INVESTIGATING THE BENEFITS AND BARRIERS OF QUALITY ASSURANCE MANAGEMENT FOR ADEQUATE HOUSING DELIVERY IN NIGERIA: AN EMPIRICAL OVERVIEW

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Abstract. Purpose: The process of housing delivery all over the world is confronted by multiple barriers resulting in houses that are short of clients' expectations in terms of quality and overall standards. The inability of the house builders (contractors) to deliver quality housing normally occurs due to non-conformance to quality assurance principles and non-adherence to the key quality indicators. An assessment of recent developments and actions in the building industry that might help mitigate the identified barriers has been made in this study. Hence, skilful application of quality assurance principles to overcome quality barriers in housing delivery is essential. Methodology: The study has employed quantitative methods of data collection. Closed-ended questionnaires have been prepared and administered to building contractors in Akure, Nigeria. The collected quantitative data have been analysed with the aid of SPSS software, version 27. The results have been accordingly reported to ascertain the level of commitment made by building contractors on ensuring quality in housing delivery in Akure. Findings: Findings have revealed that building contractors are well conversant and knowledgeable about the probable benefits of implementing quality assurance in the housing delivery process. There are, however, obvious challenges and serious barriers that are militating against effective implementation of quality assurance measures in the housing delivery process such as engaging unskilled labour force. Recommendation: The study recommends that a pre-assessment of the workforce be made to establish their level of knowledge and competencies on quality assurance management principles. *Originality and value*: Creation of "quality assurance consciousness" for the housing industry will result in quality housing delivery to the satisfaction of all end users and the general public.

Keywords: Barriers, benefits, housing, housing delivery, quality assurance management.

INTRODUCTION

Today, with the dynamics of increased market globalization and liberalization of local economies, it has become expedient for businesses globally, including real estate businesses such as housing delivery, to develop competitive strategies in the competing world. According to Jacob et al. (1997), the increase in globalization of markets coupled with the acceptance of competitiveness make it difficult and

almost impossible for governments or institutions at the local level to protect local markets. Product quality delivery is essential in all forms of business due to its several benefits, which include customer satisfaction, continuous product or service improvement, cost reduction, reduction of material waste, increase in profitability and productivity, time saving and employees motivation (Sherif et al., 2014).

Over the past years, studies have identified criticisms against the building industry due to its poor performance when compared to other businesses (Oglesby et al., 1989; Alarcon & Ashley, 1992; Forbes, 1993; Kanji & Wong, 1998; Loushine et al., 2006). The management practices that are employed in building industries in order to achieve quality are no longer tenable, as they are not truly reflecting the exact situation in the industry. It has been argued that clients normally require improved service, product quality, and improved building operations through the use of innovative technology.

Housing delivery requires sufficient combination of resource input of man, money and material delivered through a systematic functional process of project initiation, project planning and design (planning stage), land acquisition and documentation, project financing, approval/permission and infrastructural provision, construction/development (construction stage) commissioning and transfer of units, occupation of units, and maintenance management. Tomlinson (2006), Alabi (2012) and Ramovha (2017) mentioned that quality housing could not be realised without an efficient combination and control of all human and material resources. The authors suggest that quality assurance management system is an essential factor that influences the delivery of adequate housing.

Quality assurance management system creates the platform upon which all the expectations of the participants can be realised. Lau & Tang (2009) argue that quality and quality systems are issues that have attracted a lot of global attention both from researchers and policy makers.

Certain key factors that influence management decision in project delivery include good leadership style support of senior management, open communication and feedback, employee's motivation and participation (Hoyle, 2006). All these must be efficiently managed to achieve decent quality in a project.

Quality assurance in the building industry can be described as the actions taken with regard to ensuring that quality is built into a product or service (Foster, 2001). The development of quality assurance management (QAM) system helps an organisation effectively organise and synchronise their operations, define and assign responsibilities, document their processes (Aliverdi et al., 2013). Hence, Pheng & Teo (2004) opine that "the purpose of quality assurance is to prevent quality problems through planned and systematic activities".

