Benefits and implications of the different types of quality management in the Malaysian construction industry

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Abstract. The quality management system (QMS) is defined in terms of quality assurance, quality control, and quality planning. It is necessary for the construction field to confirm the projects will to be finished with success and without any obstacles for the best quality, explicit amount and at a minimum attainable value. The aim of this article is to produce a crucial and constructive analysis through a revision of five revealed works of literature that relate to QMS in the construction field based on Malaysian research setting. Relevant articles associated with the QMS in Malaysia has been studied. The main findings at those researches indicated that the satisfaction of the owner or the client, improved management and work capacity of the company, and facilitate the project management team to expeditiously manage the development activities for the project life cycle. More studies can use constant performance indicators at the project to check the efficacy of QMS in many samples to enhance the findings.

1. Introduction

The issue of quality has become a heavy concern inside the development of the construction industry. There are several advantages that can be gained by International Organization for Standardization (ISO). ISO is an international organization that promotes a standard for various type of companies and products. However, this does not mean that if a company has succeeded in obtaining certification, they will be ready to expertise all the useful results. Kiev [1] stated in his study that the benefits obtained by construction companies as a result of the ISO implementation were small and indicated that the level of improvement was in line with their original expectations. That is why most construction companies are reluctant to implement the system because they are uncertain whether or not the enforced system is worth it particularly once an enormous outlay was invested with in implementing the system [1].

According to researchers, the Quality Assessment System in Construction (QLASSIC), the ISO 9001 quality management system (QMS), the quality assurance (QA) system, and the quality control (QC) system are among the many types of standards which provide a number of indicators on the way to establishing a high-quality process management system to manage the processes that affect their products or services. It was initially developed in 1987 to improve the service and merchandise standards provided by completely different business sectors [2]. QLASSIC is an important tool used to assess the degree of quality of a building work supported by the quality standards. QLASSIC score is considered One of QLASSIC’s key
outcomes is that it denotes the quality extent of the construction projects being evaluated [3]. In the field of construction, the quality management system had been enforced and widely adopted, especially those firms are able to handle mega projects. Although numerous research was carried out to review and analyze the relationship between the quality management system and various industries (e.g., manufacturing, food, service, etc.). There is a shortage of relevant construction industry studies. As a result, the importance of project works and cost accounting in the construction industry as compared to the quality management system is given by these researchers [4].

The main goals of this article are: To spot the various varieties of quality management system within the Malaysian construction field. To spot the advantages of the application of a quality management system in the construction companies in Malaysia. To spot the issues encountered by the firms of construction in the application of the system of quality management. To spot the methods adopted by construction firms in overcoming or mitigating the implementation dilemmas.

2. Major findings

Benefits gained from implementing quality management, there are several advantages which will be achieved through quality management. Keng and Kamil [2] done a research by surveying construction companies, it was found that the benefits gained by contractors are: a common language for communicating quality assurance. Major general guidance to a top quality management system for a company or establishment in any business. Facilitates and promotes auditing and certification by third parties. Rise the confidence of the owner. Raise the competition for higher quality merchandise and services. Raise the satisfaction of the client on quality and reduce the prices to make the correction for the problematic work.

Keng and Kamil [2] has categorized the advantages that are fulfilled by construction firms into two classes that internal and external benefits. Internal benefits: increased company communication, improve the documentation, improved the technique of operating, improved quality of labor done, bigger owner or client focus, improved worker morale, improved performance appraisal, and increased potency and productivity. External benefits: access to domestic market, higher competitive edge, higher perceived quality of labor done, improved profitableness, access to overseas market, having a valuable selling tool, improved consumer satisfaction, improved the relations with provider or the supplier.

The researcher has classified his discovery of the advantages seasoned in the ISO 9000 registered corporations into three classes that are major advantages to employees, a benefit to processes an advantage to a business. As an advantage to staff: improved shared aims, clear operating procedure, scale back employees conflicts, lower employee turnover, an additional suggestion from employees. As an advantage to operation: reduced the waste of materials, enhanced potency, raised product quality or service quality, higher management of subcontractors which resulted in lower operating prices, and enhanced amount of production. As an advantage to the business: enhanced sales to the current clients, additional new native clients, decreased the complaints, raised the profitability, more and more new clients abroad. The researcher also admitted that ISO 9000 certification’s most strategic profit grant associate improved the relationship with clients the led to associate enhanced market share. The most operational undertaking blessings is that the operational process documentation that raises worker’s abilities and permits the corporate to reply rapidly to cause order changes of the market. Additionally, to it, the ISO 9000 QMS additionally provides positive implications for shorter completion of the project, better control, and management of the risk, and decreased issues in errors liability amount.

