STUDY OF QUALITY MANAGEMENT PRACTICES OF BUILDING CONSTRUCTION FIRMS IN JOS METROPOLIS

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ABSTRACT
The study aimed at assessing quality management practices of building construction firms in Jos metropolis. Data used for the study were gathered through the use of 40 returned questionnaires administered to construction sites in Jos metropolis. A random sampling technique was used in determining the sample. A sample size of 52 and a population size of 61 were used. Descriptive statistics and relative importance index (RII) were used in the analysis. The research findings shows that adequate of site personnel (RII=0.87), adequate of project control (RII=0.86), certification of materials (RII=0.83) ranked highly significant as factors of quality management. Whereas onsite supervision (RII=0.86), education of employee on the need for quality (RII=0.83) and compliance to quality standard (RII=0.83) ranked highest as the most significant among the practices that firms conform with ensure quality management. The research also established that there are some variations with regards to firm size in conformity with quality management practices. It was concluded that inadequate on site supervision, customer satisfaction and education of employees on the need for quality management are the major practices that firms need to conform to ensure quality management in building construction firms. The research recommends building construction firms to conform strictly to quality management practices.

Keywords: *Quality management, construction firms*

Background to the Study
The issue of quality management in construction projects cannot be over emphasized since building facilities contribute the largest to any nation's

development and economy (Farooqui, Masood & Aziz, 2011). The construction sector is globally considered to be a basic industry on which the development of a country depends. To a great extent, the growth of a country and its development status is generally determined by the quality of its infrastructure and construction projects (Wasiu, Aliyu and Modupe, 2012). The quality movement can trace its roots back to medieval Europe, where workers began organizing into Unions called Guilds in the late 13th century (American Society for Quality, 2010).

In the early 20th century manufacturers began to include quality inspection in processes as a general practice, at the beginning of World War 2 quality became a critical component of the war effort as a product manufactured in one of the states had to work consistently with products from other states hence the eventual adoption of sampling techniques for inspection, aided by the introduction of military-specification standards and training courses (American Society for Quality, 2010).

The American Society for Quality (2010) notes that in the few years since the turn of the 20th century, the quality movement matured beyond Total Quality. New quality systems have evolved and quality has moved beyond manufacturing into service, healthcare, education, construction and government sectors.

In Nigeria, the construction industry has been identified as occupying a significant segment of the capital base of the Nigerian economy and also attracts a significant percentage of the labor force in the economy (Sanni and Windapo, 2008). Due to its prime position within the economy, the successful or non-successful performance of the industry impacts either positively or negatively on the whole economy. The construction industry has been slow to apply total quality management, which is standard for most manufacturing concerns, despite the construction industry's capital requirement being equal to many years of output from a typical manufacturing organisation. However expressed, quality is obtained if the stated requirements are adequate, and if the completed project conforms to the requirements (Arditi and Gunaydin, 1997).

Arditi (2004) also defines quality in terms of professional liability, a legal concept that requires all professionals to know their trade and practice it responsibly. Architects, Engineers and Builders who offer his or her expertise to owners are subject to professional liability laws, some design professionals believe that quality is measured by the aesthetics of the facilities they design.

According to Stasiowski and Burstein (1994) Cited from (Sanni and Windapo, 2013) this traditional definition of quality is based on such issues as how well a building blends into its surroundings, a building's psychological impact on its

inhabitants, the ability of a landscaping design to match the theme of adjacent structures, and the use of bold new design concepts that capture people's imaginations.

According to Kado (2010) the major weaknesses of construction firms in Nigeria are in the areas of staff training, awareness, education and skills, objective measurement, feedback and natural use of total quality tools and techniques.

These concerns involving quality in the construction industry have been identified by various researchers. One of the major concerns of the construction industry in Nigeria is the increasing cases of collapsed buildings across the country in recent times. (Abdulkareem and Adeoti, 2010).

While these concerns linger on, the problem of the technical professional bodies and allied government agencies have not really focused on the quality management of construction projects in such a way as to have a statistical base on the state or status of their quality management implementation (Lawal, 2000 Cited in Abdulkareem and Adeoti, 2010).

