Effective quality management strategies for enhancing the success rate of indigenous construction SMEs in construction project delivery

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Abstract
The purpose of this study is to develop effective quality management modalities that could be adopted by construction SMEs to achieve sustainable construction project success. A questionnaire was distributed to SMEs management team in the general building category registered under CIDB grade 1 – 4. To validate the questionnaire survey, interviews were conducted among purposively selected contractors who took part in the survey. The data was analysed using descriptive statistics and content analysis. The findings revealed the most significant effective quality management practices for SMEs to promote sustainable success as clear working drawings, time to time request for quality inspection, effective implementation of total quality management and benchmarking for quality management. It should be noted that the quantitative findings were consistent with the qualitative findings. This paper focuses on SME contractors with CIDB grading between 1 and 4 who are registered in the Eastern Cape province. The results obtained from this paper could be adopted as a quality management tool for construction SMEs to achieve sustainable construction project success. This study is based on SMEs effective quality management strategies and provides more comprehensive effective quality management practices that could be adopted by construction SMEs.

Keywords: Client, project delivery, quality management, SMEs and sustainability.

1. INTRODUCTION
The definition of SMEs differs with the industry of operation. For instance, in the construction industry, [1] and [2] define SMEs as a business that is based on yearly turnover and number of workers. On the other hand, [3] define SME contractors as a separate entity, including cooperative businesses and non-government organisations, managed by one owner or more. According to [4], construction SMEs have high potentials in terms of contributing to the economy of the country. However, in any building project, the primary interest of the client lies in a high quality project [5]. Thus, sustainable project quality is achieved through involvement of many construction participants from various professions with many roles to enhance sustainable project implementation. The Construction Industry Development Board [6] reveal that the existing literature on quality management issues focuses on designing team and general

contractors. Notwithstanding, empirical evidence revealed that SMEs are confronted with various challenges pertaining to the implementation of quality management modalities in project delivery. For instance, [7] reveal that SMEs are confronted by project quality risks, which includes inexperienced manpower, inadequate material, ignoring project specification and lack of work schedule.

Therefore, it is necessary to determine effective quality management approaches adopted by construction SMEs to achieve sustainable project success. Further, managing quality from the beginning of construction project is significant to avoid not only operational cost overrun, but also reduces the cost of maintenance at post construction [8]. [9] and [10] argue that SMEs project success is measured based on project performance and adoption of profitable and competitive business. However, effective communication between the employer, designing team and SMEs plays a key role towards construction project success [11]. To date, construction project quality has become the centre of construction project delivery. Thus, the purpose of this paper is to propose SMEs quality management for enhancing sustainable delivery of projects.

2. LITERATURE REVIEW

2.1. Construction SMEs Quality Management

According to [12], *quality management practices* is the management philosophy that evolved from the quality management movement during the late 1940's. [13] point out that quality management has become a strategic tool in improving organisational performance during project implementation in both large enterprises and SMEs. Moreover, [14] agree that (TQM), teamwork and continuous improvement are the core in improving production, whilst mitigate waste and increase knowledge within the firm. An added benefit of effective quality management practices is the advantage of working with the same client in future projects. Effective implementation of TQM is the firm's asset to enhance a good organisational resource portfolio that increases the firm's competitive capabilities, while constituting a source of competitive advantage over the competitors [15]. [15] further divulge that quality culture is the key element for firms to enable the development of innovative quality management structures. It can be seen from the above literature there is a need for SMEs to develop effective quality management approach to achieve continuous quality improvement.

2.2. Benchmarking for quality management

Benchmarking is referred as the core contributor towards SMEs effective quality management practices in the construction sector [16]. On the other hand, [17] note that *benchmarking* assists SMEs with regard to best construction practices that lead a firm to good construction performance. While, [16] believe that benchmarking is the processes of project planning to enhance SMEs effective quality management. However, [17] note that SME contractors adopt quality management to achieve sustainable business over competitors, and therefore benchmarking needs to be recognised as the way to implement continuous quality improvement. Thus, benchmarking for quality is ideal for SMEs desiring a clear project direction and improvement in the quality of ongoing projects. [18] add that benchmarking could be used to improve and evaluate firm's construction quality management. [19] believe that SMEs need to consider the benchmarking processes and techniques that could be developed to avoid waste and poor quality on construction projects.

