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**DETERMINANTS OF ISO 9001 QUALITY
MANAGEMENT SYSTEM
EFFECTIVENESS AMONGST
ELECTRICAL AND ELECTRONICS
MANUFACTURING FIRMS IN MALAYSIA**

***Abstract:** The study aims to investigate the critical factors that influence the effectiveness of the ISO 9001 Quality Management System (QMS) amongst electrical and electronics (E&E) manufacturing firms in Malaysia. Data were gathered from a survey of respondents from eighty-eight E&E manufacturing firms in Malaysia. The results signify that there are positive and significant influences of internal motivation on the continuous improvement, internal motivation on the prevention of non-conformities, employee attributes on the customer satisfaction, employee attributes on the prevention of non-conformities, and top management commitment on the continuous improvement. However, the study found positive and insignificant relationships between the internal motivation with the customer satisfaction, employee attributes with the continuous improvement, top management commitment with the customer satisfaction, and top management commitment with the prevention of non-conformities. The theory, practical, and literature implications of these findings are further discussed.*

***Keywords:** ISO 9001 QMS, Internal Motivation, Employee Attributes, Top Management Commitment, Effectiveness*

1. Introduction

Quality management has been considered as firms' strategic planning mechanisms and source of competitive advantage for firms' continuous survival in the market. Quality has been recognised as one of the competitive strategies for developing business performance in the international market, with intense competition and demanding customers (Ismaylis, Moschidis, & Tsiotras, 2015).

Past studies have signified that quality with the focus to increase the employee's

competencies and customer satisfaction can become the major competitive resources to the companies (Zailani et al., 2015).

Presently, many companies have incorporated the quality management idea in their practices as research has discovered that the execution of a quality management system has directed organisations towards greater performance (Mokhtar & Yusof, 2010).

According to Goetsch and Davis (2013), a quality management system is made out of all of the association's policies, strategies, procedures, processes, assets, and delineation

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of responsibility and authority, all intentionally aimed at achieving product or service quality levels consistent with customer satisfaction and the organisation's objectives. In this case, the ISO 9001 QMS standard is the standard that is the highest adopted by organisations around the world (Zeng et al., 2005).

The ISO 9001 QMS standard is based on eight quality management principles, which are customer focus, leadership, process approach, involvement of people, continual improvement, system approach to management, factual approach to decision-making, and mutually beneficial supplier relationship (Hoyle, 2009). The standard was first published in 1987 and then revised in 1994, 2000 (Zeng et al., 2005), and 2008, with the latest revision being made in 2015. If this standard is implemented constantly, the ISO 9001 is expected to deliver a powerful outcome that is derived from the QMS best practices (Psomas et al., 2013).

This standard cannot simply be considered as an early step to simple conformation to quality desires but also as a framework for the enhancement of the effectiveness of the QMS (McGuire & Dilts, 2008). According to Heras-Saizarbitoria (2011), the ISO 9001 QMS standard cannot be denied of its crucial impact on the development of quality management. It has arguably made the most important contribution to quality management that there has been to date. The purpose of this standard is to help the companies in establishing a solid quality system to sustain the quality level (Lin & Chai, 2012). The achievement of the ISO 9001 QMS certification can be recognised by its capability of changing any firm to a world class status (Sivaram et al., 2014), by providing a set of guidelines which is targeted at increasing the functional and process capability of an organisation through the process improvement (Prajogo, 2011).

However, the lack of understanding of the ISO 9001 QMS standards' requirement and the challenges in executing corrective and

preventive activities, document and data control, and internal audits are obstacles to the ISO 9001 QMS performance (McCullough and Laurie, 1995). The employees' attributes, such as low level of knowledge and inadequate training, employee resistance to change, and the lack of qualified workers, are significant obstacles to the successful implementation of the ISO 9001 QMS. In a study conducted amongst Malaysian manufacturing firms, the researchers found seven clauses of the ISO 9001 QMS that are mostly hard to achieve, which included corrective and preventive actions, design control, management responsibility, statistical techniques, process control, document and data control, and a quality system (Yahya and Goh, 2001). This has prompted the need to find the critical factors to ensure the effective implementation of the ISO 9001 QMS amongst manufacturing firms in Malaysia.

Furthermore, the past studies on the effectiveness of the ISO 9001 QMS amongst electrical and electronics firms in Malaysia are very limited, with most of the studies in the QMS being concentrated on the construction (Keng & Kamal, 2016), oil and gas (Al Turki & Faris, 2010), and education sectors (Daud et al., 2012). As such, this study is significant in view of its contribution to fill the gap of knowledge in a very important electrical and electronics sector in Malaysia, which has contributed significantly to the country's GDP growth, job employment, investment, and exports (The Star, 2016). Besides the practical contribution, this study is expected to contribute to the scarcity of studies in the current body of literature on the critical factors that impact on the ISO 9001 QMS' effectiveness measured by the standard's objective, especially from the manufacturing firms (Psomas & Antony, 2015).

Hence, the use of this sector is relevant and useful to fully understand the factors that influence the effectiveness of the ISO 9001 QMS and provide insights of the critical factors that are needed for effective

implementation amongst the manufacturing industry players in Malaysia.

The present study follows the suggestions by Psomas and Antony (2015) by conducting a study in the sub-sector of the electrical and electronics manufacturing industry. Besides that, the study has also incorporated a new variable of top management commitment, in addition to the existing internal motivation and employee attributes utilised in Psomas and Antony's (2015) study.

The paper is structured with a literature review on the effectiveness of the ISO 9001 QMS implementation, internal motivation, employee attributes, and top management commitment which are discussed after the introduction section. A conceptual model is then proposed to identify the influence of the internal motivation, employee attributes, and top management commitment on the effectiveness of the ISO 9001 QMS implementation, which was conceptualised through the standard's objectives. Subsequently, an empirical study using a survey is conducted to validate the proposed conceptual model and is followed by the conclusion and recommendations in the last section of the paper.

