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A New Integrated Framework for ISO 9001 Quality Management System Maintenance in Malaysia

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Abstract: ***Importance of ISO9001 Quality management system (QMS)cannot be ignored by the business world at any cost as it has a direct impact on the organization's ability to fulfilclient's requirements.This research identified the gap that a comprehensive framework for quality management maintenance is lacking, and the present quality management frameworks in use are not capable enough to meet the ISO9001 quality standards. This research is contributing to scholarly knowledge by integrating knowledge management and process-based management (PBM) elementsin the quality management system maintenance area. This study is descriptive in nature, and a quantitativeprocedure wasadopted to gather the data from 341 sample sizes. A total of 4 hypotheses were proposed and these form the overall research framework of this study. The quantitative data was analyzed through a technique named as partial least squares structural equation modeling (PLS-SEM). The structural model results showed that process-based management element has a majorinfluence on quality management maintenance while knowledge quality has a significant impact on process-based management element. Surprisingly, the finding shows that there is no important direct effect contributed by knowledge quality on QMS maintenance.This research also discovered that the process-based management element fully mediates the association between knowledge quality and quality management system elements. This new framework can support its users in assessing the strong and week points of their QMS maintenance effort and strategy, directing their improvement areas, making a plan of action for enhancements, and customizing a particular part to the requirements of their organizations. Based on thequantitative results, the researcher has concluded and proposed a new quality management system maintenance framework for ISO9001 certified organizations in Malaysia.***

Keywords: ISO9001, Knowledge Quality,Process Based Management Element, Quality Management System.

I. INTRODUCTION

The technological, business and economic changes and challenges require the Quality Management System Maintenance (QMSM) framework to be frequently improved and enhanced.

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The multi-discipline focus and context on the QMS framework by the academicians and practitioners also found some weaknesses and room for improvement on the existing framework, which shall be improved accordingly.

The researcher has examined these frameworks and found some limitations and problems towards implementing them by organizations. The problems and opportunities for improvement for both Kanter's (1994) and Wahid's (2012) QMS maintenance framework are highlighted in this research paper.

This research paper explored the problem related to the maintenance of QMS from two different angles. Firstly, the researcher explored the weaknesses of the current available QMS maintenance framework developed by previous researchers. Additionally, the researcher explored the problem of QMS maintenance from all phases in certification processes within the organization. By having a thorough understanding of problems pertaining to the QMS maintenance from both angles, the researcher can justify the needs of having a new element in the QMS framework. To initiate a better understanding of the problem and issues about QMS maintenance, the researcher illustrates the journey of ISO-9001 certification in Figure 1.

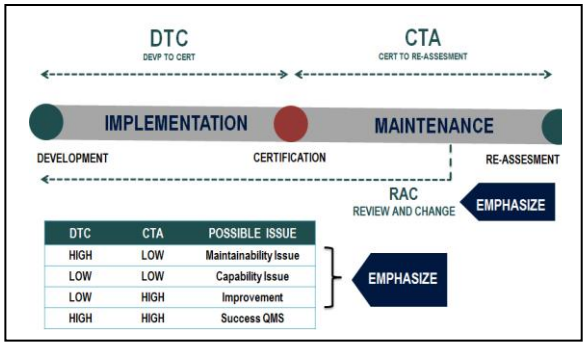


Fig. 1 Illustration of QMS ISO9001 certification journey and important issue for QMS maintenance

ISO9001 certification starts with the development activities of the QMS, such as mapping of the core processes, the establishment of quality manual, creation of documentation systems and writing the important procedure or manuals. In the next stage, the organization implements the QMS (DTC) before the certification body assesses and awards the ISO9001 certification. Subsequently, upon obtaining the certificate, the organization should maintain all that has been developed and ensure that they comply with the standard requirements accordingly throughout the maintenance stage before the certification body periodically re-assess the organization's QMS (CTA).

During this maintenance stage, organization may also continuously make necessary review and changes to the existing QMS as part of improvement initiatives (RAC).

During the ISO9001 certification journey, a few possible scenarios may happen to the organization, contribute to the occurrence of several issues, as shown in Figure 2. For instance, if the organization implements the QMS very well (DTC – High) but difficult to maintain it upon obtaining the certificate (CTA–Low), there are possibilities that maintainability issue occurs. In different scenarios, if the QMS is not very well implemented (DTC – Low) and at the same time, they also face some problems during the maintenance period (ATC-Low), the organization may have some issues on employee capability to implement and maintain the QMS. Another scenario illustrated in Figure1.3 is that the organization improved from DTC-Low to ATC-high. These issues and improvement initiatives shall be emphasized by the organization towards QMS success with specific and suitable strategies as illustrated in Figure 2.