2.3. SMEs project quality control

According to [12], appropriate assessment of contractor's performance should be applied as a strategic implementation of any quality management system. Nonetheless, quality control does not only require the involvement of the contractor alone, but everyone in a team is required to have a common goal to achieve quality. [20] stress that it is important for SMEs management team to have common project goals. Also, [20] opine that the ultimate goal of contractor's approach is getting everyone involved including the designers, the subcontractors, and the client, in the process of achieving TQM. Notably,

SME contractors adopts ISO 9001 as quality measure within the industry and to maintain the high standard of quality management in order to achieve continuous improvement.

However, ISO 9000 was established in 1987 as a quality standard by government, and in most developing countries ISO 9000 has become mandatory [21]. There are many political issues that revolves around ISO 9000. For instance, [21] opine that many construction firms see the registration to ISO 9000 as firm's commitment to quality. A report compiled by [6] confirms that the benefits of ISO 9000 quality management certification is often relevant to large construction firms. In addition, it was evident that in the CIDB report that there are only limited number of contractors accredited by ISO 9000 in both General Building (GB) and Civil Engineering (CE) category [6]. However, there is still a dilemma concerning whether the development and certification of quality assurance systems in respect to ISO 9000's series of standards and guarantee continuous quality improvement in firms [22].

2.4. SMEs quality inspection

Quality inspection is important in the industry for SMEs to achieve project quality requirements [23]. Project scope is important in construction SMEs planning to incorporate quality inspection and also understand the quality tolerance at early stages of the project [24]. Therefore, quality inspection could be regarded as the process of checking planned work against actual work on site [25]. Thus, SMEs need to continuously conduct inspections on construction sites to ensure that the required quality standards are being met, and retain a sustainable success rate of project delivery to the client.

3. METHODOLOGY

This study adopts a mixed method research approach consisting both quantitative and qualitative approach. The sample focus of the study is based SME contractors registered on CIDB general building (GB) category grade 1 to 4 population. It is mostly important to highlight that the study population comprised of construction managers, technician, site agent, quantity surveyors and business owners/ directors in the cycle of SMEs. This study adopts a purposive technique to determine the number of the survey participants. In support, [26] opine that purposive sampling technique is referred to decision of the scholar in that a sample is composed of fundamentals that contain the most characteristic and representative of the population. One of the main advantages of the purposive sampling technique is that the researcher(s) select the participants based on research purpose and objectives.

Construction SMEs in East London, Port Elizabeth, Mthatha and Butterworth in the Eastern Cape Province, were each grouped into clusters of thirty-two (32) in which participants were selected using a purposive sampling approach. One hundred and twenty-eight (128) firms were selected. Closed-ended questions were formulated to obtain data from all the participants.

To analyse the quantitative data, Statistical Package for the Social Sciences (SPSS) version 25 was adopted. Descriptive statistics was adopted to summarise, organise, and reduce large numbers in the research study. The results are organised with the mean ranking using the relationship between the variables, the mean could either be ascending or descending. Nevertheless, [27] suggested that after completing the rankings of the variables, these ratings indicate the degree of being affected and ranking displays the hierarchy. In the event where mean value of the respondents was the same, standard deviation was used to determine the most significant variables. This study adopted the Cronbach's Alpha coefficient to measure the internal consistency of the items associated with the Likert scale questions.

To validate the data obtained from the questionnaires, structured interviews were conducted. Open-ended interview questions were developed. The interviews were conducted with the aim to establish effective quality management practices to achieve sustainable success rate of SMEs. Regarding semi-structured interviews, content analysis was adopted. [28] explain that content analysis enables the researcher to omit any irrelevant information, terms and also by giving a summary of accounts.

4. ANALYSIS AND DISCUSSIONS OF RESULTS

4.1. Company CIDB grade

Table 1 presents the CIDB grading for firms in which the respondents are employed. It should be noted that 35.6% of the firms were categorised as grade 3, followed by 32.2% of the firms who are classified as grade 4. 22.0% of the firms are in the category of grade 2 and only 10.2% of firms are in grade 1.