According to Zakuan [4], the advantages achieved by corporations by adopting QMS, is divided into two classes that are considered as internal advantages and external advantages. Internal advantages match with the benefits which will be gathered from the establishment that
are helpful for the workers and the internal functioning of the establishment. As an example of advantages gained from an inside perspective are increased company communication, the documentation was enhanced, enhancement for the technique of operating, enhancement for the quality of labor done, enhancement for the morale of the worker, accrued potency and productivity, and less waste of the material. The external advantages match with advantages which will be noticed from the perspective of the client that is beneficial for the company itself. As an example of advantages obtained from an external viewpoint are increased firm’s place in the market, accrued gain, accrued sales with the current client, enhanced the relationships with provider or supplier, a lot of new native clients, decreased the amount of errors, completion of project in the right time as planned, a lot of Contracts or agreements and facilitate the reach to the market.

Again research by Zakuan [4], the investigator explicit that that application of the quality management system will enhance the dilemma of communication between the workers; decrease mistakes, rework, and the big amount of the waste of the materials; have higher management and subcontractor and supplier control. Therefore, the gain of better productivity, and usually market sharing is accrued and conjointly alter contractors to fulfill the consumer necessities. Quality management could be management operate that ensures Providing products, services, operations or processes that meet client’s demand and conjointly needs a repetitive enhancement. The quality process results in the aggressiveness and property of the establishment [5]. Clear advantages incontestable via the implementation of QMS. Effects of client satisfaction are being declared by Kiew and Ismail [1] as “for the primary time a serious study has shown that implementation of TQM is completely related to home-buyer satisfaction”.

QMS is employed as follow: To enhance the company's quality image within the construction industry. To raise the company's potency and management. To resolve the issues with poor quality arising construction processes. to cut back the failure prices and liability risks. To satisfy the mandate from the government. To satisfy the needs of the non-public owners/ clients. To be a benchmark to start implementing total quality management.

Ali [3] indicated that quality provides a crucial climate for creativity and advancement of construction creativity. By adopting correct QMS the company is anticipated to control consistently the time, the scope, the value, and the resources to fulfill the goals of the project. Consequently, it encourages to deal with a number of modern problems encountered in the construction field i.e. the errors of the work, the extra costs and project’s delaying. Usually, most companies employed by ISO 9001 certified contractors point out their quality performance range of the complaints of the customer, rating from the feedback forms of the client, waste of materials, variety of work errors, failing in testing results and the like. Apart from those metrics, a score of QLASSIC can be a beneficial tool to evaluate the projects’ performance.

QLASSIC was created and enhanced to fulfill the subsequent goals: to create a benchmark for the quality of the workmanship. To assess the quality of accomplishment of the residential projects. To assess the quality of accomplishment of a residential project supported on the approved standards. To evaluate the interpretation of subcontractors and main contractor supported on quality of accomplishment. To assemble information and data for applied mathematics analysis.

According to the reviewing of the literature, several kinds of research have shown the benefits in the application of QMS in the execution corporations. Ali [3] had abstracted the category of benefits as follows: Raising the communications and the relationships between all parties. Mitigate process and decrease reworking. Cost and time are going to be reduced. Raise the effectiveness of the work.
3. Issues of quality management implementation

The road to obtaining the certification of ISO 9001 is rarely interesting and sleek. Many types of research on the system of quality management point out this matter which obviously clarifies that the adopting of an efficient quality program isn’t a straightforward duty. Between the dilemmas of application that had been known by the primary researchers are combating to alter is one of the intense dilemmas mentioned by Keng and Kamil [2]. As the researcher expressed that workers’ combating is the most crucial issue that becomes an obstruction for the application of the ISO quality.

The main issues for the combating are as follow: modification is a danger for them. It makes doubt and moves one from a foothold of the rest as one’s information and ability isn’t any longer enough. Recent information and skills gaining have become compulsory. Modification needs further work. The procedures of the application need additional works like documentation and coaching the workers. The benefits of the modification may not outweigh the prices in question. Workers may be concerned that the additional effort and spending the time on creating and implicating ISO 9001 QMS will not fulfill or meet the company advantages. They are much busy with the work and have no much time to carry out a replacement effort like ISO 9001 QMS. In fact, some establishment ought to set up and perform ISO while not further employees. Shortage of commitment from prime management.