However, the current QMS maintenance framework developed by previous research limitedly focuses on the issue and strategies discussed. The researcher argues that both Kanter's (1994) and Wahid's (2012) do not address the issue and strategies that an organization should undertake to ensure the QMS is a success as illustrated in Figure 2. Kanter (1994) and Wahid (2012) only addressed that to maintain QMS, organizations shall conform to all ISO9001:2015 requirements which is something that is understandable. Kanter (1994) and Wahid (2012) also limitedly address the importance of QMS's review and change that involve the process, people and cultural changes as stressed by other researchers such as Hammer and Champy (1993), Heckl&Moormann (2010) and Cleven et al., (2010).

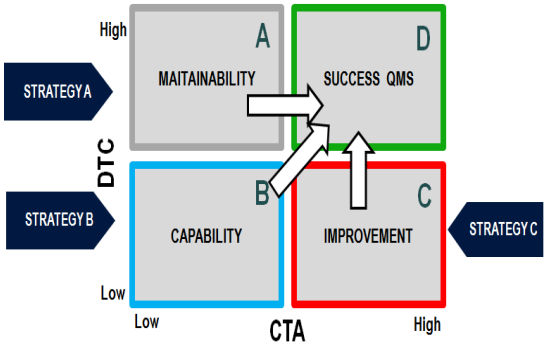


Fig.2 Illustration of a specific strategy for ISO9001 maintenance issue towards QMS success

Both researchers also limitedly focus on handling the process and its collaboration in QMS, which is highlighted and stressed in the standard Section 0.2 of ISO9001:2015 and ISO9004:2009. The management of processes and its interaction (known as process-based management (PBM) in ISO9000 standard) is essential to the organization as it pushes people to aware of the link between the activities in the process. PBM is established with the belief that ananticipatedoutcome is realized more professionally when activities and related resources are considered as a process (Bhuiyan and Alam, 2004). This is also supported by Fraser (2004), who specified that the identification and management of processes in an organization are a criticalexplanation of the ISO9001 standard. Without the rightsupervision of the processes and its interface, it will be hard for organizations to fulfill the technical desiresas the compliance of requirements, for ISO-9000,are complicated and deliverssubstantialdifficult to the organization and its workforce. In this context, the researcher believes that PBM can be included in the QMS maintenance framework. The element that drives the organization fulfills all the requirements set in the standard.

II. LITERATURE REVIEW

The management processes which have interrelated elements used to guide and control an organization with regards to quality is known as quality management system (QMS). This is in-line with the definition outlined in ISO9000 that specifically describes QMS as a management system that manages the quality in an organization by establishing and achieving organizational quality objectives and policy. By having the quality management systems, organizations integrate their processes and tools, translate them into operational assistance, monitor and develop the efficiency of the strategy and the operational actions.

The ISO technical committee 176 (TC-176) has established ISO 9000 standards specifically to standardize the practice on quality management in a systematic manner. It describes and outlines the basic elements of the quality system required to guarantee that an organization's products or services meet clientrequirements and anticipations. ISO9000 is also highly generic. Its principles can be applied to any organization providing any product or services anywhere in the world.

Currently, ISO9000 family standard consists of ISO 9000:2005, ISO 9001:2015 and ISO 9004:2009 with each standard has its specialization and focus. ISO 9000:2015 is a standard that becomes a guidance file. Itdelivers an understanding of the ideas, intent and the application of the "process approach" to the ISO9000 family of QMS standards whereby ISO 9001:2015 specify all the requirements for QMS to be used by all types of organization. ISO9001:2015 which currently still in applications, was published on 15th September 2015 and the only standard in ISO9000 family, which is used for certification purposes. Last but not least, ISO9004:2009 provides guidance to support the achievement of sustained success for any organization in complex, demanding and ever-changing environment by a quality management approach.

QMS implementation has an internal and external impact on both quality and operational aspects (Boiral, 2012). According to Boiral (2012), the positive internal impacts of QMS implementation are on the output, operational effectiveness, price and waste reduction, documentation management, innovation and inventory management as well as the increment of quality of the product, reduction of nonconformity, and more effective quality control and planning.

The positive impact to organizations from the implementation of QMS and ISO 9000 certification are such as on the clienthappiness, customer care, complaint reduction, distribution, belief, trustworthiness, and reduction to purchasing cost. By the end of 2017, 10380 certificates were issued to organizations in Malaysia. The growth rate of ISO 9000 certificates for Malaysia, on average is around 21.3% per year from 1993 to 2017. InAsia, Malaysia placed in 5th place behind China, Japan, India and South Korea. This indicates that ISO9001 standard is widely accepted in Malaysia with the nearest neighbouring country Singapore for comparison currently just having 3,704 ISO9001 certificates.

