Relationship Between Total Quality Management (TQM) Practices and Safety of Halal Food Products

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Abstract. Safety of halal food products sold in the market is questionable if the products was not prepared in unhygienic practices. Previous study stated that total quality management (TQM) practices can influence safety of food. Therefore, this study seeks to study relationship between TQM practices and safety of halal food products. The TQM practices are rooted in the work of Malcom Baldrige National Quality Award (MBNQA). Meanwhile, safety refers to halal food is prepared in an accordance to good hygiene practices (GHP). In order to achieve objective of this study, food manufacturers from southern region of Malaysia were selected with 200 returned responses. Partial least square structural equation modelling (PLS - SEM) were used in this study to analyzed the data. Meanwhile for the statistical processing of the data, WARP PLS version 5.0 was used. The results showed that strategic planning, information management, top management, human resources are four dimensions that can assure safety of halal food products. Meanwhile, customer focus and process management were not significant to safety. Through the execution of TQM practices by SMEs halal food manufacturers, this study serves as a guideline to ensure halal food products is safe to consume by consumers.

Keywords: Total Quality Management (TQM), Safety of Halal Food, SMEs, Structural Equation Modelling Techniques (SEM)

1 Introduction

Shariah compliance of ingredients and safety of food are two components which encompass Halal food product [1]. Safety of food can be defined as food products is safe to consume by consumers because it is prepared in accordance to good hygiene practices (GHP) [2][3][4]. Failure of food handlers to adhere GHP guidelines can cause harm to the health of consumers [5][6][7][8].

There are several cases of food handlers which prepared their food in unhygienic practices such as Penang's city council has shut down popular Line Clear Nasi Kandar restaurant for two weeks after discovered pests on its premises. The council also found live and dead rats in the premises, along with cockroaches [9].

Furthermore, Yusoff [10] reported that 297 cafe of Secret Recipe was failed to implement GHP at their premises. According to JAKIM, Halal Hub Director, these premises were failed to follow the elements of hygiene and sanitation practices as stipulated in MS 1500:2009.

Hassan [11] also reported that halal certification for one of the factories which produced bread in Ipoh has been suspended by JAKIM. This is because the factory was found to be unhygienic. Meanwhile, Mohamed et al. [12] reported that one of the famous breads which was

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labeled with the JAKIM halal certification was suspended for stamping the JAKIM halal certification. This is because, premises that produced the bread which is located in Nilai, Negeri Sembilan was found to have failed to comply with the GHP standard as laid out by MS 1500:2004 standard.

In relation to the issues as discussed above, Din and Daud [13] urged halal food manufacturers to implement total quality management (TQM) practices if they want to produce Shariah compliance and safety of halal food product. Talib et al. [14] suggested that food manufacturers can constantly deliver safe and Shariah compliance of halal food by implementing TQM practices and Shariah elements. Furthermore, quality management system from the Islamic perspective or known as MS 1900:2005 emphasized that TQM practices must be implemented if the organization wants to ensure product produce can fulfil the Shariah regulatory requirements. However, there are still few TQM research has been conducted to examine safety of halal food products [14]. Thus, this study will examine relationship between TQM practices and safety of halal food products.

1.1 Safety of Halal Food

Bistari [15] stated that halal food products are readily acceptable by Muslim and non-Muslim consumers because of the wholesomeness concept of halal. Halal food does not only cover the Shariah requirement, but it is also covering safety aspects of food. Safety of halal food can be achieved through hygienic preparation by food manufacturers. To achieve the wholesomeness concept, both aspects need to be adhered to and implement [4][16].

Safety attributes of halal certification refers to halal food will not cause harm to the health of consumers because it is prepared in accordance to GHP [2][4]. GHP can provide certain assurance concerning hygiene practices of food handlers. The failure of food handlers to wear suitable uniforms, aprons, caps, covered shoes, smoking and wearing jewelry at food production premises are the main reasons why food handlers are considered to be unhygienic [5].

GHP also will drive food handlers to always maintain a high degree of its hygienic food handling operation area. For example, the premises of halal food production should be free from any sources of food contamination [17]. Sources of food contamination such as biological, chemical or physical agents can be prevented by regularly conducting a pest control system at all food premises [18].