Past research has shown that housing quality adequacy has not been achieved in Nigeria. For instance, Mbazor (2021) and Omeife & Windapo (2013) report that inadequate housing quality is everywhere in Nigeria due to several factors such as bad design, lack of quality culture, poor workmanship, poor monitoring and evaluation, lack of political will to regulate housing delivery projects etc. On the other hand, Ugwu et al. (2018) observe that a lack of effective maintenance policy and funding are the major causes of public housing deterioration in Nigeria. Over

the years, unquantifiable amount of both human and material resources have been lost in collapsed buildings in Nigeria.

Quality assurance management has continuously been used globally by both building industry and other organisations as an important instrument in solving organisational quality problems to the satisfaction of clients and the end users. For instance, Oakland & Aldridge (1995) argue that a construction industry is mainly the industry that adopts a quality management practice. Similarly, Alfeld (1988) posits that the construction sector possesses a better payback for performance improvement than all other industries due to its size. Unarguably, the full implementation of quality assurance management principles in housing sub-sector is obviously difficult, largely due to a lack of universal standardization of elements used, coupled with the number of people that are party to the industry.

Therefore, the present research is conceived to identify the barriers and benefits associated with QAM concept in the delivery of adequate housing in Nigeria. Data of the study are used to illustrate and discuss project manager's level of QAM knowledge; efforts made at ensuring quality, and identify the barriers and benefits that are associated with quality assurance management in housing delivery.

1. LITERATURE REVIEW

The right to adequate housing is unambiguously recognised in international human rights law, including the International Covenant on Economic, Social and Cultural Rights (ICESCR), which provides for "the right of everyone to an adequate standard of living both for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions" (UN-Habitat, 2006).

Housing is therefore of paramount importance to humankind. Ankeli et al. (2017) argue that housing plays a significant role in the socio-economic and psychological life of a man. Ayedun & Oluwatobi (2011) see housing as a process of erecting a permanent structure that a man uses as a shelter for himself and his belongings. This suggests that housing is an essential human need to which every household requires an unrestricted access irrespective of status in the society.

Providing adequate housing for the people is a core policy objective of every government globally, and this has risen to the fore in international frameworks through the adoption of the 2030 Agenda for Sustainable Development, with its committed urban "Sustainable Development Goal (namely SDG11) – and of the New Urban Agenda" during the 2016 United Nations Conference on Housing and Sustainable Development – Habitat III, 2016.

The Nigerian housing industry as presently configured lacks a systematic framework that will guarantee the delivery of housing that is seen to be adequate, safe, resilient, suitable and guarantee the value for money and at the same time satisfy the national and individual interests. In a clear term, the Nigerian housing question is principally that of a "crisis situation", manifesting itself in both quantitative and qualitative forms. The persistent collapse of buildings all over Nigeria in the recent times with its attendant economic and human losses is a cause for concern. The housing collapses in Nigeria have often been attributed to several

factors among which are a lack of quality culture, an outright neglect of quality assurance indicators before and doing the delivery process.

The European Association of Conservatoires (AEC), (2021) places more emphasis on QA as an external process of monitoring the reliability and consistency of a product or service, while Duff et al. (2000) argue that QA is a process of demonstrating excellence, accountability and value for money. Further, Chan (2007) mentions that QA is "a management discipline which is concerned with anticipation of problem(s) and creating the right attitudes and controls which prevent such anticipated problems from arising". Chan simply captioned quality assurance as "a common sense written down". This suggests that QA in a general sense involves the process of establishing project related policies, standard procedures/guidelines, training programmes, and a standard system necessary to produce quality.