Concept of Quality Management

The concept of quality management is as an approach to ensure that a whole organization is involved in producing high quality outcomes in everything they do. According to Willar (2012) earlier researchers in the quality movement there is no particular definition for quality in construction. Quality can be defined according to American Society of Civil Engineering (2005) as meeting the legal, aesthetic and functional requirements of a project. These requirements may be simple or complex, or they may be stated in terms of the end result required or as a detailed description of what is to be done.

For construction projects, quality management means making sure things are done according to the plans, specifications, and permit requirements. The days of embarking on projects which usually involve huge funds without due diligence and proper regulation seem to be over, making it imperative that communities get the most out of their infrastructure projects (Arditi, 2004). Gunaydin (1997) opined that one of the best ways to assure good construction projects is to use an inspector.

Quality Management in Nigeria

The Nigerian construction industry produces nearly 70% of the nation’s fixed capital formation, and its performance within the economy has been, and continues to be on the increase. But despite the increased growth of the sector the Nigerian construction industry’s contribution to the country’s Gross Domestic product

(GDP) of 3.05% as at the close of 2012 is still below the World Bank's average of employment in the construction sector of about 3.2% in developing countries. Whereas the sector has remained consistently on the increase in terms employment to about 7.6% of the total employed citizens both directly and indirectly after rebasing of the Nigerian economy according to reports from National Bureau of Statistics (2015).

The construction sector is globally considered to be a basic industry on which the development of a country depends. To a great extent, the growth of a country and its development status is generally determined by the quality of its infrastructure and construction projects (Wasiu *et al.*, 2012).

According to Kado (2010) the acceptance of the BSI publication and standard by Nigeria, establishing SON/NSI and the development and National Building Code (2006) in 2007 are all steps towards improvement in the quality of building construction in Nigeria among many other things. In addition, there are laws, decrees, associations, authorities and regulatory bodies that are responsible for regulating building construction practices in the country.

Further development which sought to regulate professional practices in the construction industry led to the founding of The Architects Regulation Council of Nigeria (ARCON) from CAP A19 Laws of the Federation of Nigeria 2004. According to the Law, ARCON derives the power to register and control practices of Architecture in Nigeria (Yunusa, 2009).

Quality Management Systems in Construction

Some of the recognized quality management standards include; The ISO9000 series, Total Quality Management, Quality Control, Quality Assurance, Malcolm Baldridge (MB) standard and BS 5750 of the British Standard Institute (BSI), European Construction Institute (ECI) which produced the (ECI) Matrix in 1993 (Kado, 2011). According to the ASCE manual, (2012) the primary purpose of codes and standards is to protect the public's health and safety, compliance with codes and standards should be an issue addressed early in the design phase. Kubal (1994) claims that regulations controlling the construction processes are much more restrictive than in most manufacturing and service industries. Stasiowski and Burstein, (1994) underline that quality design begins with sound engineering and scientific principles which must satisfy the criteria of applicable codes and standards, but also the owner's project requirements.

Quality Assurance/Quality Control

According to Ferguson and Clayton (1998) "Quality Assurance (QA) is a program covering activities necessary to provide quality in the work to meet the project requirements. (QA) involves establishing project related policies, procedures, standards, training, guidelines, and system necessary to produce quality.

The emphasis continued to be on quality and control of exposure to liability. At about the same time, the widespread use in the public sector and, to a large degree, in the private sector, of the sealed competitive bid gave the owner the advantage of competitive pricing, but also forced the general contractor to look for every advantage during construction to control cost and maintain a profitable stance (ASCE, 2005).

ISO 9000 Series

The ISO 9000 series comprises two basic types of standard: those addressing quality assurances and those addressing quality management. The quality assurance standards are designed for contractual and assessment purposes and are ISO 9001, ISO 9002, and ISO 9003 (British Standards Institution, 2008). The quality management standard is ISO 9004 and is designed to provide guidance for companies developing and implementing quality systems, (Doyle, 2011).

A company registered as complying with ISO standards has demonstrated to an accredited third party (an approved outside auditor) that its processes have been documented and that the company is systematically auditing and being audited that they are following the policies and procedures necessary to produce high quality products (Arditi, 2010).

A TQM system is the big picture and is concerned with customer satisfaction and all activities conducted by a firm. A good way of viewing ISO is that the emphasis in the ISO registration is on the management of process quality. This is not meant to minimize the role of ISO in a TQM system (Arditi and Gunaydin, 1997).

