# Awareness Level towards Implementing ISO9001: 2008 of Selected Small & Medium Enterprise (SME) Construction Firms in the Philippines

Joseph Berlin P. Juanzon

Civil Engineering Department, Mapua Institute of Technology at Laguna, Malayan Colleges Laguna, Pulo Diezmo Road, Cabuyao City, Laguna 4025 Philippines
Email: jbpjuanzon@mcl.edu.ph

*Abstract*—The implementation of Quality Management System (QMS) ISO 9001:2008 in construction industry is meant to assist the industry in the improvement of the efficiency and effectiveness of the construction management team. In achieving such goals, assessment of the level of awareness of the SME in the construction industry towards the implementation of ISO 9001:2008 QMS was conducted. Descriptive method of research was used in data gathering as well as in the analysis and interpretation of the results. A total of 139 SME based construction firms have been selected in this study. The level of awareness of SME contractors was measured based on the theoretical framework of Knowledge, Attitude and Practice (KAP) of ISO 9001:2008 QMS in the construction sector. Results showed that most of the SME-based construction firms were not aware of the implementation of ISO 9001:2008. This implied that the initiatives of the construction industry in training, exposing, and actual learning to SME construction firms are low, which affected their level of awareness.

*Index Terms*—ISO 9002:2008, Quality Management Systems (QMS), Small Medium Enterprise (SME)

## I. INTRODUCTION

Construction infrastructure projects are one of the most important factors in supporting the social economic development in the country. It could generate downstream economic activities and completely enhance productivity and competitiveness in the construction industry.

Considering the significance of the construction industry in the economic growth, it is necessary to identify major issues affecting the efficiency of its sector. The main objectives of any project are improvements in time, cost, and quality [1]. And in order to implement an infrastructure project effectively and efficiently, the construction enterprise must adopt a management system that will serve as guide to ensure that projects are successfully completed within the constraints of best quality, on time schedule, and at the minimum cost possible [2]. As building projects get larger and more complex, clients are also increasingly demanding higher

standards for their delivery [3], therefore, the need for a quality management system becomes more of a necessity than just a requirement.

According to Abdul Hakim [4], QMS is the interaction of people, process, and documentation to meet the customer's stated and implied needs. The result would be a reduction in inefficiencies and waste, improved work practices, increased morale of the management team, and the opportunity for a greater market share.

Management of construction companies are focusing on quality issues as a competitive edge. Delivering projects that satisfy client requirement has become a main priority in maintaining good business relationships. Hence, the construction industry should develop a common standard in every stage of construction process. The International Standardization for Organization has been formed to promote the development of standardization, therefore the acceptance of ISO standards in the construction industry should be widely implemented in order to achieve high quality product in every stage of construction process [1].

There are at least 2,536 listed construction companies in the Philippines as of 2009, out of which 2,409 belongs to the Micro, Small and Medium Enterprise or better known as the MSME's (Industry and Trade Statistics Department, 2009). SMEs play a crucial role in the development of the Philippine economy. They represent 99.6 percent of all businesses registered in the country and employed 70 percent of the total labor force. In addition, they account for 32 percent of the country's gross domestic product (GDP) [5]. In China, the SMEs are the core of the construction industry development and play main role in the urban and rural building [6].

There is still no specific data or information regarding the present condition on the implementation of ISO 9001:2008 in the construction industry in the Philippines, moreover to the SME construction firms in the provinces of Cavite, Laguna, Batangas, Rizal and Quezon, known as CALABARZON area.

### A. Research Problem and Objectives

The main objective of this study was to develop a Quality Management System model for the small and medium enterprise in the construction industry. This will

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assist them in attaining its objective of implementing quality construction projects at stated period of time and minimum cost. Specifically, the following questions were answered:

- What is the profile of the selected SME-based construction firm respondents?
- What are the different quality management systems being implemented by SME in the construction sector?
- What is the sensitivity level of SME-based construction firms in implementing ISO 9001:2008 QMS?
- Are there significant differences in the awareness level of construction firms in implementing ISO 9001:2008 when grouped according to their profile factors?