2. Literature review

2.1. Effectiveness of the ISO 9001 QMS Implementation

Effectiveness has been described as the extent to which the outcomes meet the prescribed goals (Oztas, Guzelsoy, & Tekinkus, 2007). Therefore, the effectiveness of the ISO execution can be well-defined as the degree to which the anticipated results or objectives of the ISO 9001 QMS are achieved (Psomas, et al., 2013).

According to Gotzamani (2005), the basic idea of the ISO 9001 is the effective execution of the QMS which is achieved through continuous improvement actions and the prevention of non-conformities and results in increased customer satisfaction. There are

numerous definitions for the term effectiveness for the standards. However, it seems clear that there is a consensus amongst researchers for the effectiveness of an ISO 9001 QMS in achieving the three main objectives - continuous improvement, customer satisfaction, and prevention of non-conformities. This was prevalent in a study by Tsim et al. (2002), which stated that the effective implementation of the ISO 9001 QMS can be achieved through the prevention of non-conformities and the continuous improvement actions which bring the results of increasing consumer satisfaction.

Besides that, Goetsch and Davis (2005) agreed that the objective of the ISO 9001 QMS is the establishment of consistent products with client and regulatory requirements, which can be explained as, the establishment of a system that will contribute to continuous improvement, customer satisfaction focus, and prevention of non-conformities. The aim of the ISO 9001 QMS is to guarantee that company will deliver products or services that follow consumer requirements with regards to quality, whilst targeting the achievement of continuous improvement and enhancing customer satisfaction (Briscoe, Fawcett, & Todd, 2005). According to Öztaş (2007), in order to manage and lead the organisation effectively, it is important to direct and control it in a precise and straightforward way. The authors also agreed that performance can be achieved by maintaining and implementing a QMS that is continually improving performance to meet the requirements of all interested parties.

Based on the above, the study has conceptualised the effectiveness of the ISO 9001 QMS implementation based on the three main achievements of the ISO 9001 QMS objective - continuous improvement, customer satisfaction, and prevention of non-conformities.

2.2. Internal motivation

Internal motivation for adopting the ISO 9001 is focused to form an effective and proven

quality assurance programme that consists of procedures of documentation and monitoring, operation traceability, client communication, mistake reduction, and after-sales service (Boiral, 2003). On the other hand, Tarí et al. (2014) claimed that the internal reason to implement the ISO 9001 is to improve the processes, procedures, people, and product or service quality as well as to develop quality awareness and reduce incidents and complaints. Companies which seek certification to increase their quality of products and services tend to gain excellent benefits from the ISO certification process (Feng et al., 2008).

In relation to this, Georgiev and Georgiev (2015) described that the common theory, based on the empirical evidence in their study, is that firms which have actualised the ISO 9001 standard are actually driven by the internal motivation and regularly report positive improvements. In addition, according to Yahya and Goh (2001), the firm that is certified for internal motives, experience less difficulty in satisfying the elements of quality certification than those that are certified for external motives.

2.3. Employee attributes

Employee attributes delineate the workers' awareness and empowerment to perform quality-related matters and being suitably trained for the work they do (Singh & Smith, 2006). To guarantee the effective management and implementation of the ISO 9001 QMS, employee attributes are the important factor that needs to be considered as it has directly affected the effective implementation of the QMS (Singh & Smith, 2006).

According to Singh (2008), commonly, the workers of an ISO 9001 registered organisation have to be fully trained for the work they perform, need to be aware on how the quality policies of the company affect their job, know their goals and roles, have their improvement and motivation promoted, have an active role in formulating

organisational and work plans, and continuously improve their work output. Furthermore et al. (2014) stated that motivated workers are more productive and based on this, there is a need to motivate the workers to implement excellent quality practices and help organisations to survive. For the non-performing workers, changing the culture and attitude of the employee is the only way to accomplish improvements (Luning & Marcelis, 2006) in order to achieve the highest ISO 9001 QMS quality practices.

2.4. Top management commitment

The management's responsibility includes the commitments to improve and develop the quality system, formulating planning and quality policies, and describing responsibilities, authorities, and communication processes to facilitate effective quality management (Biazzo & Bernardi, 2003). In the standard-based approach, the top management leadership is predicted to make sure that the quality management system is frequently audited, revised, and continually enhanced for effectiveness. In relation to this, top management leadership should show commitment to quality, take a long-term strategic view of quality, and make sure that adequate assets are available for quality related actions (Singh & Smith, 2006).

According to Al-Najjar and Jawad (2011), the execution of the ISO 9001 can influence the entire company and if top management display total commitment to quality programmes, it leads to continuous improvement. This is because a greater top management commitment leads to superior internal communication and better-motivated employees (Wahid et al., 2011). The top management also need to assure that the certification could enable the organisation to communicate to its client with a clear commitment to quality (Al-Najjar and Jawad, 2011). This is due to the fact that the customer will be more trusting of the certified manufacturers and will go to a considerable

extent to selectively work only with the certified ISO 9001 QMS manufacturers.

3. Research Model and Hypotheses Development

The study has proposed the research model as depicted in Figure 1. Based on the review of literature, the study has proposed that factors such as internal motivation, employee attributes, and top management commitment could influence the effectiveness of the ISO 9001 QMS adoption by increasing the firm's continuous improvement, prevention of non-conformities, and customer satisfaction. Through the foundation of the contingency theory, it is argued that there is no best way to manage the organisation, and firms should align the organisation's systems or processes with several related factors in order to achieve high performance (Joiner, 2007). Firms should find the right possible root cause and choose the best counter-measure that can provide the best solution for the

problem solving, by taking into consideration the firm's internal and/or external conditions (Lee et al., 2016).

Likewise, firms that are adopting the ISO 9001 QMS need to find the right factors that could influence the effectiveness of the ISO 9001 adoption and eventually increase the firm's performance.

