

# Green Lean TQM Islamic Process Management Practices In Malaysian Food Companies

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## ABSTRACT

*Halal market is expanding globally. With the world Muslim population is approaching 2.8 billion people, Muslims are expected to account for 30% of the world's population by 2025. This large market has created interest from food producing countries worldwide including Malaysia. Being recognized internationally as a progressive Muslim country, Malaysia has the edge of becoming a major producer of Halal food products. Nevertheless, in order to realize this potential demand, the food-based Halal industries should consistently enhance their products by practising a high quality process management system. Lean TQM Islamic Process Management System is a system whereby Process Management Practices are integrated to Lean Manufacturing (LM), Total Quality Management (TQM), Environmental Management System (EMS) and Islamic Manufacturing Practices (IMP) principles. In this study, 30 food companies from Selangor have been selected to participate in this survey. From the data collected, Green Lean TQM Islamic Process framework have been proposed. The implementation practices were divided into 5 categories which are Foundation Level, Level 1, Level 2, Level 3 and level 4. From the data collected in this study, unfortunately there are none of the practices listed in the Foundation level. The output from this study will provide insights on the good management benchmark that will be beneficial to the food industries, especially for Small and Medium Enterprise (SMEs).*

**Keywords:** Total Quality Management, Lean Manufacturing, Environmental Management System, Islamic Manufacturing Practices, Malaysian food industry,

## **Introduction**

According to Pew Research Center, Islam is the fastest growing and second largest religion in the world. By 2050, the number of Muslims is projected to increase to 2.8 billion that will make up more than a quarter of the world's population [1]. Based on the Thomson Reuters Report State of The Global Islamic Economy Report 2015/2016, the Halal food consumption in the Organization of Islamic Cooperation (OIC) companies in 2014 resulted to US\$947 billion. Meanwhile, the global expenditure of the Muslim consumer on food is expected to reach US\$3.7 trillion by 2017. Malaysia is surprisingly listed in the top countries of Halal food producers in the world altogether with India, Pakistan, China and Indonesia. Not to mention Malaysia is ranked 1<sup>st</sup> for Halal Food, Islamic Finance and Halal Travel which put Malaysia as the best developed Islamic economy out of core countries [2].

Total Quality Management (TQM), Lean Manufacturing (LM) and Environmental Management System (EMS) are the well-known and established system especially in the automotive industry [3-5]. These systems however are not limited to one specific industry. A study on the implementation of TQM in Germany food industry shows that the system provides positive effects to the company success [6]. As for the LM, the system was applied to the Portuguese food and beverage companies and the implementation resulted to the increment of production flexibility and reduction of lead time [7]. Differ to TQM and LM, EMS is not quite familiar with the food industry. Nonetheless, the comparison between EMS certified with non EMS certified fish processing plant in the Iberian Peninsula [8] proving that the application of EMS provides better insight on the environmental preservation and increasing in sale for the organization. While Islamic Manufacturing Practice (IMP) is intended to provide a guideline under an appropriate system for managing Shar'iah Compliance. It is also intended to ensure that all manufacturers meet the requirements for quality, efficacy and purity towards the "halaalan thoyyiba" products [9].

Process management involves the planning and performance monitoring which is one of the most important activities within the organization. Apart from the leadership management [10], TQM, LM, and EMS are having its own process management guidelines or philosophy. The process management of the TQM, LM and EMS have been integrated in the previous study [4-6], and the framework has been proposed in the automotive industry. Since this study is focusing on food industry, the existed framework of integrated Green Lean TQM Process Management will be synergize with the IMP's.

## Methodology

In this study, the Islamic Manufacturing Practices (IMP) process management have been integrated in the previous Green Lean TQM model. The existed model was established based on the adaptation of Malaysian Prime Minister Award Model, Malcolm Baldridge National Quality Award, European Quality Foundation Award, Toyota Production System, ISO16949, SAEJ4001 and MAJAICO Lean Production System. The survey involved the participation of 30 companies from Selangor. The respondent selection was 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 "Selangor International Expo 2016" participants.

As for the method of data collection, some of the data 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. This is due to the diversity in the company's group selection. Basically, the respondent groups are mostly the personnel's from the Top Management Unit, Managers, Executives and Quality divisions of the organizations. The data gained from the survey was analyzed by using Minitab software before the result documentation takes place after. Figure 1 below illustrates the research methodology of this study.

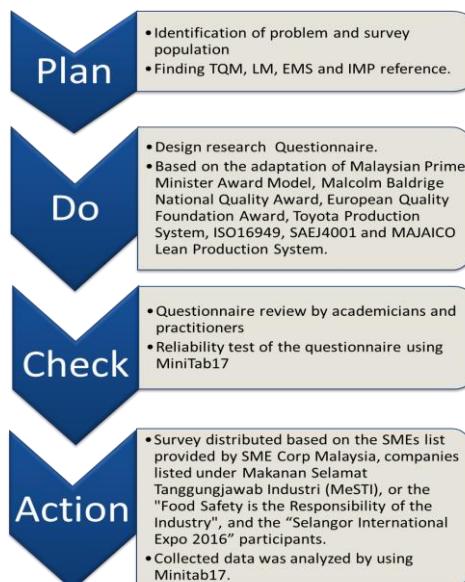


Figure 1: Research work layout

## Result and Discussions

### Reliability Test of the Questionnaire

The set of the questionnaire in this survey consisted of multiple Likert questions. 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. Table 1 below shows the details of the Likert Scale used in the questionnaire.

