

# Green Lean TQM Supplier/Organization/Customer Management Practices in Malaysian Food Companies



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**Abstract** Malaysia once has been cited by The United Nations as the best example in the world in terms of justification for the labeling of halal food. In effort to enhance productivity and the quality of the product, the organization must go through efficient methods of production by elimination of unnecessary procedures and process that add to the production cost. This paper proposes Green Lean TQM Islamic Supplier/Organization/Customer Management System and the probability to integrate these management systems in a new Islamic model that can be proposed its implementation in the Malaysian food industry. The system integrated the Supplier/Organization/Customer Management Practices of Lean Manufacturing (LM), Total Quality Management (TQM), Environmental Management System (EMS) and Islamic Manufacturing Practices' (IMP) principles. The designation of the questionnaire was based on the adaptation of Malaysian Prime Minister Award Model, Malcolm Baldrige National Quality Award, European Quality Foundation Award, Toyota Production System, ISO16949, SAEJ4001 and MAJAICO Lean Production System. 30 selected food companies from Selangor have been participated in the survey. The reliability of the questionnaire and the data was tested and analyzed both by using Minitab Statistical Software (Minitab 17). Overall, there are 13 practices proposed in this framework. Four practices in Level 1, three practices in Level 2, five practices in Level 3 and a single practice in Level 4. Each level is determined based on the percentage of the implementation of the Supplier/Organize/Customer management practices. It is found out that for food industry, the readiness of the

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integrated system is still not as strong as the automotive industry with high implementation of prompt and effective handling of their customer complaint/feedback as well as practicing high assurance of continuously improved qualities.

**Keywords** Total quality management · Lean manufacturing · Environmental management system · Islamic manufacturing practices · Malaysian food industry

## 1 Introduction

Halal food market is increasing rapidly along with the development of population growth rate and financial status. Halal products represent to near 20% of the whole worldwide food production. With expected increments in both populace and the salary of the product consumer and the fact of the expected growth of halal product by more than 70% by 2050, the future interest for halal nourishment is solid [1]. The value of worldwide halal industry excluding Islamic finance is evaluated to be worth around USD2.3 trillion. Increasing at an expected annual rate of 20%, the business is esteemed at about USD560 billion a year.

The food supply chain is a series of processors, operations and entities made from all levels from the agricultural sector down to the retail sector [2]. Each process needs to be in control especially in terms of cleanliness and hygiene at top priority [3]. To be the central trading hub for Halal products, the organization must adopt an intelligent marketing and strategic supply chain system. In the previous study [4], a new framework system which integrated Halal Assurance System (HAS) into the supply chain system has been proposed. This proved that the Islamic framework system has become one of the initiatives for manufacturers to improve the quality of their halal products.

Total Quality Management (TQM) and Lean Manufacturing (LM) is a holistic management philosophy that strives for continuous improvement in all functions of an organization and it can be achieved. Lean Manufacturing (M) is a system that utilizes less, in terms of all inputs, to create the same outputs as those created by a traditional mass production system, while contributing increased varieties to the end customer [5, 6]. Environmental Management System (EMS) is one the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing, and maintaining the environmental policy (UNE-EN ISO 14001, 1996). While Islamic Manufacturing Practice (IMP) is a guideline under an appropriate system for managing Sharia Compliance. It is also intended to ensure that all manufacturers meet the requirements for quality, efficacy and purity towards the “halalan thoyyiban” products.