The factors such as internal motivation, employee attributes, and top management commitment are significant to influence the firm's continuous improvement, prevent of non-conformities, and provide customer satisfaction. In other words, the effectiveness of the ISO 9001 QMS adoption based on the contingency theory is contingent on the specific factors that need to be established or improved in the organisation. Such ambiguities in determining the factors could lead to "one size fits all" in adopting the ISO 9001 QMS, which eventually could produce less effective results from the implementation of the ISO 9001 QMS in the organisation.

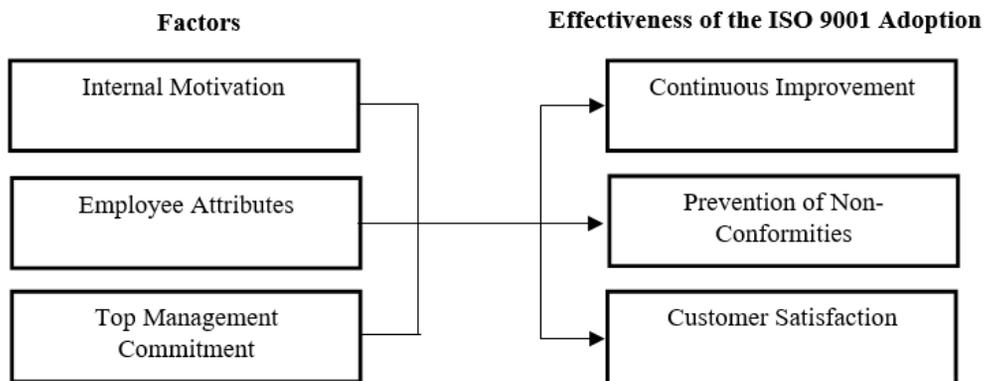


Figure 1. Research Model

According to Yeung et al. (2003), when there is an absence of motivation to execute the QMS, any strategic directions for further development of the QMS and improvement of its effectiveness cannot be successful. Martínez-costa (2008) further added that, the quality certification derived from a firm's internal motives can generate valuable internal resources because the quality

improvement activities connected to the quality standard can become part of the firm's technical core. Hence, the following hypothesis has been formulated:

H1: Internal motivation will positively impact on continuous improvement.

Feng et al. (2008) asserted that, gaining the ISO 9001 certification does not guarantee product and service quality, but it somewhat

provides an assurance to customers that the organisation has conformed to an international standard. According to Magd (2008), there is an increasing number of organisations that develop and adopt a QMS to enhance efficiency, competitiveness, and customer satisfaction. Based on this, the following hypothesis has been formulated:

H2: Internal motivation will positively impact on customer satisfaction.

Tarí, et al. (2014), in their study, stated that the internal reason improved the efficiency, product or service quality, processes and procedures, and aided in developing quality awareness and reducing incidents and complaints. Moreover, according to Kartha (2004), the ISO 9001 QMS standard offers a guideline on methods, controls, and documentation to assist an organisation in identifying mistakes, streamlining its operations, and keeping up a consistent level of quality. Thus, this has led to the following hypothesis.

H3: Internal motivation will positively impact on the prevention of non-conformities.

Luning and Marcelis (2006) revealed in their study that, managers prefer to change the culture and attitude of employees; as, the managers greatly believe that this is the best way to achieve the improvements, especially in the implementation of the QMS in the organisation. To get the best results, employees must be fully motivated to be involved in the quality improvement activities and, eventually, contribute to the change of the overall company's quality culture (Kafetzopoulos et al., 2014). Thus, this has led to the following hypothesis.

H4: Employee attributes will positively impact on continuous improvement.

Namasivayam, et al. (2014), in their study, found that satisfied workers who received appropriate empowerment can influence their commitment towards the organisation and contribute significantly to customer satisfaction.

In a standard-based working practice, employees are more mindful and authorised to act on the quality-related problems as well as being properly trained to carry out their work (Singh and Smith, 2006), to serve the customers more effectively. Moreover, Soltani et al. (2003) asserted that employee performance, skills, and motivation can improve work performance and customer satisfaction. A well-educated and continuously trained worker-base is crucial to provide quality to customers and the firm's competitive advantage in the market. Thus, this has led to the following hypothesis.

H5: Employee attributes will positively impact on customer satisfaction.

According to Yeung, Chan, and Lee (2003), resistance to change amongst employees creates a significant problem in advancing a QMS and increasing its effectiveness. Employees who follow the procedures can support the organisation's mission towards continuous improvement by avoiding making the same mistakes, learning from the past weaknesses, and recognising ways to correct them (Sadikoglu and Zehir, 2010). In this case, employees can adopt continuous improvement by maximising their efforts to reduce the errors in their work and, eventually, reach the goals of continuous quality improvement (Lin and Jang, 2008). Nevertheless, employees' refusal to accept the QMS adoption may cause major difficulties to leverage the effectiveness of the QMS (Yeung et al., 2003), which include the firm's continuous improvement, customer satisfaction, and prevention of non-conformities. Thus, this has led to the following hypothesis.

H6: Employee attributes will positively impact on the prevention of non-conformities.

One of the significant factors that contribute to the successful improvement programmes is top management commitment (Alhaqbani et al., 2016).

Continuous improvement adopted in the organisations is likely to fail without the support from the top management (Fryer et

al., 2007). Amongst the roles of the top management is monitoring and regularly participating in the continuous improvement activities, training, briefings, and meetings (Seaver, 2001). By showing the total commitment to the quality programmes, top management could inculcate a better atmosphere of continuous improvement amongst the employees in the organisation (Al-Najjar & Jawad, 2011). Thus, this has led to the following hypothesis.

H7: Top management commitment will positively impact on continuous improvement.

Ooi et al. (2011), in their study, discovered that leadership with customer focus through the adoption of total quality management has a strong linkage with customer satisfaction. The results were coherent with the study by Pannirselvam and Ferguson (2001), and Sakthivel et al. (2005) which stated that continuous support and commitments from the top management in the adoption of a quality management practice could greatly influence customer satisfaction. The top management responsibility related to quality includes the establishment of a quality policy, developing and improving a quality system, and listening to clients (Biazzo & Bernardi, 2003). Thus, this has led to the following hypothesis.