*B.  Scope and Limitations*

The study was limited to category A, B, C, and D construction firms based on the accreditation standards of Philippine Contractors Accreditation Board (PCAB). These contractors belong to the SME-based contractors according to size of assets and number of employees. The SME-based contractors in CALABARZON were selected from the total list of licensed contractors listed by PCAB as of April 27, 2012.

*C.  Definition of Terms*

- *Contractors* are companies engaged in building infrastructure projects.
- *ISO- International Standard in Organization* is an international standard to provide the generic core of a quality system standard applicable to a broad range of industry and economic sector.
- *Quality Management System* is comprised of activities of the overall management function that determine the quality policy, objectives, and responsibilities of the company. It is implemented through quality planning, quality control, quality assurance, and quality improvement.
- *SME or Small and Medium Enterprise* is any business activity/enterprise engaged in industry, agri-business/services, whether single proprietorship, cooperative, partnership, or corporation whose total assets value is between 3M to 15M for small and 15M to 100M for Medium enterprise.

## II.  REVIEW OF PERTINENT LITERATURES

The Quality Management System for the Construction Industry is a systematic approach for the companies who want to develop and establish a quality system. The QMS gives guidelines to the introduction, structure, and contents of quality systems for the use of all parties involved in the construction industry.Plan and building authorities, clients, architects, engineering consultants, contractors, subcontractors, factories and suppliers have adopted the system [7].

Through the use of the QMS, the building industry will achieve a surer and better communication. The system

has through the years, been adapted for use abroad. Up to 1995, QMS has been introduced and further developed in five European countries [7]. The implementation program - the Five Step Model as shown in Fig. 1 is an effective tool for quality management.
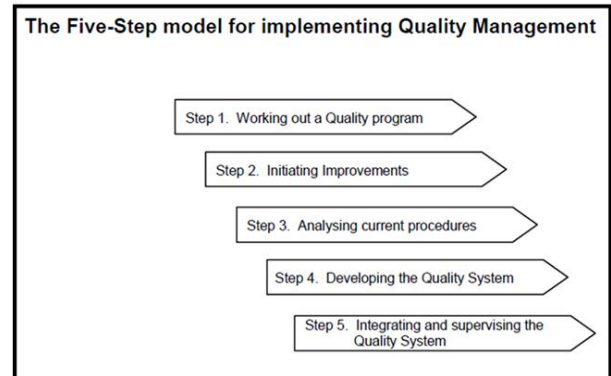


Figure 1.   Five step model for implementing QMS

According to the original 1987 bulletin from the International Organization for Standardization (ISO), ISO 9000 is "a series of international standards dealing with quality systems that can be used for external quality assurances purposes." The ISO was founded in 1946 to develop international quality standards to facilitate worldwide trade and help Western countries regain their competitiveness. The organization consists of a coordinating group of members from more than 90 countries. The U.S. representative is the American National Standards Institute [8]. Fig. 2 shows the framework of ISO 9001:2008 based on Deming's and Shewart's cycle better known as PDCA (Plan, Do, Check, Act) cycle.
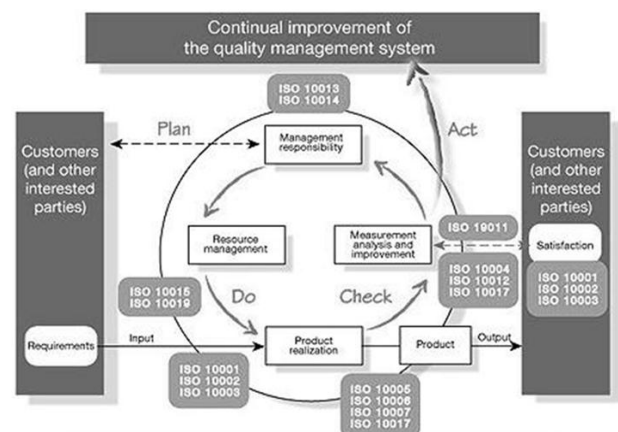