Clearly, the context of an effective QMS implementation is to ensure that work is performed according to specifications, throughout the design and development phases, manufacturing and construction, and servicing, and also ensure that customers are satisfied with the resulting products and services (Beaumont 2013).

Quality Management Factors

Establishing the project requirements for quality begins at project inception. As opined by Artidi and Gunaydin (1997), a careful balance between the owner's requirements of the project costs and schedule, desired operating characteristics,

materials of construction, etc. The design professional is obligated to protect public health and safety in the context of the final completed project. The process of construction can be broken down into three main phases, namely,

1. The planning and design phase,
2. Construction phase, and
3. Operation and maintenance phase.

Management and Leadership

The Business Roundtable construction industry cost effectiveness study concluded that the primary causes for the decline of construction productivity directly or indirectly involved poor management practices (Burati, Michael & Satyanarayana 2011).

According to Joiner and Scholtes (2010) in this style of management, the emphasis is on the organizational chart and the key control points within the structure. All managers, beginning at the top, are given certain goals for the next year. It is simple, logical, and consistent. But there are problems when the work gets displaced by the controls themselves (Burati *et al.*,2013).

Employee Training on Quality

The importance is recognized by every quality expert. Under TQM, quality becomes everyone's responsibility and the training must be targeted for every level of the company. There should be customized training plans for management, engineers, technicians, home and field office staff, support personnel and field labour (Smith, 2008). It can be argued that the transient construction work force is quite different from the relatively stable manufacturing work force. This transient nature may make it more difficult to train workers, particularly craft labour, for the construction industry (Burati *et al.*, 2011).

If TQM concepts become widely accepted throughout the construction (Oberlender, 2009) industry, workers switching from one company to another should require less TQM training since all workers would have received basic quality awareness in their previous employment (Burati *et al.*, 2011). The training effort may include instruction in the basics of TQM, cause-and-effect analysis, team problem solving, interpersonal communication and interaction, rudimentary statistical methods and cost of quality measurement. A study of TQM in more than 200 companies found that skills in human interaction, leadership, and initiative are instrumental to the success of any quality improvement effort.

The demands on these interpersonal skills increase as the complexity and sophistication of the technical systems increase. The training effort follows a specific plan, and its implementation and effectiveness are carefully tracked. It is initiated in a limited number of pilot teams (Gunaydin, 2003).

It follows that operation and maintenance crews working in constructed facilities should be the main recipient of training efforts, Findings are parallel to ISO 9001 which emphasizes the importance of training and underlines that activities demanding acquired skills should be identified and the necessary training provided (Doyle, 2011).

Teamwork among Professionals

Quality teams provide companies with the structured environment necessary for successfully implementing and continuously applying the TQM process. Quality training is conducted and the continuous improvement process executed through a well-planned team structure (Lukman *et al.,* 2011).

At the industry level, extending the TQM concept to the parties mentioned above in the form of joint teams achieves higher customer satisfaction. These joint teams are responsible for establishing joint goals, plans, and controls (Juran, 2008).

These obstacles can be overcome in the construction industry however, if the owner is dedicated to doing so (Burati *et al.,* 2005).

Contractor Performance

Contractor quality performance indicators have been divided into corporate level as adapted from manufacturing industries by Yasamis, Arditi and Mohammadi (2002) and project level indicators which consist of the most common tools used in project management Yasamis *et al.* (2002), Arditi and Lee (2003, 2004), Ling and Chong (2005) and Lee and Arditi (2006) conducted their researches corroborating this division of corporate level quality performance and project level quality performance. Lists of product and service attributes with their definitions were found in literature (Yasamis *et al*, 2002; Arditi and Lee, 2003; Arditi and Lee 2004). Product quality attributes include: performance, reliability, conformance, durability, serviceability, aesthetics and perceived quality.

Customer Service

TQM is a process that requires universal involvement to be successful. This includes customer involvement. As more and more companies become involved in the TQM process and demands for improved quality increase, this concept

becomes increasingly important. Customers may be either internal or external (Palaneeswaran, 2006). Satisfying the needs of these customers is an essential part of the process of supplying the final external customer with a quality product.

Drawings and Specifications

Drawings and specifications are the two sets of documents given to the constructor that provide technical information on materials, performance of the constructed facility, and quality requirements. Drawings are the only documents given to the constructor that show the design concept, size and scope of the job, number and size of materials or items, and how they are assembled into a final project (Oberlender ,2007). That is why it is critical that drawings be clear, concise, and uniform (Ferguson and Clayton, 2011). Indeed Gunaydin's findings in (2004) indicate that the quality of the drawings and specifications received from the designer affect the quality in the design and construction phases, and consequently the quality of the constructed facility.