## 2 Methodology

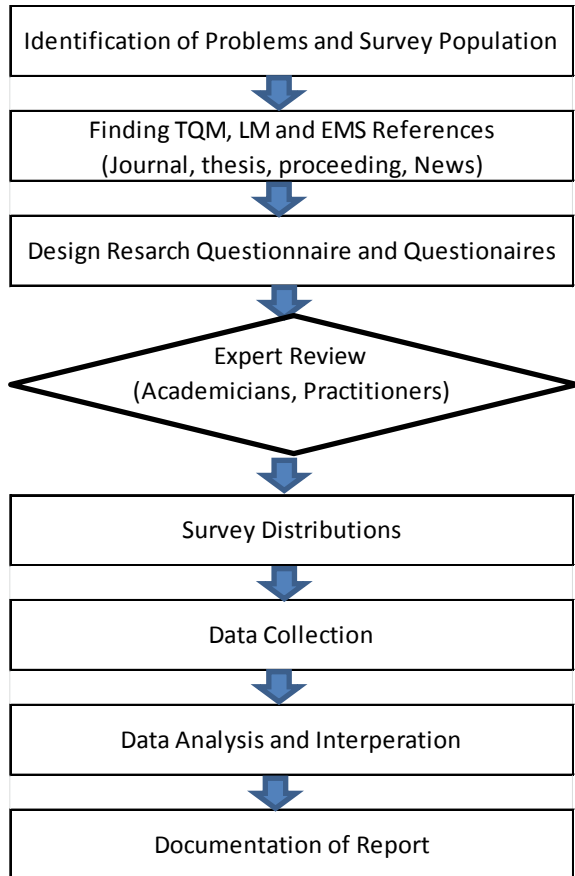
Six (6) points Likert scale is used in the questionnaire to measure the company implementation and the performance in the implementation of Supplier/Organizer/Customer management of TQM, LM, EMS and IMP. The highest scale of 6 on the Likert scale indicated that the respondent strongly agreed with the point while the lowest scale indicated vice versa. The designation of the questionnaire was based on the adaptation of Malaysian Prime Minister Award Model, Malcolm Baldrige National Quality Award, European Quality Foundation Award, Toyota Production System, ISO16949, SAEJ4001 and MAJAICO Lean Production System. The management systems of Islamic Manufacturing practices were integrated into the existed TQM, LM and EMS framework from previous study. However, the survey has been done in the automotive industry [7–9]. The implementations of the systems are mostly customer’s driven and restricted only to companies which has the capability to assess their customer’s perceived requirements [10]. For this study, the focus was changed to food industry and 30 companies from Selangor have been participated in this survey. The selection of the companies is based on the SMEs list provided by SME Corp Malaysia, companies listed under “Makanan Selamat Tanggungjawab Industri (MeSTI)”, or the “Food Safety is the Responsibility of the Industry”, and the companies who are joining Selangor International Expo 2016. The survey response collection methods for this survey are different between each company. Some of the data were collected via email; some through the walk into the company’s booth during the exhibition and the rest of the data are collected through phone calls. The respondents group mostly the personnel from the Top Management Unit, Managers, Executives and Quality divisions. The collected data were analyzed by using Minitab 17 and the result was documented. Figure 1 illustrates the research methodology.

## 3 Results and Discussion

### 3.1 Reliability Test of the Questionnaire

As the set of the questionnaire in this study consisted of multiple Likert questions, Cronbach’s alpha is a common measure of internal consistency (“reliability”). The Minitab output provides some useful descriptive statistics, including the sample size for each item, as well as the mean and standard deviation. The system also provided with the Cronbach’s alpha ( $\alpha$ ) score. The documented results gained from the survey were gone through the Minitab 17 for reliability test (Fig. 2).

A questionnaire was employed to measure the construct, Green Lean TQM Islamic Supplier/Organization/Customer Management Practices in Food Companies’, which consisted of 13 questions. The scale had a high level of internal consistency, as determined by a Cronbach’s alpha of 0.9758.