Table 1 CIDB Grade

CIDB Grade	No	Percent	Cumulative %
Grade 1	6	10.2	10.2
Grade 2	13	22.0	32.2
Grade 3	21	35.6	67.8
Grade 4	19	32.2	100.0
Total	**59**	**100.0**	

4.2. Profile of respondents

Concerning the age group of the participants, Table 2 indicates the age group distribution of the 59 participants. It can be seen that about 54.2% of respondents are in the age group between 26 and 39, 23.7% were in the age group between 40 and 49. Also, Table 2 shows the relevant experience of the respondents in terms of managing and running construction projects. It can be seen that 37.3% of respondents have relevant experience ranging between 1 to 5 years. In respect to educational qualification, Table 2 clearly demonstrates that the largest share of the participants (47.5%) hold a National Diploma qualification. Regarding the role of the respondents in the company, Table 2 shows that about 37.3% of the respondents are site agents.

Table 2 Profile of respondents

Age group of the respondents	No. of respondents	Percentage %
18 – 25	6	10.2
26 – 39	32	54.2
40 – 49	14	23.7
50 – 59	7	11.9
Total	**59**	**100.0**
Relevant experience of respondents in the industry	**No. of respondents**	**Percentage %**
1-5 years	22	37.3
6-10 years	15	25.4
11-15 years	15	25.4
16-20 years	4	6.8
20 & Above	3	5.1
Total	**59**	**100.0**
Educational qualification	**No. of respondents**	**Percentage %**
Below Matric	1	1.7
Matric Certificate	7	11.9
National Diploma	28	47.5
Bachelor Degree	15	25.4
Other	8	13.6
Total	**59**	**100.0**
Role of the respondents	**No. of respondents**	**Percentage %**
Quantity Surveyor	6	10.2
Project Manager	12	20.3
Site Agent/ Foreman	22	37.3
Other	19	32.2
Total	**59**	**100.0**
Gender	**No. of respondents**	**Percentage %**
Male	37	62.7
Female	22	37.3

Total	**59**	**100.0**

4.3. SMEs effective quality management practices

The participants were requested to indicate the level of agreement with regard to effective quality management practices that can be adopted by construction SMEs to achieve sustainable construction project delivery in South Africa, using a 5-point scale where: Strongly Disagree = (SD); Disagree = (D); Neutral = (N); Agree = (A); and Strongly Agree = (SA).

It is evident from Table 3 that clear working drawings supplied by the architect is ranked highest, with mean a value (MV) 4.29. 86.5% agreed, 11.9% of the respondents are neutral and 1.7% of the respondents disagreed on this quality management strategy. On the other hand, Periodic requests for quality inspection is ranked second, with MV=4.19. 86.4% of the respondents agreed that adopting quality management through periodic requests for quality inspection is significant for construction SMEs to achieve sustainable construction project success. 11.9% of the respondents are neutral and only 1.7% of the respondents disagreed. Nonetheless, 88.1% of the respondents agreed that effective implementation of quality management is also a core of construction SME quality management, with MV=4.15. Notably 81.4% of respondents agreed that it is important for construction SMEs to benchmark for quality management on project delivery, with MV=4.15 ranked third, similar to implementation of total quality management, but less significant with std=0.71. The least recognised modality is quality function development, with MV=3.86. It is notable that the combined modalities have an (average mean value) AMV=4.06. These findings imply that a good quality management culture on SME construction sites in South Africa may be achieved by adopting these quality management practices.