Constructability of Design

Constructability is one of the major factors that affect the quality of design. According to the ASCE manual (2010), the design professional must consider the requirements of the constructor. The project must be constructible by those retained to build the project. Like codes, constructability and construction techniques vary in different geographical areas. Kubal (2012) indicates for example that in addition to general reviews of constructability, designs must also be reviewed for effectiveness and compatibility with local requirements, including both the initial construction and post-construction operations.

Quality Improvement in Construction

According to O'Brien (2010) one way in which more attention will be given to quality control is development of a project quality control plan. Presently, testing and inspection requirements are scattered throughout the contract specifications. Alexander (2008) when discussing quality enhancement or improvement the terms quality assurance (QA) and quality control (QC) are frequently used interchangeably. These procedures include planning, coordinating, developing, checking, reviewing, and scheduling the work. The quality control function is closest to the product in that various techniques and activities are used to monitor the process and to pursue the elimination of sources that lead to unsatisfactory quality performance (Wick and Veilleux, 2003).

Quality Improvement in Nigeria

Kado (2010) asserted that, although there are such laws and regulatory organizations and their manuals, yet shortcomings still persist in the construction industry. Also Bamisile (2004) observed that "in certain instances, unqualified persons prepared both architectural and engineering designs and/or working drawings are poorly prepared even in some cases without drawings number and the name of the designer or drawn by column completed not to talk about name of the person that checked the drawings before they are issued for construction" In addition, some of the drawings are uncoordinated, grossly inadequate for construction, specifications are not used by the design team, in many instances they are left to quantity surveyors to write.

Research Method Adopted for the Study

This research was carried out using quantitative analysis to obtain data in other to assess quality management practices in building construction firms in Jos metropolis.

Method of Data Collection

Questionnaires served as the primary sources of data. Questionnaires were administered to building construction firms within Jos metropolis. The secondary sources of materials used in the research work include: textbooks, journals and published research.

Population of the Study

The population of the study consists of building construction firms in Jos metropolis. There are 45 registered construction firms in Jos metropolis (JMDB, 2010). Therefore, the sample frame of the study was 45 construction firms.

Sample Size

A sample size of 40 was obtained from a population of 45 using Krejcie and Morgan table 1970.

Sampling Technique

The sampling technique adopted for this research work is random Sampling. The random sampling method selects the sample size without giving priority (unbiased).

Method of Data Analysis

Descriptive and inferential statistics were used for simplicity and clarity. Tables, means, and percentage were used to present the results.

Relative Importance Index (RII)

Relative importance index was used in the study to rank the factors affecting quality management and also practices that conform to quality management in the various building construction firms which ensures effective service delivery.

Relative Importance Index (RII) $=\Sigma fx/\Sigma f\times 1/k$

Where, Σfx = is the total weight given to each attributes by the respondents.

Σf = is the total number or respondents in the sample.

K = is the highest weight on the liker scale.

Ranking of the items under consideration was based on their RII values. The item with the highest RII value is ranked first (1) the next (2) and so on. The rating of all the factors for degree of significance was based on the value of their respective relative importance index (RII).

Mbamali and Okotie (2012), Interpreted of the RII Values as follows: RII < 0.60, item is assessed to have a low significance. 0.6 ≤ RII < 0.80 item assessed to have high significance. RII ≥ 0.80 item assessed to have very high significance.

Data presentation, analysis and discussion of results

Table 1 Distribution of questionnaires/No. returned

Types of response	Frequency (No.)	Percentage (%)
Number distributed	40	100
Number properly Completed and returned	28	70
Number not returned	12	30

Table 2: years of experience

Years of Experience	*Frequency (No.)*	*Percentage (%)*
1-5 years	9	22.5
6-10 years	13	32.5
11-15 years	8	20
16-20 years	6	15
20 years and above	4	10

Total	40	100

Source: Field Survey (2019).