Figure 2.   ISO 9001:2008 Framework

The acceptance of ISO 9000 standards in the construction industries is not as wide as in other industries such as manufacturing. There are special features in the construction industry that limit the implementation of the ISO 9000 standard. One of these features is that a construction project is usually a unique collection of people, equipment, and materials brought together at a unique location under unique weather conditions, while most manufacturing is a system of mass

production wherein all of these factors are consistent with producing typical products over and over again [9].

Micro, small, and medium enterprises (MSMEs) are defined as any business activity/enterprise engaged in industry, agri-business/services, whether single proprietorship, cooperative, partnership, or corporation whose total assets, inclusive of those arising from loans but exclusive of the land on which the particular business entity's office, plant and equipment are situated, must have value falling under the following categories: By Asset Size, Micro: Up to P3,000,000; Small: 3,000,001 - P15,000,000; Medium: P15,000,001 - P100,000,000; Large: above P100,000,000.

Based on the study conducted by Philippine Institute for Development Studies, Small and Medium Enterprises (SMEs) have played an important role in industrial production in particular, and economic growth in general in less developed, developing, and transitional economies worldwide. They have generally provided the bulk of entrepreneurs and employment in these economies, and the necessary foundations for sustained economic growth and rising incomes.

The SMEs are the core of the construction industry development and play a main role in the urban and rural building. With the professional subdivision, the increasing of professional ability, and the improvement of project sub-contract system in the construction industry, the roles of the Industry Cluster of SMEs will become more and more obvious, including stabilizing economic development, enlarging employment rate in the towns, and promoting technology innovation [6].

## III. METHODOLOGY

### A. Research Design

Descriptive method of research was used in the study, wherein the principal aim was to describe and interpret the data collected. The sensitivity level of SME contractors were measured according to knowledge, attitude, and practice of ISO 9001:2008 QMS in the construction sector and perceived service quality levels among SME construction firms.

### B. Research Locale

At the regional level, the most number of construction projects were located in CALABARZON, according to the Private Building Construction statistics fourth quarter of 2011. It was decided, therefore, by the researcher that the study will be limited to SME-based construction firms in CALABARZON areas.

### C. Population and Sampling

The respondents of the study were the operational managers/supervisors and company owners of the SME-based construction firms in CALABARZON areas, since most number of construction projects were located in this area during the time of research. Applying Precision Approach for the population proportion, assuming P=proportion of contractors aware of the ISO 9001:2008 and Q=proportion of contractors not aware of the ISO

9001:2008 = 0.50 and targeting a C of the estimate as 7.5 percent the sample size was determined using the formula:

$$n = NQ / PC^2 (N-1) + Q (1)$$

where N = 613, Q = 0.50, P = 0.50, C = 0.075, resulting to n = 139 or a sampling rate equivalent to approximately 22.5 percent. Table I shows the allocated proportion of the SME-contractors in each province.

TABLE I. RESEARCH SAMPLING

| PROVINCE | TOTAL SME CONTRACTORS (N) | SAMPLE POPULATION SIZE (n) |
|---|---|---|
| A. Cavite | 96 | 22 |
| B. Laguna | 115 | 26 |
| C. Batangas | 195 | 44 |
| D. Rizal | 137 | 31 |
| E. Quezon | 70 | 16 |
| TOTAL | 613 | 139 |

### D. Research Instruments

Survey questionnaires were used by employing the aid of enumerators in different provinces who distributed and conducted interviews with the respondents. Rating scale was used to measure awareness of SME-based construction firm as to knowledge, practices, attitude, and perceived quality among SME-based construction firms.

### E. Data Gathering Procedures

The researcher sent copies to the enumerators of the duly approved letter of endorsement and the attached survey questionnaire to the identified list of respondents.

