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Effects of Quality Control Practice on Performance of Building Construction Projects in Borama District, Somaliland

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The performance of building construction projects is highly affected by many factors. In Borama, 70% of construction projects does not meet the expected project cost, time, and scope. Therefore, this study aimed and investigated the effect of quality control practices on the performance of building construction projects in Borama District Somaliland. The study used a cross-sectional survey design with a sample of 92 workers in the 17 construction companies in the Borama district. The study uses a questionnaire as a data collection method. The result show that, there is no quality control standard/code in Somaliland due to these projects are adopting a foreign building code, but the foreign codes are not considering the Somaliland weather conditions, working environment and culture. And the study concluded that, current quality management ($R = 0.568$, $p = 0.000 < a = 0.05$), supervision of work ($R = 0.671$, $p = 0.000 < a = 0.05$), and construction quality ($R = 0.358$, $p = 0.001 < a - 0.05$) model show that a statistical significance on the performance of building construction projects in Borama district. Secondly, the study found a significant positive correlation between quality control management on performance building construction projects construction companies. This shows that, if current quality management is practiced well, the performance of the building construction projects are improved.

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1. INTRODUCTION

The concept of quality control ensures efforts to achieve the required level of quality for a well-planned and organized product. From the perspective of a construction company, quality management in construction projects should mean maintaining the quality of construction works at the required standard to obtain customers' satisfaction which would bring long-term competitiveness and business survival for the companies [1]. However, many risks are encountered in construction projects and threaten their operations [2].

Current quality management includes all the activities that managers perform to implement their quality policy [3]. These activities include quality planning, quality control, quality assurance, and quality improvement, which ensures continuous quality improvement to ensure a more desirable future, on the other hand, quality management systems refer to the set of quality activities involved in producing a product, process, or service, and encompasses prevention and appraisal. QC is a management discipline that is concerned with preventing problems from occurring by creating the attitudes and controls that make prevention possible [4]. The supervision work body of quality self-control is the co-supervision committee, and the supervision object is quality management activities of the parties involved in the implementation the supervision committee is composed of members from the development and reform commission, financial department, construction department, and auditing department, on the one hand, they supervise the agent construction quality based on their administrative power, on the other hand, they supervise management work of the construction agent as client based on the agent contract. First this paper sets up the agent self-control system in the vertical dimension based on quality target orientation, then the government functional departments' supervision system in the horizontal dimension is established, in the vertical, the construction agent sets self-control points based on the agent contract, feasibility study report, preliminary plan, construction drawing design and construction bidding. On the horizontal, the government selects supervision points to form self-control points based on the construction agent self-control system, the agent contract, and relevant laws and regulations. Quality management and supervision framework of the agent construction project [5].

2. LITERATURE REVIEW

2.1 Current Quality Management and Performance of Building

Quality may mean different things to different people Some take it to represent customer satisfaction (others interpret it as compliance with contractual requirements, yet others equate it to the attainment of prescribed standards The International Organization for Standardization (ISO) formally defines quality as the 'totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs (ISO, 1994).

an international authority in quality management perceives quality simply as 'fitness for purpose Indeed, a product befitting its intended purpose would satisfy the user's needs and expectations The crucial point lies in making the purpose clear to all parties involved in the design and production In the context of quality management, quality is not an expression of excellence in a comparative sense, It is just an abbreviation for 'desired quality that should be laid down as explicitly as possible The supplier (producer), on the one hand, endeavors to attain the desired quality at optimum cost while the customer, on the other hand, requires confidence in the producer's ability to deliver and consistently maintain that quality [6].

2.2 Quality Supervision of Works and Performance of Building

The competence of the project manager during the project implementation will also affect the timely completion of a project. The positive attitude of project managers and project participants has emerged to be the most important success attribute for quality compliance at project sites (Tha & Iyer, 2006). The authors additionally observed that some of the attributes are of high importance and are all related to the project manager. For example, effective monitoring and feedback by the project manager. Project manager's technical capability. The leadership quality of the project manager, effective monitoring, and feedback by the project team members. Authority to make day-to-day decisions by the project manager's team at the

site. Furthermore, the success of the project hinges on the efficacy of the project team in managing the process [7]. This indicates the adequate capacity of the project manager as well as the project team to ensure proper inspection and investigation of work done on-site. "A weak link in the process such as a lack of project management experience could adversely affect timely execution/ timely completion of the projects" Olatunji [7].