Table 1 shows the number of questionnaires administered to Building Construction Firms. 40 questionnaires were administered 28 were properly completed and returned representing 70% response. This percentage can be regarded appropriate and an adequate representation of the population of this study and therefore valid for consideration and use for the study.
Table 2 shows that 32.5% of respondents have 6-10 years working experience and 20 years and above have the least working experience percentage as 10%. Also 20%, 22.5% and 15% of the respondents have working experiences of 11-15 years, 0-5 years and 16-20 years respectively. Therefore, the respondents have adequate knowledge and experience.

Respondents' Profile
This section focuses on the respondents" working experience, educational background and the category of firms.

Table 3: Respondents Profile

Types of response	Frequency (No.)	Percentage (%)
PhD	0	0
M.sc	5	12.5
B.sc	17	42.5
PGD	4	10
HND	8	20
ND	6	15
Total	40	100

The academic qualification of the respondents is summarized in Table 3 of which 12.5% is Master Science (M.Sc.) holders. The other categories of academic qualification are given as follows; First degree 42.5%, Postgraduate Diploma (PGD) 10%, Higher National Diploma (HND) 20% and National Diploma (ND) 15%. None of the respondents possesses a Doctorate degree. The academic qualification of the respondents is important and supports the fact that they are knowledgeable and capable of providing the much needed professional judgment required for the credibility of the data collected for the research.

Table 4: Satisfaction with Quality Practices

Types of response	Frequency (No.)	Percentage (%)
Highly satisfied	12	30
Satisfied	18	45
Neutral	5	12.5
Dissatisfied	3	7.5
Highly dissatisfied	2	5
Total	40	100

Source: Field Survey (2019).

Table 4 Shows 45% of firms are satisfied with quality management being practiced in their firms; also 30% are highly satisfied. While12.5 %, 7.5% and 5% are neutral, dissatisfied and highly dissatisfied with the quality standards adhered to in their firms respectively.

Table 5: Firms Awareness of the need for Quality Management Practices

Types of response	Frequency (No.)	Percentage (%)
Yes	40	100
No	0	0
Total	40	100

Source: Field Survey (2019).

Table 5 summarizes the category of awareness of Quality Management, it shows 100% the respondents are aware of the need for quality management in construction firms,. This shows all of the respondents are fully informed on the need for quality management in construction firms.

Table 6: Firms perception of Quality Management as Feasible

Types of response	Frequency (No.)	Percentage (%)
Yes	38	95
No	2	5
Total	40	100

Source: Field Survey (2019).

Table 6 presents the firms‟ perception of the viability and feasibility of involvement in quality management. As seen in the table 95% of firms see quality management as feasible and viable practice, while 5% see otherwise.

Table 7: Interest of Firms to Implement Quality Management Practices

Types of response	Frequency (No.)	Percentage (%)
Yes	40	100
No	0	0
Total	40	100

Source: Field Survey (2019).

From Table 7, from the results above, it shows clearly that 100% of the firms visited are aware of the importance of quality management in construction and are interested in adopting quality management measures in order to achieve effective service delivery.

Table 8: Empowerment of Employees to make Quality Changes

Types of response	Frequency (No.)	Percentage (%)
Fully empowered	12	30
Only key officials	23	57.5
No empowerment	5	12.5
Total	40	100

Source: Field Survey (2019).

From table 8 it is seen that only 30% of employees are fully empowered to carry out quality changes, while 57.5% of firms have key officials empowered. It is also seen that 12.5% have no empowerment respectively.

Table 9: Types of Quality Improvement Systems Firms are involved with

Types of response	Frequency (No.)	Percentage (%)
TQM	5	12.5
Quality assurance	12	30
ISO 9001	9	22.5
Others	8	20
None	6	15
Total	40	100

Source: Field Survey (2019).

Table 9 show that 12.5% of firms utilize TQM which is the least also 30% of firms use Quality Assurance which has the highest percentage. 23.5% and 22.5% make

use ISO 9000 and others take 20% while 15% are not involved in any form of quality management practice.