However, there are approximately 82,691 certificates that have been withdrawn (until 2014) all over the world due to various reasons,as shown in Figure 3 below. In Malaysia, there was a total of 2461 certification being withdrawn from 2006 to 2014. This issue is very important to the business community, authority, certification body as well as to the customers indirectly due to the fact that failure to maintain the certification means that organizations having some problems maintaining the quality processes and elements in fulfilling customers' satisfaction. Given the importance of this issue, many research has been done to investigate the sustainability and maintenance issue of ISO9001:2015 certification such as by Low and Omar, (1997), GoranSvensson (2006), Chin et al., (2000), Zeng et al., (2007), Prajogo (2008), Roslina et al., (2011) and Wahid (2012).

ISO 9001 - Withdrawn certificates

Country	2006	2007	2008	2009	2010	2011
Total	1415	589	1049	1554	665	863
Kuwait		18	3	5	6	4
Kyrgyzstan		4		4		
Latvia		1	24	67	49	41
Lebanon	1	12			9	3
Libyan Arab Jamihiriya				1	1	21
Liechtenstein	5	8	4	3	1	2
Lithuania			246	6	67	37
Luxembourg	1			29	5	4
Madagascar				11		1
Malaysia	**1402**	**274**	**137**	**142**	**203**	**303**
Maldives				2		
Malta					1	4
Mauritius						3
Mauritania				2		
Mexico		266	629	1278	319	437
Moldova	6	6	5		4	2
Monaco				1		1
Mongolia			1	3		

Source: ISO Certification Survey, 2014

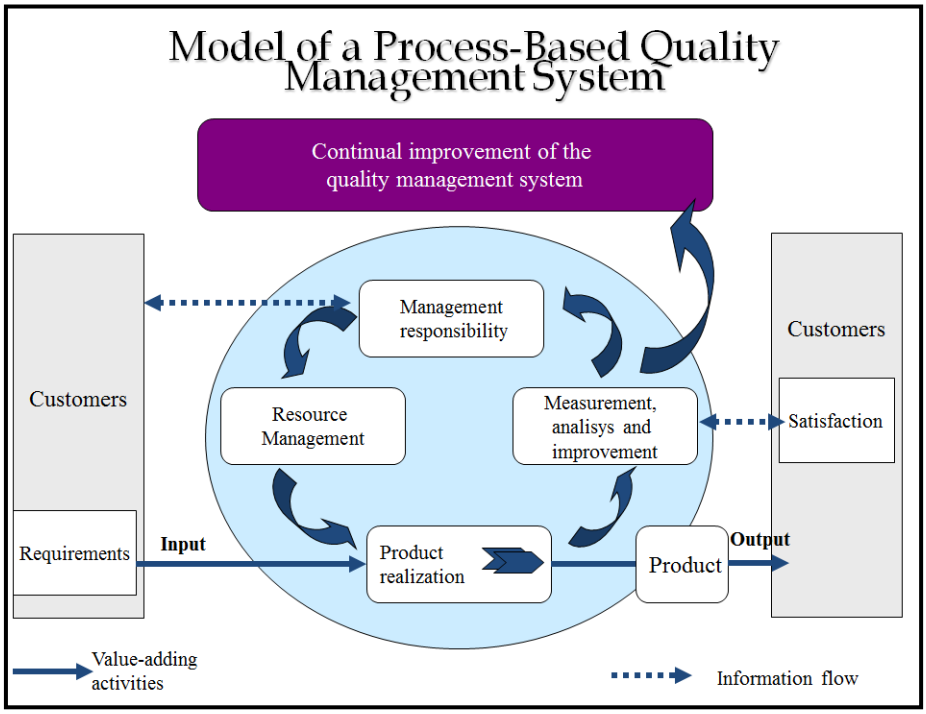
Fig.3 ISO 9001 certificate withdrawn per country until 2014

`PBM is one of the main part of TQM philosophy (Oakland, 1993), and few researches have been done on PBM such as by Koopman& Nicholas (1997), Balzarova et al., (2004) and Carmignani (2015). Commonly, PBM can be defined as the management of the organization by highlighting on maximizing the efficiency of processes rather than the efficiency of departmental or functional units (Harmon, 2003). Carmignani (2008) noted in his article "Process-based management: A structured approach to provide the best answers to the ISO 9001 requirements" that "Process-based approach means, first of all, identifying the process necessary to achieve a product or services, defining the interactions of such process among themselves and applying to their management (control)". According to Kohlbacher (2010), PBM is not simply about planning, evolving and executing business processes, but also considering the collaboration between these processes. Jeston and Nelis (2006) added that PBM is determined as a comprehensive exercise where features such as organizational management understanding and involvement of the top management of the organization, definite roles, sufficient technical, highlytrained staff and a culture receptive to processes business are important to attain the preferred result.