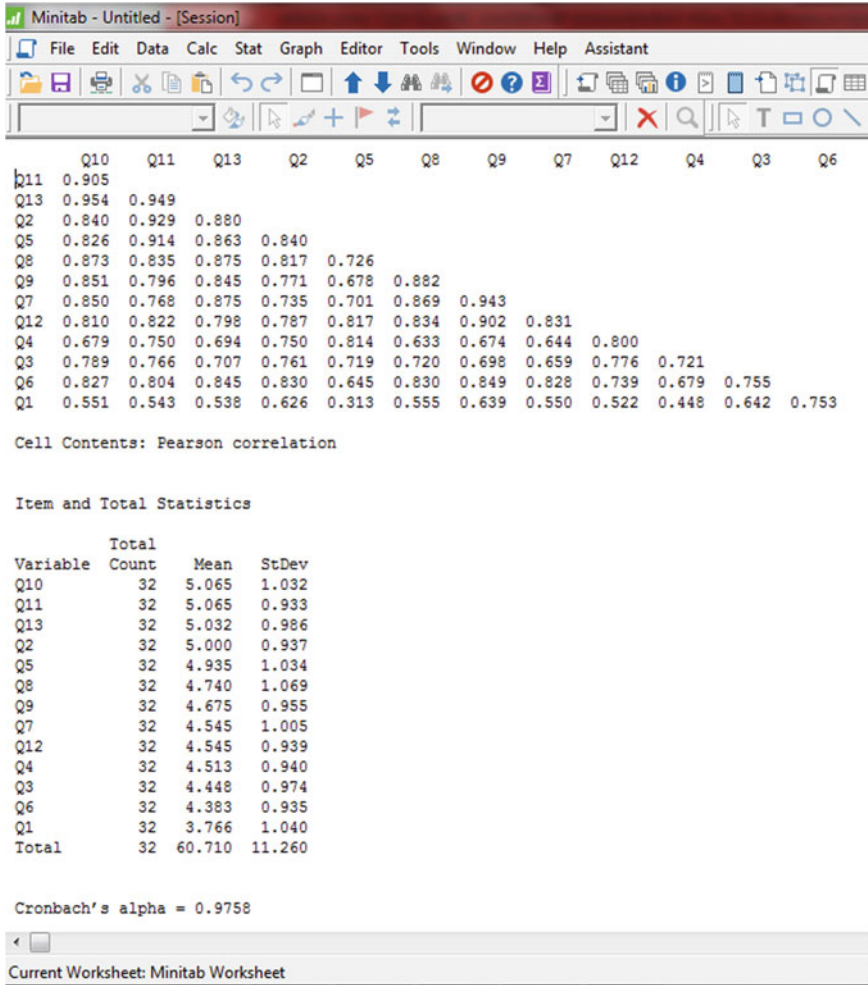
**Fig. 1** Research work layout

### ***3.2 Integrated TQM, LM, EMS and IMP in Malaysia Food Companies***

The framework model proposed in this study consisted of 4 implementation levels which are Foundation level, Level 1, Level 2 and Level 3. Each level is determined based on the percentage of the implementation of the Supplier/Organize/Customer management practices. Meanwhile, the percentage of the implementation was obtained by the mean analysis of the collected data. The practices levels in the framework were sorted out based in the percentage value of the mean. Table 1 summarized the percentage value for each level of the framework.

To determine whether the implementation level is high, moderate, low or very low, Table 2 shows the range of the percentage that has been used in this study.

Once the data has been going through analysing stage by using Minitab, the final data are documented according to their percentage level. The data in the table below are ranked from highest to lowest percentage of the implementation



**Fig. 2** The value of Cronbach's alpha for reliability test of the questionnaire

**Table 1** The percentage range to determine the implementation level for the proposed framework

Implementation level	Percentage range (%)
Foundation	90.5–96
Level 1	85–89.9
Level 2	80–84.9
Level 3	70–79
Level 4	0–69

**Table 2** The percentage range for the implementation level practices in the company

Implementation level	Percentage range (%)
High	>85.0
Moderate	80–85.5
Low	75–79
Very low	<79

level. Overall, there are 4 practices which are highly implemented in the organization while 3 practices are moderately implemented. Sadly, there are 6 practices of supplier/organization/customer management that are poorly adapted in the organization (Table 3).