The Codex General Principles of Food Hygiene and the Malaysian Standard MS 1514 on General Principles of Food Hygiene are two components which can ensure food product consistently manufactured in hygienic practices. There are eight critical areas to assure food hygiene. First, in order to avoid the presence of potential hazards which may affect the safety of food, hygienic practices should be implemented at the primary production of food premises.

Second, the location of food premises should be in areas that are safe from potential sources of contamination. In addition, equipment and facilities used should be designed and arranged in such a way that can permit easy flow of maintenance and cleaning process. These facilities will influence food operators to carry out good personnel hygiene practices.

Third, preventive measures such as the food safety system must be continuously implemented in food premises. Fourth, food operators must be regularly executing maintenance and cleaning program, pest control system, waste removal and storage as well as sanitation system.

Fifth, other elements that can ensure food products are safe to consume by consumers are personal hygiene practices such as food operators must wear appropriate caps, mask, gloves and

shoes when dealing with food. Besides that, sick or suspected food handlers who are suffering from any disease are strictly prohibited to enter any food handling area.

Sixth during transportation activity, any dust, fumes or fluctuation of temperature and humidity must be prevented. Seven, packaging of the product should be labelled and provided with relevant product information. Eight, food operators should be trained and equipped with the knowledge of food hygiene practice [4].

1.2 TQM Practices in Food Companies

Samson and Terziovski [19] stated strategic planning, information management, top management, process management, human resources and customer focus are six dimensions of Malcolm Baldridge National Quality Awards (MBNQA). Due to its ability in providing a good measurement instrument for the researchers to use and proven empirical results related to previous study, this study believes that all the six dimensions can assure safety of halal food products.

Taking into account that the utilization of TQM instruments can assure safety of food, Alsaleh [20] examined the use of TQM by the Saudi food industry. The outcomes revealed that there is proof of the execution of TQM among the Saudi food organizations. The outcomes shows that the respondents executed TQM in their organization because they believed that it can improve quality of food items.

A few researchers like Talib et al. [14], Psomas et al. [21], Psomas and Fotopoulos [22] and Barendsz [23] have called attention to determine relationship between TQM and safety of food products.

Psomas et al. [21] further analyzes the effect of TQM by Greek food organizations. Utilizing a structured questionnaire method, only 90 Greek food organizations took an interest in this examination. The exploratory factor examination results showed that, two parts of TQM – the "soft" TQM components and "hard" TQM components was implemented by Greek food organizations. Applying multiple regression analysis to decide the effect of TQM on the Greek food organizations, the outcomes showed "soft" TQM components can improve food quality and increase consumer loyalty. Then, "hard" TQM components will affect quality improvement, competitive advantage and consumer loyalty

Psomas and Fotopoulos [22] examined which TQM practices have an effect towards accomplishing of quality in food organizations. The outcomes shows that the process and data of the company affected quality improvement in food companies. However, employee involvement and customer focus had no effect on quality improvement in food companies.

Barendsz [23] in his food handling and TQM paper survey demands that TQM execution in food organizations can work with the powerful execution of HACCP and ISO. He suggested that TQM, HACCP and ISO ought to be together executed to satisfy with the need for more secure food sources.

Din and Daud [13] as well as Karim et al. [24] showed that TQM can be carried out by certified halal food manufacturers. With regards to Malaysian halal food industry, it is believed that TQM can guarantee Shariah consistence of halal food items. Thus, dependent on the above discussion, there are six hypotheses developed in this study (refer Table 2).

2 Methodology

The objective of this study is to examine the relationship between TQM practices and safety of halal food products. Hypotheses for this study was tested quantitatively. This study was conducted in a non-contrived setting where operation of food manufacturing process was operated normally. This is a field of study where variables of interest are correlated to understand the relationship without much interference by the researchers at the food manufacturer's premises.

The unit of analysis for this study was employees (i.e., the halal committee members, the halal executives, the production supervisors, Muslim employees) who are working in the food production premises. In term of population, this study was implemented in Central Region and Southern Region of Peninsular Malaysia. As reported by Malaysia Halal Industry Directory (2013) majority of certified halal food manufacturers was located in Central Region with 56.87 percent (Selangor, 39.82 percent; Kuala Lumpur, 10.69 percent; Negeri Sembilan, 6.36 percent). Meanwhile, 21.37 percent of food manufacturers was located in Southern Region (Johor Baharu, 16.54 percent; Melaka, 4.83 percent).

