THE EFFECT OF TOTAL QUALITY MANAGEMENT AND ENVIRONMENTAL REGULATION AND POLICY ON SUSTAINABLE PERFORMANCE IN THE MALAYSIAN FOOD AND BEVERAGE COMPANIES

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Abstract - These There has been inconsistent findings in the literature concerning the relationships between TQM and sustainable performance. Hence, this has prompted further investigation on the effect of other variables that may better explain the nature of these links. The main purpose of this study is to investigate the moderating effect of environmental regulation and policy (ERP) on the relationship between total quality management (TQM) and sustainable performance. Management Leadership, Benchmarking, Continuous Improvement Process, Human Resources Management, Service Design and Quality, Quality assurance and Information and Analysis as TQM elements considered in this study are to be moderated with their respective relationships with sustainable performance. Questionnaires were distributed to 250 Malaysian food and beverages companies while PLS-SEM was used as analysis technique. This study is exclusively based on the soft elements of TQM.

Index Terms - Environmental Regulation and Policy, Food and Beverage, Sustainable Performance, Total Quality Management

I. INTRODUCTION

In the changing environment of today's business, it is required for any organization to examine its internal and external environment for challenges and opportunity in order to sustain their growth and remain competitive [1]. In order for an organization to survive and grow in such environment, seeking sustainability by leading the innovation has to be a priority. Notably, organizations in both public and private sectors are striving to achieve competitive advantage over other competitors and sustain their performance. However, to enhance the performance and how to implement different strategies are the issues that need to be investigated further. The goals and core businesses of every public and private sectors determines their performance. While the public sector intends to achieve customer satisfaction, good performance and quality, the private sector desires to achieve profit by satisfying their customers. So, the need for a comprehensive study that will capture the relationship between TQM elements like: management leadership, benchmarking, quality assurance, continuous process improvement, human resources management, service design and quality and information and analysis with sustainable performance and environmental regulation and policy become necessary. The quest for more research on the relationship between TQM and sustainable performance for provision with an extensive review of the existing system of factory's quality such as implementation of standards, management, present manufacturing procedures and procurement in conjunction with economic, social and environmental development in Agro-allied industry are issues that provoked the essence of this study.

II. LITERATURE REVIEW

A. Sustainable Performance

Business sustainable performance happens when affirm or company build continuous value for its shareholders and stakeholders while keeping up with environmental requirement [2]. There are few essential aspects of firm's sustainable value which are; doing well for the environment and society, and more importantly by keeping the customer and shareholders happy. According to Dunphy [3], "sustainable consists of actions that extend socially useful life of the organization, enhance the ability to maintain and renew viability of the biosphere and protect all living species, enhance ability of society to maintain itself and to solve its major problem and to maintain a decent of welfare, participation and personal freedom for present and future generations of humanity".

Chen et al. [4] pointed out three criteria of sustainable performance; economic sustainable performance, environmental sustainable performance, and social sustainable performance. In 2001, the European Commission published a sustainable development strategy by emphasizing the importance of social cohesion, environmental protection, and economic growth to go hand in hand [5]. Guan, Cheng, and Ye [6] addressed sustainable supply chain management as "a modern management pattern emphasizing on the integration of the economy, environment, and society through all the processes including procurement, producing, packaging, transportation, storage, consumption and disposal of the end-life product, supported by supply chain management technology, and its final goal is to achieve the sustainable development of economy, environment and society".

The proposed framework applied in this study to assess the sustainable performances is divided into three dimensions as proposed by Brent and Labuschagne [2]. The dimensions are: environmental sustainability, economic sustainability and social sustainability. Thus, in order to embrace the whole concept of sustainability, these three dimensions are critical to paddle a business successfully for now and the nearest future [7].

B. Total Quality Management (TQM)

Notably, many studies have been conducted to measure TQM and sustainable performance [8-17]. Abu-Hamatteh et al. [18] explained that for TQM to be achieved at enhancing the competitiveness and performance excellence in SMEs, businesses and manufacturing companies, five areas of TQM which are leadership, strategic planning, process management, resources management and results must be focused. The concept of TQM has been adopted since 1980 together with a strategic approach to quality with the aim of focusing on all the resources in achieving sustainability [10]. Therefore, TQM is believed to be a major innovation in the field of management from the last decades [19].