Table 3. Effective Quality Management Practices

Statements	No	SD %	D %	N %	A %	SA %	Mean	Std.	Rank
Clear working drawings supplied by the architect	59	0.0	1.7	11.9	42.4	44.1	4.29	.74396	1
Time to time request for quality inspection on project	59	0.0	1.7	11.9	52.5	33.9	4.19	.70649	2
Effective implementation of total quality management	59	0.0	0.0	11.9	61.0	27.1	4.15	.61064	3
Benchmarking for quality management	59	0.0	0.0	18.6	47.5	33.9	4.15	.71471	3
Quality management planning	59	1.7	0.0	6.8	66.1	25.4	4.14	.68122	4
Adopting or using appropriate construction methods and processes to achieve quality workmanship	59	0.0	1.7	11.9	59.3	27.1	4.12	.67171	5
Adhering to specifications to achieve quality workmanship	59	0.0	1.7	13.6	56.6	27.1	4.10	.68720	6
Projects executed in accordance with drawings and specifications	59	0.0	0.0	13.6	64.4	22.0	4.08	.59562	7
Measurement of quality throughout project life	59	0.0	1.7	16.9	59.3	22.0	4.02	.68207	8
Quality of design specification	59	0.0	0.0	23.7	52.5	23.7	4.00	.69481	9
Strategic implementation of quality management system	59	0.0	0.0	20.3	61.0	18.6	3.98	.62949	10
Comply with International Standard Organisation for continuous quality improvement	59	0.0	0.0	33.9	37.3	28.8	3.95	.79706	11
Commitment of top management regarding quality issues	58	0.0	1.7	22.0	54.2	20.3	3.95	.71137	11
The influence of management towards quality considerations on project delivery	59	0.0	1.7	23.7	54.2	20.3	3.93	.71594	12

Balance between owners requirements and cost	59	0.0	0.0	25.4	59.3	15.3	3.90	.63504	13
Quality function deployment	59	0.0	0.0	30.5	52.5	16.9	3.86	.68122	14
Average	**59**						**4.05**		

4.4. Factor Analysis

4.4.1. Identifying the most significant quality management strategies adopted by construction SMEs to achieve sustainable construction project success. Factor analysis (FA) was used to evaluate the most significant quality management practices adopted by construction SMEs. A total of 16 items were loaded together to determine the most significant modalities. FA is adopted to reduce and categorise the most significant modalities adopted by SME contractors. FA is also performed to validate the consistence of the quantitative analysis [29]. Furthermore, principal component analysis was adopted to extract the variables.

4.4.2. KMO adequacy and Bartlett's test. The test of appropriateness of the data for factor analysis was performed in respect of effective quality management practices adopted by construction SMEs, with both KMO measure of sampling adequacy test at 0.644 and Bartlett sphericity at p=0,000, being significant. Thus, findings reveal that the results were suitable to perform FA. The results are presented in Table 4.

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.644
Bartlett's Test of Sphericity	Approx. Chi-Square	347.570
	Df	120
	Sig.	.000

Kaiser's criterion using eigenvalues was adopted and oblim rotation was used to extract the variables loaded on each component. Table 5 present 6 variables with eigenvalues greater than 1, with 4.791, 1.763, 1.449, 1.407, 1.176 and 1.027. These results add up to 72.58% of the total variance.

Table 5 Total variance explained by the components

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	4.791	29.945	29.945	4.791	29.945	29.945
2	1.763	11.016	40.961	1.763	11.016	40.961
3	1.449	9.059	50.020	1.449	9.059	50.020
4	1.407	8.794	58.814	1.407	8.794	58.814
5	1.176	7.349	66.163	1.176	7.349	66.163
6	1.027	6.416	72.580	1.027	6.416	72.580
7	.929	5.806	78.385			
8	.763	4.767	83.152			
9	.508	3.174	86.326			
10	.476	2.973	89.299			
11	.422	2.637	91.936			
12	.389	2.434	94.369			
13	.326	2.040	96.409			
14	.247	1.543	97.953			
15	.193	1.205	99.158			
16	.135	.842	100.000			

Extraction Method: Principal Component Analysis.

In confirmation of the number of components to retain, Catell's scree test was performed on the variables and the results, as indicated in Figure 1, which indicates the 6 components are retained.