H8: Top management commitment will positively impact on customer satisfaction.

Top management commitment to quality is important, especially during the implementation, by maintaining the management commitment to QMS and efforts towards achieving effective implementation (Grover et al., 2006; Sila, 2007). This is because all of the quality efforts, such as prevention of non-conformities in the organisation, are likely to fail without the total involvement of the top management (Sureshchandar et al., 2001). Thus, this has led to the following hypothesis.

H9: Top management commitment will positively impact on the prevention of non-conformities.

4. Data analysis

4.1. Research Design

The study was quantitative in nature with the utilisation of the cross-sectional design, on which the data was gathered through a survey over three months, from January to March 2017. The study focused on electrical and electronics manufacturers in Malaysia. This sector was chosen due to it is having the largest product export performance, with over RM234 billion in exports recorded in the year 2016 (DOS, 2017); thus, they were deemed fit as they were more likely to adopt the ISO 9001 QMS due to international market requirements.

The survey questionnaire was divided into seven sections. Section A was used to solicit the background information of the respondents. Sections B, C, and D were comprised of the questions for the independent variables: internal motivation, employee attributes, and top management commitment. This was followed by the questions for the dependent variables in section E, F, and G: continuous improvement, customer satisfaction, and prevention of non-conformities. The Likert-scale used ranged from (1) strongly disagree, (2) disagree, (3) not sure, (4) agree and (5) strongly agree. As the study was exploratory in nature, component-based structural equation modelling (SEM) was deemed fit (Hair et al., 2011). As such, the software package Smart-PLS was utilised to analyse the data of the study. In addition, the SPSS was used to analyse the demographic profile of each respondent.

4.2. Sample profile

This study utilised the population of electrical and electronics manufacturing firms registered with the Electrical and Electronics Association of Malaysia (EEAM). Based on the number of members of the EEAM, the study had drawn a sampling frame of 486 electrical and electronics manufacturing firms

in Malaysia (Zailani et al., 2017). As such, a total of 486 questionnaires using the census sampling method were sent by post and email to the quality assurance managers working in the E&E firms to get their views and feedbacks on the questions. After two reminder letters in addition to telephone calls and e-mails, the total final samples of usable sets of questionnaires received were 88 sets or 18% of the response rate. The major response was received from electronics manufacturers (71%), followed by electrical goods manufacturers (29%). The majority of the firms had been operating for more than 15 years (69%), large firms with 300 to more than 500 employees (51.7%), with almost equal percentage between local and local joint venture firms (49.3%), and multi-national corporations (50.7%), respectively. Lastly, all of the firms were ISO 9001 QMS certified with more than half receiving the certification for five years or above.

4.3. Analysis of the relationships

In this study, two stages of analysis have been adopted, which are the measurement and

structural models (Zailani, et al., 2017). The measurement model was established first before analysing the structural model. The measurement model was used to analyse the individual loading of each item, composite reliability, average variance extracted (AVE), and discriminant validity. This was to test the reliability and validity of the measures prior to the assessment of the structural model (Zailani, et al., 2017). The structural model was used for testing the hypothesis related to the research objective. For the structural model, it applied the bootstrapping method to determine the significant level of the weights, path coefficient, and loadings (Hair et al., 2011).

4.4. Assessment of the Measurement Model

In the assessment of the measurement model, the reflective constructs were evaluated to determine the acceptance of the reliability and validity of the constructs. Table 1 shows that the composite reliability of all of the constructs in the study exceeded the 0.7 threshold, as suggested by Hair et al. (2013).

Table 1. Measurement Model Evaluation

Construct	No. of Items	Factor Loadings	Composite Reliability	AVE
Internal Motivation	5	0.843-0.953	0.958	0.820
Employee Attributes	5	0.784-0.869	0.919	0.694
Top Management	5	0.739-0.907	0.927	0.718
Continuous Improvement	5	0.662-0.929	0.931	0.731
Customer Satisfaction	5	0.795-0.892	0.929	0.725
Prevention of non-conformities	5	0.783-0.882	0.930	0.727

The factor loadings above 0.6 (with the details shown in Figure 2) also clearly indicated that the reliability of each individual item was greatly achieved (Hair et al., 2010). Subsequently, the convergent validity was assessed, and with the results of the AVE of all of the constructs being above 0.5, this indicated that the convergent validity had reached a satisfactory level (Fornell & Larcker, 1981).

The assessment of the discriminant validity was made by examining the cross loadings of the constructs (Hair, et al. 2012) and making a comparison between the square root of the AVE and the intercorrelations with the other model constructs (Fornell & Larcker, 1981). The former analysis method revealed that the items' factor loadings for each construct loaded higher in its construct than its opposing construct (Hair et al., 2012).