Table10: Firms' perception of Factors Affecting Quality Management Frequency response

Management factors	Total									
	1	2	3	4	5	No.	Score	Mean	RII	Rank
Adequacy of site personnel	-	-	3	20	17	40	174	4.35	0.87	1
Adequacy of project control	-	1	4	18	17	40	171	4.26	0.86	2
Certification of material	-	2	2	23	13	40	165	4.13	0.83	3
Knowledge of project	-	3	3	18	16	40	165	4.13	0,83	3
Material quality	-	2	5	21	12	40	163	4.10	0.82	5
Quality of workmanship	-	4	7	14	15	40	160	4.00	0.80	6
Project quality	1	2	8	15	14	40	158	3.95	0.79	7
Adequacy of delivery	1	3	5	20	11	40	157	3.91	0.78	8
Adequacy of design	2	1	7	18	12	40	157	3.91	0.78	8
Progress review meeting	-	3	8	20	9	40	156	3.90	0.78	8
Scheduling	-	3	8	18	10	40	152	3.80	0.76	11
Estimation	2	6	7	13	12	40	147	3.68	0.74	12
Time completion	3	4	5	20	8	40	146	3.65	0.73	13
Risk assessment	3	4	8	16	9	40	144	3.60	0.72	14
Site safety	1	4	13	16	6	40	142	3.55	0.71	15
Interaction of professionals	2	6	9	17	6	40	133	3.33	0.67	16
Site cleanliness	3	7	11	14	5	40	130	3.28	0.66	17
Testing procedure	2	9	15	11	3	40	124	3.10	0.62	18
Adequacy of storage	3	10	14	9	4	40	121	3.03	0.60	19
Adequacy of security	4	10	14	9	3	40	92	2.30	0.46	20

Source: Field Survey (2019)

Key: 1- Strongly Disagree, 2- Disagree, 3-Somewhat Agree, 4- Agree, 5- Strongly Agree

Table 10 shows the factors affecting quality management in the construction firms in Jos and has been ranked accordingly. The highest ranked factors with the values of RII $\geq$ 0.80, regarded as a factors with very high significance because the relative important index (RII) is greater than 0.8 were Adequacy of site personal ranked

highest with relative performance index (RII) of 0.87 and Adequacy of project control with (RII) 0.86 ranked second, while Certification of material and knowledge of project having a relative performance index (RII) of 0.83 ranked third. Material quality ranked fifth with (RII) of 0.82, Quality of workmanship ranked sixth while project quality ranked seven with (RII) of 0.79. Adequacy of delivery, adequacy of design and progress review meeting ranked eight with (RII) of 0.78 respectively. Scheduling, Estimation, Time completion, Risk assessment, Site safety, Interaction among professionals, Site cleanliness. Testing procedure, Adequacy of storage ranking eleventh, twelfth, thirteenth, fourteenth, fifteenth, sixteenth, seventeenth, eighteenth, and nineteenth respectively. Only Adequacy of security ranking last with relative performance index (RII) < 0.6 which is assessed to be of low significance.

Based on the above results of the study, it can be seen that Adequacy of site personnel and adequate project control are key challenging factors affecting quality management in construction firms.

Table 11: Firms' Ranking of Quality Management Practices they conform with Frequency response

Management factors	Total									
	1	2	3	4	5	No.	Score	Mean	RII	Rank
On site supervision	-	1	3	19	17	40	172	4.30	0.86	1
Education on need for quality	1	2	3	19	15	40	165	4.13	0.83	2
Compliance to quality standard	-	2	2	23	13	40	165	4.13	0.83	2
Customer Satisfaction	-	4	3	18	15	40	164	4.10	0.82	4
Motivation of employee	1	2	5	20	12	40	164	4.10	0.82	4
Adequacy of employee training	1	3	7	13	16	40	160	4.00	0.80	6
Budgetary Allocation	1	2	8	15	14	40	158	3.95	0.79	7
Staff training	1	3	4	20	12	40	157	3.91	0.78	8
Proper Planning	3	3	6	16	12	40	151	3.90	0.77	9
Personnel management	2	3	7	20	8	40	149	3.73	0.75	10
Qualification of Employee	1	5	8	18	8	40	147	3.68	0.74	11
Attention to client needs	2	8	7	13	10	40	141	3.53	0.71	12
Team work among workers	3	7	5	17	8	40	140	3.50	0.70	13
Administration of change order	5	5	8	15	7	40	134	3.35	0.67	14

Source: Field Survey (2019)

Table 11 presents the quality management practices that building construction firms conform with. On site supervision of the construction process has been ranked as the highest with the relative importance index (RII) as 0.86. Education of employees on quality and compliance to quality standards ranked second .Customer satisfaction and motivation of employees ranked fourth. Adequacy of employee training rank sixth with relative importance index (RII > 0.8) which is assessed to be of very high significance.