Table 1: The Likert scale table

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

In order to measure the consistency or the reliability of the scale, the collected data are analysed by using the Minitab. Other than providing some useful descriptive statistics, such as the mean and standard deviation of the data, the Minitab also provided with the Cronbach's alpha ( $\alpha$ ) score. Cronbach's alpha is a measure of internal consistency. A questionnaire was employed to measure the construct, 'Green Lean TQM Islamic Process Management Practices in Food Companies', which consisted of 21 questions. The scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.9103.

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

In order to get the level of the practices, the percentage of the implementation is obtained by using the mean results calculation. The implementation practices were divided into 4 categories which are Foundation Level, Level 1, Level 2 and Level 3 so that the framework mode can be established. The level of the practices is sorted out based on the percentage of the implementation level. The percentage of each level is listed in the Table 2 below.

Table 2: The percentage of the level

Level	Foundation	I	II	III
Percentage (%)	90.5 – 96.5	85.0 – 89.9	80.0 – 84.9	70.0 – 79.0

While for the implementation level, the implementation status is considered high if the percentage is greater than 85%. The percentage of moderate level however is in between 80.0% to 85.5% and the percentage lower than 80% is considered as low. From the data collected in this study, unfortunately there are none of the practices listed in the Foundation level, but there are 6 process management at High level which is level 1.

Table 3: Process management practices of integrated TQM, LM, EMS and IMP for level 1 framework

GLTQMI Process Practices	Mean	% Implementation Level
<b>GLTQMI-LSHIP (1)</b>		
Committed in ensuring the cleanliness and hygiene of the premise	5.33	88.89 (High)
<b>GLTQMI-LSHIP (2)</b>		
Raw materials are free from non-halal elements	5.33	88.89 (High)
<b>GLTQMI-LSHIP (3)</b>		
The work environment is clean and well organized	5.33	88.89 (High)
<b>GLTQMI-LSHIP (4)</b>		
Product segregation is in place	5.2	86.67 (High)
<b>GLTQMI-LSHIP (5)</b>		
Any process changes are communicated to all, staffs are trained prior to the implementation and process changes are audited	5.13	85.56 (High)
<b>GLTQMI-LSHIP (6)</b>		
Person machine separation is in place	5.13	85.56 (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

The highest activities or practices in the process management, the organizations are very committed in ensuring the cleanliness and hygiene of the premise (GLTQMI-LSHIP (1)) with the 88.89% of implementation level.

The second and third practices of the process management that sharing the same percentage of the implementation level with the highest practices are the organization is ensuring the raw materials are free from non halal elements (GLTQMI-LSHIP (2)) and the work environment is clean and well organized (GLTQMI-LSHIP (3)) are secured. The implementation is high probably due to the nature of the industry. Since all of the respondents in this study are Halal certified organization, so the cleanliness and the purity of their materials and premise must be taken care of.

Besides, the Halal concept itself must follow the Shariah compliance, safe, hygienic and not hazardous to human health if consumed. Next, with the 86.67% implementation level, the fourth practices in level I is the organization assured the product segregation is in place (GLTQMI-LSHIP (4)). Any process changes are communicated to all, staffs are trained prior to the implementation and process changes are audited (GLTQMI-LSHIP (5)) is chosen as the fifth most implemented practices by the organization with 85.56% follows by person-machine separation is in place (GLTQMI-LSHIP (6)). This proven that the participated organizations implemented LM in their workplace.

Table 4: Process management practices of integrated TQM, LM, EMS and IMP for level 2 framework

GLTQMI Process Practices	Mean	% Implementation Level
<b>GLTQMI-LSHIP (7)</b>		
Premises designed to enable the process flow to control the product contamination's risk	5.07	84.44 (High)
<b>GLTQMI-LSHIP (8)</b>		
All processes are continuously improved.	4.9	81.67 (High)
<b>GLTQMI-LSHIP (9)</b>		
Changeover histories are recorded	4.87	81.11 (High)
<b>GLTQMI-LSHIP (10)</b>		
Bills of Materials are accurately catalogued and standard operations are accurately routed, timed and have been value engineered.	4.87	81.11 (High)
<b>GLTQMI-LSHIP (11)</b>		
	4.87	81.11 (High)

The work environments are audited regularly  
against standardized 5S practices

GLTQMI-LSHIP (12)			
. Problem solving method is used in the Preventive Maintenance activities.		4.83	80.56 (High)
GLTQMI-LSHIP (13)			
An effective planned Preventive Maintenance System is in its place.		4.8	80.00 (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

As for level II implementation, there are 7 practices listed a shown in the table 4 above. The highest practice in this level with 84.44% is the premises designed to enable the process flow to control the product contamination's risk (GLTQMI-LSHIP (7)). The manufacturers are very well aware of how the contaminated food issues would affect them negatively. The organizations assure that all processes are continuously improved (GLTQMI-LSHIP (8)) and the changeover histories are recorded (GLTQMI-LSHIP (9)).