The data collected was then compiled, sorted, merged, and summarized to facilitate both qualitative and quantitative analyses. The tabulated result of the survey was sent to a professional statistician who conducted the analysis using statistical softwares such as SPSS and Microsoft Excell. The results of the data was then analyzed and interpreted and used as the basis in formulating the Quality Management Systems model for the SME-based construction firm.

## IV. RESULTS AND DISCUSSIONS

### A. Profile

The profile of the respondents were classified according to Philippine Contractors Accreditation Board (PCAB) category with 33 in category A, 30 in B, 32 in C, and 44 in D, as shown in Table II. In terms of asset size there were 30 respondents under micro size of assets, 70 in small, 33 in medium, and 6 in the large asset size. When classified according to number of employees, there were 37 under the micro, with employees ranging 1 to 9, 83 under small, with employees ranging 10 to 99, and 19 under medium with employees ranging from 100 to 199.

TABLE II.   Number of Respondents Per Category and Provinces

| Province | Category | | | | TOTAL |
|---|---|---|---|---|---|
| | A | B | C | D | |
| Cavite | 4 | 2 | 11 | 5 | 22 |
| Laguna | 6 | 4 | 3 | 13 | 26 |
| Batangas | 9 | 12 | 7 | 16 | 44 |
| Rizal | 8 | 7 | 10 | 6 | 31 |
| Quezon | 6 | 5 | 1 | 4 | 16 |
| TOTAL | 33 | 30 | 32 | 44 | 139 |

The respondents were classified according to the most common types of business in the Philippines. These are sole proprietorships, partnerships, and corporation. Table III shows that most of the respondents in the SME-based contractors are sole proprietors, which correspond to 68.75 percent of the total respondents followed by corporation with 31.25 percent and only one respondent has a partnership business.

TABLE III.   Number of Respondents Per Province According to Type of Business

| Province | Sole Proprietor | Partnership | Corporation | Total |
|---|---|---|---|---|
| Cavite | 19 | | 3 | 22 |
| Laguna | 21 | | 5 | 26 |
| Batangas | 26 | 1 | 17 | 44 |
| Rizal | 17 | | 14 | 31 |
| Quezon | 11 | | 5 | 16 |
| TOTAL | 94 | 1 | 44 | 139 |

Assets size are based on the Department of Trade and Industry (DTI) classification of Micro, Small, Medium Enterprises (MSMEs) and are defined as any business activity/enterprise engaged in industry, agri-business/services, whether single proprietorship, cooperative, partnership or corporation whose total assets, inclusive of those arising from loans but exclusive of the land on which the particular business entity office, plant and equipment are situated, must have value falling under the following categories as shown in Table IV.

TABLE IV.   Number of Respondents Per Province According to Asset Size

| Province | Micro Up to 3M | Small 3M to 15M | Medium 15M to 100M | Large above 100M | Total |
|---|---|---|---|---|---|
| Cavite | 1 | 21 | | | 22 |
| Laguna | 10 | 10 | 6 | | 26 |
| Batangas | 12 | 21 | 8 | 3 | 44 |
| Rizal | 6 | 13 | 10 | 2 | 31 |
| Quezon | 1 | 5 | 9 | 1 | 16 |
| TOTAL | 30 | 70 | 33 | 6 | 139 |

Alternatively, MSMEs may also be categorized based on the number of employees. Table V shows the respondents classifications for MSMEs according to number of employees. Majority of the respondents or 59.71% belongs to the small category with employees ranging from 10 to 99, only 13.37% has employees ranging from 100 to 199 and 26.62% belongs to the micro category with 1 to 9 employees in their construction firm.

