and technical challenges faced by global service and manufacturing organisations [20]. In order to develop a generalised framework of TQM practices, the literature was systematically reviewed. Thus, in order to select articles on TQM, the following online journal databases were searched: EBSCO Business Source Complete, Emerald Management Extra, Elsevier's Science Direct, ProQuest ABI/Inform Complete, Scopus, and Taylor & Francis. Various sets of practices have been provided and deemed as essential practices for the success of TQM, however, TQM practices are not universally valid for every organisational context and situation, implying it is difficult to reach a conclusion regarding which TQM practices should be adopted by an organisation with specific characteristics or belonging to a particular business sector [21,22]. In this study, ten most highly cited TQM practices, based on renowned TQM literature, will be adopted for this study's TQM model development. As a result, ten TQM practices encompass leadership, strategic planning, supplier's quality management, process management, product and service design, employee management, customer relationship management, information and analysis, hard TQM as well as tools and technique were selected and used in this study due to several reasons. Firstly, these practices had been appraised as core practices in the literature [23] and they tackle the principal fields of quality management [24]. Secondly, these practices include the distinct perspectives of quality 'masters', for instance, Deming and Juran [24]. Lastly, they amalgamate the most renowned and prominent quality award standards which are diffusely acknowledged by TQM academicians and adopted extensively in the local and international arenas [25].

3. Research Methodology

There were 10 main practices for the problem under investigation, namely, Leadership (C1), Strategic Planning (C2), Supplier's Quality Management (C3), Process Management (C4), Product and Service Design (C5), Employee Management (C6), Customer Relationship Management (C7), Information and Analysis (C8), Hard TQM (C9), and Tools and Technique (C10). In addition, the sub-practices were: Top Management Commitment, Top Management Support, Top Management Involvement,

Quality System, Quality Culture, Supplier Involvement, Supplier Focus, Supplier Quality, Continuous Improvement Process, Resource Management, Product/Service Design, Product/Process Design, Training and Education, Teamwork, Communication, Employee Empowerment, Employee Commitment, Customer Focus, Customer Satisfaction, Customer Feedback, Information Management, Performance Measurement System, Quality Data and Reporting, Quality Control, Quality Improvement, Quality Assurance, Advanced Quality Planning, Quality Function Deployment, Just in Time, and Benchmarking. To determine the relative importance of these factors, all the respondents were required to fill up the DEMATEL and ANP questionnaire. DEMATEL was used to model the cause and effect relationships and clarify interactions in the decision model. On the other hand, ANP was used to find the relative weight of each factor in the decision model. The integration of DEMATEL-ANP (DANP) as a Multi-Criteria Decision Making (MCDM) technique was used to achieve objectives of this research which is to determine the interdependency relationships and rankings among TQM practices.

The selection of the participants was restrained to experts or senior management core who were knowledgeable regarding the quality management initiatives being implemented in their respective companies (for instance managing directors, quality executives, quality control managers or quality operations manager) in order to advocate the reliability and validity of the data acquired [26]. Experts or senior management core that were either hotel quality executives or hotel operations managers at 4- and 5-star hotels selected from Malaysian Association of Hotel (MAH) directory were invited to participate in the study. The MAH directory was selected as the hotel data source as it provides contemporary and comprehensive information on all hotels in Malaysia, primarily information on hotel category, star-rating, site, and contact address. Experts or senior management core currently or had once been responsible for the hotel's overall quality management programmes were selected to ensure that they could provide detailed information regarding their experiences and involvement in implementing quality programmes. A final sample of 10 participants were purposively selected as they had the largest possibility of engaging in similar TQM practices and be familiar with and take responsibility for the hotel's TQM implementation. The research methodology DEMATEL-ANP (DANP) for this paper is schematically presented in Figure 1.

