Quality Green Lean Energy Leadership Management Practices in Malaysian Automotive Companies

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ABSTRACT

Quality Green Lean Energy Leadership Management System is a combination of Green Management System (EMS), Total Quality Management System (TQM) and Lean Manufacturing (LM) with the Energy Management System (EnMS) policy. Therefore, a survey questionnaire was developed and distributed to 30 highly active and recommended automotive vendors in Malaysia by Malaysian Automotive Institute (MAI) and the data was analyzed by using Statistical Package for the Social Sciences (SPSS) v.19. From the survey, it was found that most vendors have been practicing TQM, LM and EMS due to customer requirement, however, there are only a few vendors that are aware of Energy Management System (EnMS). However, from the survey the awareness of the EnMS is still lacking due to lack of action and commitment. In order to turn out with a system model, the implementation practices were separated into 4 classifications which are Foundation Level, Level 1, Level 2 and Level 3. The level of the practices is arranged based on

ISSN 1823- 5514, eISSN 2550-164X
Received for review: 2017-05-29
Accepted for publication: 2018-12-15
Published: 2019-04-01

the implementation level. The objective of this system is to achieve customer satisfaction, green management system and energy safety and efficiency,so that the organization can compete in the market.

Keywords- *Automotive Industry, Operational Engineering Management, Total Quality Management, Green Management System and Energy Management System.*

Introduction

Energy Management System (EnMs), is a new standard based on ISO 9001 (Quality Management Systems) and ISO 14001 (Green Management Systems). The energy management system generally provides framework and guidance to the organization to manage energy aspects in production [6]. Focusing on the wide applicability across national economic sectors it is estimated within research that this standard could influence up to 60 % of world energy consumption [7]. Energy is a decisive subject for all organizational activities and it can be prohibitively expensive for businesses, regardless of the field of their activity. The waste of energy and the raw material management can be utilized within the Supply Chain of the company [8].

In Malaysia, the EnMS was not fully recognized among the automotive industries. However, since 2000, ASEAN-Japan cooperation in energy efficiency & conservation (EE&C), ASEAN Center for Energy (ACE) and the Energy Conservation Center, Japan (ECCJ) cooperation with Malaysian Ministry of Energy, Green Technology and Water (KeTTHA) to enhance the promotion of EE&C by private sector through energy audit which aims to share on the EE&C policy, best practices, new efficient technologies, knowledge exchange and information transfer about the analysis of energy saving potential in the automotive factory. The potential EE technologies in automotive industries focused on the heat pump, air compressor, factory energy management system (FEMS) and stamping press machine [1].

The main goal of this system is to establish an energy-efficient companies, so that, it can be more competitive and have a better market accessibility. The implementation of Quality Green Energy Leadership Management System will create sustained local market for EE services based on enabling regulatory and financing green. It also will transform the market between industrial energy user and equipment suppliers. Meanwhile, by improving the operational reliability, the energy usage in the factories will be improved, thus the operating cost can be reduced. Malaysian automotive companies are competitive in fulfill the customers demand for high quality and service products with the lowest price [2][3]. In order to survive, the companies

need to be world class manufacturer [4]. In organization, leadership has been included as one of the TQM, Green and LM Leadership Management that available in the Lean TQM framework that has been established in 2011[9].

In this study, TQM, Green and LM Leadership Management practices are integrated in a framework in order to establish Quality Green Energy Leadership Management Practices that will manages the organization resources; the 5M- material, man, machine, methods, money as well as supplier [5].however, this study establish for Malaysian automotive industry based on adaption of four awards and four systems which are from Japan (Deming Prize), America ((Malcolm Baldrige National Quality Award), Europe Countries (European Quality Foundation Award) and Malaysia (Malaysian Prime Minister Award Model) while ISO/TS 16949 or ISO 9000 for TQM and three system from LM (America - SAEJ4001, Japan - Toyota Production System and Malaysia - MAJAICO Lean Production System). The leadership is one of the criteria in both TQM (5 awards + ISO/TS16949) and LM models [5]. The purposed of this study is to establish a Quality Green Energy Framework by implementing the integration of TQM, LM, EMS and EnMS leadership practices.