A 'process' gets inputs and executes valuable actions on these inputs to generate output (Marín& Ruiz-Olalla, 2011). Similarly, the vital business processes perform collectively inside an organization to accomplish the organization's mission and strategic objectives; therefore, managing individual processes is not enough.If an organization's processes do not work together or work uselessly, then the organization's performance will be less than best (Marín& Ruiz-Olalla, 2011). According to ISO 9004:2009 standards, processes and activities within each process are particular to an organization and are determined by the kind, dimensions, the distinctive features and level of maturity of the organization.

Furthermore, Hammer and Champy (1993) have remarked that there is a need to identify for business process re-engineering and visualizing the processes before the improvement. These are the reasons PBM is very important in maintaining QMS. Section 0.2 of ISO9001:2015 Quality Management Systems standard itself has emphasized PBM as an approach to manage and maintain the quality systems in the organization.

This is endorsed by Fraser (2004) that the identification and management of processes in an organization are an important part of the ISO-9001 standard. Furthermore, ISO9004:2009 standard stresses that preferred organizational outcomes can be realized more efficiently when activities and associated resources are controlled as a process. Besides, the previous version of ISO9001:2008 standard stated that the PBM process would also ensure the PDCA cycle in QMS can be successfully implemented as explains by the PBM model in Figure 4.



(Source: MS ISO9001:2008 Standard published by Standard Malaysia, 2009)

Fig. 4 Model of a Process-based QMS

Process-Based Management (PBM) model in Figure 4 shows the main processes in QMS and how each process is related and interacted. The model, which is based on PDCA (Plan-Do-Check-Action) principles required specific knowledge on the input-output of the process itself. Each interaction between the processes of each process will not be managed effectively if the employees are not having knowledge sharing self-efficacy and knowledgeable in the activity within the processes. The development of each PDCA part will depend on the completeness and efficiency of each approach in each phase itself while the completeness and effectiveness will depend extremely on the worth of information accessible within the employee to take action and decision.

Normally, as knowledge has developed the mainsource for competitive advantage (Soo et al., 2004), hence, nowadays the quality of knowledge acquired and utilized is very critical for most of the industry. For example, it is essential in the hospital, in the aviation and aerospace sector, in the armed-forces activities and even in the education industry. The quality of knowledge attained from numerous knowledge gaining activities will be used in the processes and the organization. That quality knowledge will also need to be used in the maintenance of QMS through effective knowledge within the organization.

From the context of the QMS maintenance framework, the researcher believes that the quality knowledge will fit very well to improve the existing framework by providing significant contribution and effect to the application of technical and non-technical aspects in maintaining QMS. The quality of knowledge will be very significant for the compliance to ISO9001:2015 requirements, during the management of the processes and its interaction,for solving problems and issue related to human resource aspect, to enhance the level of understanding of QMS and very important in the improvement activities within the certified organization. Apart from that, quality knowledge is very important for quality activity in the organization. According to Dooley et al. (2000), quality knowledge provides valuable input for quality preparation, quality control and quality improvement. For quality planning, knowledge provides valuable input to understand the relationship between product or services and customer satisfaction. For quality control, the quality of knowledge will be very important to evaluate the stability of the processes and diagnose the root cause for defective products or services. The valuable inputs provided by quality knowledge will be significant for quality improvement during the selection of optimal process conditions as well as evaluate the relative capability of processes.

Several studies Knowledge has explored the quality of knowledge attained through knowledge sharing and knowledge acquisition for online activities or virtual community. Few researchers have related the quality of data and information within the frameworkof knowledge quality because both of these are the key ingredient of knowledge.

Yoo et al. (2011) addressed the nature of knowledge quality in a team environment, describe its dimensions, and create valid and reliable instruments to measure it. They developed valid and reliable measures of three dimensions of knowledge quality and provides evidence that knowledge quality forms a second-order factor model. They also aimed to examine important antecedents and outcomes of knowledge quality. The detail dimensions of quality knowledge and its characteristic suggested by Yoo et al. (2011) is shown in Table 1.

Table. 1 Knowledge quality dimensions and its criteria (Yoo et al., 2011)

No	Dimension of quality knowledge	Description	Proposed Knowledge Criteria
1	Intrinsic knowledge quality (IKQ)	The amount to which knowledge has quality in its right.	Precision, Consistency, and Timeliness
2	Contextual knowledge quality (CKQ)	the extent to which knowledge is supposed within the context of the mission.	Significance, Suitability, and Value-addedness by understanding the environment in which a task functions.
3	Actionable knowledge quality (AKQ)	The extent to which knowledge is expandable, adaptable, or easily applied to tasks.	Expandable, adaptable, or easily applied to tasks.