Ahire and Dreyfus [20] stated that process and design management are two important elements of TQM that are distinctively different in terms of improvement targets and technic visibility. Allen and Kilmann [21], reported that the evolution and rise of TQM led to a big change in the last two decades with the way companies were being managed but was recognized with terms like TQM, total quality, process improvement and continuous improvement. Meanwhile, Catalin et al. [12] stated that the first action to be taken during TQM implementation is identification of the level of quality provided by the organization through its services and products. The study listed training, planning, evaluation and implementation as the stages in TQM evaluation.

Historically, TQM can be traced back from 1920s when the theory of statistics was first applied to management of product quality. In Japan, it was later developed by Juran, Feigenbaum and Deming by widening the focus from product quality to quality of all issues within an organization [22]. Rungtusanatham, Ogden, and Wu [23], examined the advancing theory development of TQM from 'Deming management method' perspective. The study explained the Deming management method as related to scientific research and the scientific contribution of the research to TQM theory development by highlighting two research paradigms related to the Deming management method namely: the Deming-based theory of TQM and the concept of profound knowledge.

In all these views of scholars about TQM approaches, it was evidently established that TQM practices required team work, quality planning, quality training, continuous improvement process, management commitment, focus on customers, benchmarking, quality assurance , focus on processes and prevention. Some of all these elements are equally regarded as the core of TQM elements in this study.

C. Environmental Regulation and Policy (ERP)

Environmental quality is measured by the level in which ERP is being properly followed. It is an attribute of the regulatory socio-natural relationship, the functional significance of which depends in the ability to reflect the maximum processes of environmental safety [24]. The high demand for compelling environmental policy on production processes and product end-of-life is supported by customer concerns for protection of environment [25]. Hak, Moldan and Dahl [26] examined the environmental sustainability index based on environmental issues. The study showed that no environmental law and conservation has been extensively discussed in term of environmental pollution. The study proved that environmental accountability, transparency and information and adequate capacity for credible policies and enforcement would promote a better environmental activity performance performed by various institutions internationally.

Leshinsky [27] stated that the use of agreement plan to support environmental and sustainable preservation through a contextual framework that will draw collaborative planning theory and practice for agreement plan together can be employed as an instrument to generally conserve environmental principles and values. The study explored a case study of municipality of Casey located in the state of Victoria and measures are introduced through agreement plans between the estate developers and the municipality in order to preserve the flora, fauna and green values located in the surroundings of the Royal Botanical Gardens in Cranbourne. The finding revealed that agreement plan might have established excellent practice and procedure to preserve the environment of the botanic gardens but the efficiency of the agreement plan as a tool for environmental preservation has limits like deficiency in resources for effective enforcement and distribution of information.

In conclusion, this section affirms the fact as referred by the literatures that Environmental Regulation and Policy are set in place by Malaysian government to preserve the natural environment from any form of pollution.

III. METHODOLOGY

This study employed quantitative approach as its survey research. The questionnaire is suitably appropriate as a gathering instrument. Also, in this study, all the variables to be investigated are continuous variables. They are: human resources management, service design, information and analysis, continuous process improvement, benchmarking, management leadership and quality assurance, with different sub-variables for each of

them. The remaining variables are sustainable performance being the dependent variable, and Environmental Regulation and Policy as the moderating variable [28]. The data was collected from the company employees who are top managers of the food and beverage companies as sampled by this study in regards to attending issues discussed in the study background. This survey was also done offline, individually administered to the companies' respondents through Post Mail. The items designed are as questions to be asked under each of the constructs studied by this study. This was administered to the company employees that are of managerial positions [29].

IV. RESULTS AND DISCUSSION

The data was collected using survey questionnaire over the period of six months from October 2017 to March 2018. The data sample collected includes 95 participants from different departments who represent each company to complete the questionnaire. The overall response rate from the respondent was 38%. This response is considered acceptable for this study as it is above 30% acceptable level considering the post mail method that is used to distribute and collect the questionnaire.

