

# Study on Performance Factors of Public Building Construction Project in Assosa Zone

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**Abstract:** Construction industry is highly competitive and a job creator for a different groups of expertise such as owners, consultants, contractors and other shareholders. General objectives is to assess the effects of issues determining the presentation of public building construction project in Assosa Zone. The research was used quantitative design; the data was collected from owners, consultants, and contractors using questionnaires and interviews. The performance problems of which the respondents were asked to rank each according to the five-point Likert scale. The results of this research identified 74 factors influencing the performance of public building construction project. From among factors escalation of material prices, unavailability of resources as planned through project duration, sequencing of work according to schedule, differentiation of currency prices, leadership skills of project manager, are the top five significant factors in Assosa zone. To accomplish the public building construction project without delay the clients should hire a specialized engineer and the consultant should give training for the project organization. The contractors should be using the qualified employees with good experience to avoid any problems during construction of the project.

**Keywords:** Performance Factors, Public Building Construction Project, Top Five Significant Factors

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## 1. Introduction

Construction industry is the advanced comes in its nature as a result, it contains an oversized variety of parties as clients, contractors, consultants, stakeholders, shareholders, and regulators, this parties is by moving the performance of the building construction comes and factors like time factor, cost factor, quality factor, client satisfaction factor, productivity factor, health and safety factor [13]. Construction industry plays a serious role in development and achievement the goals of society. The performance of the development industry is suffering from national economies. Therefore, performance is related to many factors such as time factor, cost factor, quality factor, client satisfaction factor, productivity factor, and health and safety factor.

In the building construction project, the perception of key stakeholders, including client/government officials, consultants, and contractors regards the failure in construction projects over their different stages that are, conceptual, planning and tender, production and operation [3]. He states that different stakeholders may have different

viewpoints about project success as well as the success factors. Hence, as the nature of the construction company's participant is different for different projects, it is not easy to make a comprehensive list of success factors. As such, it was concluded that different performance factors are involved to achieve different objectives for each project.

From the among groups the most significant factor affecting performances of construction projects [6]. The survey findings indicate that the most important factors affecting the performance of construction projects are: because of improper planning, improper designing, site management, decision- making, construction methods, shortage of labor, and technical personnel, quality, and shortage of materials, construction mistakes and defective work, productivity [12].

Strategic decision on client satisfaction, financial stability, efficiency, and effectiveness of the internal business process, and project teams, sustainable projects and delivery of innovative projects to clients are to optimize building project

performance. The aim objectives of the research are to assess the effects of factors determining the performance of the public building construction projects in the Assosa Zone.

## 2. Literature Review

Construction projects can be considered as the largest industry in the world. Growth during this industry, in reality, is an indicator of the economic conditions of a country. Since, most construction comes exhibit value overruns, time extensions, and conflicts among parties and dereliction in the safety and quality sector. Design to control practical information for reaching the project objectives is a significant component of project management. The project management is the planning, organizing, directing, and controlling of company resources to achieve specific goals and objectives. In the project management which are cost, time and performance are the main objects, but in the construction project management its cost, time and quality which did not change fundamentally. Therefore, in the construction industry management is one of the most important factors affecting the performance of works.

### 2.1. Construction Management and Performance

In the construction industry delay of construction projects depends mainly on the poor performance in the projects. Inappropriately managed the estimation and coming up with, scheduling, value management, and budget management, resource allocation, collaboration package, communication, quality management, and documentation or administration system and quality of field data is that the essential issue influencing the performance of the public-funded construction comes [15].

The effect of construction project performance on economic development in Nigeria is improvement in technology, the extension of infrastructures, increase in employment opportunities and government expenditure [14].

The essential factors influencing the success of comes are known and unremarkably associated with the subsequent areas: project (e.g. clear goal, realistic schedule, adequate funds, resources, size, complexity), project manager and leadership (e.g. leadership, management of changes, effective conflict resolution, communication), project team members (e.g. communication, technical background, qualified team), organization (e.g. high management support, responsibility and authority chart) and external setting (client, technological setting, political setting, social setting, physical environment) [9].

The factor affecting of the performance of construction project that is agreed by the owners, consultants, and contractors in Libya are escalation of material prices; availability of resources as planned through project duration; average delay thanks to closures and materials shortage; convenience of personals with high expertise and qualification; quality of equipment and raw materials in project; and leadership skills for project manager [7].

### 2.2. Factor Affecting of Performance in Construction Projects

#### 2.2.1. Cost Factor

The cost has been addressed by many researchers as a very important success criterion, whereas, budget plan and proper cost estimation has been mentioned as prominent success factors. As suggested by the experts, the four areas that are highly relevant to project cost control are interim payments, variation orders, cost and prolongation claims, and final account forecasts [2].

#### 2.2.2. Time Factor

Time or schedule as one of the most important project success criteria for any project. Time has been self-addressed as a criterion by that to gauge a project's degree of success [5]. It is conjointly been mentioned as an element, which may facilitate the opposite factors/criteria be met. It is found in this study that the definition of "Time" is of great importance. "Time" as the date when a project is most likely to end can be criteria, but "Time" as a manageable component might be considered as a factor.