In doing this study, the researcher also reviewed whether there is a different level of knowledge quality within the organization. Therefore, the researcher has made a thorough research on this matter and found out that there is research that proved that there are various levels of quality knowledge in the organization. The study was conducted by Erden et al. (2008), which suggested a complete model explaining various levels of tacit knowledge quality that a group can achieve within the organization. Erden et al.'s (2008) study has proved that there is a different level of knowledge quality within an organization. Their model is applicable and suitable to be referred to since the research focus is on the quality aspect of knowledge (tacit and explicit), which is created collectively at the organizational level by individual or group which is being shared and transferred within the organization.

The initial understanding,as discussed previously in the literature, summarized that KQ would provide a significant effect on QMS maintenance. However, in daily business and operations of the company, the management of process is carried out continuously by the management and its employee thus indirectly will influence the quality systems of the organization and will also continuously generates dynamic force to the organization to change and improve the quality systems. It was noted that to ensure effective process-based management; all important resources shall be allocated and made emphasized to it. This is in-line with Siriram (2012) that commented, organization is connected through processes, requiring balancing resources such as people, knowledge and systems. It is likely that in the actual situation, KQ direct effect on QMSM will be degraded since the quality of knowledge of the employee will be much centered to ensure the process-based management is effective. Therefore, it will be interesting to understand further the scenario which PBME potentially becomes the mediator of the relationship between KQ and QMSM. To have better understanding of this scenario, the researcher had undertaken this as part of the research objective and will empirically test it. The path relationships for PBME as mediator between KQ and QMSM is shown in Figure: 5 below.

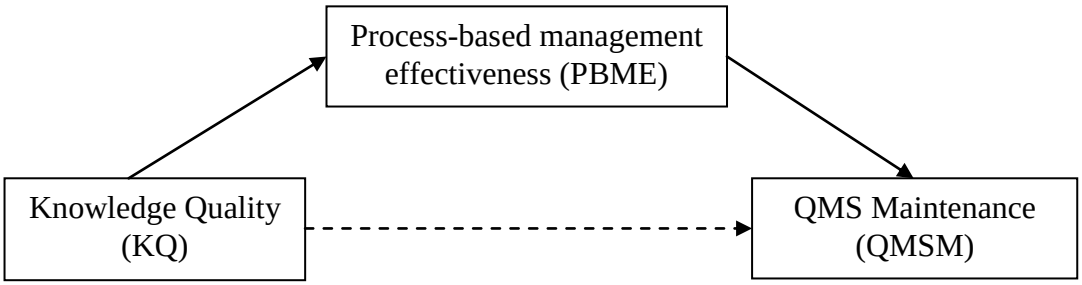


Fig. 5 Path relationships between KQ and QMSM with PBME as a mediator

III. METHODOLOGY

The selection of sample size is crucial for accurate findings of this study, as noted by Bartlett et al., (2001). As this study used PLS-SEM as part of the analytical technique, the role of sample size is crucial. However, when using PLS-SEM, so the true sample size is contentious depending on influencing elements on sample size,for example, model complication, departures from normality and methods of estimation. Maximum likelihood estimation can deliveraccurate outcomes with sample sizes of only 50, but it is not suggested (Hair et al., 2010). Gorsuch (1983) has recommended a minimum of 5 participants per variable and not less than 100 participants as total respondents. Schumacker and Lomax (2004) noticed that many researchers hadcompleted studies with 250 to 500 subjects. Moreover, they also proposed that someone can define the sample size by using the general rules of statistics (i.e., 10 or 20 observations per variable). However, for PLS-SEM software, the minimum sample size should be referred to the requirements of 10 times rules (Barclay et al., 1995). Hence it indicates the minimum sample size should be equal to the larger of 10 times the largest number of structural paths directed at a particular construct in the structural model.

Initially, the sampling size technique used for this study is suggested by previous researchers such as Krejcie and Morgan (1970). Based on the sample size developed by Krejcie and Morgan's (1970) (Table 3.6), 341 samples are required to appropriately represent the population of 3041 companies. This was supported by Comery and Lee (1992), from an inferential statistics perspective, 300 is considered a suitable sample size for the representation of the population. Therefore, based on the basis ofthe above-mentioned guideline and the existing time for this study, the proposed sample size for the study was set to 341 divided amongst the tenth business sectors based on calculated ratio as shown in Table 2.