In level 1 of the implementation practices of Supplier/Organization/Customer management, the highest score is 87%. Sharing the same implementation value with the second most highly practices in level 1, [GLTQMI-LSHIP (1)] shows that the organization handles their customer complaint/feedback promptly and effectively. The issues have been analyzed and documented for better result. In order to improve the total quality of a food processing system, how the organization addressing customer complaints must be taken care of very well. The organization also have to ensure that all supplied materials and services from suppliers are assured and the qualities are continuously improved [GLTQMI-LSHIP (2)]. To achieve competitive advantage by delivering value added products/services, the quality assurance must be implemented throughout the supply chain [11]. In this level, the organization would ensure the method of identifying customer needs and requirements as been promised/agreed [GLTQMI-LSHIP (3)]. One of the difficulties that manufacturers

**Table 3** Supplier/organization/customer management practices of integrated TQM, LM, EMS and IMP for level 1 framework

GLTQMI process practices	Mean	% Implementation level
GLTQMI-LSHIP (1) Customer complaint/feedback is handled promptly, effectively, analyzed and documented	5.2	87.00 (high)
GLTQMI-LSHIP (2) All supplied materials and services from suppliers are assured and the qualities are continuously improved	5.2	87.00 (high)
GLTQMI-LSHIP (3) Method of identifying customer needs and requirements shall be ensured has been promised/agreed	5.17	86.00 (high)
GLTQMI-LSHIP (4) Suppliers and customers are appropriately represented on the organization's product/process/project team	5.13	86.00 (high)

Notes Mean Value Scale: 5.1–6 (High Implementation), 4.8–5.1 (Moderate Implementation), 4.2–4.8 (Low Implementation) and 0–4.2 (Very Low). Percentage Scale: 85–100: High Implementation, 80–84: Moderate Implementation, 70–79: Low Implementation, 0–69: Very Low Implementation

**Table 4** Supplier/organization/customer management practices of integrated TQM, LM, EMS and IMP for level 2 framework

GLTQMI process practices	Mean	% Implementation level
GLTQMI-LSHIP (5) Long term agreements for financial benefits are in place	5.07	84.00 (moderate)
GLTQMI-LSHIP (6) Follow-up activities with customers are conducted to determine satisfaction	4.87	81.00 (moderate)
GLTQMI-LSHIP (7) All the support services like financing, purchasing, human resource and manufacturing/engineering are geared towards meeting the quality requirements	4.8	80.00 (moderate)

*Notes* Mean Value Scale: 5.1–6 (High Implementation), 4.8–5.1 (Moderate Implementation), 4.2–4.8 (Low Implementation) and 0–4.2 (Very Low). Percentage Scale: 85–100: High Implementation, 80–84: Moderate Implementation, 70–79: Low Implementation, 0–69: Very Low Implementation

faced is the inconsistency of the supply from the supplier due to local and situational factors [12]. So, the organization makes sure that both suppliers and customers are appropriately represented on the organization's product/process/project team [GLTQMI-LSHIP (4)] (Table 4).

Up to date, endless management analyst and experts have attempted the advantages the organizations of all sizes can gain by setting up “partnership” with their supplier. In level 2 of implementation, the organizations are ensuring that they make a long-term agreement with their supplier for financial benefits [GLTQMI-LSHIP (5)]. In order to assure that there is no miscommunication or future complains the organization determines their customer satisfaction by conducting the follow up activities [GLTQMI-LSHIP (6)]. All the support services like financing, purchasing, human resource and manufacturing/engineering are geared towards meeting the quality requirements [GLTQMI-LSHIP (7)] (Table 5).