TABLE V.   Number of Respondents Per Province According to Number of Employees

| Province | Micro 1 to 9 | Small 10 to 99 | Medium 100 to 199 | Total |
|---|---|---|---|---|
| Cavite | | 22 | | 22 |
| Laguna | 15 | 11 | | 26 |
| Batangas | 13 | 24 | 7 | 44 |
| Rizal | 5 | 17 | 9 | 31 |
| Quezon | 4 | 9 | 3 | 16 |
| TOTAL | 37 | 83 | 19 | 139 |

SME-based construction firm respondents were further categorized according to their years of operating in the construction industry, ranging from 1-5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years, and more than 20 years in operations. Table VI shows the profile of the respondents according to their years in operations. Research survey shows that 30.22% of the respondents had 6 to 10 years in operations, while 23.74% has already more than 20 years in operations. The lowest among the respondents in terms of years in operations ranges from 16 to 20 years with only 9.25%, and the rest are 20.14% for respondents operating from 11 to 15 years, and 16.55% for respondents operating from 1 to 5 years in the construction industry.

TABLE VI.   Number of Respondents Per Province According to Number of Years of Experience

| Province | 1 to 5 years | 6 to 10 years | 11 to 15 years | 16 to 20 years | above 20 years | Total |
|---|---|---|---|---|---|---|
| Cavite | 5 | 13 | 3 | 1 | | 22 |
| Laguna | 6 | 9 | 1 | | 10 | 26 |
| Batangas | 5 | 11 | 10 | 7 | 11 | 44 |
| Rizal | 5 | 6 | 10 | 4 | 6 | 31 |
| Quezon | 2 | 3 | 4 | 1 | 6 | 16 |
| TOTAL | 23 | 42 | 28 | 13 | 33 | 139 |

The type of construction services being rendered by SME-based construction firms are based on PCAB classification, which are General Building (GB) for contraction firms involved in constructing vertical structures such as buildings, whether they are commercial, industrial, government institution, and industrial plants. For General Engineering (GE) classification, contractors are involved in infrastructure projects such as Road, Highways, Pavement, Railways, Airport Structure, and other government infrasture. There are construction firms that can qualify in doing both GB and GE as another classification for type of construction services. Specialty construction firms are those who specialize on specialty works such as Foundation Work, Structural Steel Work, etc. Table VII shows that most of the SME-based construction firm respondents can do both General Building and General Engineering representing 46.04% of the total population, while 26.62% are involved mostly on government infrastructure projects for General Engineering classification and 20.14% are involved in private building structures such as General Building classification. Only 7.19% of the respondents are into specialty construction projects.

TABLE VII. NUMBER OF RESPONDENTS PER PROVINCE ACCORDING TO NUMBER OF YEARS OF EXPERIENCE

| Province | General Building (GB) | General Engineering (GE) | Both GB & GE | specialty | Total |
|---|---|---|---|---|---|
| Cavite | 11 | 6 | 4 | 1 | 22 |
| Laguna | 4 | 8 | 14 | | 26 |
| Batangas | 8 | 13 | 20 | 3 | 44 |
| Rizal | 3 | 5 | 20 | 3 | 31 |
| Quezon | 2 | 5 | 6 | 3 | 16 |
| **TOTAL** | 28 | 37 | 64 | 10 | 139 |

### B. Quality Management Tools

Summary of findings shows that PERT-CPM, flowchart, and check sheets are the top quality management tools being utilized by SME-based construction firms, as shown in Fig. 3.
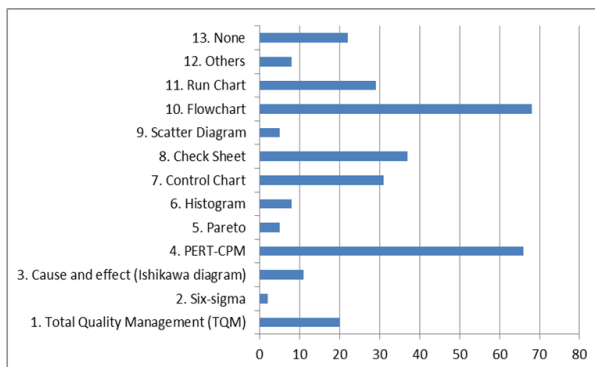