2.3 Construction Quality and Performance Building

Construction quality is an inseparable part of each other construction quality cannot exist without a project and a construction project cannot exist without quality the modern construction market requires construction companies to guarantee the quality of their product to their clients quality is a key function in all infrastructure development. Vadivel, [8]. Ali & Wen, [9] highlighted the significance of measurement of quality in the construction sector stated that construction quality can be defined as the meeting of the requirements of the parties involved meeting contractual requirements of the client, legislative and regulatory requirements of the authorities, social requirements of the public, and even cost requirements of the contractor". Therefore, construction quality can be measured based on these criteria.

How there is no literature available on the effect of quality control practice on the performance of building construction projects on construction companies in Borama Somaliland. The study is therefore, aimed to establish (i) whether the construction project in Borama Somaliland is completed successfully, and (ii) the actual effect of quality control practice on the performance of building construction projects in Borama Somaliland.

Section two discusses the literature relevant to the objective of studying building construction project quality management, supervisor to work, and construction quality. These are discussed in detail and how they affect quality control practice. Finally, the research gaps are identified that the issue of the key effect quality control practice of the project has not been addressed by previous studies.

2.4 Theoretical Framework Review

Antunes & Gonzalez, [10]. (The understanding of what is construction extrapolates its technical characteristics, in the research building construction is not restricted to civil engineering and architecture but comprehends a broader understanding of building construction is the materialization of a concept through design taking into account functional requirements and technical specifications for a project [11,12].

3. METHODOLOGY

3.1 Research Area

This study was being conducted in Borama District, the capital town of the Awdal region. Borama is located 120km west of Hargeisa, the Capital City of Somaliland. Bounded in the North by the Gulf of Aden and Djibouti, South-West lies Ethiopia. The population of Borama is approximately about 352,000 (Borama Local Governments). Borama has a latitude of 9°56'20.10"N and 43°11'3.28"E as well as 1454m above sea level (UNHCR,2014). In Borama most building construction projects do not succeed [13].

3.2 Research Design

The study used a cross-sectional survey research design. A survey designed to investigate populations by selecting samples to analyze and discover occurrences. Surveys are used when you collect data for a short time. This study anticipates administering the data collecting tools and collecting data without much elongated time in the research exercise. Data are collected within a short duration for analysis. For this reason, this design is found suitable for this study.

3.3 Target Population

The target population of the study was 119. All respondents are from 17 construction companies operate in the city of Borama, Somaliland. Describes the target construction companies with their target respondents [14].

3.4 Sample Size

The researcher selected 92 respondents out of a population of 119 to determine the desired sample size of the research study. According to the used (Yamane, 1967) formula, they recommended a sample of 92 for a population of 119. A confidence level of 95% and a margin of error of 5% would be best for representativeness. Therefore, the sample size is 92 respondents.

$$n = \frac{N}{1+N(0.05^2)}$$

$$n = \frac{119}{1+119(0.05^2)} = 92$$

3.5 Data Analysis

Data is organized coded entered into statistical software, SPSS Statistics, and cleaned. It is then analyzed using simple linear regression techniques. This technique was used to predict the amount of variance that could be explained by the independent variables in the study.

4. RESULTS AND DISCUSSION

This chapter presents the results and findings of the study on the Effect of quality control practice on performance building construction projects on construction companies in Borama Somaliland.

The variable exerts some effects on certain aspects of the performance of building construction projects. These are conceptualized as current quality management, supervision of work, and construction quality [15]. Performance building construction projects are certain when the benefit is satisfied and if the objective of the construction projects is met under the budget, time scope [16], and customer satisfaction with the performance building the construction project is completed [17].

The population and the sample size of the study were 119 and 92 construction professionals currently working in Borama respectively. Out of these 92, 84 professionals returned the complete questionnaires. This was a 91.3% response return rate which was an acceptable response return rate since it was more than 70%. The collected data was analyzed through statistics software and the results are presented and discussed in this chapter [18].

4.1 Hypothesis: Quality Control and Performance Building Construction Projects

This sub-section describes how the variables were measured to determine the effects of quality control practices on performance building construction projects in construction companies in Borama District, Somaliland. The study was guided by three variables: current quality management, supervision of works, and construction quality. Each of these variables was measured individually. Current quality management was operationalized as planning organizing, and assurance. Supervision was operationalized as time management, resource management, and quality of work. Construction quality was operationalized as material quality design quality and detailed BOQ. Respondents were asked to react to several statements on these variables to assess the status of each variable by indicating either Strongly Agree, Agree, No Comment, Disagree, or Strongly Disagree. Responses were scored on an ordinal scale such that strongly agree was scored 5, agree 4, no comment 3, disagree 2, and strongly disagree 1.