For data analysis, Structural Equation Modelling was utilized by utilizing partial least square structural equation modelling (PLS - SEM). Furthermore, in this paper, the statistical analysis software SPSS 22 (Statistical Package for Social Sciences) and WARP PLS version 5.0 were utilized for the statistical processing of the data. For testing the hypothesis, assessment towards measurement model and structural model is examined.

3 Results

3.1 Respondent Profile

The vast majority of the responding companies in this study was small and medium industries (SMEs) with 78.5% followed by small industries with 21.5%. For the dispersion of halal certification scheme, generally respondent (72%) had halal accreditation for food only, trailed by (19.5%) of respondents had halal confirmation for beverages only and just 8.5% of respondents had halal certificate for food and beverages. Besides, halal committee (44%) and halal supervisors (29%) are the majority of the respondents participated in this study.

3.2 Measurement Model

Three criteria have been used to validate the measurement model in this study Construct validity (e.g., convergent validity and discriminant validity), reliability analysis and assessment of the nature latent construct are criteria used to validate the measurement model. The criteria used to measure convergent validity, first, the value of individual items loading should have a relatively high-standardized loading (0.50 or greater) on that factor [25]. Second, composite reliability (CR) should be greater than 0.70 [25][26][27]. The measurement model meets the value of the average variance extracted (AVE), where AVE should be greater than 0.50 [25]. In this study, the factor loading the CR and the average variance extracted (AVE) were exceeded the recommended level. Next, the discriminant validity results show square root of the AVE had adequate discriminant validity. Lastly, variables used in this study are reliable because results of the variance inflation factor (VIF) (see table 1) were below the recommended level of 5 [25].

3.3 Structural Model

Based on the Table 2, it shows that four hypotheses were supported (H_1, H_2, H_3 and H_5) and two hypotheses was not supported (H_4, H_6). Strategic planning, information management, top management and human resources was found to have a positive significant relationship on safety. Conversely, process management was found to have negative relationship on safety. Therefore, hypotheses H4 was not supported. Lastly, customer focus was found not to have a positive significant relationship on safety. Hence, hypotheses H6 was not supported.

4 Discussion

Many studies have been conducted to identify relationship between TQM and product quality. However, little or and most likely no previous study had tried to investigate the relationship between TQM and safety of halal food products. As explained in the literature review section, results of this study confirm the findings of several related studies by Talib et al. [14], Psomas et al. [21], Psomas and Fotopoulos [22], Barendsz [23] and Karim et al. [24]. Hence, towards ensuring safety of halal food product, food manufacturers should take proactive action to comply with GHP throughout the halal food supply chain activity by implementing TQM practices in their premises.

Table 1. Results of measurement model

Construct	Type	N items	Factor loading	CR	AVE	$(Corr)^2$	VIF
Strategic Planning	Reflective	4	0.903 to 0.947	0.962	0.863	0.929	3.018
Information Management	Reflective	4	0.793 to 0.930	0.926	0.758	0.870	3.501
Top Management	Reflective	4	0.590 to 0.901	0.890	0.675	0.822	2.318
Process Management	Reflective	3	0.889 to 0.941	0.938	0.835	0.914	2.944
Human Resources	Reflective	4	0.874 to 0.931	0.951	0.829	0.911	3.258
Customer Focus	Reflective	4	0.782 to 0.950	0.944	0.810	0.900	2.770
Safety	Reflective	4	0.655 to 0.798	0.827	0.546	0.739	1.479

Table 2. Results of structural model

Path	β	$p-value$	$f2$	Hypotheses
SP → Safety	0.249	<0.001	0.114	H1: supported
IM → Safety	0.224	<0.001	0.089	H2: supported
TM → Safety	0.166	0.002	0.071	H3: supported
PM → Safety	0.172	0.002	0.053	H4: not supported
HR→ Safety	0.098	0.047	0.040	H5: supported
CF → Safety	0.023	0.349	0.009	H6: not supported

Note: **denotes significant at p <0.01, *denotes significant at p <0.05, SP=Strategic planning, IM=Information management, TM=Top management, PM=Process management, HR=Human resources, CF=Customer focus.

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