Table. 2 Sample Size Estimation (reference)

Total Population	Sample Size Requirement
2000	322
2200	327
2400	331
2600	335
2800	338
3000	**341**
3500	346

For this study, stratified random sampling was adoptedas a replacement for random sampling based on the business sector. There was diversity in the sampling frame for this study since the different business sectors selected will have different internal cultures, different types of knowledge, diverse activity, different types of challenges and obstacles in maintaining QMS. This is to confirmadequate representation from each business zone to support precise analysis. According to Sekaran (2003), a stratified random sampling includes a process of stratification; followed by random selection of samples from each stratum.

IV. RESULTS & FINDINGS

The analysis of this research required a measurement model contains indicator reliability, internal consistency reliability as along with convergent and discriminant validity, which target to measure the reliability and validity of the constructs. The first phase of analyzing the measurement model is to inspect the convergent validity of the measurement model. For this, we studied the outer loadings of the indicators and the average variance extracted (AVE). For further analysis, the items that did not fulfil the required least value were deleted. According to Hair et al., (2014), the outer loadings should be 0.708 or higher. Hair et al. (2014) also noted that the AVE value should be a minimum of 0.50. AVE value of 0.50 or higher indicates that, on average, the construct explains more than half of the variance of its indicators. The following table 3 displays that all the CA, CR and AVE values are in the acceptable range as recommended by Hair et al. (2014).

Table. 3 CA, CR and AVE values

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
KQ	0.952	0.956	0.547
PBMS	0.966	0.969	0.584
QMSM	0.969	0.972	0.620

Based on the analyzed data, from the overall 72 items, 13 items (indicator) had been found not meeting the minimum required value of 0.07; However, all first-order constructs have fulfilled the requirements of AVE. Subsequently, all 13 items have been removed from the model (one item at one time), and the researcher runs the PLS algorithm until the measurement model meets all the requirements. Below is the image after removal of items :