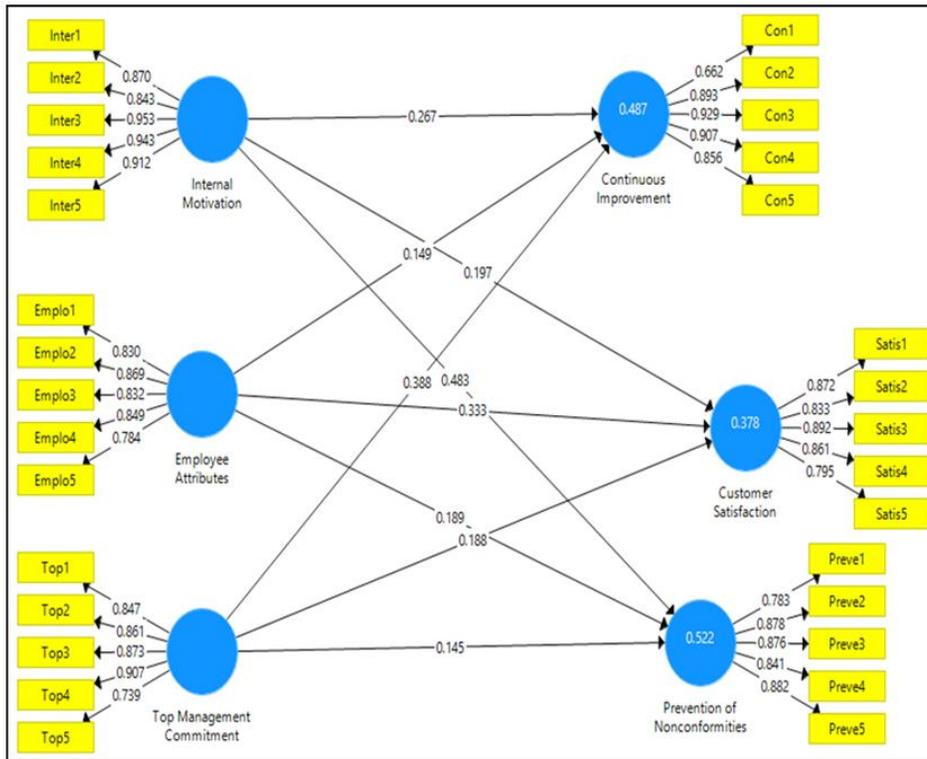


Figure 2. Measurement Model

The latter analysis, with the results shown in Table 2, revealed that the square root of the AVE for each construct was higher than the intercorrelations between the other constructs. Hence, both tests demonstrated an adequate discriminant validity, in addition to

the justified convergent validity carried out at the earlier stage. This showed in a very clear position that, the model was sufficient to be further evaluated on its structural model performance.

Table 2. Discriminant Validity

	1	2	3	4	5	6
Continuous Improvement	0.855					
Customer Satisfaction	.609**	0.851				
Employee Attributes	.511**	.550**	0.833			
Internal Motivation	.612**	.525**	.617**	0.905		
Prevention of Non-conformities	.647**	.631**	.561**	.694**	0.853	
Top Management Commitment	.638**	.486**	.509**	.655**	.557**	0.847

Note: The diagonals represent the square root of the AVE, whilst the other entries represent the correlation between the constructs.

4.5. Assessment of the structural model

The goal of the assessment of the structural model of this study was to investigate the

interrelationships of the internal motivation and employee attributes with the effectiveness of the ISO 9001 QMS adoption, which were measured through the standard

objective: continuous improvement, customer satisfaction, and prevention of non-conformities. The assessment included the path coefficient's estimates and the R square value in order to determine the power of the prediction of the model (Ee, Abdul Halim & Ramayah., 2012).

As shown in Figure 2, the model accounted for 49%, 38%, and 52% of the variances in continuous improvement, customer satisfaction, and prevention of non-conformities, respectively. Moreover, the predictive relevance measure developed by Stone (1974) and Geisser (1975) has been utilised in this study to assess the model fit. In this case, the cross-validated redundancy value was computed based on the blindfolding process in the PLS as suggested by Chin (2010). The results demonstrated that the values of the predictive capability for all of the exogenous variables were above zero, signifying that the model had significant predictive relevance and achieved an adequate fit. The non-parametric bootstrapping method, as suggested by Wetzel et al. (2009), was utilised with 1000 subsamples being generated to assess the structural model. The results are shown in Figure 3. The significance level of the path coefficients in the structural model was

assessed, with the t-values for a one-tailed t-test being 1.645 (5% of the significance level) and 2.326 (1% of the significance level) (Hair et al., 2011). Based on the summary of the results presented in Table 3, there were positive and significant paths leading from internal motivation towards continuous improvement (path coefficient=0.267, $p < 0.05$), internal motivation to prevention of non-conformities (path coefficient=0.483, $p < 0.01$), employee attributes to customer satisfaction (path coefficient=0.333, $p < 0.01$), employee attributes to prevention of non-conformities (path coefficient=0.189, $p < 0.05$) and top management commitment to continuous improvement (path coefficient=0.388, $p < 0.01$). Hence, the results supported H1, H3, H5, H6, and H7. On the other hand, the path coefficients were positive and insignificant from internal motivation to customer satisfaction (path coefficient=0.127, $p > 0.05$), employee attributes to continuous improvement (path coefficient=0.149, $p > 0.05$), top management commitment to customer satisfaction (path coefficient=0.148, $p > 0.05$) and top management commitment to prevention of non-conformities (path coefficient=0.145, $p > 0.05$). Hence, the findings did not support H2, H4, H8, and H9.

Table 3. Path Analysis Result

Hypothesis	Path	Coefficient	t value	Remarks
H1	Internal Motivation -> Continuous Improvement	0.267	2.198	Supported
H2	Internal Motivation -> Customer Satisfaction	0.127	1.176	Not Supported
H3	Internal Motivation -> Prevention of Non-conformities	0.483	3.483	Supported
H4	Employee Attributes -> Continuous Improvement	0.149	1.497	Not Supported
H5	Employee Attributes -> Customer Satisfaction	0.333	2.906	Supported
H6	Employee Attributes -> Prevention of Non-conformities	0.189	1.769	Supported
H7	Top Management Commitment -> Continuous Improvement	0.388	2.924	Supported
H8	Top Management Commitment -> Customer Satisfaction	0.148	1.306	Not Supported
H9	Top Management Commitment -> Prevention of Non-conformities	0.145	1.300	Not Supported