Figure 3. Management tools being implemented by SME-based construction firms

### C. Awareness Level

Awareness level of SME-based construction firms were measured using knowledge, attitude, and practices. Knowledge Scale

From all the SME-based respondents from the construction service sector, there was an indication that most of the respondents (61.87%) are not aware or have heard about ISO 9001:2008, and only 38.13% of the respondents were informed about the ISO 9001:2008 standard prior to its adoption as shown in Fig. 4.
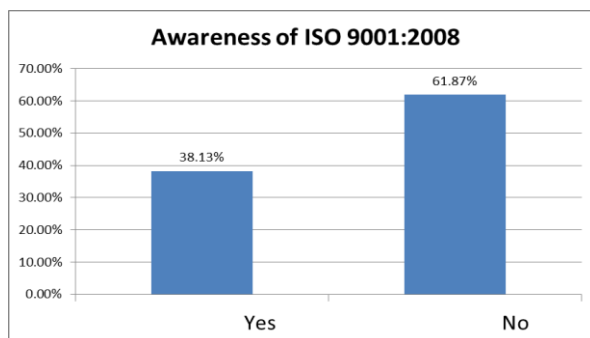


Figure 4. Level of awareness of SME firms to ISO 9001:2008

Survey results also show that the level of exposure of the 53 respondents who are aware of ISO 9001:2008 only

heard it or seen it from other industries and friends, and the level of awareness of the 29 respondents said that they are only somewhat familiar with it (Fig. 5).
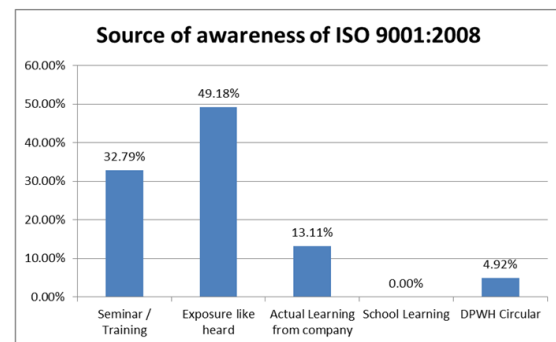


Figure 5. Level of exposure of SME construction firm respondents

- Attitude Scale

On the attitude level of SME-based respondents, the top three factors that will motivate them to implement ISO 9001:2008 is if it will be required by clients, to qualify for bidding, and increase customer satisfaction. Table VIII shows that fifty three percent (53%) and more than nine percent (9%) agrees and strongly agrees that it will be beneficial for their companies to implement ISO 9001:2008, while 36% remains undecided.

TABLE VIII. NUMBER OF RESPONDENTS PER PROVINCE ACCORDING TO NUMBER OF YEARS OF EXPERIENCE

| Provinces | Weighted Mean | Description |
|---|---|---|
| CAVITE | 3.545 | Agree |
| LAGUNA | 3.269 | Undecided |
| BATANGAS | 3.932 | Agree |
| RIZAL | 3.677 | Agree |
| QUEZON | 3.938 | Agree |

- Practice Scale

On the practice scale level of SME-based respondents, there were only 9 out of 139 or 6% of the respondents who are implementing ISO 9001:2008, and the main reason for implementing it is it is required by their clients, to qualify for bidding and increase their company image.

Significant Differences of Awareness Level when Grouped according to Profile Factors

There are significant differences in the knowledge level of the implementation of ISO 9001:2008 QMS among SME-based construction firms when classified according to their profile factors. More so, there are no significant differences in the attitude of the implementation of ISO 9001:2008 QMS among SME-based construction firms, and is no significant difference in the practices of the implementation of ISO 9001:2008 QMS among SME-based construction firms.