Therefore, the design professionals, developers, contractors and consultants are directly responsible for developing an appropriate programme for each project. Quality assurance provides protection against quality problems through early warnings of trouble ahead. Such early warnings play an important role in the prevention of both internal and external problems. Hence, Nyakala et al. (2017) argue that to make QA work particularly in a housing delivery project, there is a need to create effective policy objectives to control the quality system. Further, Nyakala et al. (2017) contend that operators in the housing industry need adequate quality knowledge in order to build quality into the final housing product.

Kam (2000) states that "using a preventative approach to quality rather than inspection of the final product (quality control), an organisation can save the money and time which could be spent on scrapping and reworking". Tang et al. (2017) support the argument that quality assurance management is a knowledge driven, preventive function and that it is more cost-effective to get things right in the very first place. Therefore, to successfully implement quality assurance in a housing delivery project, it is required that proper and methodical procedures should be outlined, understood meticulously followed by the concerned individuals or groups.

Despite the emphasis on quality assurance management as portrayed by different writers in achieving product quality, Feigenbaum (1956) and Wentzel (2010) note that quality may not be assured by merely placing control on production activities. Accordingly, Yang (2017) outlines the sequence of quality activities in the project delivery process to include: product design, quality approval, process quality control, product reliability, inventory, delivery, and customer service. Yang (2017) further states that the effective and systematic combination and control of all these activities will give a reasonable assurance that each activity undertaken is right before the next activity starts. Therefore, the study recommends that quality culture should be developed by all the operators in project execution and management, be it the project consultant, main or subcontractor, project manager, material supplier, and those agencies that carry out tests and supervision.

1.1. Quality Assurance in Housing Delivery

The application of quality assurance in the housing delivery has been variously expressed. QA in housing delivery implies "meeting customers" expectations'

(Kanji & Wong, 1998), "reduced rework or defects" (Yong & Pheng, 2008), "prevention of repeat of business" (Chindo & Adogbo, 2011), "conformance to standard criteria" (ISO, 2000), and "completion on-time and within budget" (Van der Krabben & Lambooy, 1993).

1.2. Barriers to Quality Assurance Management in Housing Delivery

There are many studies on the barriers to quality assurance in the housing delivery process. These studies have been carried out in different parts of the world. According to Hoonakker et al. (2010), the primary barrier to quality assurance management implementation lies with the nature of the construction processes. The study notes that most of these projects are often very large, highly labour intensive and often not situated in the same location. Sommerville (1994) observes that the workforce tends to be temporary in nature; demand is not static but fluctuates subject to the client's perception of the value of the project.

Construction project such as housing delivery is a complex system, which several participants enter, and each participant has own ideology, perspectives and interests. These participants are brought together from diverse cultural and social settings to work on a project that changes several times during the construction process. Each of the participants strives as much as they can to minimise the unpredictable effects of weather, hazards, delays, and building defects (Chindo & Adogbo, 2011). These changes can lead to delays in completion of the project, also complaints by clients about quality can result in rework, which in turn leads to further delays in completion and so on and so forth. Based on the configuration of housing delivery industry, Chindo & Adogbo (2011) state that "the sector is purely characterised by confrontational instead of cooperative relationships between the different parties involved." In addition, the people who are involved in the housing delivery process constitute yet another barrier to quality implementation, since each of them always tries to protect their own interests in order not to be blamed.

Further, Hoonakker et al. (2010) identify three basic categories of participants in a project delivery process, and they are: the owner (often referred to as the customer), the architect/designer/engineer, and the main contractor who hires the project manager. The study explains that the client (owner) hires an architect/engineering firm to design the project and thereafter advertises for bidding of contractors (in a competitive bidding process). Selection of building contractors is based on key selection criteria as identified by Igboanugo & Ogbeide (2014), which are acculturation, outsourcing management, duration of work, worker welfare and adherence to client's health, safety and environment programme, delivery capability, contractor's responsiveness, QA management, innovations for quality work (Igboanugo & Ogbeide, 2014). The selected contractor thereafter mobilises workers to the site and performs the actual construction work.

These groups of participants are of immense importance in the execution of projects but their cultural and other diversities make it difficult to implement quality in the construction project.