Table 1. Measurement of variables

Variable	Indicators	Scores	Scale	Analysis
Current Quality Management	- Planning - Organizing - Assurance	11-28	Ordinal	Descriptive Statistics Regression
Supervision of Work	- Time Management - Resources Management - Quality Work	12-29	Ordinal	Descriptive Statistics Regression
Construction Quality	- Material Quality - Design Quality - Detailed BOQ	12-26	Ordinal	Descriptive Statistics Regression
Performance Building Construction	- Cost - Time - Scope - Customer	4-20	Ordinal	Descriptive Statistics Regression

4.2 Current Quality Management Practice on Performance

The first objective of this study was to establish the effect of current quality management on the performance of building construction projects of construction companies in Borama District, Somaliland. Current quality management was operationalized as planning, organizing, and assurance. Respondents were asked to react to several statements on the current quality management.

In Table 2: F is a measure of the overall significance of the simple linear regression model in this data distribution. F (1, 82) = 38.97, ρ = .000, which led to rejecting the null hypothesis. The current quality management. Has a significant effect on the performance of building construction projects, there were significant differences in the performance of building construction projects of construction companies and current quality management. Hence the study established that current quality management has a significant effect on current quality management on performance building construction projects for construction companies in Borama District, Somaliland. In Table 2, R is the correlation between performance building construction projects of companies and, Current quality management R = 0.568 indicates that there is a very high positive association between performance building construction projects of companies and, Current quality management. Performance building construction increases with the increasing status of current quality management in equal margins. R^2 is the variance in the implementation of a joint program that is explained by current quality management. R^2 adj. = 0.314 which shows 31.4% of the variance in the performance of building construction projects on construction companies in Borama District, Somaliland. This can be explained by the current quality management of employees. The remaining 68.6% are due to other factors. Hence, the performance of building construction can be improved by up to 31.4% with current quality management, other factors being equal to zero. Further, in Table 3, B (0.660) is the unstandardized simple linear regression coefficient indicating the weight of current quality management and its strength on the simple linear regression model. From the value of B and the constant term, the simple linear regression model was developed as follows:

$$PBCP^{I} = -0.089 + 0.660\ CQM$$

$PBCP^{I}$ = predicted performance building construction project and CQM is the status of current quality management. This shows that for a unit change in the status of current quality management, performance building construction changes by about 0.660 units.

4.3 Supervision of Work on Performance Building Construction

The first objective of this study was to establish the effective supervision of work on performance building construction projects of construction companies in Borama District, Somaliland. Supervision of work was operationalized as time management, resources management, and quality work. Respondents were asked to react to several statements on the supervision of work [19].

4.4 Supervision of Work on Performance Building Construction

In Table 3, F is a measure of the overall significance of the simple linear regression model in this data distribution. F (1, 82) = 67.196, ρ = .000, which led to rejecting the null hypothesis. The supervision of work. Has a significant effect on the performance of building construction projects, there were significant differences in the performance of building construction projects of construction companies and supervision of work. Hence the study established that supervision of work has a significant effect supervision of work on the performance of building construction projects on construction companies in Borama District, Somaliland.

Table 2. Current Quality Management

Mode	B	R	R^2	R^2 adj.	Std ε	F	Sig.
Constant	-0.089				2.514		
	0.669				0.106		
Currents Quality Management	1	0.568	0.322	0.324	3.569	38.97	0.000

F (1, 82) = 38.97, ρ = .000

In Table 3, R is the correlation between performance building construction projects of companies and, supervision of work R = 0.671 indicates that there is a very high positive association between performance building construction projects of companies and, supervision of work. Performance building construction increases with the increasing status of work supervision on equal margins.

R^2 is the variance in the performance of building construction projects that is explained by the supervision of work. R^2 adj. = .0.444 which shows 44.4% of the variance in the performance of building construction projects on construction companies in Borama District, Somaliland. This can be explained by the supervision of work of employees. The remaining 55.6% are due to other factors. Hence, the performance of building construction can be improved by up to 44.4% with current quality management, other factors being equal to zero.

Further, in Table 3, B (0.718) is the unstandardized simple linear regression coefficient indicating the weight of supervision of work and its strength on the simple linear regression model. From the value of B and the constant term, the simple linear regression model was developed as follows:

$$PBCP^{I} = -1.416 + 0.718\ SW$$

$PBCP^{I}$ = predicted performance building construction project and SW is the status supervision of work. This shows that for a unit change in the status of supervision of work, the performance of building construction changes by about 0.718 units.

4.5 Construction Quality on Performance Building Construction

The first objective of this study was to establish the effect of construction quality on the performance of construction projects of construction companies in Borama District, Somaliland. Construction quality was operationalized as material quality, design quality, and detailed BOQ. Respondents were asked to react to several statements on the construction quality.