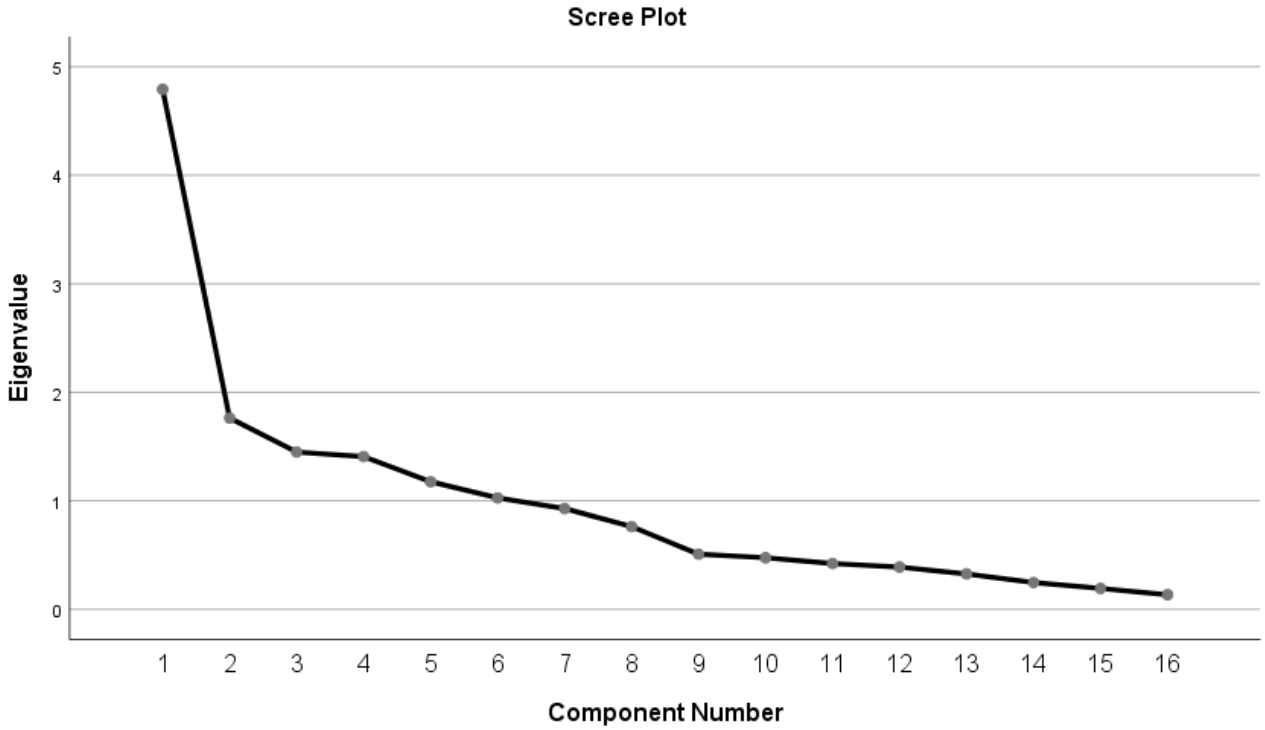

Figure 1. Catell's scree plot on effective quality management variables adopted by construction SMEs to achieve sustainable project success

4.5. Summary of Factor Analysis on effective quality management practices adopted by construction SMEs

It is evident from Table 6 that 6 components show a number of strong loadings on component matrix, with most of the variables greater than 0.30, while all other variables less than 0.3 are suppressed. In addition, Table 6 also indicates that the variables fit well into components, significantly most variables are greater than 0.30, which reveals a positive relationship between 6 components. It can be seen that components that are most significant in construction SME quality management practices variables, the variables that is converged on component 1 represent "*effective implementation of total quality management*", component 2 represent "*quality documentation and quality inspection of project*", component 3 represent "*competence of management regarding quality considerations on project delivery*", while component 4 represent "*continuous quality improvement based on international standard*", component 5 represent "*quality function development*" and component 6 represent "*quality management planning*".

Table 6. Component matrix[a]

	Component					
	1	**2**	**3**	**4**	**5**	**6**
Quality management planning	.534				-.445	.494
Measurement of quality throughout project life	.587					
Quality of design specification	.622	-.344			-.447	
Balance between owners requirements and cost	.633		.543			

The influence of management towards quality considerations on project delivery	.438		.553	.377		
Projects executed in accordance with drawings and specifications	.478	-.431		.332		
Effective implementation of total quality management	.701		-.301			.326
Strategic implementation of quality management system	.669					
Benchmarking for quality management	.575		-.304	-.507		
Comply with International Standard Organisation for continuous quality improvement	.449		.314	-.623		
Quality function deployment	.577				.495	-.407
Commitment of top management regarding quality issues	.549	.320			.493	
Adopting or using appropriate construction methods and processes to achieve quality workmanship	.528		-.471	.425		
Adhering to specifications to achieve quality workmanship	.628					-.380
Clear working drawings supplied by the architect	.334	.718		.329		
Time to time request for quality inspection on project		.703	.433			

Extraction Method: Principal Component Analysis.
a. 6 components extracted.