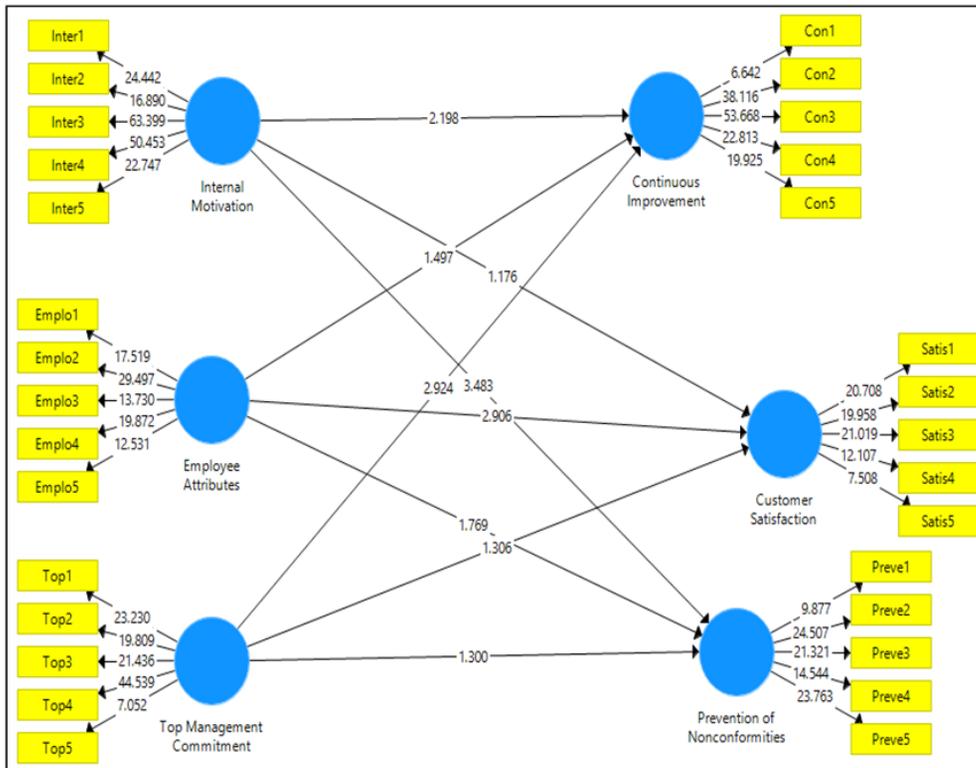


Figure 3. Structural Model

5. Discussion

The purpose of this study is to identify the factors, such as internal motivation, employee attributes, and top management commitment, which have a significant influence towards the effectiveness of the ISO 9001 QMS adoption, by increasing the firm's continuous improvement, prevention of non-conformities, and customer satisfaction. This study has also utilised the contingency theory, on which a firm's effectiveness of the ISO 9001 QMS adoption is contingent upon the alignment of the critical factors of internal motivation, employee attributes, and top management commitment into the internal process or system in the organisation. Besides that, the study used credible data that were able to support the study's findings. With the demographic profile of the respondents from the members of the EEAM, followed by the majority of the manufacturers have been

operating for more than 15 years, large firms with more than 500 employees with all of them being ISO 9001 QMS certified, the data obtained were likely to present appropriate findings that can be generalized to the E&E industry in Malaysia.

The result revealed that, internal motivation significantly influenced the effectiveness of the ISO 9001 QMS; as continuous improvement was one of the key factors that measured the effectiveness of the ISO 9001 QMS. This was supported by Prajogo (2011), that an organisation which seeks the quality certification for internal motives can achieve internal benefits of the lower cost operations.

In other words, the organisation that has internal motivation will contribute to continuous improvement by improving product or service quality, developing quality awareness, and reducing incidents. These E&E firms implement the ISO 9001 QMS

because the management wants to reduce costs, increase their profits, and reduce the defects of the products. With these motives, the firms achieve continuous improvement as they emphasise that the employees must create or improve the procedures or processes in the organisation.

According to Georgiev and Georgiev (2015), the common theory based on empirical evidence is that firms, which have actualised the ISO 9001 QMS standard driven by internal motivation, regularly report positive improvements. Moreover, according to Yahya and Goh (2001), the firm that gets certified for internal motives experience less difficulty in satisfying the elements of quality certification than those that get certified for external motives. Internal reasons to implement the ISO 9001 QMS relates to the processes, procedures, and people within the organisation by improving product or service quality, efficiency, and processes and procedures, and developing quality awareness and reducing incidents and complaints (Feng et al., 2008).

Meanwhile, this study has discovered that, internal motivation and customer satisfaction showed a low relationship effect, respectively. Customer satisfaction is one of the objectives that measure the effectiveness of the ISO 9001 QMS. This is consistent with Tarí et al. (2014) study that the internal reasons to implement the ISO 9001 relate to the procedures, processes, and people within the organisation. Nevertheless, the outcome of this study seems to show that E&E firms were focusing more to improve the processes, techniques, and people in the organisation rather than concentrating on customer satisfaction. Moreover, the majority of the firms aimed to reduce the defects, improve the production, and reduce the costs in order to ensure that they could increase the profit as well as achieve high performance (Georgiev & Georgiev, 2015). They were more concerned about the number of defects, production delays, and other cost increases related to the production line compared to the number of complaints received from the

customer. In addition, the organisation may lack concentration on customer satisfaction for the internal motives. Based on this, it is a crucial focus for the firms to be highlighted on customer satisfaction in order to ensure the practices of the ISO 9001 QMS are implemented effectively within the organisation.

The motivation of the E&E firms to reduce defects and improve production gives a great influence to the prevention of non-conformities. As found by this study, the relationship between internal motivation and non-conformities showed a positive significant impact on one another since they were more concerned about internal motivation in improving the non-conformities related issues. To put it simply, non-conformities can be explained as a product that does not meet the specification or requirement of the production. It is usually related to an error that can be detected in a process or component of a product. Therefore, by having the internal motivation to achieve the effectiveness of the ISO 9001 QMS, the organisation builds an effective quality assurance which will contribute to the prevention of non-conformities (Psomas et al., 2013).