A. Reliability and Validity

The reliability analysis was conducted in order to measure the consistency of items of the constructs. From the common four methods that are used to measure the reliability of constructs namely: split-half method, test-retest methods, alternative form methods and Cronbach's alpha coefficient method which was employed by this study [30]. This method has been the dominant method of testing reliability as it overcomes the weakness of other methods. According to Nunnully and Beinetein [31], the minimum standard for Cronbach's alpha is 0.7 for exploratory research. As presented in Table I, it can be noticed that the Cronbach's alpha coefficient for all constructs are at the acceptable level of consistency. Most of the tabulated values of the alpha coefficient above are the agreed level of alpha which is 0.70. Additionally, the minimum acceptable level of Cronbach's alpha is 0.60 for any construct to measure reliability [32]. Therefore, quality assurance is still acceptable as it is lower than 0.70 for this exploratory research.

Table I: Reliability Analysis

Constructs	No. of Original Items	Cronbach's Alpha
SP		
Economic performance	5	0.794
Social performance	5	0.881
Environmental performance	6	0.913
ERP	10	0.751
TQM		
Management Leadership	4	0.817
Benchmarking	3	0.911
Continuous process improvement	4	0.879
Human resources management	9	0.800
Service design	3	0.722
Quality assurance	10	0.645
Information and analysis	5	0.942

The measurement can indicate a good level of reliability and be a pre-requisite for measurement [30]. In this study, items that include the measurements were developed based on a comprehensive literature review.

B. Factor Analysis

To validate the instrument, a factor analysis on each construct has been tested separately similar to some method previously used. The applicability and appropriateness of the factor analysis is checked to extract the Kaiser-Mayrt-Olkin (KMO) and to measure the Bartlett's test of sphericity and adequacy sampling. The smaller the partial correlation between all variables' parts, the closer is the KMO near (1.0) and the more suitable the factor analysis will be. The study from the Table II showed that, the KMO ranged between 0.502 and 0.876 and therefore, the appropriateness of the factor analysis is confirmed. The factor loading of the items were tested and found that, most are more than 0.50 which are acceptable according to Hair et al. [32].

Table II: Factor Analysis and Reliability of the Instrument

Constructs	No. of Items	Factor Loading for Items in First Factor*	KMO	Eigen-Value	% of Variance	Cronbach's Alpha
SP						

Economic performance	5	0.754, 0.820, 0.754, 0.830, 0.812	0.745	1.810	60.327	0.794
Social performance	5	0.801, 0.804, 0.749, 0.795, 0.768	0.800	2.523	63.068	0.881
Environmental performance	6	0.811, 0.803, 0.649, 0.755, 0.968, 0.832	0.773	2.604	65.090	0.913
ERP	10	0.611, 0.707, 0.849, 0.695, 0.768, 0.895, 0.711, 0.783, 0.687, 0.765	0.775	2.573	61.735	0.781
TQM						
Management Leadership	4	0.911, 0.888, 0.686, 0.685	0.765	2.441	89.389	0.817
Benchmarking	3	0.907, 0.849, 0.765	0.739	2.636	81.376	0.911
Continuous Process Improvement	4	0.645, 0.707, 0.841, 0.765	0.675	3.276	65.897	0.879
Human Resources Management	9	0.607, 0.749, 0.865, 0.945, 0.737, 0.861, 0.775, 0.705, 0.741	0.811	2.847	82.339	0.800
Service design	3	0.775, 0.705, 0.741	0.868	2.940	71.169	0.722
Quality Assurance	10	0.611, 0.847, 0.747, 0.785, 0.768, 0.852, 0.633, 0.864, 0.789, 0.985	0.729	3.703	80.968	0.645
Information and Analysis	5	0.707, 0.719, 0.665, 0.845, 0.837	0.722	2.503	83.425	0.942

C. Descriptive Analysis

A descriptive analysis was conducted for the data in order to describe TQM, Environmental regulation and Policy (ERP) and sustainable performance (SP) from the respondents' perspective. Table III presents the mean, minimum and maximum of the constructs and the standard deviations. The results show the implementations level of each factor of TQM, OE and SP and reflected the perceived performance in the context of Food and beverage companies.