Implementing Total Quality Management practice in the organization [13], customers' requirements including the service requirements are communicated to all employees [GLTQMI-LSHIP (8)]. Supply chain management are set up across organizations so that all the members of the channel, from suppliers to end users, coordinate their business activities and processes to minimize their total costs and maximize their effectiveness in the marketplace [14]. To gain the benefit through the supply chain management, suppliers' improvements are done by partnership, training, incentives and improved supplier selection [GLTQMI-LSHIP (9)]. To prevent future problems, financial incentives/benefits for supplier, organization and customers are in place [GLTQMI-LSHIP (10)]. Establishing close relationships with suppliers, though, means that buyers and customers must conduct the necessary research to make sure that they select the right companies. Hence, suppliers and customers participate in the regular reviews of product/process/project progress [GLTQMI-LSHIP (11)]. Several platforms used to keep up-to-date and customer requirements are available through surveys, interviews etc. [GLTQMI-LSHIP (12)] (Table 6).

**Table 5** Supplier/organization/customer management practices of integrated TQM, LM, EMS and IMP for level 3 framework

GLTQMI process practices	Mean	% Implementation level
GLTQMI-LSHIP (8) Customers' requirements including the service requirements are communicated to all employees	4.67	78.00 (low)
GLTQMI-LSHIP (9) Suppliers' improvements are done by partnership, training, incentives and improved supplier selection	4.67	78.00 (low)
GLTQMI-LSHIP (10) Financial incentives/benefits for supplier, organization and customers are in place	4.63	77.00 (low)
GLTQMI-LSHIP (11) Suppliers and customers participate in the regular reviews of product/process/project progress	4.57	76.00 (low)
GLTQMI-LSHIP (12) Up-to-date and customer requirements are available through surveys, interviews and etc.	4.5	75.00 (low)

*Notes* Mean Value Scale: 5.1–6 (High Implementation), 4.8–5.1 (Moderate Implementation), 4.2–4.8 (Low Implementation) and 0–4.2 (Very Low). Percentage Scale: 85–100: High Implementation, 80–84: Moderate Implementation, 70–79: Low Implementation, 0–69: Very Low Implementation

**Table 6** Supplier/organization/customer management practices of integrated TQM, LM, EMS and IMP for level 4 framework

GLTQMI process practices	Mean	% Implementation level
GLTQMI-LSHIP (13) Suppliers and customers participate at the earliest stage of product/process/project	3.87	64.00 (very low)

*Notes* Mean Value Scale: 5.1–6 (High Implementation), 4.8–5.1 (Moderate Implementation), 4.2–4.8 (Low Implementation) and 0–4.2 (Very Low). Percentage Scale: 85–100: High Implementation, 80–84: Moderate Implementation, 70–79: Low Implementation, 0–69: Very Low Implementation

The only one practice listed on the level 4 of this is the suppliers and customers participate at the earliest stage of product/process/project [GLTQMI-LSHIP (13)]; where the implementation is quite low within the organization. This is probably due to lack of commitment between the supplier, organization and customer.

## 4 Conclusion

Even though there is minimal information about the Islamic quality framework model, it became the main reason we should explore the potential subject in order to



maximize the quality of management system. The aftermath of knowing the current standing of LM, TQM, EMS and IMP synergy will acknowledge supplementary development of a fresh enhanced model when needed. Overall, there are 13 practices proposed in this framework from 30 respondents of best integrated manufacturing practices. Four practices in Level 1, three practices in Level 2, five practices in Level 3 and a single practice in Level 4. Each level is determined based on the percentage of the implementation of the Supplier/Organize/Customer management practices. It is found out that for food industry, the readiness of the integrated system is still not as strong as the automotive industry with high implementation of prompt and effective handling of their customer complaint/feedback as well as practicing high assurance of continuously improved qualities. The participated companies have practiced method of identifying customer needs and requirements by ensuring that both suppliers and customers are appropriately represented on the organization's product/process/project team but the participations are still not at the earliest stage of product/process/project. It is hoped that in the future, this integrated system can be recognized worldwide if it is supported by most Muslim countries and further research in future for better improvement are strongly recommended to initiate a more holistic model.

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