#### 2.2.3. Quality Factor

Quality management method as a project success issue that facilitates the success of alternative criteria and factors [1].

#### 2.2.4. Client Satisfaction Factor

It is worthwhile to note that stakeholders' satisfaction is sometimes paraphrased as satisfying stakeholders' needs or meeting stakeholders' expectations. Major contribution to unsuccessful projects is the lack of understanding or defining project and product scope at the start of the project. A properly defined and managed scope leads to delivering a quality product, in a controlled cost and within specified schedules to the stakeholders [10].

#### 2.2.5. Productivity Factor

Inconvenience of materials, late payment of salaries and wages, suitability/adequacy of plant and instrumentation, superior incompetence, and lack of workforce skills, at the highest five most vital factors striking on labor productivity in Zimbabwe [4]. An adequate work coming up with, economical resource procurable systems, timeouts payment of salaries and continuous skilled development for employees, area unit amongst the counseled intervention methods to enhance on-the-scene labor productivity.

#### 2.2.6. Environmental Factor

External environmental factors, that embrace political surroundings, economic surroundings and social surroundings, have an effect on the success of housing development come in developing countries. The construction professionals who work as developers, consultants or contractors, and those working in public housing agencies [11].

## 3. Methodology

### 3.1. Measures

Several factors having direct and indirect effect on the

progress of construction projects from were identified literature research. Those factors were then filtered to 74 most relevant factors through interviews held with the experienced professionals having construction project management experience of 5 to 15 years. The filtered factors highly influence the construction projects of contractor, client and consultant. Survey was limited to the public building construction projects of Assosa zone, Ethiopia.

### 3.2. Development of Questionnaire and Data Collection

The identified factors were transformed into research questionnaire to gather the data contractor, client and consultant. Total 16 (sixteen) construction projects consists of 10 Educational schools, 6 Health centers of public service buildings were visited for the purpose of onsite feed-back and to get the required data from the professional engineers working at different building projects.

Questionnaires were sent to different professional engineers working with construction firms by post, through email and through engineers working on site. Thirty three responses were collected from the professionals out of whom five responses were discarded for not being valid responses.

The respondents were asked to tick (✓) the appropriate item according to their projects. Quantitative data analysis of 33 responses of the professionals engaged in construction projects for 74 different factors were analyzed on likert's scale. "1" Not Significant, "2" Slightly Significant, "3" Moderately Significant, "4" Very Significant, "5" Extremely Significant.

### 3.3. Data Analysis Technique

Following tests were carried out for data analysis:

- 1) Cronbach's alpha;
- 2) Relative Importance Index.

## 4. Results and Discussions

### 4.1. Cronbach's Alpha

For internal reliability, Cronbach's alpha was calculated for each scale. Cronbach's alpha for 33 samples was collected as 0.734. Thus, the results indicate internal construct consistency and reliability of the data. Cronbach's coefficient alpha is designed as a measure of internal consistency [8]. Cronbach's coefficient alpha can be used to check the reliability of the questionnaire. The normal range of Cronbach's coefficient alpha values between 0.0 and + 1.0. The closer the alpha is to 1, the greater the internal consistency of items in the instrument is assumed.

### 4.2. RII Ranking Results

The data included 74 factors that were to be analyzed. Strength of index familiarity, frequencies and agreements were computed through the technique of Relative Importance index (RII). Ranking carried out through the Likert's Scale and top five factors were identified.

$$RII = \frac{\sum W}{A * N} = \frac{5 * n_5 + 4 * n_4 + 3 * n_3 + 2 * n_2 + 1 * n_1}{5 * N} \quad (1)$$

Where, W is the weight given to each factor by the respondent, ranging from 1 to 5, (n1 = number of respondents for Not Significant... n5 = number of respondents for Extremely Significant) A is the highest weight (i.e. 5 in the study) and N is the total number of respondents. Analyzing the data from the gathering information and ranging by using RII value between  $0 < RII \leq 1$ , the highest value of RII, the most significant performance factors. The importance of the indices and overall ranking the factors calculated are shown in table 1.

Table 1. RII and ranking of factor affecting the performance of public building construction projects.

Sr. No	Factors	RII	Rank
1	Escalation of material prices	0.922	1
2	Unavailability of resources as planned through project duration	0.860	2
3	Sequencing of work according to schedule	0.856	3
4	Differentiation of currency prices	0.849	4
5	Leadership skills for project manager	0.818	5
6	Social Environment	0.768	6
7	Material and equipment cost	0.750	7
8	Employee attitudes in projects	0.748	8
9	Project location is safe to reach	0.745	9
10	Quality of equipment and raw materials	0.739	10
11	Technology advancement	0.729	11
12	Management-labor relationship	0.725	12
13	Site condition problems	0.715	13
14	Number of disputes between owner and project parties	0.712	14
15	Quality and availability of regulator documentation	0.699	15
16	Cost of variation orders	0.698	16
17	Training the human resources in the skills demanded	0.694	17
18	Quality training/meeting	0.694	17
19	Industrial relations environment	0.692	18
20	Motivation cost	0.687	19
21	Application of health and safety factors in organization	0.678	20
22	Average delay in claim approval	0.671	21
23	Cost of rework	0.639	22
24	Climate condition	0.631	23