Another key constraint (barrier) to QA implementation in the housing delivery sector is a lack of standardization. In the building process, the general contractors desire that quality is built into the project throughout. However, it was observed in

Boadu et al. (2020) that the construction industry was generally characterised by its lack of standardization and uniformity. In a number of cases, it is observed that production processes are not always the same even if the designs of the product are similar. Hence, Hoonakker et al. (2010) posit that "no universal standard or specification can be applied to the product, which leads to difficulties in quality assurance in the industry". It can be deduced that changes that are made to the designs constitute a fundamental reason for non-standardization of construction products. Quality becomes risky when changes are made to plan during project construction.

The bidding process (generally referred to as a procurement process) is also a significant barrier to quality assurance implementation and management in building delivery.

Barriers to the implementation of QAM in the housing delivery process are construction related factors such as shortage of skills and inadequate training of the workforce, lack of leadership commitment to quality, and lack of quality culture and quality control measures. Rowlinson & Walker (1995) argue that apart from the well-known construction and procurement related factors, a barrier to quality in housing delivery is corruption, which has been noted as one of the major barriers to implementing quality in construction projects.

1.3. Benefits of QAM Implementation in Housing Delivery

Quality assurance as previously identified is a tool employed to check and ensure that product or service is up to the required standard, and that an organisation offers the kind of product or service that will make customers to return again. Khwaja et al. (2020) argue that a proactive approach where defects are detected before a product or service goes into the public domain is necessary. The study advocates that QA is vital in ensuring the satisfaction of customers' housing quality needs.

Efforts at ensuring quality in the housing delivery process are intended to demonstrate to the leadership of an organization and to the general public that the end product is up to the required standards of quality, often established by each individual company or government and agency regulators. However, Besterfield (2004) advises that QA should never be ignored or compromised in an attempt to finish a job within schedule. Besterfield (2004) further argues that QA process allows one to know if resources such as money, man and materials are used rightly or wrongfully, and hence recommends that contractors and QA managers need not to 'cut corners' in any form or shed. The study also reveals that 'cutting corners' can result in loss of faith by clients, decreased profit margin and in the long run – loss of business. It further mentions that customers (clients) are attracted back, there are reduced claims, litigations and reduced incidence of rework. There is also an improved relationship between project designers and contractors (main and sub), which allows all participants to have confidence in themselves and the work they do.

Pheng & Teo (2004) outline the benefits of QA to include: reduction of total costs because there is less wastage and rework, given that the product is checked at every stage of its development; enhanced workers' motivation as they take pride

and assume more ownership and recognition for their work; it helps breaking down 'us and them' barriers between company workers and managers.

From the foregoing description of housing quality assurance, there is a gap in finding a common understanding of quality assurance in the housing delivery industry in Nigeria. Besides, there are little empirical data on the application of QA in housing delivery in Nigeria. Therefore, to study how contractors perceive quality, how they assess or determine quality, how they ensure quality in project delivery, it is fundamental to investigate the barriers to quality assurance in housing delivery.

2. RESEARCH METHODOLOGY

The goal of this paper is to obtain the necessary information on how project managers implement QAM criteria in housing delivery in Akure, Nigeria. Primary data have been used to conduct the study. The primary source is the use of questionnaire, which is based on a five-point Likert scale. Names and contact details of the construction project managers have been obtained from the official register maintained by the Association of Building Contractors and Artisans, Akure branch. This is with a view to investigate their level of knowledge of QAM concepts, the level of application of the concept in housing delivery. The sample population consists of 414 registered members who are actively engaged in the delivery and supervision of housing projects in the area of study. Members are drawn from different fields, including 73 builders, 168 architects, 65 civil engineers, 47 quantity surveyors, and 61 building artisans.