This positive internal motivation of the E&E firms to reduce defects and improve production gives great influence to the prevention of non-conformities. In addition, for the E&E firms that were more concerned about internal reasons and obtaining higher profits, it usually came from the implementation of quality systems, reaching a superior practical execution of the quality management principles, and were the most likely to progress towards the total quality improvement (TQM) (Llopis and Tari, 2003). Therefore, by having the internal motivation, the organisation has a positive influence towards the prevention of non-conformities. It has been revealed that, employee attributes were not influenced the continuous improvement since this study showed that the relationship was not significant. According to Singh (2008), the employees of an ISO 9001

QMS certified organisation needs to be fully trained for the work they perform, aware of the quality policies of the organisation which affect their job, and must continuously improve their work output. Nevertheless, the insignificant results of this study indicated that the employees need to have more training and be provided with enough knowledge of the ISO 9001 QMS implementation. This suggested that, most of the employees in the E&E firms still lack the knowledge and commitment to excel in continuous improvement in the organisation. The employees need to be well-trained and give a full commitment in order to foster outstanding continuous improvement in achieving the desired goals. As a normal practice, the engineering and technician teams are usually the only ones involved in improving the process in the production or system, whilst other employees are not truly involved in the improvement processes (Kafetzopoulos et al., 2014). Hence, this signified that the employee attributes in the organisation do not fully influence the continuous improvement, as the majority of them are not involved in the improvement activities.

On the other hand, the results of this study demonstrated a positive between employee attributes towards the customer satisfaction. Customer satisfaction is one of the objectives that measure the effectiveness of the ISO 9001 QMS. The employees who are directly or indirectly involved in the production, quality assurance and operation in the organisation will contribute to customer satisfaction. As the employees, they are responsible to ensure that they can deliver quality work in order to reduce customer complaints and increase customer satisfaction. In this study, the employees believed that their responsibility to ensure the process or flow in the organization was well managed. For example, an employee suggested the management methods that could be used to reduce customer complaints. According to Sadikoglu and Zehir (2010), fulfilled and motivated workers will add to

enhancing quality, creating new thoughts for product, service or process enhancements, and presenting new products or services in the marketplace in a convenient and effective way. Hence, the employee attributes will give a positive influence towards customer satisfaction.

The relationship between employee attributes towards prevention of non-conformities also showed a positive impact and was supported by this study. As mentioned earlier, the major concern of employees is more on prevention of non-conformities where the employees are more aware of the importance of quality and producing products with the avoidance of defects. They are given sufficient training by management which increases their knowledge and skills in managing non-conformity items in production. According to Singh and Smith (2006), basically, each department has its own target or key performance index (KPI) in reducing the defective items and idle time due to non-conformity issues during the production. This is crucial for each department to work as a team in order to achieve the desired KPI; as well, it is important for the employees to contribute excellent quality job performance to ensure the effectiveness of their jobs. The consistency of their endeavours, and enhancing the firm's performance in respective areas are some of the examples that lead to product quality achievement. Thus, this indicates that the employee attributes give a positive impact to the prevention of non-conformities in the firm. In many firms, the top management is vital and play the main important role in confirming that the QMS is practised and applied successfully in the organisation (Aggelogiannopoulos et al., 2007).

This is not an exception for E&E firms; as, the research conducted in this study has found that there was a positive significant impact between top management with the continuous improvement. Good leadership and commitment are expected to ensure that the QMS is frequently audited, revised, and continually improved for the effectiveness in

the organisation. According to Singh and Smith (2006), in order to help organisations to have continuous improvement, top management is responsible to create an environment in which the QMS can be understood by employees and implemented effectively. This scenario is also applied by E&E firms as found by this study. The top management will usually have a monthly meeting session with employees to share the company's target, profit, awareness about quality, and current issues happening in the organisation. Thus, by showing this commitment, it can enhance the effort of the employees to excel in the continuous improvement in the organisation.

For the extent of the customer satisfaction's impact, the results revealed that the relationship of the top management towards the customer satisfaction was not significant and the hypothesis was rejected. By implementing the ISO 9001, the needs of the customer should be taken into consideration by the organisation in order to achieve customer satisfaction towards the product or service offered (Conca, Llopis, & Tari, 2004). This shows that customer satisfaction is really important to the organisation and the top management need to give full commitment to win the hearts of the customers. In this study, it seems that the top management showed more commitment to increasing the revenue and profit than achieving customer satisfaction. Another good reason probably due to the points of view of the top management towards customer satisfaction being different from the points of view of the researcher and other studies in the literature. The top management may have thought that, producing high quality output and zero-defect products, and having low cost products were more important to increase high profits and performance.

This can be seen from the top management high confidence level on the reputation with customers and placed more effort focusing on enhancing the productivity in the organisation.

On top of that, the top management impact towards the prevention of non-conformities was found insignificant in the study. Even though the top management implements the ISO 9001 QMS and is involved with quality programmes in the organisation, it is still not enough to prevent the non-conformities in the production. According to Psomas, et al. (2013), the effect of non-conformities is mainly through losing the customer, goodwill and sales, and the high cost of breaking agreements. Therefore, the top management should give full commitment to ensure the prevention of non-conformities. The practices should be consistent and systematic scheduling needs to be performed to enforce the QMS training, procedures, and the programmes carried out in the organisation. A quality control circle (QCC) team needs to be supported by all levels of the management, including the top level management, and employees. They need to revise the QMS strategies for each department and change to having positive attitudes amongst them in order to create a new QMS practice environment within the organisation. Since most of the E&E firms have been in operation for more than 15 years, the quality culture and the practices have been going on for too long and are difficult to change. According to Feng, et al., (2008), most of the practices, for any non-conformity, happen in the manufacturing process, and the top management will usually request engineers and technicians to come up with a solution for the defects that occurred. As such, the top management will receive a report on paper about the issues, without taking part in the real situation on the shop floor. Thus, this shows that the top management is not directly involved in the prevention of non-conformities. Nonetheless, the commitment given by the top management is not sufficient to achieve the full prevention of non-conformities. It is more valuable if both employers and employees can show support together and understand their respective responsibilities and needs in improving

productivity to the high performance of the company.