The Table III showed that service design had the maximum mean value among other TQM dimensions with the lowest standard deviation. These results clearly indicated that head section officers highly focused and emphasized on service design practice in accomplishing the desired sustainable performance. The lowest standard deviation value indicated that officers were not significantly different in their opinion about the importance of service design for sustainable performance.

The next high value of mean is continuous process improvement. The mean was 4.371 with standard deviation 0.750. The results revealed that officers

emphasized on continuous process improvement besides service design to achieve sustainable performance. Management Leadership's mean and standard deviation values were 4.321 and 0.901 respectively. The results also emphasized on the importance of management leadership beside TQM practices explained above. The importance of Information and Analysis also realized by respondents with mean value 4.224 and 0.873 for standard deviation. The significant of information and analysis was moderated by respondents. In other words, however the importance of information and analysis for any development in the organization, but it is not more than continuous process improvement, management leadership and service design.

Moreover, Table III revealed that benchmarking and Human resources management had mean values 4.201 and 3.871 respectively. In addition, their standard deviations were 1.102 and 1.385 respectively. Furthermore, quality assurance construct was reported to have the lowest mean as 3.589 with standard deviation 1.563. These results indicated the lack of quality assurance in those companies which led to poor practices in benchmarking and Human resources management. In other words, quality assurance is the most important asset to achieve other practices, therefore, food and beverage (F&B) companies should focus more on how they can increase the awareness of the importance of quality from their operations to the level of employees beside satisfy them to achieve the aimed sustainable performance.

Regarding ERP, the results in Table 3 indicated that the ERP has the highest mean values among the whole constructs. This revealed that the awareness of F&B's officers is important towards practicing regulations and policy when dealing with TQM to achieve sustainable performance. The ERP dimensions mean values and standard deviations were 4.940 and 0.420 respectively. The results showed that F&B's officers realized the importance of focusing on environmental policy.

On sustainable performance construct, the results in Table 3 showed the lowest mean values as 3.311, 3.189 and 3.429; however standard deviation showed lower results as 1.845, 1.940 and 1.742 respectively. Thus, it is normal that the self-assessment indicated high sustainable performance; this study showed that the respondents criticized the current performance in F&B companies which reflects the problem of the study. Also, the small values of standard deviation revealed the fact that this perception is almost agreed most among the managers of F&B companies.

Table III: Descriptive Statistics of the Constructs

Variable	Dimension	Min	Max	Mean	Std. Dev.
SP	Economic performance	1.00	5.00	3.311	1.845
	Social performance	1.00	5.00	3.189	1.940
	Environmental performance	1.00	5.00	3.429	1.742
ERP	OE	1.00	5.00	4.940	0.420
TQM	Management Leadership	1.00	5.00	4.321	0.901
	Benchmarking	1.00	5.00	4.201	1.102
	Continuous process improvement	1.00	5.00	4.371	0.750
	Human resources management	1.00	5.00	3.871	1.385
	Service design	1.00	5.00	4.870	0.621
	Quality assurance	1.00	5.00	3.589	1.563
	Information and analysis	1.00	5.00	4.224	0.873

N=95

D. Results of the Tested Hypotheses

For the purpose of concluding whether the path coefficients are statistically significant or not, bootstrapping techniques embedded in this study with Smart PLS 2.0. As reported in table IV, the T-Values with each path coefficient were generated using bootstrapping technique and P-Values subsequently were generated. The results showed that Total Quality Management (TQM) has significant effect on sustainable Performance (β= 0.230, t=2.813, p<0.01). Therefore, the hypothesis (H1) of the effect of TQM on sustainable Performance was supported. Similarly,

the dimensions of TQM have mixed results. The Management Leadership (β= 0.155, t=2.493, p<0.01), Benchmarking (β= 0.213, t=3.839, p<0.01), and service design (β= 0.158, t=1.835, p<0.01), have a positive significant effect on sustainable Performance. Thus, the hypotheses H1a, H1b, and H1e are supported. In addition, information and analysis has a negative significant effect on sustainable performance (β= -0.271, t=3.552, p<0.01). Thus, the hypothesis H1g is not supported. On the other hand, continuous process improvement (β= 0.063, t=0.743, p<0.1), human resources management (β= 0.051, t=0.643, p<0.1), and quality assurance (β= 0.038, t=0.410, p<0.1) have no effect on sustainable Performance. Therefore, their results do not support the hypotheses of the study postulated in H1c, H1d, and H1f respectively.