The study combines both the simple random and stratified sampling techniques. The simple random sampling ensures that every member of the association has equal and independent opportunity of being selected in the samples studied. On the other hand, stratified sampling ensures that the samples are divided according to the representative skills. The sample size used in the study has been obtained using Taro Yamene's formula (1):

$$n = \frac{N}{1 + N(e)^2} \ . \tag{1}$$

When appropriate values have been substituted into the formula, the sample size for the study has become 203.

In addition, Bowles's proportional allocation formula has been used to determine the actual number of persons for administering the questionnaire (see Table 1). Bowles's formula is given as follows: $n_h = \frac{N_h}{N} n$, where: n_h – the number allocated to each unit; N_h – the total population in each unit; n – the total sample size; N – overall population.

A total of 203 questionnaires have been distributed, but only 178 have been correctly filled, returned and found valid for the analysis.

The study employs a cross-sectional descriptive study design to achieve the study objectives. The 178 responses retrieved have been analysed using a simple

descriptive statistical method of percentage and weighted mean score (WMS) as shown below:

$$WMS = (5n_5+4n_4+3n_3+2n_2+n_1). \hspace{2cm} (2)$$

3. RESULTS AND DISCUSSION

3.1. Results

Table 1 shows the distribution and retrieval of questionnaires from the respondents. From a sample population of 203, 178 respondents (88% of the total sample population) have completed the questionnaire, and the researchers consider this ratio to be sufficient for the analysis. Generally, the response rate to the questionnaire by 178 respondents is considered adequate for statistical analyses. This conforms to the position of Chang & Sinclair (2003) and Igalens & Roussel (1999) who opine that adequate sample size is required for a true representation of the sample group.

Table 1. Questionnaire Distribution and Retrieval Rate

Respondents	Distribution	Retrieved	% Retrieved
Builders	36	31	86.1
Architects	82	69	84.1
Quantity surveyors	32	29	90.6
Civil engineers.	23	21	91.3
Others	30	28	93.3
Total	**203**	**178**	**87.7**

Source: The authors' field survey (2021)

In terms of the socio-economic distribution of the respondents, it has been found that from 178 respondents, 38 have 1–5 years of job experience representing 21.4 %, 67 of them have 6–10 years of job experience representing 37.6 %, while 73 of the respondents have above 11 years of job experience in housing delivery, which represents 41 %. Also, the study reveals that the respondents possess varying levels of academic qualifications ranging from Bachelor's degree to PhD qualifications. Out of 178 participants, 50 % do not possess a degree or HND certificate, 52 have either BSc or HND, 34 of them have either Master's degree or postgraduate qualification, while 3 have a PhD qualification. Their percentage distribution is 50 %, 29.2 %, 19.1 % and 1.7 %, respectively. In terms of the professional membership, 18.5 % belong to a professional association in the field of the built environment, 10.7 % have their professional membership in fields other than the built environment, while 70.8 % do not belong to any professional association. The implication of the socio-economic characteristics of the respondents is that a majority of them have advanced job experiences, but are not sufficiently educated up to the first degree or HND level, and a majority of them do not belong to any professional organisation in the built environment. The

percentage of participants' years of experience, their level of educational and professional attainment make them suitable for this study.

Table 2. Socio-Economic Characteristics of Respondents

Respondents' years of experience	Frequency	Percentage
1–5 years	38	21.4
6–10 years	67	37.6
Total	**178**	**100**
11 years and above	73	41
Level of education	**Frequency**	**Percentage**
Below degree level	89	50
BSc/HND	52	29.2
MSc/PGD	34	19.1
PhD	3	1.7
Total	**178**	**100**
Professional membership	**Frequency**	**Percentage**
In the built environment field	33	18.5
In other fields	19	10.7
None	126	70.8
Total	**178**	**100**