Management shortage is considered one of the most important issues faced during the application mentioned by Keng and Kamil [2]. Expressed the rationale of the matter was related of miss understanding of the advantages of the system of quality. He also mentioned that many companies’ prime management do not place quality because of the priority versus the issue of time and price. Interpreting the quality and needs of the quality system is difficult: Zakuan and Saman [4] expressed that the quality and demand of the standard system is difficult to know. He pointed out that transforming the standards into the appropriate action requires a full understanding of the thinking and philosophies of the standards of the ISO. While not fully understanding, it would be complicated to realize the specified commonplace of quality. Keng and Kamil [2] the same thing that some difficulties appeared when they tried to interpret the standards’ requirements within the construction context. However, due to a shortage of data and resources, it is found that it is difficult to identify the needs of ISO 9001. Perceived in the work to be redoubled. Usman, n., Said, i. (2013) expressed that the ISO 9001 application suggests that additional documentation work should be handled throughout the application phase. He further stated that cognitive content or the shortage of a obvious understanding of the basic requirements of the documentation is the main reasons of the creation of a large amount of hard-to-use work. However, this may be the first defect of most organizations in some state of affairs that they will not have unbroken enough records or important data for observing, assessing and to review the performance of the establishments. As coaching is vital to give the idea of QMS understanding and familiarity.

This disadvantage may be due to management’s reluctance to commit time and expenditures to train the employees. He mentioned jointly that some organization felt that QMS was all about simply documenting their quality system and not listening to the importance of training the staff. Moreover, Ali [3] argued that lack of assurance even supposing they need exerted heaps of effort coaching between workers They made a heavy bank on the quality manager. The QMS idea is clearly understood by the UN agency. Consequently, they will simply hear the instruction given and then execute it in accordance while not really knowing why they do it. This created unhealthy dependence on the associated degree on the standard manager, So the standard idea gave the impression of becoming a’ one man ' show. A high content of foreign workers and lack of skilled labor. Ali, m. (2014) found that a high labor shortage caused the majority of local subcontractors, such as brick builder, steel fixers, plaster’ makers and tile workers, to engage in foreign labor holding the majority of the work with 1 or 2 expert staff. It is therefore exhausting to expect these subcontractors to provide products and services of
sensitive quality below the standard idea of assurance.

Lack of management or collaboration of appointive sub-contractor. Since the consumer presented the appointing subcontractor, the degree of management of the most contractor was restricted over the appointing of the subcontractor. This drawback becomes additional crucial once non-conformance is detected and correction got to be taken. Co-operation from appointive sub-contractors will occasionally be tough [5]. High implementation and maintenance cost: [5] United that a system of high quality requires a high value for application. As a result, several establishments are reluctant to implement QMS because they are uncertain whether or not the advantages obtain can cover the price concerned. However, several establishments misconstrue the value of the quality because they usually understand that the application of it is an additional costing. In fact, prices are not the standard. Non-compliance with quality, however, is more dear. This may be related to the cost of errors” correction, reworking, and customer grievance reaction [5]. Meagre the time: many studies jointly reported that meager time has become a barrier to the successful application of a good system of quality. Kiew and Ismail [1] mentioned that this drawback was because of poor designing so inflicting delay since the corporate did not meet the proposed point in time. He was conjointly explicit that the meager time to perform is because of the shortage of human resources and the capital.

Shortage of communication: Kiew and Ismail [1] declared that shortage of the external and the internal communication conjointly are the obstructions for the application of a good system of quality. He conjointly declared that little communication within the organization was as a result of restricted resources and data, shortage of expertise plus coaching. Kiew and Ismail [1] meanwhile, it means that there is a downside in communication between staff attributable to language differences and cultural differences between the workforce. Shortage of consultant participation: despite the fact that the contractor has performed a high-quality management system, the contractor’s performance usually suffers from consultants who have not performed quality assurance despite the fact that they need tons of attempts to enhance quality. For example, discrepancies in drawings and specifications on an ongoing basis have led to delays in construction, thus reducing the efficacy of quality assurance [4]. A shortage of participation from owner or client. There is a shortage of customer involvement throughout the application of the process. If the owner support exists, the application will be formed solely to meet the needs of the owner. The establishments are oblique to carry out QMS as it becomes a precedent for its owner or customer services. Kiew and Ismail [1] else stated that clients need to have ISO certification from the consultant and the contractor, but they do not have such quality data themselves. So much weak system design: the organization may fail to recognize or understand the basic needs of quality management. Therefore, it’ll result in uneconomical, government officials and high paper generating system.