Sr. No	Factors	RII	Rank
25	Absenteeism rate through project	0.629	24
26	Recruitment and competence development	0.627	25
27	Information coordination between owner and project parties	0.625	26
28	Time needed to implement variation orders	0.622	27
29	Implementing effective safety system	0.612	28
30	Quality assessment system in organization	0.608	29
31	Conformance to specification	0.608	30
32	Cost control system	0.607	31
33	Average delay in regular payments	0.598	32
34	Regular project budget update	0.597	33
35	Percentage of orders delivered late	0.594	34
36	Speed and reliability of service to owner	0.594	35
37	Review of failures and solving them	0.583	36
38	Economic environment	0.571	37
39	Unavailability of competent staff	0.569	38
40	Project overtime cost	0.565	39
41	Cash flow of project	0.565	40
42	Overall managerial actions	0.565	41
43	Employees motivation belonging to work	0.554	42
44	Number of non-compliance events	0.552	43
45	Reportable accidents rate in project	0.549	44
46	Learning from own experience and past history	0.548	45
47	Control mechanisms	0.544	46
48	Time needed to rectify defects	0.537	47
49	Communication systems	0.534	48
50	Number of rework incidents	0.532	49
51	Site preparation time	0.529	50
52	Assurance rate of project	0.508	51
53	Planned time for project construction	0.498	52
54	Planning effort	0.497	53
55	Project labor cost	0.492	54
56	Learning from best practice and experience of others	0.483	55
57	Liquidity of organization	0.478	56
58	Market share of organization	0.457	57
59	Work group	0.456	58
60	Project design cost	0.455	59
61	Implication an effective quality assurance	0.452	60
62	Physical environment	0.449	61
63	Developing appropriate organizational structure	0.444	62
64	Feedback capabilities	0.441	63
65	Cost of compliance to regulators requirements	0.427	64
66	Overhead percentage of project	0.423	65
67	Control sub-contractor's works	0.406	66
68	Waste rate of materials	0.366	67
69	Profit rate of project	0.323	68
70	Number of new projects / years	0.272	69
71	Wastes around the site	0.270	70
72	Project complexity	0.263	71
73	Noise level	0.243	72
74	Air quality	0.222	73

*Five most important factors identified are discussed below:*

1. Escalation of material prices

It was obtained that the escalation of material prices results from unexpected rise in the market prices of key construction materials was the most important performance factor, 92% participants (30/33) strongly agreed. This agreement between all target groups is traced to the political situation from which affects the Assosa zone. Public building construction projects in the Assosa zone are suffering from a number of problems because of the unexpected rise in the market prices of key construction materials. These problems can be considered as an obstacle for the cost performance of projects as this effect

on the rate at which projects are executed. All clients, consultants, and contractors feel with such a sensitive problem in their projects. The current political situation in Ethiopia is the result of the increment of the market price of construction material.

2. Unavailability of resources as planned through project duration for the construction projects

This factor can be considered as important for three parties and it has an approach rank for all parties, 86% participants (29/33) strongly agreed as it affects directly the completion of a construction project such as time performance. If resources are not available through construction projects as

planned through project duration, the project will suffer from the problem of time and cost performance. Hence the progress of construction projects is not finished according to the schedule. This is because the availability of resources as a planned schedule can improve the time performance of the construction projects.

### 3. Sequencing of work according to schedule

This is mainly because cash flow affects the project budget and project cost performance problems, 86% participants (29/33) strongly agreed.

### 4. Differentiation of currency prices

Public building construction project in the Assosa Zone it is affected by increasing of dollar prices, 85% participants (28/33) strongly agreed. This differentiation of currency prices has it happened because of political and economic situation with all of the countries in the earlier years. This factor influencing the liquidity, project budget, and cost performance.

### 5. Leadership skills for project manager

This factor is considered as more important for contractors and clients than for consultants, 82% participants (27/33) strongly agreed. This is mainly because that if a project manager has strong leadership skills, then the project performance can be able to plan and execute their construction projects to maximize the project's chances of success with quality and in the scheduled.

## 5. Recommendations

Based on the findings, it is recommended that the client must determine project duration by their professional engineers because thus to avoid a change in the schedule and request everything they need in the contract from the beginning and avoid any requirements after the implementation of works and develop a clear vision for projects. The client is recommended to provide clear criteria for the selection of contractors according to the nature of the project and to have a good reputation and great experience. The client is recommended to provide the consultant with sufficient time to prepare bidding documents to avoid any mistakes or misunderstandings. The governmental security and the project organization must work together to produce the projects within a schedule.

## 6. Conclusions

The reliability of data was checked by using Cronbach's alpha, the internal consistency of performance factors in the research was high-reliability consistency. From the survey conducted and analysis, it was seventy- four factors of performance influencing were identified from the response questionnaire. From the identified factors the top five significant factor affecting of performance of public building construction projects were: escalation of material price, unavailability of resources as planned through project duration, sequencing of work according to schedule, differentiation of currency prices, leadership skills for project manager.

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