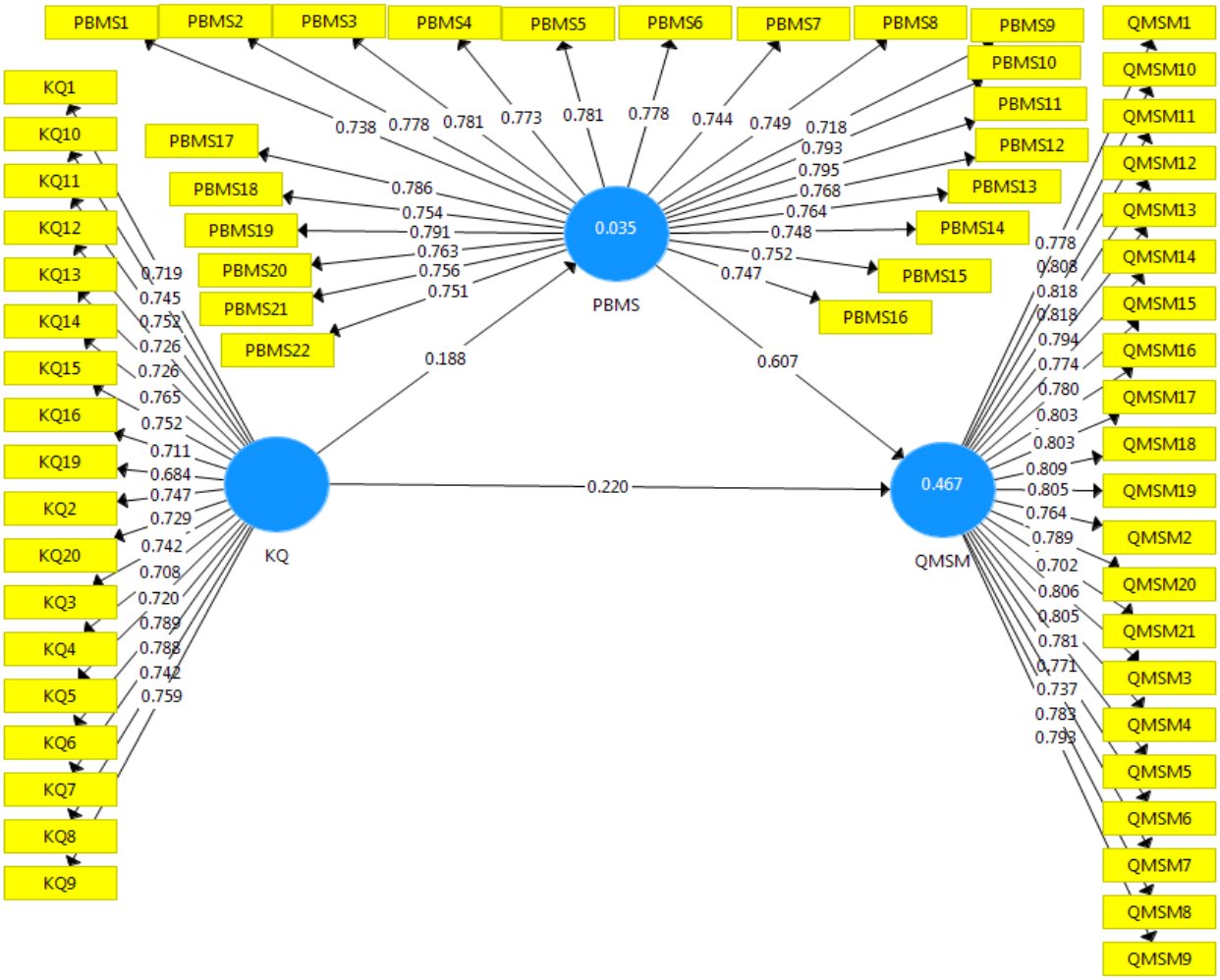


Fig. 6 Algorithm image KQ and QMSM with PBME as a mediator after removing items

In this study, Fornell and Larcker (1981) criterion analysis for testing discriminant validity was applied to study the discriminant validity of the measurement model. It is noticed that the values of the square root of AVE for each construct (i.e. in the bold caption) should be greater than the correspondence row (the correlation value between construct) as shown in Table 4

Table. 4 Fornell and Larcker (1981) criterion analysis for checking discriminant validity

	KQ	PBMS	QMSM
KQ	**0.740***		
PBMS	0.188	**0.764***	
QMSM	0.334	0.648	**0.787***

R^2 value indicates that the amount of variance independent variablesare described by the independent variables. The predictability of the structural model is shown by the large R^2 value. According to Cohen (1988), the values of R2 ranging from 0.02 - 0.12 are assumed weak, whereas values from 0.13 - 0.25 are considered weak, and values ranging 0.26 and above can be considered as significant.

Table. 5 Coefficient of Determination R^2

	R^2	Result
PBMS	0.035	Weak
QMSM	0.467	Significant

The above table depicts the results of R^2 values shows that a 3.5% variance in PBMS is having weak value explained by the independent variable KQ, whereas 46.7% variance in QMSM is explained by KQ, and itshowsa significant direct relationship.

Effect size (f^2) was used to measure the model fitness. According to Cohen (1988),the value of 0.02 – 0.14 displays weak effect, f^2 values of 0.15 -0.34 shows moderate effect whereas f^2 values more than 0.35 specifies strong effect. Table 4.5 showsthe effect size values for each path in the model.

Table.6 f^2 Values for each Path

	Effect Size	Result
KQ→PBMS	0.037	Weak Effect
PBMS→QMSM	0.088	Weak Effect
KQ→QMSM	0.0667	Weak Effect

Table 6 is showing the values of overall results are quite. Effect of KQ→PBMS is Weak effect, and surprisingly it is found a weak effect of PBMS→QMSM, there is a weak effect in KQ→QMSM.

The assessment of the structural model is evaluatedthrough the path coefficient value. By the help of these values, the strength of the association between the two latent variables can be calculated. Bootstrapping output of smart PLS is applied to assess the connection between independent and dependent variables. To test the significance level, t-statistics and p-value are examined for all paths in both countries Pakistan and Malaysia. When the empirical t-value more than the critical value we say that the coefficient is important at a definite significance level (Hair et al., 2014). This research has used a t-value of 1.96 at 0.05 significance level.

	Path Coefficient	SE	t-value	p-value	2.5%	97.5%
KQ-> PBMS	0.188	0.052	3.591	0.000	0.087	0.292
KQ -> QMSM	0.220	0.042	5.252	0.000	0.128	0.294
PBMS-> QMSM	0.607	0.042	14.474	0.000	0.522	0.686
KQ ->PBMS ->QMSM	0.114	0.033	3.477	0.001	0.053	0.179

The above tables show the research hypothesis results, H1: There is a relationship between knowledge quality and quality management system maintenance.The results indicated thatthe path coefficient between the KQ and QMSM is 0.607 as shown in figure (6) with standard error 0.042, t value 14.474 and p-value is 0.000. This p-value is greater than the threshold of 0.05 (Hair et al., 2006). This indicates enough empirical evidence to accept the research hypothesis. Thus, H1 has been accepted, and the study established an insignificant relationship withKQ and QMSM.

H2: There is a relationship between KQ and PBMS. The results indicated that the path coefficient between the KQ and PBMS is 0.188as shown in figure (6) with standard error 0.052, t value 3.591 and p-value is 0.00. This p-value is smaller than the threshold of 0.05, and the t-value is also greater than the 1.96 (Hair et al., 2006). This indicates enough empirical evidence to accept the research hypothesis. Thus, H2 has been accepted, and the study established a significant relationship between KQ and PBMS.