Methodology

By using the same method in previous study, the questionnaire was distributed over 30 highly performing and active automotive supplier's companies in Selangor. The companies were selected based on Phase 1 MAJAICO Improvement and Vendor Improvement program and recommended by Malaysian Automotive Institute (MAI) and Kelab Vendor Proton and Perodua. The set of questionnaire has been reviewed by 4 reviewers which consists of academicians, industrial person and practitioners. The data collections have been through the process interviewing to the company directly, via email and through phone calls. The respondent group is mostly from the personnel of the Top Management Unit, Managers, executives and Quality divisions. The data collected from the survey were analyzed by using SPSS software.

Result and Discussions

a) Current Status of TQM, LM, EMS and EnMS in Malaysian Automotive Industries

From this study, it was found that the most practice systems in the participated companies are LM with 68% implementation percentage followed by EMS and TQM with 60% and 55%. There are increment in the implementation percentage of this management system in the automotive companies when compared with the previous study. LM is the most practiced system in the studies is due to the recognition from the Toyota Production System. Beside

the LM systems have been promoted by the Malaysian government through the Malaysian Automotive Institute (MAI) from MAJAICO program.

The implementation percentage of TQM and EMS increased by 21% and 11.2% from the previous study in 2012. The improvement in implementation was due to the customer requirement and market request. Since 2000, the MAI have been encouraging the automotive companies to implement an Energy Management System. The training has been provided to the companies under the MAJAICO vendor program. Even though the companies are aware of the advantages and benefit from the EnMS, the result is quite disappointing. There are no participated companies have implemented the system yet.

b) Integrated TQM, LM, EMS and EnMS in Malaysian Automotive Companies

By using the SPSS software, the mean of the data was analyzed which resulted to the implementation percentage of the system. The implementation level is divided 4 categories which are Foundation Level, Level 1, Level 2 and Level 3.

Table 1: Leadership management practices of integrated TQM, LM, EMS and EnMS for foundation framework

QGELM Leadership Practices	Mean	% Implementation Level
QGELM-LSHIP(1) Committed in meeting customer, statutory, regulatory, green and energy	5.40	90% (Very High)
QGELM-LSHIP(2) Establishing vision and mission statement	5.67	94 %(Very High)

Notes: Mean Value scale: 5.1-5 (High Implementation), 4.8-5.1 (Moderate Implementation, 4.2-4.8(Low Implementation and 04.1 (Very Low) . Percentage scale: 95-90: High Implementation, 89-80: Moderate Implementation, 70-79: Low Implementation, 0-69: Very Low Implementation

The levels were sorted based on the percentage of implementation. The percentage of the foundation level is in between 90.5% to 96.5%. While the range of percentage practices for Level I, II and III is in between 85 - 89.9%, 80 – 84.9% and 70 – 79%" respectively. The analyzed data are listed in Table 1, 2, 3 and 4 below which is arranged from highest to lowest percentage of the implementation level. If the percentage is greater than 85%, then the level is

considered as high, while moderate level is in between 80.0% to 85.5% and the rest is low.

The result of the implementation level system for this study in the participated companies for high level was interpreted in the table 1 and table 2. In this study, 6 leadership practices have been highly implemented in the companies. Table 1, show the highest percentage with high implementation in the companies between 90-95% believe in the important of setting and establishing mission statement on LM, TQM and Green (QGELM_LSHIP2). These companies also believe and practices in the companies to committed meeting with customer, statutory, regulatory and green which aware on new energy management requirements (QGELM-LSHIP1).

Table 2: Leadership management practices of integrated TQM, LM, EMS and EnMS for level 1 framework

QGELM Leadership Practices	Mean	% Implementation Level
QGELM-LSHIP(3) Committed in review and monitoring recommendation for improvement	5.13	86% (High)
QGELM-LSHIP(4) Reviewing and monitoring customer feedback	5.50	92%(High)
QGELM-LSHIP(5) Managing green and safety	5.45	90%(High)
QGELM-LSHIP(6) Reviewing and monitoring cost of quality	5.43	90%(High)
QGELM-LSHIP(7) Reviewing and monitoring status of corrective and preventive actions	5.40	90%(High)
QGELM-LSHIP(8) Reviewing and monitoring audit result	5.40	90%(High)