4.6. Qualitative Interviews

4.6.1. Background information of Respondent A. The interview was conducted with the company's director (referred here as respondent A) on 05 September 2019 in King William's Town, a suburb of East London in the Eastern Cape Province, at 10:00 am in the construction site office during teatime. The interview lasted for about 44 minutes, as the respondent responded to each of the question after reading by the interviewer from the copy. The respondent interviewed has twelve years of experience. The respondent has a degree in Forestry Engineering and is also involved in land optimisation, which the respondent was championing for five years before moving to the construction industry. The respondent is the director of the firm, which is operating under CIDB grade 4 GB (General Building) and involved in both capital and conventional contracts.

According to the interviewee, quality is managed through clear working drawings and specifications issued by consultants, and also as a result of the accuracy from the team working with those drawings. The respondent also stated that the firm carried out work inspections to ensure that the work complied with the standard prior to the quality inspection by the consultants. The respondent recommend that firms should adopts the quality checklist approach to measure the compliance of the work done. The respondent indicated that the firm adopted the central system of deliveries approach to check the quality of the work, and the person that is responsible for ordering materials is the construction manager on site.

4.6.2. Background information of Respondent B. The second interview was conducted with the firm's director (referred here as respondent B) on 06 September 2019 in Southernwood suburb of East London at 14:45 pm in the meeting room of the SME contractor during office hours. The interview lasted for about 70 minutes, as the respondent responded to each of the questions after reading by the interviewer from the copy. The respondent had ten years of experience in the construction industry and has a BTech degree in both construction management and quantity surveying. The respondent is the director of the firm operating under CIDB 3GB and 1CE, and involved with renovations and alterations contracts, including housing and small roads maintenance projects. The director further stated that most of the clients are financed by banks.

The director of the firm oversaw the project quality, and also employed an experienced team. The respondent further state that before any inspection is carried out by the consultants, the contractor initiates the quality checks and invites the project team for inspection. Through that inspection carried out by the director, the defect list would be given to the foreman in order to rectify any defect prior to client's or consultant's inspection. The firm has developed a quality worksheet for quality checks and this approach is used to measure the project quality. The firm is also registered with NHBRC, who provide some guidance in terms quality management related issues. The respondent further stated that the knowledge gained at tertiary level through construction technology was also vital to the firm's

quality management. The respondent mentioned that the working drawings are the ones that show the finished product of the project. There are dynamics with regard to the drawings circulated by the designing team, which at times made life difficult for the contractor during project implementation stage. In addition, the respondent indicated that the design team need to take a critical look at material that will be used when designing such as counting number of bricks that will be used on a linear wall to avoid waste. Before setting out on the project, the firm analyse the drawings and ascertain in all the project requirements, as well as double-checking the building lines, and those drawings formed part of the contract document. The missing information on the drawings is requested from the design team timeously. The firm had no other tools to control the quality, other than a physical quality check on site. The firm monitored the subcontractors through quality checks and withholding payment for poor quality.

4.6.3. Background information of Respondent C. The third interview was conducted with the contract manager (referred here as respondent C), who managed all the construction sites of the firm, on 23 September 2019 in Mthatha at 8 am in the construction site office. The interview lasted for about 76 minutes, as the respondent responded to each of the questions after reading by the interviewer from the copy. The respondent had 20 years of experience in the construction industry, and the respondent had a matric certificate (Grade 12. The contract manager is a registered project manager at SACPCMP since 2006. The respondent stated that the firm operates under CIDB 3CE and 4GB and confirmed that the firm is involved with alteration, renovation and roadwork projects. The company is registered as a closed corporation.

The respondent reveal that the firm complies with quality standards such as NHBRC and that, if there were quality test that had to be carried out for materials such as concrete, it should be documented. The respondent further stated that the firm timeously called the consulting team to come and inspect the work carried out. The respondent indicated that the quality of work is benchmarked from the drawings and specifications to satisfy the designers and the client.