### D. Quality Management Model

Based on the findings and business processes of a construction company, a QMS model was created as shown in Fig. 6 and Fig. 7 to guide the SME-based construction firms in implementing ISO 9001:2008 in their companies.
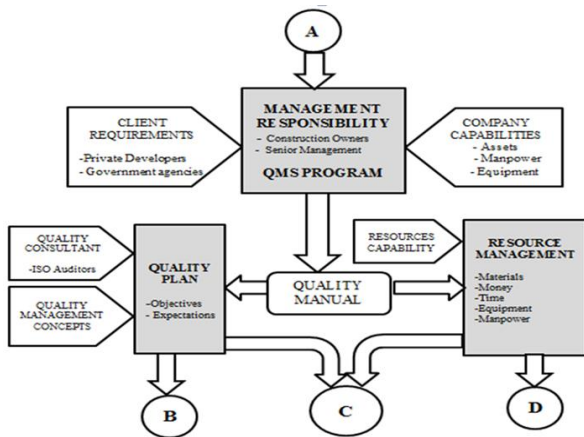
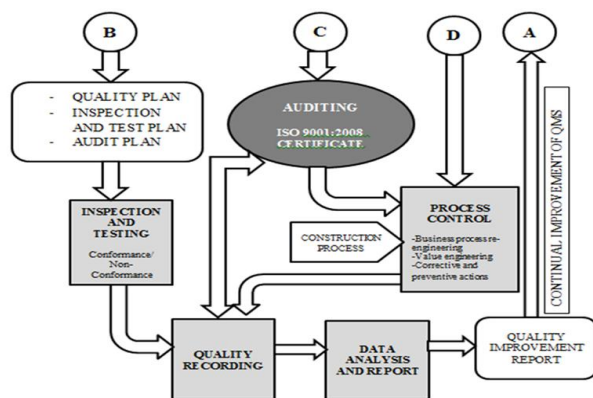Figure 6. Quality management model part A



Figure 7. Quality management model part B

- Management Responsibility

The role of the SME-based construction firm owners and senior management is the key to the success of the QMS implementation. Starting from the establishment of the quality policy, procedures and practices, right through the implementation including employee training, monitoring and until the final auditing, the management has a greater responsibility without which the success of the program will be unrealistic. The key output of this process is quality manual, established in line with the company general quality policy, procedures and practices of the organization. This will become input to both quality planning and resources management.

- Quality Planning

The SME-based construction firm owners and senior management, in conjunction with other parties such as quality consultants will hold series of quality meetings to produce suitable quality plan specific to the company. The plan should reflect the objective and expectations of the construction firm. Therefore, company specific information based on the profile factors of the SME-based construction firm should be considered. The key outputs of this process are quality plan, inspection and test plan, and audit plan.

- Resources Management

Resources management includes identifying, analyzing, deploying, and monitoring the resources required to

undertake the company activities. Resources are analyzed taking into account the Quality Manual. Information related to company capability becomes the key in managing resources. It includes resources availability within the organization and the capability of the resources in undertaking the work task.

- Process Control

It involves a detailed analysis of the construction business process as to the delivery, resources requirement, and value it is likely to offer to its customer. Process improvement can be effectively undertaken by adopting some established proven techniques such as business process reengineering, value engineering, and corrective and preventive actions.

- Auditing

The auditing process is comprised of a series of tasks to be performed periodically. It includes planning and preparing for the audit, doing the audit, reporting the result, and taking a follow-up action on them. This is the heart of the QMS model, wherein the construction process itself has to be audited for its performance output and non-conformance.

- Quality Recording

Quality records containing the results of quality-related activities need to be maintained in order to demonstrate the effectiveness of the system and in developing strategies for performance improvement. All results and reports produced from process control, auditing and inspection, and testing activities must be recorded and maintained for future retrieval.

- Data Analysis and Reporting

At every stage in the implementation of the Quality Manual, respective data need to be collected and analyzed. All data need to be analyzed appropriately using the right approach and techniques. Finally, the results of the analysis should be reported to the right department or the authority. The results of the analysis will form the basis for the overall improvement of the program.