In summary, the findings of this study were consistent with the past study conducted by Psomas and Antony (2015) in which internal motivation and employee attributes contribute to the effectiveness of the ISO 9001 QMS adoption. In addition, the study has incorporated a new variable of top management commitment as part of the integrated model tested in the study. However, the effect of top management commitment was unconvincingly transpired against the predicted effects of the previous study. As such, the current finding disputed the existing literature top that suggested top management commitment are extremely important determinants to increase the effectiveness of the ISO 9001 QMS adoption. This implies that top management commitment is not the main factor that determines the effectiveness of the ISO 9001 adoption. Furthermore, the underlying principles of contingency theory were appropriate for explaining the significant role of internal motivation and employee attributes as the main motivating factors towards the effectiveness of the ISO 9001 QMS adoption. This strongly suggests that through the lenses of contingency theory, firms are embracing the factors of internal motivation and employee attributes in order to achieve the effectiveness of ISO 9001 QMS adoption. This includes taking appropriate measure to improve these specific aspects internally and avoiding “one size fits all” circumstances, especially the general approaches that are not tailored to the specific needs to attain the highly effective adoption of ISO 9001 QMS.

6. Conclusions

This study has examined the influential factors which impact the effectiveness of the ISO 9001 QMS adoption at E&E firms. Three independent variables have been tested individually with all key measure factors towards the success of the implementation.

Contingency theory was used to explain the influence of the relationship between internal motivation, employee attributes, and top management commitment and the effectiveness of ISO 9001 QMS adoption. The result of this study showed that, both internal motivation and top management factors had a positive significant impact towards the continuous improvement in the firms. These findings showed that most firms are more concerned with the ongoing effort of understanding the internal rewards and being supported by top level management. Besides that, both the internal motivation and employee attributes also showed a positive relationship with the prevention of non-conformities, respectively. This relationship explained, and aligned with continuous improvement, that the firms are always planning to eliminate the cause of non-conformities and prevent the occurrences as well. For the extent of customer satisfaction, out of three key factors, only the employee attributes indicated a positive influential impact towards this relationship. The findings signified that, the firms are more concerned about internal development processes instead of the external perspective received by customers in achieving a high-performance goal.

Meanwhile, this study also revealed that, top management commitment has a lack of influence factors towards both customer satisfaction and prevention of non-conformities in achieving an effective ISO 9001 QMS implementation. The findings contradict with the prediction from the past literature that suggested top management commitment is significant to achieve the effectiveness of the ISO 9001 QMS adoption. In this case, it is possible to conclude that, top management is more concerned about setting and establishing the quality policy, key performance index (KPI), and competitive strategy towards excellent quality job performance without taking part directly in the process of how to achieve those aims. Even though the top management implements the ISO 9001 QMS and are involved with

quality programmes in the organisation, it is still not enough to prevent non-conformities in the production or satisfy the customer. The internal motivation is also important and needs to be focused on for the satisfaction of the customer.

This study showed that, the relationship between both of these elements is not significant to the firms studied. Even though the firms are more likely focused on continuous improvement, the employee attributes are still lacking and not significant enough to be counted towards successful ISO 9001 QMS practices. This is potentially due to the normality of the culture related to the behaviour and changing opinions of the employees since it has been practised for a few years. Therefore, the management should realise the need to make improvements and encounter some factors in order to increase the effectiveness of the ISO 9001 QMS, especially in E&E firms.

The findings of this study demonstrate practical implications for the managers by providing evidence of the critical factors towards the effectiveness of the ISO 9001 QMS practices amongst E&E firms in Malaysia. Two factors, which are internal motivation and employee attributes, have been shown to be more positive influence factors towards the effectiveness of the ISO 9001 QMS practices in terms of continuous improvement, preventive conformities, and customer satisfaction. However, top management commitment should be focused on by E&E firms due to less significant results being found towards the positive influence on the effectiveness of the QMS practices. Top management plays a main role in the organisation as they are involved in deciding on important decisions for the organisation. Even though top management show commitment towards achieving customer satisfaction and prevention of non-conformities in the organisation, it is still not sufficient. Therefore, top management should take advantage as they have already implemented the ISO 9001 QMS to attain

customer satisfaction and prevention of non-conformities.

Moreover, the non-significant result can be because of the different perspectives of the top management towards customer satisfaction and the prevention of non-conformities, and these E&E firms putting more emphasis on the employees to achieve higher sales and obtain high profit. Furthermore, a different understanding and perspective of the top management towards customer satisfaction and prevention of non-conformity has led to the non-significant result in the study. Top management need to have a wide understanding and sufficient information as the implementation of the ISO 9001 will help the organisation to fulfil customer satisfaction and also achieve the prevention of non-conformities.

The study has discovered several important factors that impact on the effectiveness of the ISO 9001 QMS adoption amongst E&E firms in Malaysia. Based on the underpinning of the contingency theory, firms should inculcate and nurture the internal motivation, employee attributes, and top management commitment within the organisation in order to grasp the effectiveness of the ISO 9001 QMS adoption in the organisation. Although not all factors were found to significantly influence the adoption, the critical factors such as internal motivation which impacted on two ISO 9001 objectives - continuous improvement and prevention of non-conformities, are imperative to assist firms in the ISO 9001 QMS adoption.

On a similar note, employee attributes also play a significant role in influencing two ISO 9001 QMS adoptions – customer satisfaction and prevention of non-conformities. Lastly, top management support is significant to impact on the continuous improvement in the organisation. As such, the firms can use the contingency theory as the foundation to fully utilise these factors to ensure the effectiveness of the adoption of the ISO 9001 QMS. On the other hand, the non-significant factors are those weak points that need to be

addressed by the firms so that the implementation of the ISO 9001 QMS could be effectively achieved towards all of the three standard objectives – continuous improvement, customer satisfaction, and prevention of non-conformities.

This study enriches the existing literature by incorporating a new variable - top management commitment. The results of the current study showed that top management commitment amongst E&E manufacturing firms were only channeled towards the

continuous improvement, but less concerned with the customer satisfaction and prevention of non-conformities.

Although such findings are hard to justify as the top managements commonly refuse to commit on the resources (Lam, 1996), however, this could provide the senior management with vital information, in order for them to increase their commitments for the effective adoption of the ISO 9001 QMS in their organisation.

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