Budgetary allocation, Staff training, proper planning, Personnel management and Qualification of employees ranked, seventh, eighth, ninth tenth and eleventh. Attention to clients needs, Team work among workers and Administration to change order are ranked twelfth, thirteenth and fourteenth respectively.

As shown in the results below, on site supervision and Education on need for quality are very essential to the enhance conformance to quality management of Building construction firms in Jos metropolis.

Table 12: Effects of Firm Size on Ranking of Practices that Firm Conform to Enhance Quality Management.

Management Practices	Small Size Firms RII	Rank	Medium Size Firms RII	Rank	Large Size Firms RII	Rank	Mean RII	Final Rank
On site supervision	0.82	4	0.92	1	0.86	2	0.87	1
Customer Satisfaction	0.86	1	0.86	3	0.86	2	0.86	2
Education on need for quality	0.85	2	0.84	6	0.82	5	0.85	3
Compliance to quality standards	0.77	9	0.88	4	0.89	1	0.84	4
Budgetary allocation	0.82	4	0.80	8	0.83	5	0.82	5
Staff training	0.82	6	0.80	8	0.80	9	0.81	6
Adequacy of employee training	0.76	11	0.88	2	0.77	13	0.80	7
Proper planning	0.80	8	0.80	8	0.80	9	0.80	8

Motivation of employee	0.77	9	0.80	8	0.78	11	0.78	9
Personnel management	0.82	6	0.80	8	0.71	14	0.77	10
Qualification of employee	0.73	12	0,78	13	0.79	12	0.77	11
Attention to client needs	0.70	13	0.78	13	0.83	5	0.77	12
Team work among workers	0.63	14	0.81	7	0.82	8	0.76	12
Administration of change order	0.59	15	0.64	15	0.57	15	0.60	14

Source: Field Survey (2019)

Table 12 shows the highest significantly ranked practices by the large firms as Compliance to quality standards with (RII=0.89), On site supervision, Customer satisfaction, Education on need for quality, Budgetary allocation, Staff training, Team work and Attention to clients needs also ranking as highly significant. While the medium sized firms ranked On site supervision (RII=0.92) as highest and employee training, Customer satisfaction, Need for education of quality, Budgetary allocation, Employee training, Compliance to Standards and the small sized firms ranked customer satisfaction, Proper planning, Team work, Motivation of Employees and personnel management also as highly significant. Small firms ranked Customer Satisfaction (RII=0.86) as the most significant practice with Education on need for quality, Quality appraisal, On site supervision, Budgetary allocation, Proper planning, Personnel management, staff training also ranking as highly significant.

Summary of the Findings

The summary of the results of this study are as follows.

1. Inadequacy of site personnel (RII=0.87), and inadequate project control (RII=0.86) are the most important challenges faced by firms in achieving quality delivery in building construction projects.

2. Firms perceive these practices; on site supervision of construction process (RII=0.86), education of employees on quality standards (RII=0.83), conformance to relevant quality standards (RII=0.83), motivation of employees (RII=0.82) and

customer satisfaction (RII=0.82) would enhance the quality management and improve construction service delivery.

3. Large firms ranked compliance to quality standards (RII=0.89) as most important, while medium sized firms and small size firms ranked on site supervision (RII=0.92) and customer satisfaction (RII=0.86) as most important practices respectively.

Conclusion

Based on the objectives of the research stated, the following conclusions were made in relation to the findings:

1. The main factors affecting quality management of building construction firms include;
   a) Inadequacy of site personnel.
   b) Adequate knowledge of project.
   c) Poor material quality.
   d) Poor quality of professionals.
   e) Poor workmanship.
2. The major practices that firms conform with to enhance quality management are,
   a) Proper site supervision.
   b) Training of employees on the need for quality.
   c) Compliance to quality standards.
3. No significant different in the effect of firm size was discovered on the overall ranking of conformity to practices that improve quality management, however there were variations in the ranking by firms on the most important practices. Large firms ranked compliance to quality standards as most important, while medium sized firms and small size firms ranked, on site supervision and customer satisfaction as most important practices respectively.

Recommendations

1. Construction firms should ensure all site personal are adequately qualified to delivery on the tasks assigned to them
2. Construction firms need to invest more in the education and training of employees on quality management systems and the need to adhere to suitable quality management practices.

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