4.6 Construction Quality on Performance Building Construction

In Table 4. F measures the overall significance of the simple linear regression model in this data distribution. F (1, 82) = 12.35, ρ = .001, which led to rejecting the null hypothesis. The construction quality. Has a significant effect on the performance of building construction projects, there were significant differences in the performance of building construction projects of construction companies and construction quality. Hence the study established that construction quality has a significant effect construction quality on the performance of building construction projects on construction companies in Borama District, Somaliland.

In Table 4. R is the correlation between performance building construction projects of companies and construction quality R = 0.358 indicates that there is a very high positive association between performance building construction projects of companies and, construction quality. Construction performance increases with the increasing status of construction quality in equal margins.

Table 3. Supervision of work

Mode	B	R	R^2	R^2 adj.	Std ε	F	Sig.
Constant	-1.416				2.084		
	0.718				0.088		
Supervision of work	1	0.671	0.450	0.444	3.319	67.196	0.000

F (1, 82) = 67.196, ρ = .000

Table 4. Construction quality

Mode	B	R	R^2	R^2 adj.	Std ε	F	Sig.
Constant	6.750				2.536		
	0.445				0.128		
Construction Quality	1	0.358	0.128	0.117	4.18	12.035	0.001

F (1, 82) = 12.35, ρ = .001,

R^2 is the variance in the performance of building construction projects that are explained by current quality management. R^2 adj. = .0.117 which shows 11.7% of the variance in the performance of building construction projects on construction companies in Borama District, Somaliland. This can be explained by the construction quality of employees. The remaining 55.6% are due to other factors. Hence, the performance of building construction can be improved by up to 88.3% with current quality management, other factors being equal to zero.

Further, in Table 4 B (0.445) is the unstandardized simple linear regression coefficient indicating the weight of construction quality and its strength on the simple linear regression model. From the value of B and the constant term, the simple linear regression model was developed as follows:

$$PBCP^{I} = 6.750 + 0.445\ CQ$$

$PBCP^{I}$ = predicted performance of building construction project, and CQ is the status of construction quality. This shows that for a unit change in the status of construction quality, the performance of building construction changes by about 0.445 units.

5. SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This study was aimed at establishing the effect of quality control practices on the performance of building construction projects of construction companies in Borama District, Somaliland. The study mainly focused on current quality management, supervision of work, and construction of quality as the effect of quality, and the performance of building construction projects was conceptualized: Cost and time. Scope, Customer satisfaction. The study was intended for three specific objectives which were: To investigate the effect of current quality management on the performance of building construction projects in Borama District. To assess the effect of supervision of work on the performance of building construction projects in Borama Districts. To identify the effect of construction quality on the performance of building construction projects in Borama District. A sample of 84 employees was selected from the construction companies. Data was analyzed and reported in chapter four. This chapter presents a summary of the findings, concludes, and makes recommendations based on the conclusion and findings.

5.1 Summary of the Findings

The first objective of this study was to investigate the effect of current quality management on the performance of building construction projects in the Borama District. The Current quality management was conceptualized as planning, organizing, and assurance. Current quality management, and that better the performance of building construction projects in Borama District. The regression test confirmed that Current quality management has a significant effect on companies' performance of building construction, Borama Districts Somaliland, at F (1, 82) = 38.97, ρ = .000,

The second objective was to assess the effect of supervision of work on the performance of building construction projects in Borama District Somaliland. Supervision of work was measured from time management, resources management, and quality of work. The regression test confirmed that supervision of work has a significant effect on companies' performance of building construction, Borama Districts Somaliland, at F (1, 82) = 67.196, ρ = .000

The third objective was to identify the effect of construction quality on the performance of building construction projects in Borama District Somaliland. Construction quality was measured from material quality, design quality, and detailed BOQ. The regression test confirmed that Construction quality has a significant effect on companies' performance in building construction, Borama Districts Somaliland, F (1, 82) = 12.35, ρ = .001.

5.2 Conclusion

The main purpose of this study was to investigate the effect of quality control practices on performance building construction projects in Borama District Somaliland. Therefore, the study concludes that current quality management, supervision of work, and construction quality had a significant effect on the performance of building construction projects in Borama District Somaliland.

5.3 General Recommendation

With the consideration of the findings the study has found, the study recommends that a greater emphasis should be given to the effect of quality practice on performance building construction projects on construction companies in Borama

District Somaliland. First, the study found significant positive quality control of current quality management on performance building construction projects on construction companies. This shows that if current quality management is adapted well, performance building construction projects for construction companies will increase. Therefore, good current quality management should be practiced.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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