The effect of Total Quality (TQM) Management on ERP has been found to be positively significant (β= 0.344, t=3.211, p<0.01). Therefore, H2 has been supported as proposed. Furthermore, the relationship between ERP and sustainable Performance has been examined. The result (β= 0.667, t=9.422, p<0.01) showed that ERP has a positive significant effect on sustainable Performance. The result supports the postulated hypothesis H3.

Table IV: The Results of the Inner Structural Model

Hypothesis	Hypothesis	Path Coefficient (β)	Standard Error	T value (t)	P Value	Decision
H1	TQM -> performance	0.230***	0.078	2.813	0.003	Supported
H1a	Management Leadership -> performance	0.155***	0.063	2.493	0.006	Supported
H1b	Benchmarking-> performance	0.213***	0.055	3.829	0.000	Supported
H1c	Continuous process improvement-> performance	0.063	0.062	0.743	0.228	Not supported
H1d	Human resources management-> performance	0.051	0.086	0.643	0.261	Not supported
H1e	Service design-> performance	0.158**	0.093	1.835	0.035	Supported
H1f	Quality assurance-> performance	0.038	0.076	0.410	0.341	Not supported
H1g	Information and analysis-> performance	-0.271	0.054	3.552	0.000	Not supported
H2	TQM -> ERP	0.344***	0.109	3.211	0.001	Supported
H3	ERP -> performance	0.667***	0.064	9.422	0.000	Supported

***: p<0.1; **: p<0.05; ***: p<0.01**

Testing the Moderating Effect of Environmental Regulation and Policy

Based on the conceptual framework of this study, the moderating effect of ERP has been proposed between TQM and sustainable Performance on the other hand. The results in Table V showed that there is a full moderating effect of ERP in the relationship between TQM and Sustainable Performance at the 0.01 level of significant (β=0.224, t=3.624, p<0.01) according to the bootstrapping method. Therefore the result supports hypothesis of the study as postulated in H3. Furthermore, the Variance Accounted For (VAF) has been examined to confirm the previous results. According to Hair et al., [33] the VAF is proposed as follow: VAF > 20% = No Moderation; 20% > VAF > 80% = Partial Moderation; VAF < 80% = Full Moderation. The VAF for the H3 was 0.975 to be Full moderation.

Table V: Testing the Moderating Effect of Environmental Regulation and Policy

Hypothesis No.	Hypothesis	Path Coefficient	T Value	VAF	Bootstrapping Method	Baron & Kenny Method
H3	ERP as a moderator between TQM and sustainable Performance	0.224***	3.624	0.975	Moderating Effect	Full Moderator

CONCLUSION

From the above analysis, it could be noted that an effective and efficient TQM implementation would increase the satisfaction of employees and customers, produce good delivery system, reduce complaints among the customers and the society at large and increase the sustainability of the company. In addition, management leadership should be based on the capabilities of all employees in order to achieve the need of stakeholders and increase the satisfaction of the customers through process of continuous improvement. The result on service design shows that adequate preparation with good resources should be used to communicate with all employees in order to align with the needs and requirements of the customers. Though, the lack of reviewing service design before introduction and marketing reflects on

the satisfaction of the beneficiaries. The result of this study regarding human resources management revealed that food and beverage companies should focus more on how they can encourage their employees to achieve quality performance in terms of: employee empowerment and involvement on initiatives to solve the complaints of customers; team management; and provision of proper training.

Similarly, information and analysis practice must be introduced to the industry as advanced program to reduce the time of service. The results on continuous improvement process show that operations and activities of food and beverage companies are not given adequate improvement that can focus more on quality not just as short term goal but as well as long-term. Also, to achieve the best competitive advantage and sustenance, F&B companies should consider benchmarking by conducting researches to discover the best practices of local and international industries. The result also reflects the importance of the regulation and policy as a mechanism that can explain the effect of TQM practices to improve sustainable performance through the TQM elements. Lastly, the result reflects the awareness of F&B companies in following environmental regulations and policy in their daily work.

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