To make sure that the production of the goods is continuously running to cope up with the orders, the organizations are ensuring the Bills of Materials (BOM) are accurately catalogued and standard operations are accurately routed, timed and have been value engineered (GLTQMI-LSHIP (10)). The work environments are audited regularly against standardized 5S practices (GLTQMI-LSHIP (11)). In order to avoid the repetition of the same old problems, problem solving method is used in the Preventive Maintenance activities (GLTQMI-LSHIP (12)). The last activities with high percentage level of implementation in level II is the organizations are ensuring the effective planned Preventive Maintenance System is in its place (GLTQMI-LSHIP (13)). As we can see, In level II, the activities of LM are mostly taken place. Famous practices such as 5S, Preventive Maintenance, Pull System and heijunka can be seen in the table IV above.

Table 5: Process management practices of integrated TQM, LM, EMS and IMP for level 3 framework

GLTQMI Process Practices	Mean	% Implementation Level
<b>GLTQMI-LSHIP (14)</b> The cleansing method of the premise and tools are according with the Shariah Law requirements	4.73	78.89 (Moderate)
<b>GLTQMI-LSHIP (15)</b> Production sequence is load-smoothed to customer pull (pull system).	4.73	78.89 (Moderate)
<b>GLTQMI-LSHIP (16)</b> Effective management on raw material sources and supplies, material inventories are optimized, material waste is minimized and fixed assets are utilized	4.67	77.78 (Moderate)
<b>GLTQMI-LSHIP (17)</b> Current value stream is fully mapped and corresponds to BOM and Standard operations in use.	4.67	77.78 (Moderate)
<b>GLTQMI-LSHIP (18)</b> Customer demand is leveled over the manufacturing planning period (heijunka).	4.6	76.67 (Moderate)
<b>GLTQMI-LSHIP (19)</b> All the nonconformance findings from Preventive Maintenance activities are recorded and documented.	4.6	76.67 (Moderate)
<b>GLTQMI-LSHIP (20)</b> Material and product flow path are synchronously flow and the distance is continuously reduced.	4.47	74.44 (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

To meet with the concept of Halal food in Islam, the cleansing method of the premise and tools are according to the Shariah Law requirements (GLTQMI-

LSHIP (14)). Production sequence is load-smoothed to customer pull (pull system) (GLTQMI-LSHIP (15) to avoid waste in the workplace. Beside the implementation of pull system, effective management on raw material sources and supplies, material inventories are optimized, material waste is minimized and fixed assets are utilized (GLTQMI-LSHIP (16)) also was taken into consideration. Current value stream (VSM) is fully mapped and corresponds to BOM and Standard operations in use (GLTQMI-LSHIP (17)) so that the problems during the manufacturing process can be avoided. The LM activities are used when the customer demand is leveled over the manufacturing planning period (heijunka) (GLTQMI-LSHIP (18)) and all the nonconformance findings from Preventive Maintenance activities are recorded and documented (GLTQMI-LSHIP (19)). To avoid several wastes in LM such waiting, transportation and motion, the material and product flow path are synchronously flow and the distance is continuously reduced (GLTQMI-LSHIP (20)).

Table 6: Process management practices of integrated TQM, LM, EMS and IMP for level 4 framework

GLTQMI Process Practices	Mean	% Implementation Level
GLTQMI-LSHIP (21)		
Error-proofing device or system is in place in order to obtain in-process quality (poka-yoke).	4	66.67 (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 last and the only practices in level 4 of the process management implementation is the organizations are ensured that the error-proofing device or system is in place in order to obtain in-process quality (poka-yoke) (GLTQMI-LSHIP (21)). The concept of Poka-Yoke is very well known practices. As for the example, the operator wearing the gloves during the manufacturing process of the goods so that the hygienity of the finish products are assured.

## Conclusion

In order to compete with the existing established companies and new Halal food companies that are springing up like mushrooms after the rain, the manufacturer have to come up with the system that can ensure the quality,

safety and Halal integrity of their product. So, the best solution to gain many advantages in a single system is by adapting Integrated Management System (IMS) such as the proposed framework in this study. By referring to the framework, the manufacturer can implement the practices in the Level 1 first followed by Level 2, 3 and 4 since the practices in level 1 are the highest amongst the other. Which means the activities are important and easy to practice. To improve their quality for better, the manufacturer also should take into consideration the activities in lower level as their main focus since this framework is a complete process management activities for TQM, LM, EMS and IMP.

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