## V. CONCLUSION AND RECOMENDATION

A. SME-based construction firms are all represented according to company profile factors, such as PCAB category, type of business, asset size, no, of employees, years of operations, and type of construction services.

B. SME-based construction firms are still using traditional type of construction management tools in their construction firms such as PERT-CPM, flowchart, and check-sheets.

C. The level of awareness of SME-based construction firms are low as well as the familiarity with the implementation of ISO 9001:2008. SME-based construction firm will only implement ISO 9001:2008 if it will be required by their clients and in order to qualify for bidding.

D. When grouped according to profile factors, SME-based construction firms vary significantly in the knowledge or level of awareness to ISO 9001:2008. However, they do not vary significantly in attitude and practices in implementing ISO 9001:2008.

E. Assurance, reliability, and empathy are the more important factors as the perceived quality services among the SME-based construction firms, while tangibles is the least important quality service factor.

Taking into consideration the literature review and questionnaire results, the following recommendations have been formed for effective application of ISO 9001:2008 QMS in construction firms and for future research:

- Expand the activities on disseminating information like explaining the importance, advantages and benefits of QMS for SME-based construction firms.
- Giving incentives for the application of QMS, and even granting credit facilities for firms to set up the system will be encouraged.
- Government agencies involved in the construction industry should coordinate with private developers and construction firms to conduct seminars and trainings that will focus on the advantages and benefits of ISO 9001:2008 in their organization.
- Encourage government agencies and private companies involved in construction activities to make ISO 9001:2008 as part of the requirements to qualify for bidding in construction projects.
- Studies are required to be carried out in order to determine the performance criteria necessary to develop QMS performances of SME-based construction firms holding ISO 9000 certificates.
- ISO should prepare a guide, both for the construction firms and for the certification bodies and auditors, in order to apply ISO 9000 QMS more effectively and efficiently.
- Work out in reducing documentation. These are the most common complaints in the application of ISO 9001:2008 QMS. This problem can be overcome with the effective use of information technology. This can be done by scanning pertinent documents, save and file in a computer network accessible to persons who need those documents.

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**Dr. Joseph Berlin P. Juanzon** was born in the City of Manila, Philippines on May 17, 1961. He finished his PhD in Management degree at Colegeio de San Juan de Letran-Calamba on March 2013, Masters in Business Administration and Bachelor of Science in Civil Engineering degrees at Pamantasan ng Lungsod ng Maynila (University of the City of Manila) on March 2016 and April 1983 respectively. On August 1990, he received a scholarship training grant from ILO Association of Japan and received a Diploma in Construction Technology in Ohsaki Institute of Construction Technology in Tokyo, Japan on August 1991. His major field of studies includes design and construction of building structures with emphasis on cost and quality management systems in building construction management. He is currently a full time faculty member of Mapua Institute of Technology at Laguna – Civil Engineering Department, Malayan Colleges Laguna in Cabuyao City, Laguna. He is the President/General Manager of JB Juanzon Builders Inc. since 2000 up to present. In 1995 to 2000, he worked for Filipinas Dravo Corporation as the Asst. Vice President-Construction. His past positions include Operations Manager and Cost Engineering Consultant at Filipinas Dravo Corporation, Vice President for Engineering at Tecphil Inc., Assistant Project Manager at Taiyo Construction Corp., Programmer/Lecturer at Quality Computer Systems, Inc., Assistant Project Manager/Cost Engineer at Tecphil Inc., Cost Estimating – Section Head at F Cacho & Co. Inc., Project Engineer at Ultimate Strength Construction Co., and Science Research Specialist in

Materials Science Research Institute. Dr. Juanzon is a member of Philippine Institute of Civil Engineers (PICE), Association of Researchers in Construction Management (ARCOM) in United Kingdom, International Council for Research and Innovation in Building and Construction (CIB) in The Netherlands, and he is a senior member of International Economics Development and Research Center (IEDRC). He was a delegate and a technical speaker in PICE 40th National Convention held in Baguio City, Philippines last June 5, 2014.