Kiew and Ismail [1] conjointly declared that between the dilemmas throughout the implementation method is no well-structured system of quality and steps. A shortage of technical experience and cleverness: it is very crucial to appoint a quality consultant. While their experience or inappropriate participation of advisors will not hinder carrying out of the quality. Zakuan and Saman [4] conjointly stated that failing in appointing adviser of quality may result in excess delay, initial dismissal by external registrars and discontent of workers. Lack of resources. Keng and Kamil [2] stated that the lack of resources to carry out and retain the quality system is due to the poor quality of the culture of the work, a shortage of data and a low level of learning. She jointly argued that the shortage of quality management practices of resources in terms of the human resources and the capital has resulted in delays in obtaining the certification of ISO 9001 QMS.

Other issues were expressed by Keng and Kamil [2]. He expressed that among the assorted issues known the contractors who discourage carrying out of the ISO 9000 standards in their companies are losing staff productivity due to the attempts of learning and carrying out the modern system. Personnel financial obligation, remote job site creating its commitment, weak
communication, shortage of coaching for the managers and employees, combating to alteration, and therefore lack of customer and alternative authority involvement. Technical problems: Problems are caused by an external issue during this class that directly laborious to regulate and track quality system implementation altogether sites. He conjointly mentioned that almost all establishments seek to keep the certification of ISO 9001 as a 'work permit'. However, not ordering an additional enhancement in quality. It is stated jointly that it was a drag that employees were employed to figure out superintendence instead of following procedural manuals and that QMS was not applied to the subcontracting system.

According to the review of the literature, the issues faced throughout the method of carrying out by ISO-certified firms will be summarized into two categories of people-related issues and technical issues. Issues relating to people: problems during this class are caused by individuals concerned within the implementation method. It's going to occur throughout performing of the construction and doing the management on the positioning additionally as the steps of the work at the positioning. samples of the dilemma make up this class are the shortage of prime management and employees aren't caused by the behavior of people. Such problems could reflect the disadvantages of the quality system itself, making it difficult to carry them. Samples of problems that make up this classification are high carrying out and maintenance value, lack of resources, difficult interpretation of the quality and demand of the quality system, hyperbolic in the workplace and remote work, making it difficult to regulate and monitor the quality system carrying out.

4. Strength and weakness
It was noted that the five journals have achieved their main objective. The theories and analysis supported each other which made their finding are strong in comparison. However, there were some limitations of the research is the results can not be generalized statistically. It also focused on the supporting role of quality practices in managing strategically crucial processes of creativity. In the research, time was the main limitation in collecting enough data and carrying out interviews [5].

5. Technical evaluation
The researchers conducted researches through quantitative and quantitative analysis. Case studies were used as the researchers intend to support their arguments by associate in-depth analysis of someone, a gaggle of staff, a company or a specific project. The case study approach was adopted for the analysis. The tools used for information assortment was interviewing. It was mentioned that interview permits the greatest chance to get what somebody thinks or feels, and the way they react to huge problems. The shape of the interview used was semi-structured that uses a mixture of ‘open’ and ‘close-ended’ queries. This method is employed so as to allow flexibility to the scientist and therefore the responder throughout the interview session [2].

The reasons for conducting a case study for this analysis are to appear into details the advantages achieved, issues encountered and therefore the ways utilized by ISO certified contractors to combat the implementation dilemmas. Case study approach enables scientist to answer the ‘why’ and ‘how’ queries once the respondents are needed to allow justifications on the chosen issue Keng and Kamil [2]. Said and Usman [5] performed the analysis in Malaysian construction corporations. The technique which was used within the study as a result of direct interview survey would facilitate the queries, remove uncertainties, and certify the queries are totally well known by the interviewee before they give answers to the questionnaire. In addition to that, this technique can Scale back the "nonresponse" rate and gain more information throughout the interview session on QMS maintenance. The following sections provide a close description of the survey methodology [4].
6. Future research
As mentioned in some researches, the restrictions of the researches were that the results can not be generalized statistically. It jointly focused on the supplementary role of quality management processes in managing strategically necessary processes of creation. During the researches, the time factor was a significant limit to gather decent knowledge and perform interviews. Also, there were no clear examples for a few forms of quality like internal control and quality assurance. As a result of that, the reader still confused between them. Therefore, for the longer term researches, it's counseled to elucidate with real examples from the sensible life every sort and the way it may be enforced to clarify every sort rather than giving solely definitions. Conjointly for doing such researches, the researchers should take enough time to gather adequate knowledge.

