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Factors Affecting Building Construction Quality Performance in Bale Robe Town Tesfaye Tefera Gemeda

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Abstract

Quality management is important to increase quality performance. In Ethiopian construction project has been suffering from similar problems for a long time. Robe town has been the problem of construction project quality performance. The buildings found in this town are not constructed with the required quality. The reasons for the underperformance of the construction quality in Robe are not constructed in the required quality. Therefore, this paper was conducted to investigate the factors affecting building construction quality performance. Probability sampling was used for sampling purposes and methods of data gathering are questionnaires, interviews, observation, and data analysis by using the mean score method formula. After analyzing the data obtained from the questionnaire, and interview; the most critical factors such as estimation, labor productivity, and etc. are identified as the factors directly affecting building construction project quality performance. In addition, frequent challenges were identified during interviews these are a dispute between part in contract, labor productivity, and the fluctuation of labor productivity. Generally, the researcher tries to put his perspective solution to reduce those factors which influence building construction quality performance by looking for multidisciplinary project team, availability of resource, accurate initial cost estimation, motivation for workers, and etc.

Keywords: *quality performance, construction projects, project manager's competence*

1. Introduction

In a developing country, the construction industry plays an important role. The development of the construction industry depends on the quality of construction projects. To success, construction project quality is one of the critical factors. Construction projects are linked with quality management in the project life cycle for improving quality. Although, at every stage quality management of the project life cycle is important. The quality management

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at the construction stage contributes significantly to the final quality outcome of construction projects. (D.Ashokkumar, 2014).The concept of quality management is to ensure efforts to achieve the required level of quality for the product which is well planned and organized. In every construction company, quality management in construction projects should mean maintaining the quality of construction works at the required standard so as to obtain customers' satisfaction (Chin-Keng, 2011).

''In construction industry quality is one of the critical factors in the success of construction projects. The construction industry in Ethiopia has been struggling with quality issues for many years. A major amount of the budget is spent each year on infrastructure and other development projects. The quality outcomes of the projects are not according to required standards, faulty construction takes place. A construction project in its life span goes through different phases. The main phases of a project can be described as conceptual planning, feasibility study, design, procurement, construction, acceptance, operation and maintenance that activity was conducted during the construction and maintenance phase. In project life cycle phases quality of construction projects is linked with proper quality management in all the phases of the project. In project life cycle design and construction are the two important phases that affect the quality outcome of construction projects'' (P.P.Mane, 2015).

Quality measurement is the beginning of quality improvement. The things that cannot be measured cannot be improved. The quality improvement in construction projects is the difficulty and maybe lack of quality measurement methods. Improving quality, in the construction industry, plays a vital role in the economy. The need for achieving the quality of the finished product in building construction is very important (W. Femina, 2016).

Quality Management System implements depend on the collection of resources, organization of people, procedures, and policy of an organization. It clearly defines the expectations of the customer's quality level. It ensures that incoming materials consistently meet processing and quality specifications. It ensures that accurate and constant levels of quality are obtained through effective control of manufacturing or service operations. It ensures that procedures take care of any corrective action requests needed to address sources of variation in materials, products or services. QMS is a total company-wide philosophy. It is the planning, monitoring, and control of the critical activities that have a significant effect on the Quality of products including service, hardware, software, process, and materials or any combination (Dr. Daw, 2016).

The role of a Quality Management System is to ensure the quality of construction projects. It is necessary to develop a system that can help monitor the key factors influencing construction project quality on a continuous and ongoing basis with respect to time so that proper decisions can be made at the right time in order to maintain the quality of a construction project (Ankit, 2009). The project mainly focuses on the main and critical factors that affect quality management in the construction phase. The paper conducted by visiting some construction companies and conducts the questionnaire survey and interviews, then analyze the difficulties (major factors) and the critical factors due to quality defects in quality management and suggests some proactive measures for the improvement.