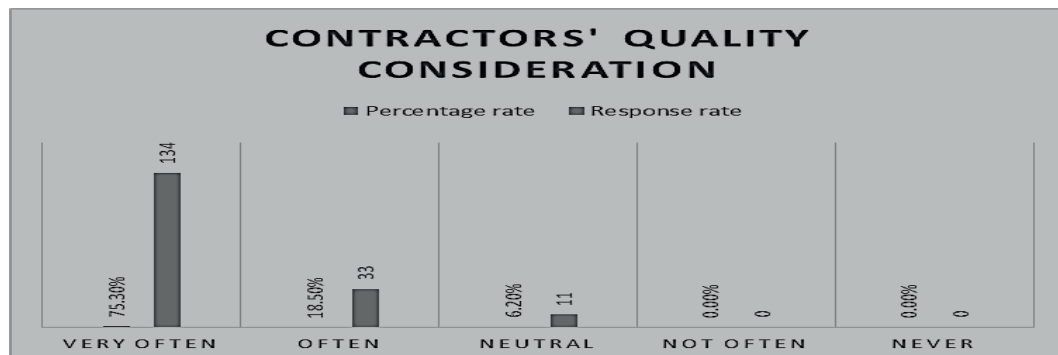*Source*: The authors' field survey (2021)

Fig. 1. Level of consideration of quality in the housing delivery process.
Source: The authors' field survey (2021)

The project managers have been asked to evaluate how often they consider quality assurance as an important element in their housing delivery process. 75.3 % of the respondents agree that very often they consider quality in their building delivery process, 18.5 % mention that they often consider quality, while none of them agrees that they never put quality into consideration in all their housing delivery efforts. The results therefore reveal that a majority of project managers

handling housing delivery projects in the study area usually consider quality a key factor in their decision making.

Table 3. Project Managers' Perception of Quality Assurance

S/N	Factors	SA	A	N	D	SD	WMS	Rank
1	Customer's overall satisfaction	74	90	11	3	0	4.32	1st
2	Assurance of supplier's quality	63	69	24	1	1	4.3	2nd
3	Pride in promoting quality improvement outside	79	72	13	10	4	4.19	3rd
4	Commitment to customers through warranties	58	61	32	12	15	3.76	4th
5	Teamwork structure results in quality	64	51	0	46	17	3.56	5th
6	Corporate quality culture	0	0	8	87	83	1.58	6th

SA – Strongly agree; A – Agree; N – Neutral; D – Disagree; SD – Strongly disagree
Source: Field survey, 2021

The project managers have been asked to assess the overall perception of quality assurance in housing delivery (see Table 3). The study reveals that a majority of the project managers see quality assurance as meeting customers' overall satisfaction, assurance of suppliers' quality, and pride in promoting quality improvement outside. These factors rank 1st, 2nd and 3rd, respectively. However, factors such as corporate quality culture, teamwork structures and commitment to customers through warranties have the least ranking of 6th, 5th and 4th, respectively.

Table 4. Project Managers' Mode of Assessing Quality of a Finished Housing Product

S/N	Factors	SA	A	N	D	SD	WMS	Rank
1	Customers' level of satisfaction	109	73	4	1	2	4.79	1st
2	Manager/Supervisor reputation	112	40	11	14	1	4.59	2nd
3	The higher the bid, the higher the quality	79	72	8	19	7	4.22	3rd
4	Ascertaining standards of material before use	57	97	10	9	5	4.09	4th
5	Testing of the finished product	46	73	7	29	23	3.51	5th
6	Displaying of quality programmes at the site	41	53	36	30	18	3.4	6th
7	Product outlook and remarks by outsiders	8	11	12	71	76	1.9	7th

SA – Strongly agree; A – Agree; N – Neutral; D – Disagree; SD – Strongly disagree
Source: Field survey, 2021

The assessment of finished housing product quality by the project managers is shown in Table 4. The study reveals that that the main way of assessing quality in housing delivery is through the level of satisfaction that customers or end users enjoy in the use of the product which has a total mean score of 4.79 ranking highest among the factors considered. This is followed by the level of reputation and image the contractor enjoys outside in relation to the project executed. It has a total mean score of 4.39, while the price of bid is followed with a mean score value of 4.22. Product outlook and remarks from onlookers, displaying of quality programme on

billboard or at the project site, and testing of the product ranked the least as they have a mean score value of 1.9, 3.40 and 3.51, respectively. The result shows that project managers consider the customer level of satisfaction, their image/reputation and bidding price as the best means of assessing quality in housing delivery. Overall product outlook/remarks by outsiders, displaying of quality programme and testing of product are considered far less important factors in assessing quality in housing delivery.