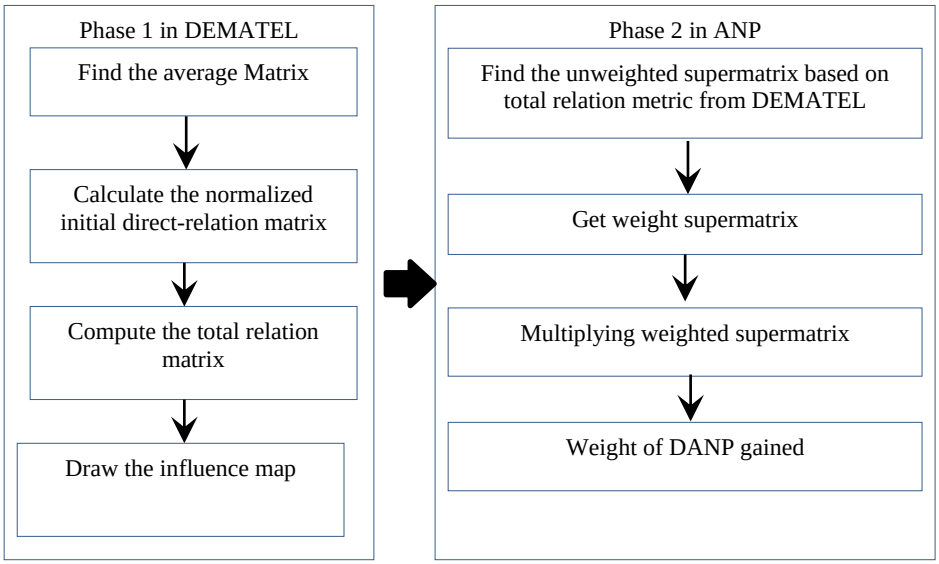

Figure 1. The Methodology for DANP

4. Results

In the context of MCDM, DEMATEL has been one of the powerful technique that enable modeling cause and effect relationships. It has been widely used for complex decision making problems [27-29]. By the use of this MCDM technique, it is possible to divide multiple-criteria into a cause-and-effect

group. In addition, in this technique it is possible to plot the network relationship map to better understand the causal relationships.

Accordingly, r_i (sum of each row i) and c_j (sum of each column j) summarise both direct and indirect effects given by practices i and j to the other practices. The sum ($r_i + c_j$) indicates the total effects received and given by the practice i. In addition, the degree of importance which the practice i plays in the system is indicated by ($r_i + c_j$). On the contrary, ($r_i - c_j$) indicates the net effect which the practice i has provided in the system. In addition, the negative value for ($r_i - c_j$) indicates that the practice is net receiver and the positive value for ($r_i - c_j$) indicates the practice is net cause. The results are presented in Table 1.

Pertaining to the results, Leadership (C1) has the highest impact and the Tools and Technique (C10) has the least impact in the system. In addition, Product and Service Design (C5) is more influenced by the other practices, and Tools and Technique (C10) receives the least impacts from the other practices. The results also indicate that Strategic Planning, Supplier's Quality Management, Product and Service Design, Customer Relationship Management, Information and Analysis, Hard TQM, as well as Tools and Technique are net receivers based on (r-c) values. In addition, Leadership, Process Management, and Employee Management are net causes in the system. Furthermore, from the results we can say that Employee Management is the most important factor based on (r + c) values. Accordingly, from these results we can provide the digraph of causal relations among ten practices.

Table 1. Influences Given and Received among the Ten Practices

	r	c	r+c	r-c
C1	1.715	0.429	2.144	1.286
C2	0.670	0.900	1.570	-0.230
C3	0.241	0.488	0.729	-0.246
C4	0.853	0.738	1.591	0.114
C5	0.415	1.155	1.570	-0.740
C6	1.516	1.126	2.642	0.390
C7	0.814	1.150	1.964	-0.336
C8	0.319	0.562	0.881	-0.243
C9	0.382	0.353	0.736	-0.029
C10	0.211	0.235	0.446	-0.023

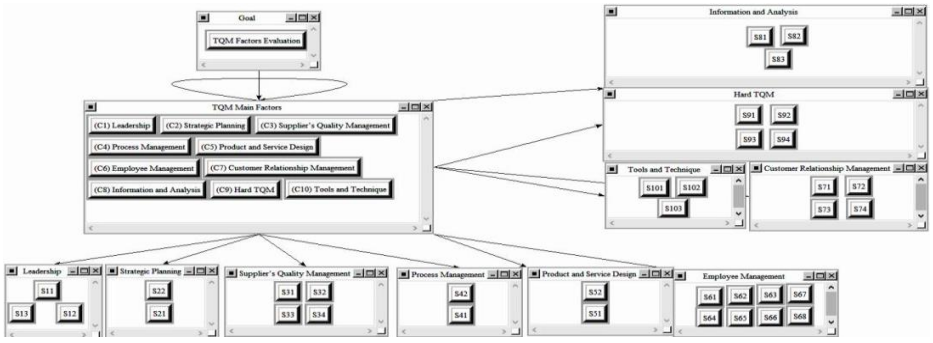

Figure 2. TQM Model Implemented in Super Decision Software

In phase two of this paper using ANP questionnaire, ten participants have completed the pairwise comparison matrices for the main practice and sub-practice of the decision making problem. All comparison matrices were evaluated by Super Decisions software [30] as indicated in Figure 2 for

their composite reliability (CR). The results of CR values of all matrices are presented in the results of the comparison matrices. It can be found that for all comparison matrices, the CR values are acceptable (CR<0.1).