2. STATEMENT OF THE PROBLEM

The construction project is a huge project all over the world under the construction industry however; the problem with this sector is quality construction project performance. The Ethiopian construction project also has been suffering from a similar problem for a long time. This thesis is conducted in the Robe town which is one of the Ethiopian towns. Robe town has been the problem of construction project quality performance. Most of the roads and buildings found in this town are not constructed with the required quality. But this thesis is focused on the problem of the buildings in this town. The building found in Robe town is run-down due to low-quality performance in their early construction.

In the case of low-quality commercial buildings, Hospitals, Educational institutions, etc. are not constructed in

the required quality. Therefore, this thesis was conducted to investigate the factors affecting building construction quality performance incited area and recommend remedial action to solve the problems that are mentioned above.

3. The Objective Of The Study

3.1 The General Objective Of The Study

The general objective of the study is to investigate the main Factors affecting building construction quality performance in Bale robe town

3.2 The specific objective of the study

- ✓ To assess the factors affecting building construction project quality performance.
- ✓ To identify critical factors that affect building construction project quality performance.
- ✓ To provide a solution for improving the construction project quality management.

4. METHODOLOGY OF STUDY

To conduct the study, the researchers, try to review the past studies and relative literature, it was gained that there were different directions and methodologies used in order to achieve the required goals and objectives. Some of the previous studies concentrated on one or three directions such as cost, time or quality performance. Some of the studies deal with different aspects related to performance such as information technology. The methodology for this study is shown below.