5. DISCUSSIONS OF FINDINGS

5.1. SMEs effective Quality management practices

The quantitative findings revealed that clear working drawings supplied by the design team is the most important quality management strategy employed by SMEs, this factor was ranked first with a MV=4.29. This finding aligns with [30] who note that drawings provide graphical information on physical arrangement, while specifications in the drawing indicate the direction regarding material, tolerances, and etc. The quantitative results depicted on Table 3 revealed that the effectiveness of periodic requests for quality inspection is the second significant modality for construction SME's quality management (MV=4.19). This finding is supported by [31] who stated that a consistent monitoring of quality to ensure that the project meets the requirements as per design is necessary. Also, the finding aligns with that of [23] who suggests that quality inspection should be an integral part of daily work, so that the project is recorded on the system daily and the progress of the project is documented. Also, effective implementation of total quality management by SMEs is the third most significant modality adopted by SMEs to manage quality in construction project, with a MV=4.15. This finding is corroborated by [32] who reveal that implementation of TQM is comprehensive and requires SMEs to include top management support, strategy, continuous improvement and quality systems of the SME. The quantitative analysis also revealed benchmarking for quality management as the third most significant quality management modality, with MV=4.15, similar to implementation of (TQM). In support of the finding, [10] define benchmarking for quality management as the search for best quality management approach to be optimal during construction project implementation.

The qualitative analysis highlighted SME contractors' quality management practices such as adopting quality checklists, complying with NHBRC quality requirements, effective communication with design team and complying with quality standards. These modalities were taken from each

respondent as most significant. With regard to adopting quality checklists, [33] reveals that contractors usually prepare the quality checklist in advance, and that is done by construction manager to monitor the progress on site. Also, in support of complying with NHBRC quality requirement, [33] argue that quality is measured with regard to client satisfaction, and is based on the difference between actual and desired construction projects. It is clear from the qualitative results that complying with quality standards is important for construction SME's quality management. The other qualitative findings, such as clear construction drawing, monitoring subcontractors and benchmarking for quality confirm the quantitative results. In respect of factor analysis, SMEs adopt the effective implementation of total quality management to achieve project quality requirements and effective use of clear working drawings supplied by the design team aligns with both the quantitative and qualitative findings.

6. CONCLUSION

The evaluation of effective quality management practices adopted by SMEs in the literature was reviewed and mixed method research approach was adopted to evaluate the most significant quality management practices adopted by construction SMEs. Regarding the quantitative analysis, the most notable effective quality management practices adopted by SMEs include: clear working drawings issued by the design team (MV=4.29), periodic request for quality inspection of construction project (MV=4.19), and effective implementation of total quality management (MV=4.15).

With respect to qualitative findings, the results align with the quantitative analysis, as the respondents agreed with effective quality management practices adopted by construction SMEs, which include clear construction drawings which align with clear working drawings issued by the design team. Also, they felt that SMEs adopting central system for checking deliveries and complying with NHBRC requirements for quality management was significant. In addition, the respondents revealed that SMEs adopting quality inspections was important, and this relates to the results from the quantitative analysis, namely periodic requests for quality inspections. The results from qualitative interviews revealed the significance of SMEs monitoring subcontractor work for quality compliance, effective communication between the contractor and design team and benchmarking for quality with drawings.

The factor analysis categorised effective quality management into six components, namely: effective implementation of total quality management; clear working drawings supplied by the architect; the influence of management with regard to quality considerations on project delivery; compliance with international standard organisation for continuous quality improvement; and quality function development and quality management planning.

The findings indicate that periodic requests for quality inspection were the technique used by SMEs to effectively improve the delivery of construction projects in terms of quality. It was found that the SMEs adopt total quality management system during construction project delivery. Management team of the SME contractors is aware of the required quality on projects.

7. RECOMMENDATIONS

With regard to effective quality management practices, SMEs in South Africa should ensure that they use unambiguous drawings and specifications and keep updating the revised drawings, which requires SMEs to have good records in place. SMEs should implement total quality management at all levels in the firm. This should be achieved by involving everyone working for the organisation being aware of the quality required. Thus, quality should be the culture of the firm rather than an individual responsibility.

During the construction stage of the project, SMEs should request periodic inspection from the consulting team in order to keep track of the project and avoid any defects at the end of the project, before achieving practical completion of the project. By asking for periodic project inspections, SMEs are increasing the chances of finishing the project on time and enhancing the quality of projects that are delivered.

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