Table 5. Project Managers' Procedure in Ensuring Quality in Housing Delivery

S/N	Factors	SA	A	N	D	SD	WMS	Rank
1	Commitment to quality culture	101	73	0	2	2	4.51	1st
2	Continuous education & training of workers	77	69	11	12	9	4.08	2nd
3	Improved relationship among workers	68	70	14	16	10	3.96	3rd
4	Reward for good performance	71	60	11	23	12	3.85	4th
5	Use of skilled labour force	62	71	1	31	13	3.78	5th
6	Regular inspections and audit	70	54	16	17	21	3.76	6th
7	Effective communication & regular meeting	61	59	7	32	19	3.62	7th
8	Well-defined goals & objectives	57	45	18	40	18	3.47	8th
9	Criteria used for bidding	60	32	12	26	48	3.17	9th

SA – Strongly agree; A – Agree; N – Neutral; D – Disagree; SD – Strongly disagree
Source: The authors' field survey, 2021

Table 5 shows project managers' efforts at assuring quality in the delivery of housing in the study area. The study reveals that out of all the procedures followed by the project managers to ensure quality in housing delivery, commitment to quality culture is the most significant factor that ensures adequate quality in housing delivery. It has the highest weighted mean score value of 4.51 and ranks highest in the scale. It is followed by continuous education and training of workers which has a weighted mean score of 4.08. The study further reveals that the criteria used for bidding and company goals and objectives are the least considered factors in the quality assurance management process as they have the least weighted score values of 3.17 and 3.47, respectively. The implication of this result is that quality is assured in housing delivery if there is commitment to quality culture and sufficient training and education are given to those engaged in housing delivery.

Table 6. Benefits of Quality Assurance Management Application in Housing Delivery Process

S/N	Factors	SA	A	N	D	SD	WMS	Rank
1	Customers/Clients are attracted back (higher patronage)	97	74	0	5	2	4.46	1st
2	Reduced claims and litigations	89	81	1	5	1	4.4	2nd
3	Reduced incidence of rework	83	70	6	13	6	4.19	3rd

4	Improved relationship with designers and contractors	81	68	9	17	3	4.16	4th
5	Improved employee job satisfaction	78	66	10	15	9	4.06	5th
6	Higher productivity and efficiency	77	69	4	19	9	4.04	6th
7	Enhanced schedule performance	68	72	8	29	1	3.99	7th
8	Reduced changed orders	67	70	3	28	10	3.88	8th
9	Good relationship with sub-contractors & material suppliers	63	71	5	34	5	3.86	9th
10	Improved safety	45	61	11	47	14	3.43	10th

SA – Strongly agree; A – Agree; N – Neutral; D – Disagree; SD – Strongly disagree
Source: The authors' field survey (2021)

Table 6 shows various benefits derived from quality assurance management implementation in housing delivery. The study reveals that among all the benefits that project managers derive, high customer patronage is the most significant benefit for quality assurance management. It has the highest weighted mean score of 4.46 and ranks highest in the scale. It is followed by reduced claims and litigations with a weighted mean score of 4.40. The study further reveals that improved safety and relationship with sub-contractors and material suppliers are the least considered benefits of quality assurance in housing delivery as they have a total weighted score mean of 3.43 and 3.86, respectively. It means that there is a high customer patronage, reduced claims and litigation, and reduction of rework incidences when an organisation implements quality assurance management.