Based on the result gained from the survey questionnaire, average show that the top management are committed in reviewing and monitoring (QGELM-LSHIP4), customer feedback and giving the recommendation for improvement in the integrated management system (QGELM-LSHIP3). In Lean TQM Leadership, in Level 1, it clearly indicates that all items must be deployed, communicated, reviewed and monitored for improvement. On this

level the percentage of implementation is between 86% to 90% which indicate high implementation practices in automotive companies. However, all the vendors agreed that all of these planning practices are essential in an organization. These company that have not certified with ISO 14001 or OSHAS 18000 still manage the green and safety (QGELM-LSHIP5), to reviewing and monitoring cost of quality(QGELM-LSHIP6), status of corrective and preventive actions(QGELM-LSHIP7) and audit result (QGELM-LSHIP8) in organization. In 2008, Putri, N. T and Yusof S. M in their study on Critical Success Factors For Implementing Quality Engineering Tools and Techniques

Table 3 : Leadership management practices of integrated TQM, LM, EMS and EnMS for level 2 framework

QGELM Leadership Practices	Mean	% Implementation Level
QGELM-LSHIP(9) Employee contribute in all program conduct by organization	5.13	86% (Moderate)
QGELM-LSHIP(10) Employee aware the activity of TQM, LM, and energy is long term benefit	4.83	81% (Moderate)
QGELM-LSHIP(11) Top management identify the new technologies that have impact on business	4.93	82%(Moderate)
QGELM-LSHIP(12) The management review communicated to people in organization	4.83	81% (Moderate)
QGELM-LSHIP(13) The procedure process for green policy is appropriate to the nature, scale and green impacts of its activities products and services that are within defined scope of your green management system	4.80	80%(Moderate)
QGELM-LSHIP(14) Reviewing and monitoring any need of additional resources	4.80	80%(Moderate)

In Malaysian's and Indonesian's Automotive Industries, found that the top management commitment, quality planning, green practices, high commitment and support as well as middle management involvement

throughout operation are factors that motivate ISO 14001 certification. It indicates that planning practices are essential in Lean TQM Leadership which similar to Deming PDCA Cycle.

The data in table 3 shows the level 2 implementation which the percentages is between 89-80%. In this level, the reviewing and monitoring any need of additional resources (QGELM-LSHIP14) is related to the financial consideration of the companies.the companies agreed that the integrated management system have long term benefits (QGELM-LSHIP10) with additional new technologies will give impact on business (QGELM-LSHIP11). The system that currently used will make the management communicated into employee in the organization (QGLEM-LSHIP12) to make sure the employee understand and reduce the miscommunication between levels of an organization. The EnMS will establish unity of purpose and direction of the organization, by applying the principle of leadership and support from the employee and contribute to the organization (QGELM-LSHIP9) the trust is established between the management and employee. The employees are provided with required resources, training and freedom to act with responsibility (QGELM-LSHIP13) so that the employee being inspired and encouraged since their contributions are recognized.

Table 4: Leadership management practices of integrated TQM, LM, EMS and EnMS for level 3 framework

QGELM Leadership Practices	Mean	% Implementation Level
QGELM-LSHIP(15) The management review the energy management system and planned interval	3.50	58% (Very Low)
QGELM-LSHIP(16) The procedure ensure that the green policy is documented, implemented, and maintained	3.70	62% (Very Low)
QGELM-LSHIP(17) The energy review to include an analysis of energy use andconsumption based on direct measurement and other data	3.53	59% (Very Low)
QGELM-LSHIP(18) All current energy sources been identified	2.53	42% (Very Low)
QGELM-LSHIP(19) The review identify, priorities and record opportunities for improving energy performance	2.13	36% (Very Low)

QGELM-LSHIP(20) The reviews identify decisions and actions relevant to the improvement in the energy performance of the organization, changes to the energy policy, objectives and targets and allocation of resources	2.33	39%(Very Low)
QGELM-LSHIP(21) Costing is an activity based and from Value Stream activities.	4.77	79%(Low)
QGELM-LSHIP(22) Performance oriented and process driven green exist in the organization	4.17	69%(Very Low)
QGELM-LSHIP(23) To ensures that effective financial management resources are implemented by managing cash flow and balance sheet	3.50	58%(Very Low)

In level 3 implementation, the least practices for Quality, Green, Energy Leadership's percentage between is between 30% to 79% . The activities in this level are more related on costing based from value stream activities(QGELM-LSHIP21) by managing cash flow and balance sheet(QGELM-LSHIP23). The management review on energy system and interval (QGELM-LSHIP15), energy used and consumption based on direct measurement and other data (QGELM-LSHIP17), all energy sources been identified (QGELM-LSHIP18), the priority and record opportunities for improving energy performance (QGELM-LSHIP19) and identify decision and relevant action on improving energy performance on organization (QGELM-LSHIP20) are a new source and process flow that the employee need to understand and been trained. Last but not least, the performance and oriented driven the organization (QGELM-LSHIP22) and the procedure of the integrated system have been documented, implemented and maintained to continuous improvement (QGLEM-LSHIP16) also listed in the level 3.