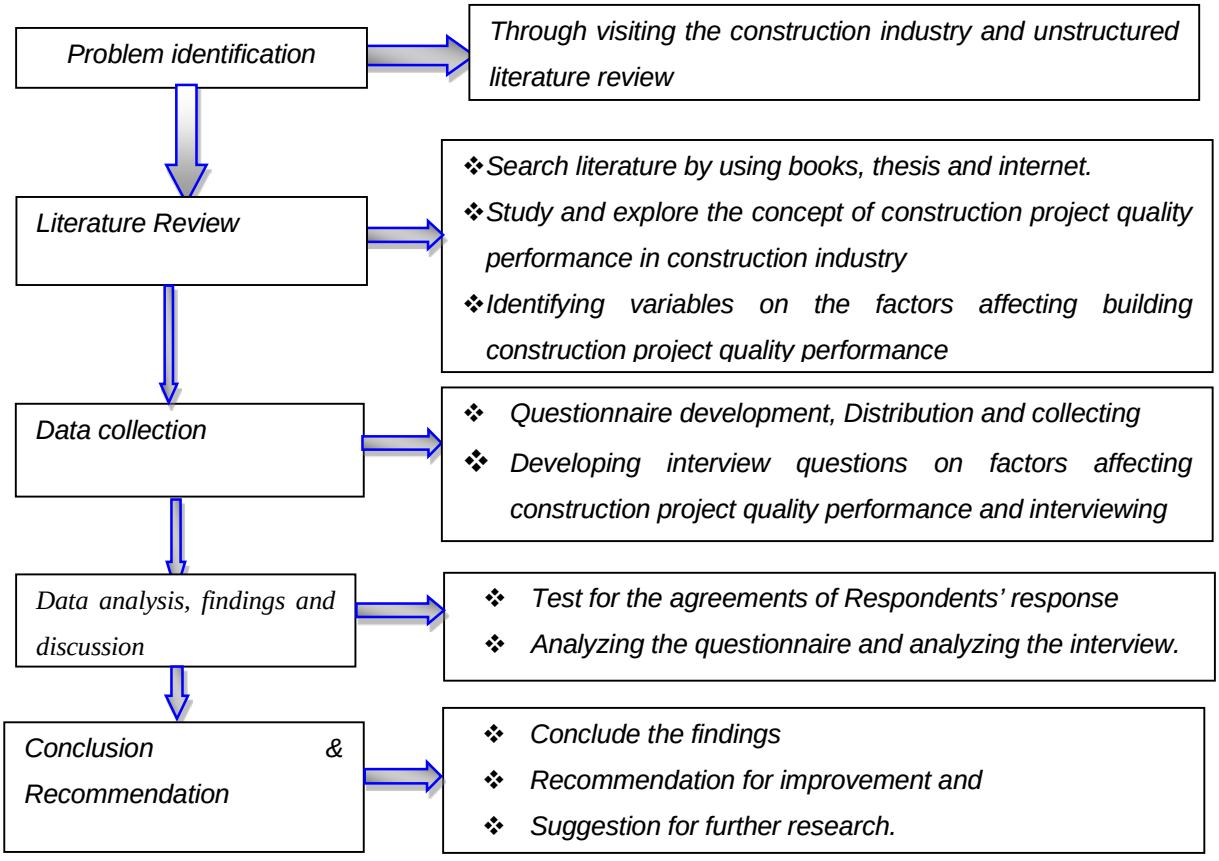


Figure 1.1 Flow chart of research methodology

5. Data Analysis And Discussion

5.1. Data analysis method

Descriptive statistics were employed to analyze the data obtained from the questionnaire. In the analysis: -the "Mean Score" method was adopted to rank factors affecting construction project quality performance Robe town. In order to determine the "Mean Score" for each variable, a Scale of four ordinal measures of agreement (1, 2, 3 and 4) which means: - not applicable, not affecting, somewhat affecting and directly affecting was used to determine the relative ranking. The mean score (MS) for each variable of factors affecting construction project quality performance in Robe town was computed by using the following formula;

$$\boldsymbol{MS} = \frac{\sum F \times S}{N} \text{ – – –

		✓ *Worker training*
		✓ *The negative attitude of project participant*
		✓ *Low morale and motivation of craftsmen*
		✓ *Absence of labor and labor unions*
		commitment/employee relation
6	***Site layout***	✓ *Land ownership disputes*
		✓ *Lack of site organizations*
		Supplier quality management
7	***Financial Issues***	✓ *Shortage of finance*
		✓ *Non-availability of collateral to secure payments*
		✓ *Problem with interim payments, honoring of payment certificate*
		✓ *Regular budget update*
		✓ *Less level of economic development*
		✓ *delay in payment*
		Estimation
8	***Environment***	✓ *Favorable working condition*
		Safety
9	***System***	✓ *Scheduling*
		✓ *Lack of using manual*
		✓ *Non-availability of technology*
		✓ *Workman directing problem*
		✓ *Construction method recommendation*
		✓ *Manpower control problem*
		Monitoring and feedback by project participants
10	***Site Staff***	✓ *Project manager's ignorance due to lack of knowledge*
		✓ *Project manager's competence*
		✓ *Lack of top management support*
		✓ *Good coordination among project*
		✓ *Poor coordination and communication structure*
		✓ *Lack of Availability qualified staff*
		✓ *Lack of Ability to delegate responsibility*
		✓ *Conflict among project participants*
		Teamwork
11	***Execution***	✓ *Job site documentation*
		✓ *Change order communication*
		✓ *Fault project conceptualization*
		✓ *Rework*
		✓ *Absence of execution of other projects*
		✓ *Client dissatisfaction*
		✓ *Owner competence*
		✓ *Lack of knowledge*
		✓ *Owner incompetence*
		variation order

Factors affecting building construction project quality performance response by the client, contractor, and consultant in Robe town.

If 2.16 < average mean score= <2.52 is not applicable.