H3: There is a relationship between PBMS and QMSM. The results indicated thatthe path coefficient between the PBMS and QMSM is 0.607,as shown in figure (6) with standard error 0.042, t value 14.474 and p-value is 0.00. This p-value is smaller than the threshold of 0.05, and the t-value is also greater than the 1.96 (Hair et al., 2006). This indicates enough empirical evidence to accept the research hypothesis. Thus, H3 has been accepted, and the study established significant relationship between PBMS and QMSM.

Hypothesis H4 is based on the mediation of this research. There is a mediating relationship of PBMSin KQ and QMSM. The results indicated that the path of KQ→PBMS→QMSM is 0.114,as shown in figure (6) with standard error 0.033, t value 3.477 and p-value is 0.001. This p-value is smaller than the threshold of 0.05 and the t-value is also greater than the 1.96 (Hair et al., 2006). This indicates enough empirical evidence to accept the research hypothesis. Thus, H4 has been accepted and the study established significant mediating relationship of PBMS in the relationship of KQ and QMSM.

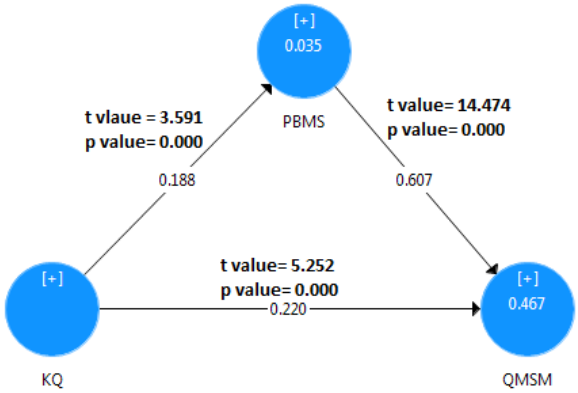


Fig. 7 KQ and QMSM with PBME path coefficient, t-value and p-value

V. DISCUSSION

The main objective of this study is to propose a new QMS ISO9001 maintenance framework by adding important variables related to knowledge and process management. To accomplish that objective, it is necessary to reach some prerequisite objectives. Therefore, four (4) research objectives have been identified to support the main objective by incorporating knowledge quality and process-based management effectiveness in the framework. To initiate the empirical support in achieving the objectives, four research hypotheses have been identified.

The quality of knowledge is one of the significant elements to confirm the effective process management inside the certified organization. This accords with the study by Dooley et al. (2000), which exhibited that the quality of knowledge can enhance the efficiency of the processes. Previous studies suggest that the organization shall put essential strategy and effort to confirm that quality knowledge is adopted for all processes and its interactions. Organizations may enhance the quality of knowledge effectively by installing the knowledge creation process.

The quality of knowledge for effective process-based management can also be improved by receivingreliable information on the realdemands and potentials of stakeholders such asclients, traders, staff, and environment etc. (Badreddine et al., 2009). By gainingcorrect information on the requirements of the stakeholders, organizations can fix the essentialprocesses that best suits their desiresin the planning phase of process-based-management. The discussion provides conclusive remarks that the study conducted has managed to achieve the desired objective to study the outcome of knowledge quality on the effectiveness of process-based management and the maintenance of QMS with interesting findings.

Based on previous literature and supported by the expert opinion derived from qualitative data, the initial understanding was that knowledge quality would have a direct and strong positive effect on the maintenance of QMS within the certified organization in Malaysia. Somehow, further analysis in this study found out that high PBME scores would be a positive indicator and was found to be a significant predictor of QMS maintenance ability, partial mediation and accounted for a significant amount of variance in the relationship between quality of knowledge and QMS maintenance ability. The basic idea for the framework is used from Kanter's (1994) theoretical model of an integrative organization for maintaining a QMS as well as Wahid's (2012) framework for effective ISO9000 maintenance in service with some additional elements and re-arrangement of elements in the existing framework. To ensure that valuable contribution of previous research work is being adopted, important elements listed in former frameworks have been used in this new framework with a new arrangement of item's placement and connectivity.

The new QMS maintenance framework is designed for being used by practitioners and will be of interest to quality managers, management representatives, top management, consultants and ISO9001 experts. Third-party auditors and certification managers may also be interested in using the QMS maintenance framework to be used as a reference during an impartial assessment of the QMS. The implication of the results has been viewed from the theoretical and managerial implications. The conclusions contribute to the literature of knowledge management, process-based management concept, as well as to quality management systems area. Practically, the findings contribute to the betterment of effort towards the maintenance of ISO9001 certification and the advancement of the existing QMS maintenance framework.

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