Table 7. Barriers to Quality Assurance Management in Housing Delivery Process

S/N	Factors	SA	A	N	D	SD	WMS	Rank
1	Dominance of quacks or unskilled workers	95	69	3	5	6	4.36	1st
2	Awarding of contracts to the lowest bidders	84	76	9	7	2	4.31	2nd
3	Poor supervision	71	79	9	13	6	4.1	3rd
4	Lack of fund	64	74	6	16	18	3.84	4th
5	Workers' attitude to their work	68	72	1	23	14	3.83	5th
6	Lack of functional tools and equipment	65	67	17	22	7	3.66	6th
7	Working with new people	53	61	1	40	23	3.46	7th
8	Poor institutional framework	58	43	12	37	28	3.37	8th

SA – Strongly agree; A – Agree; N – Neutral; D – Disagree; SD – Strongly disagree
Source: The authors' field survey (2021)

Results obtained from the respondents in the study area reveal that the two most significance barriers to quality assurance management implementation in housing delivery are the dominance of quacks (unskilled workers), and awarding contract to the lowest bidders (see Table 7). Poor institutional framework, working with new people and lack of functional tools and equipment are among the least important factors constituting a barrier to QAM implementation in housing delivery.

3.2. Discussion

The study has shown that it is challenging to define or assess quality as a concept in the housing industry. In general, a majority of the project managers agree that they employ quality assurance management in the delivery of their housing projects. This is evidenced from the result as shown in Fig. 1. However, quality is often difficult to measure and implement in reality as shown in Table 4. For example, it is practically difficult to assess the level of customers' satisfaction except for references that will be made by the satisfied customers. This is because there is no standardization in the measurement of quality outcomes. Therefore, to be able to effectively measure and assure quality, it is necessary to first establish the opinions of the project managers in respect to their perception of quality.

Project managers' mode of assessing quality as shown in Table 4 reveals that there is a need to clearly quantify the concept to be meaningful. Given this obvious challenge in determining quality in housing delivery, Hoonakker et al. (2010) asserted that if all construction managers used a standardized customer satisfaction questionnaire, it would be possible to compare the quality records of managers (benchmarking) and analyse the factors that contribute to high customer satisfaction and high quality.

Project managers, according to the study, understand the benefits that are accrued from quality assurance management application in housing delivery, which include high customers' patronage, reduced claims and litigations, and reduced incidence of rework. The study by Besterfield (2004) showed similar results. Similarly, Khwaja et al. (2020) reported that project managers who employed quality assurance management principles recorded a higher rate of customer satisfaction.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study has investigated the barriers and benefits of quality assurance management implementation in adequate housing delivery in Akure, Nigeria. The study has also assessed the perceptions of project managers with regard to the quality assurance management concept and determined their level of application. Simple statistical method of weighted means score (WMS) has been used for the analysis. Results have shown that a majority of those engaged in housing delivery in the study area do not possess sufficient educational and professional training in the field of housing. Hence, the study recommends that housing constructors should go for further training in the field of housing construction.

Recommendations

The recommendation for project managers who aspire to embrace quality assurance management principles in their practices are based on the study undertaken. The recommendations are suggested with the assumption that the project managers will adopt the culture of quality assurance in their practices.

The main recommendation that we can make to the project managers in particular and the building industry stakeholders in general is that they should develop the culture of undertaking a pre-assessment of their workforce with a view to ascertaining their level of competencies. This pre-assessment will allow determining the strengths, capabilities, and weaknesses of the workers through internal examination. The pre-assessment should be performed in such a way that it should not give room for conflict of interests.

Also, quality culture should be clearly defined and communicated to all stakeholders both in office and at the site (all workers must understand the importance of quality assurance and why it must be embraced and implemented by all).

Likewise, a quality assurance management policy should be established and strictly enforced. It is also recommended that the entire workforce be actively involved in quality assurance management implementation starting from project commencement to the end of the project. Finally, we recommend that project managers should consistently subject a team member to test with close supervision and evaluation in order to determine their efficiency.

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