If 2.53=<average mean score= <2.89 is not affecting

If 2.90 =< average mean score 3.26 somewhat affecting

If 3.27=<average mean score=<3.63 directly affecting

Table 1.2. The main factors response by the client, contractor, and consultant

S .No	*Factors affecting*	*MS of Contractor*	*MS of Client*	*MS of Consultant*
1	*Labor productivity*	*3.38*	*3.80*	*3.50*
2	*Material supply*	*3.38*	*3.20*	*3.50*
3	*Equipment utilization*	*3.25*	*3.00*	*4.00*
4	*Scheduling*	*3.25*	*3.40*	*3.50*
5	*Estimation*	*3.38*	*3.40*	*4.00*
6	*Job site documentation*	*2.75*	*2.80*	*2.50*
7	*Worker training*	*3.38*	*3.40*	*3.00*
8	*Aggressive competition during tendering*	*3.13*	*3.40*	*3.00*
9	*Negative attitude of project participant*	*2.71*	*2.60*	*2.50*
10	*Contractual relationship*	*3.38*	*2.83*	*3.00*
11	*Change order communication*	*3.00*	*2.40*	*3.50*
12	*Project manager's ignorance due to lack of knowledge*	*3.13*	*2.60*	*4.00*
13	*Lack of availability of materials*	*3.75*	*3.20*	*2.50*
14	*Non-availability of technology*	*3.63*	*3.60*	*2.50*
15	*Fault project conceptualization*	*2.63*	*3.00*	*3.50*
16	*Rework*	*3.50*	*3.80*	*2.50*
17	*Safety*	*3.00*	*3.20*	*3.50*
18	*Design problem*	*3.25*	*3.20*	*3.00*
19	*Work man directing problem*	*3.50*	*4.00*	*2.00*
20	*Construction method recommendation*	*3.13*	*3.20*	*2.50*
21	*Man power control problem*	*2.88*	*3.00*	*3.50*
22	*Equipment evaluation problem*	*3.25*	*3.20*	*3.00*
23	*Supplier quality management*	*3.00*	*3.20*	*3.00*
24	*Lack of site organizations*	*3.00*	*3.40*	*3.00*
25	*Absence of execution of other projects*	*2.88*	*3.40*	*2.50*
26	*Project manager's competence*	*3.00*	*3.40*	*3.00*
27	*Lack of Top management support*	*3.00*	*3.40*	*2.50*
28	*Monitoring and feedback by project participants*	*3.00*	*3.20*	*2.00*
29	*Poor coordination and communication structure*	*3.75*	*2.80*	*2.50*
30	*Team work*	*3.50*	*3.20*	*2.50*
31	*Good coordination among project*	*2.88*	*3.40*	*2.50*

32	Lack of Availability qualified staff	3.13	3.00	4.00
33	Lack of Ability to delegate responsibility	3.13	3.00	3.50
34	Procurement problem	3.25	3.20	3.00
35	Design review problem	3.00	3.00	3.00
36	Lack of using manual	2.88	2.60	1.00
37	Client dissatisfaction	3.1	3	3.5
38	Shortage of finance	3.5	2.6	3.5
39	Non availability of collateral to secure payments	3.63	2.8	3.5
40	Problem with interim payments, honoring of payment certificate	3.00	3.2	3.5
41	Owner competence	2.75	2.6	3.5
42	Regular budget up date	3.38	3	3
43	No competition from other contractors	3.13	3.25	3.5
44	Less level of economic development	3.13	2.4	2.5
45	Conflict among project participants	3.63	3.2	3.5
46	Lack of knowledge	3.5	3.4	3
47	Owner incompetence	2.63	3.4	3
48	Good coordination among project participants	2.38	2.4	2.5
49	Delay in payment	3.63	3.4	3.5
50	Variation order	3.38	3.2	4
51	Low morale and motivation of craftsmen	3.13	3.2	3
52	Absence of labor and labor unions	3.25	2.8	3.5
53	Land ownership disputes	3.25	2.2	3.5
54	Favorable working condition	3.00	3.2	3.5

5.2.2.2. Identify critical factors that affect building construction project quality performance

Table 1.3 Critical factors response by Client, Contractor, and Consultant

S.no.	Critical Factors	Average Mean	Rank
1	Estimation	3.59	1
2	Labor Production	3.56	2
3	Variation Order	3.53	3
4	Delay in Payment	3.51	4
5	Conflict among project participants	3.44	5
6	Equipment Utilization	3.42	6
7	Scheduling	3.38	7
8	Lack of knowledge	3.30	8
9	No competition from other contractors	3.29	9