This paper has ten main practices for which the average paired comparisons is presented in Table 2. The results of this pairwise comparison show that, without considering the internal relationships, the Employee Management (C6) with a weight of 0.265 is the most important practice of the model. The Customer Relationship Management (C7) with a weight of 0.230 and the Leadership (C1) with a weight of 0.227 are respectively in the second and third ranks. The CR value of this matrix is 0.058<0.1, which is deemed acceptable.

Table 2. The Pairwise Comparison Matrix of TQM Main Practices

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	Weight
C1	1.000	5.848	7.739	7.368	4.656	0.693	1.130	7.509	8.091	8.198	0.227
C2	0.171	1.000	5.237	1.839	0.794	0.136	0.164	3.490	6.371	6.336	0.072
C3	0.129	0.191	1.000	0.390	0.215	0.124	0.137	0.810	2.364	2.879	0.026
C4	0.136	0.544	2.564	1.000	0.466	0.121	0.146	2.145	4.013	4.125	0.044
C5	0.215	1.259	4.651	2.146	1.000	0.166	0.216	3.651	5.172	4.982	0.074
C6	1.443	7.353	8.065	8.264	6.024	1.000	1.000	7.496	7.855	8.526	0.265
C7	0.885	6.098	7.299	6.849	4.630	1.000	1.000	7.972	8.183	8.415	0.230
C8	0.133	0.287	1.235	0.466	0.274	0.133	0.125	1.000	2.395	3.659	0.029
C9	0.124	0.157	0.423	0.249	0.193	0.127	0.122	0.418	1.000	1.714	0.018
C10	0.122	0.158	0.347	0.242	0.201	0.117	0.119	0.273	0.583	1.000	0.015

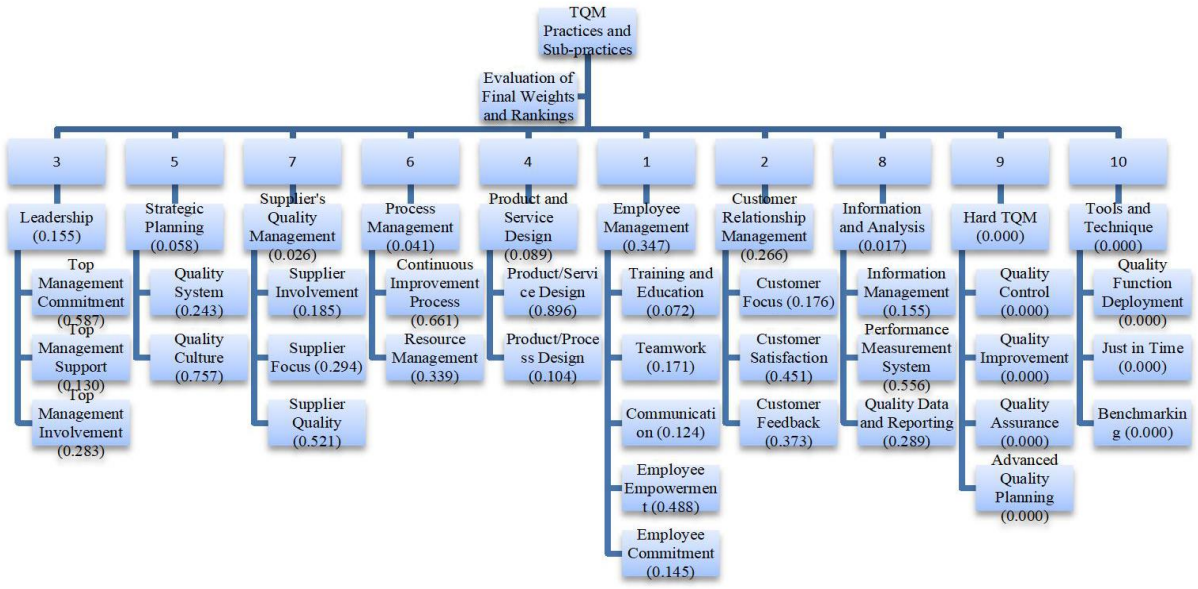

Figure 3. The Evaluation of Final Weights and Rankings for TQM Practices and Sub-practices

After performing the pairwise compressions for the practices and sub-practices, the pairwise compressions were conducted in the Super Decision software for the interdependencies among the practices discovered by the DEMATEL techniques. The evaluation of final weights and rankings for the TQM practices and sub-practices of the model are presented in Figure 3.

5. Discussion

According to Figure 3, Employee Management with a weight of 0.347 was ranked first, Customer Relationship Management with a weight of 0.266 was the second important factor, Leadership with a weight of 0.155 was the in the third rank, Product and Service Design with a weight of 0.089 was in fourth rank, Strategic Planning with Weight 0.058 was in fifth rank, Process Management with a weight of 0.041 was in sixth rank, Supplier's Quality Management with a weight of 0.026 was in Seventh rank, Information and Analysis with a weight of 0.017 was in eighth rank.