7. Conclusion
This article was launched to look at 5 journals associated with quality management in the construction field in Malaysia and build an outline for them. The results show that owner or customer satisfaction and the time reducing have a positive and important related to QMS. During this section, all the findings are summarized. This section can discuss the common advantages, issues, and techniques known within the findings from the previous section.

Benefits: Improved management and work efficiency. Improved communication. higher documentation management. Increase the owner or client confidence and satisfaction. Also adopting proper quality management raised the company’s company image. Raised range of project undertaken. Improved quality of labor done on the site. A quality set up by strictly following these documents, contractors are able to forestall any errors like a rejection of sub-standard materials. Therefore, this leads to value maintaining through avoidance of errors. Secondly, all construction activities were strictly supervised by the positioning supervisor, Site officer likewise as a project manager. this can be to make sure that construction employees meted out the work following the proper method, to the standard of workmanship needed whereas yielding with the protection necessities. The standard of labor was therefore secured with fewer defects and material wastage and accidents on the site. On-time completion, corporations argued that systematic management of labor beneath the ISO standards did advantages them by enabling the current projects to be delivered on time. However, in some project, there are surprising events occur that hinder the comes to be completed in the desired time albeit they meted out the work following the needs.

Problems and strategies: Awareness and employee’s commitment: so as to combat this quandary, all respondents mentioned that their company sent all staff for coaching. Usually, there are two main coaching given which are the notice or awareness course and auditing coaching. Either the ISO authority employed by the corporate, CIDB or alternative external bodies conducts these coaching. Except that, the team working towards the task could be awakened strategy so that staff can share their data, interests, and experiences to unravel issues and this can be effective to extend their commitment towards the duty. Lack of cooperation from consumer, authority and/or sub-contractor: corporations encounter issues with their consumer and consultants. Firms face problems with the consultants who didn't provide full cooperation towards them even supposing they grasp that the contractors are implementing ISO. A number of the consumer/clients and consultants that they're operating with tend to try and do the works their own manner.

In distinction, one company mentioned that they get full cooperation from their consumer and authority. However, they had some problems with their sub-contractor who were unsuccessful in meeting the ISO needs as tough to monitor quality system on the remote website: Some corporations in agreement that it's tough to observe the standard quality system at the remote site. In overcoming this drawback, company b allocates one in every of their quality unit employees to observe all activities there. They applied cross-auditing between the
site, which ends in time, and the company's price savings. Meanwhile, for any company, if the issues are unable to be sorted out by the project team on site, home base ought to be told as more action are often applied. Lack of resources: Some corporations intimate scant of human resources in implementing ISO particularly throughout the document preparation. Since this company is assessed as a little and medium-sized company, they have to mobilize all of their staff. External audit and internal audit so as to make sure that the systems applied are operating properly. Corrective action is created where there are errors in carrying out of the system. It can jointly facilitate the spotting of the contractor if any resources are needed to carry out the system.

References
[1] Kiew P N and Syuhaida I 2016 Integration of quality management system in the malaysian construction industry J. Organ. Manag. Stud. pp 1–9
[2] Keng C T and Kamil S Z 2016 Implementation of iso quality management system in construction companies of malaysia J. Tech. Manag. Bus. 3 pp 1–23
[3] Ali C 2014 Exploring the potential of integration quality assessment system in construction (QLASSIC) with ISO 9001 quality management system (QMS) Int. J. Qual. Res. 8 pp 73– 86
[4] Zakuan N and Saman M Z 2014 Using project performance to measure effectiveness of quality management system maintenance and practices in construction industry Sci. World J. pp 1-9
[5] Said I and Usman N 2013 Evaluation of innovative quality management practices: a case study J. Ent. Bus. pp 11-20