10	*Rework*	*3.27*	*10*
11	*Worker Training*	*3.26*	*11*
12	*Project Manager ignorance due to lack of knowledge*	*3.24*	*12*
13	*Non-availability of technology*	*3.24*	*12*
14	*Safety*	*3.23*	*14*
15	*Problem with interim payments, honoring of payment certificate*	*3.23*	*14*

As shown in table 1.1 there is the main problem that affects the quality of building construction. This factor was collected from the past study and relative literature review to identified the factors in a little way. From those factors, the researcher tries to ranks in a priority manner based on the questioner analysis.

From table 1.2, the result obtained from questionnaire analysis, the factors ranked from 1st to 10th are considered as factors highly affecting building construction project quality performance. As stated in table 1. 2, the rank of these factors depends on the evaluation of the mean score of three groups of respondent namely, contractors, clients/owners, and consultants. The factors took second place as it can be observed from table 1.2, ranked from 11th to 15th are considered as factors that somewhat affect building construction project quality performance. As stated in table 1.1, based on the average mean score interval from 2.53 to 2.89 is not affecting the building construction quality performance and also 2.13 to 2.52 is not applicable as factors affecting building construction quality performance.

Estimation is calculating the near values of cost, time, and quantity for a numeric case and quality and similar for a numeric case. Based on the questionnaire analysis shown in table 1.2, this factor is ranked first having an average mean score of 3.59. This indicated that as it's valued by respondent these factors are the main factors affecting building construction project quality performance in Robe town.

In the same way, another important point determined in table 1.2, is that labor productivity takes second place based on the average mean score of three groups of respondents namely contractors, clients/owners, and consultants. Therefore, this justifies that labor productivity is the second and the next closest factor identified by the respondents as the factors affecting building construction project quality performance. In the construction sector labor productivity consider as the main value and also the main required in the construction industry. Generally, productivity is the average direct labor hours required to fix a unit of material.

As shown in Table 1.2, the third-ranked factor based on a questionnaire is the variation order has an average mean score of 3.53. This implies that variation order is another important factor affecting building construction project quality performance in Robe town.

According to the analysis results of the average mean score shown in table 1.2, delay in payment is the fourth-ranked factor with an average means score of 3.51. This statement clearly states that delay in payment is the fourth important factor affecting building construction project quality performance. The construction delay in payment is a commonly evident reality not only in Robe town; however, all the countries faced this global fact. Construction delay in payment can be defined as payment later than intended planned, or a particular period, or letter than the specific time that all the concerned parties agreed for construction projects. Delay in payment is counted as a common problem in construction projects. Escalation of the construction industry is imperative for all regions of the national and international economy, as well as everyone involved in the industry like contractors, workers, financiers, architects, engineers, etc. The project's success depends on meeting objectives within time and budget limits.

According to the analysis results of the average mean score shown in table 1.2, Conflict among project participants is ranked fifth which means conflict among project participants with an average mean score of 3.44 is one of the most highly ranked factors affected building construction project quality performance in Robe town.

Generally, as categorized in table 1.1, financial issues, labor factors, site staff, and execution are the critical factors that directly and somewhat affecting building construction project quality performance in Robe town.

5.2.2. Analysis of Interview

These interviews are done on three Construction Company those found in Robe town. The interview is analyzed by the answer gotten from them. The interview conducted on a few construction companies to support this research is analyzed as follows.