Meanwhile, Top Management Commitment with a local weight of 0.587 is the most important sub-practice in the Leadership dimension while Quality Culture with a local weight of 0.757 is the most important sub-practice in the Strategic Planning dimension. Furthermore, the result for local weights shows that Supplier Quality with a local weight of 0.521 is the most important sub-practice in the Supplier's Quality Management dimension whereas Continuous Improvement Process with a local weight of 0.661 is the most important sub-practice in the Process Management dimension. Besides that, Product/Service Design with a local weight of 0.896 is the most important sub-practice in the Product and Service Design dimension while Employee Empowerment with a local weight of 0.488 is the most important sub-practice in the Employee Management dimension. Moreover, Customer Satisfaction with a local weight of 0.451 is the most important sub-practice in the Customer Relationship Management dimension whereas Performance Measurement System with a local weight of 0.556 is the most important sub-practice in the Information and Analysis dimension.

Nonetheless, the result surprisingly indicates that the weight of Hard TQM as well as Tool and Technique are zero because they have no connection (as reported by DEMATEL technique) with the other practices and only influenced by the other practices), which indicates their very low significance compared to the other practices. Thereupon, this result also interprets that leadership, strategic planning, supplier's quality management, process management, product and service design, employee management, customer relationship management as well as information and analysis have high significance compared to Hard TQM as well as Tool and Technique, which is suitably to be entitled TQM best practices within hotel settings.

This result indicated that the participants predominantly agreed that employee management and customer relationship management are two prime factors that must be emphasised within the hotel industry. Since the hotel industry is always in constant contact with people and thus requires advanced communication skills, especially among employees, the employees' qualities pertaining to knowledge, skills, and thoughts lead to a hotel's survival and development. Apart from that, hotel employees, from front desk staff, laundry room attendants, vendors, and porters to the upper echelons of the management, serve a certain role in the continual and perpetual operation of a hotel. A breakdown in function of any areas disrupts the flow of operations and causes a ripple effect that inhibits the organisation's ability to optimise its business. This discovery is synchronised with existing literature that employee management has been extremely important in the hotel business and is an essential management tool as it has many benefits. Among the benefits are providing a harmonious atmosphere, increasing work effectiveness, helping employees and the company itself to compete in the fast-changing environment, reducing damages and wastage, forming accurate work specification, and instilling passion of work between employees and the management team within the process [31].

Additionally, this finding agrees with prior literature in which customer relationship management is regarded as one of the best strategies and practices for hotel development performance by ensuring their long-term business plan is the survival of the hotel industry [32]. In the same vein, to achieve customer satisfaction and profitability, nowadays, hotels ought to emphasise on complying a customer relationship management strategy that seeks to find, gather, and keep the right data, share it throughout the hotel, and then use it at all organisational levels to enhance personalisation and uniqueness of customer experience [33,34]. Suffice to say, the hotel industry, like any business

sectors, must be highly competitive to be able to do well in the business environment; therefore, it is vital for hotels to keep track of behavioural patterns of continuous re-purchase and to retain customers longer [31].

Subsequently, as indicated by the results, leadership was in third place, behind employee management and customer relationship management. This finding might be due to the concern that staffs who appeared to be operating effectually as a team, relied more on team effort rather than individual effort within the hotel context. Moreover, compared to leadership, teams can coordinate their activities and interdependent delivery, effectually communicating the work and obstacles, and together solving problems and making decisions that support the goals of the organization.

6. Conclusion

The integrated Multi-Criteria Decision Making (MCDM) approach using DEMATEL and ANP in this paper will be valuable and applicable to tackling the issues associated with the evaluation process of selecting TQM best practices within hotel industry. The research findings will assist the policy makers (Ministry of Tourism) to formulate policies that require all hotels to undergo auditing quality process using the integrated MCDM model. As well, this study will provide useful findings for the betterment of quality practices in the Malaysian hospitality industry as the development of this MCDM model helps different hospitality industries especially towards hotels firms' managers in identifying the key elements and factors that need to be thoroughly considered and managed in order to achieve success. Following with that, the information on quality management practices will provide quality management best practices for use as benchmarks by other practitioners especially towards hoteliers. Likewise, quality management representatives within Malaysia hotel industries can also beneficial from the results of this study by enhancing their approaches to mitigate the TQM adoption issues described in this study, for example emphasising the credibility of several TQM practices such as leadership, strategic planning, supplier's quality management, process management, product and service design, employee management, customer relationship management, and information and analysis, as well as overall reliability of the TQM system, in order to safeguard and uphold the sustainability constitution.

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