Conclusion

Leadership is the ability to motivate groups of people towards a common goal. From the study it concluded that top management have the ability to demonstrate an understanding the business green and the impact on the organization strategy. The system objectives need to be compatible and set

levels within the organization. The companies need to demonstrate alignment between system objective and its strategic direction. The integrated management system between Quality, Green and Energy is the accountability of the effectiveness of the management system. The communication, engage and support is the importance of an effective management system in leadership requirement. The support of other relevant roles management demonstrates the leadership as applied to the areas of responsibility. The companies will improve their productivity through effective leadership methods. This model can be used to assess and gauge the status of leadership management practices in their companies as well as to another industry

Acknowledgement

This contribution was developed from Research Study funded by Ministry of Education Malaysia and UniversitiTeknologi MARA Malaysia – GeranInisiatifPelajar (600-IRMI/GIP 5/3 (0048/2016)). Special thanks to all participated vendors and Dean of Faculty of Mechanical Engineering UiTM Shah Alam Malaysia.

References

[1] Halim, N. H. A., Jaffar, A., Yusoff, N. and Adnan, A. N. 2013. The Methodology Of Lean Manufacturing. *Journal of Applied Mechanics and Materials*. 393: 3 – 8.

[2] Putri, N. T. and Yusof S. M. 2008. Critical Success Factors For Implementing Quality Engineering Tools And Techniques In Malaysian's And Indonesian's Automotive Industries: An Exploratory Study. *Proceedings of theInternational Multiconference of Engineers and Computer Scientists*. 2: 18 – 20

[3] Jusoh, R., Ibrahim, D. N. and Zainuddin, Y. 2008. The Performance Consequence Of Multiple Performance Measures Usage: Evidence From The Malaysian Manufacturers. *International Journal of Productivity and Performance Management.* 57 : 119-136

[4] http://www.iso.org/iso/iso_50001_energy.pdf

[5] M.S. Noor Azlina, K. Salmiah, J. Ahmed. "Green Lean TQM Practices in Malaysian Automotive Companies," "International Journal of Mechanical, Aerospace, Industrial, Mechatronic and Manufacturing Engineering", Vol. 6, No. 10, (2012).

[6] N.A.M.Salleh, S.Kasolang and A.Jaffar. "Lean TQM Automotive Factory Model System","World Academy of Science, Engineering and Technology", vol. 79: 627-633, (2011).

[7] Piercy, N. 2015. The Relationship Between Lean Operations And Sustainable Operations. *International Journal of Operations and Production Management*. 35(2): 282 – 315

[8] Siti Norhafizan Hibadullah*, Nurul Fadly Habidin, F.I.M.Z, N.M.F and Auni,2013, Lean Manufacturing Practices and Green Performance in Malaysian Automotive Industry, Asian Journal of finance 7 Accounting, ISSN 1946-052X, Vol. 5, No. 1 ;462-471

[9] Zakuan N.M, Yusof S.M, Shamsudin S and T.L,2008, Reflective Review of Relationship between Total Quality Management and Organizational Performance, Proceedings of International Conference on Mechanical & manufacturing Engineering (ICM2008), 21-23 May 2008, ISBN : 97-98-2963-59-2, Faculty of Mechanical & Manufacturing engineering, UTHM,

[10] Rebelo, M.F. (2011) Contribution to the Structuring of a Model of Integrated Management System QES. Master Thesis, Polytechnic Institute of Cávado and Ave, Barcelos

[11] R. Jusoh, D. N. Ibrahim, and Y. Zainuddin, ."The performance consequence of multiple performance measures usage: evidence from the Malaysian manufacturers," International Journal of Productivity and Performance Management, vol. 57, pp. 119-136,

[12] Gwen Christini; Michael fetsko and Chris Hendrickson, M.ASCE. 2014. Green Management Systems and ISO 14001 certification for construction firms. Journal of Construction Engineering and Management @ Asce/May/June