The summarized interview three construction companies are discussed as the following: -

1= Less frequent, 2 = Frequent and 3 = More frequent=

Table 1.3. Summary of response from interview

	Factors	*Frequency*
Interview (1-3)	*Work culture*	*2*
	Quality management	*2*
	Quality of material	*2*
	Availabilities of construction material	*2*
	Lack of equipment supply	*1*
	Duration	*3*
	Cost overrun	*2*
	Labor productivity	*3*
	Lack of top management involvement in construction management	*2*
	The dispute between part in the contract	*3*
	Climatic condition	*3*
	The fluctuation of labor availability	*3*
	Estimation	*2*

As a result of the analysis shown in table 1.3, some of the factors were identified as the factor more frequently affecting building construction quality performance in Robe town. Some of these are the following:

- ✓ *Climatic condition*
- ✓ *Duration*
- ✓ *Labor productivity*
- ✓ *The dispute between part in a contract*
- ✓ *The fluctuation of labor availability*

As a result of the analysis shown in table 1.3, some of the factors were identified as the factor frequently affecting building construction quality performance in Robe town. Some of these are the following:

- ✓ *Work culture*
- ✓ *Quality management*
- ✓ *Lack of top management involvement in construction management*
- ✓ *Cost overrun*
- ✓ *Availabilities of construction material*
- ✓ *Quality of material*
- ✓ *estimation*

As a result of the analysis shown in table 1.3, some of the factors were identified as the factor less frequently affecting building construction quality performance in Robe town. Some of these are the following:

- ✓ *Lack of equipment supply*

5.2.2.3. Provide a solution for improving construction project quality management.

The project can be affected by many reasons, to improve those factors affecting project quality due to some factors. Many investigators try to put their recommendations to minimize the factors that affect building construction quality performance. Generally, the researcher tries to put his perspective solution to reduce those factors which influence building construction quality performance by looking for multidisciplinary project team, availability of resource, accurate initial cost estimation, motivate, give them direct instruction how to install the material equipment, give the training to upgrade their performance, reaching experienced staff, facilitate house for workers, bonus, safe the labor from environment danger and other services.

Conclusion

Building construction quality project performance is not the concern of client/owner, contractors, and consultants but other stakeholders who participate in the construction industry. The effect and consequences of poor quality can be a loss in productivity; additional expenditure by way of rework and repair; loss of reputation, leading to a loss in market share; and eventually being put out of business. The importance of performing work to the expected quality level has been recognized since ancient times. From the result of data analysis, the following conclusions are derived: Estimation is the most important factor affecting building construction project quality performance in Robe town with an average mean score of 3.59 and ranked first. From the analysis, the result discussed there is a strong side effect of labor productivity on building construction project quality performance with the average mean score of 3.56 which indicates a strong effect relationship between project quality performance and labor productivity. Variation order is the factor directly affecting building construction project quality performance. Generally, factors ranked from first to fifteenth were identified as the factors that critical affecting building construction project quality performance.

As a result of the interview, the dispute between parts in contract, Fluctuation of labor availability, Labor productivity, Duration are the most frequent factors affecting building construction project quality performance. Finally, to reduce those factors which influence building construction quality performance, looking for the multidisciplinary project team, availability of the resource, accurate initial cost estimation, motivate, give them direct instruction on how to install the material equipment, give training to upgrade their performance, reaching experienced staff.

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Reference

[1] Ankit, B., 2009. Project Level Factors Affecting Quality Of Construction Projects.

[2] Chin-Keng, T., 2011. Study of Quality Management in Construction Projects. International Islamic University Malaysia, Kuala Lumpur, Malaysia, 10(7), pp. 542-552.

[3] D.Ashokkumar, 2014. Study of Quality Management in Construction Industry. International Journal of Innovative Research in Science, Engineering and Technology, 3(1), pp. 36-43.

[4] Dr. Daw, A. a. D. A. K., 2016. Application of Quality Management Systems (QMS) in the Construction Industry. USE, s.n.

[5] P.P.Mane, J., 2015. Quality Management System at Construction Project: A Questionnaire Survey. Int. Journal of Engineering Research and Applications, 5(3), pp. 126-130.

[6] W. Femina, D. a. B., 2016. A Study on Critical Factors affecting the Quality Performance of Construction. International Journal of Latest Trends in Engineering and Technology (IJLTET), 7(2), pp. 623-628.