



Title: Study on Communication Impact on the Public Building Construction Projects among Stakeholders (*The Case of Bahir Dar City, Ethiopia*).

Author: Alemu Abinew Dejen

Department of construction technology and Management, Assosa University, Ethiopia.

alexabinew33@gmail.com

ABSTRACT

Construction is a team activity involving many different actors specialized in various areas. An ineffective communication management system in the construction projects is the major cause of failure. The main objective of the study is to explore the impact on the public building construction projects between stakeholders in Bahir Dar City. The significance of the study is to help all stakeholders to be aware of factors, which are drawbacks of project success to avoid such negative impacts and get committed for better performance. Data were collected from building contractors, consultants, clients, and Urban Development and Housing Construction Bureau. The data collection method included a desk study interview, panel discussion, and questionnaire survey. The gathered data were analyzed by using Statistical Package for Social Scientist (SPSS) software computer program. Both descriptive and inferential statistics were used for the analysis of the data. The study revealed that the top five impacts of communication in building construction projects due to ineffective information exchange are delay (87%), time overrun of project (85%), cost overrun (81%), variation order (70%), termination of projects and health and safety issues (70%).

Keywords: Impacts of communication, Project communication, Stakeholders.

1. Introduction

Construction projects is unique in the sense that, they are often consisting of new actors that need to collaborate and involve in many uncertainties throughout the project's lifecycle. There is a widespread of stakeholders involved in conceiving a building project through typical stages such as design, finance, build, manage, upgrade and ultimately, replacement and a corresponding need for communication and cooperation [1].

Construction is the second-largest activity in the Ethiopian economy to contribute GDP and the success of such large-scale construction projects is a vital factor for its growth. The project communications management processes provide critical relations among people and information that is necessary for the successful completion of projects [2]. Communication is a wide-term that attracts major attention through many works of literatures. Studies have confirmed that it is the foundation of every human interaction between the different organizations, any parts of the exchange of ideas, and it gives meaning and solidity to the conducted activities. Primarily, the word communication as the process of informing and interchanging ideas, viewpoints or information, by speaking, writing or signals [3].

Communication is transferring any information between people and can be the pipeline that transfers activity situations from one individual to another. Communication is one of the main tools necessary for project success in the construction industry [4]. Drawings, specifications and construction methods must be communicated throughout all the stages of construction. Therefore, all construction project execution requires effective communication means between construction professionals in any project delivery. Studies have revealed that proper communication between stakeholders has a significant contribution to any project's success. With this as vital concern, all stakeholders in the industry should ensure that project communication must always be on the agenda of the project management team and site workers before the commencement of the actual project. Having the above in mind, the study aims at assessing and evaluating the state of communication and its effectiveness on public building projects in the City of Bahir Dar.

1.1. Problem Statement

The construction industry is a complex enterprise with several stakeholders whose interaction requires smooth information flow to be analyzed and transmitted for effective action. In fact, most construction disputes are due to a breach of or inadequate communication among the team

members. In order to accomplish the project within the contract time and fixed cost, managing communication in every stage is very essential.

The work of [5], affirms that poor performance of the construction sector has its roots in poor communication. The major causes of poor communication is the absence of a shared language between superiors and workers, workplace stress, superiors and colleagues' attitude towards site workers, misinterpreting of instructions and poor communication skills among workers. The construction sector is experiencing high cases of delays, cost and time overruns, poor quality, health and safety issues, pollution and issues of sustainability because of ineffective communication practices [5].

In the current local practice, project communication is less properly managed. Generally, in the Ethiopian context, there are no written documents, guidelines and code of practices on communications that have to be exercised in construction sites. It is not even included in contract documents as a major concern, and communication methods used in construction project management has not been handled properly. The use of appropriate communication and communication medium (channel) to resolve construction and design problems is essential. Therefore, this research tries to investigate the impact of inefficient communications and suggest remedial measures for a level of better performance focusing on public building construction projects.

2. Research Methodology

2.1. Description of the Study Area

The study was conducted in Bahir Dar City, which is the capital of Amhara National Regional State of Ethiopia. The City is located at 578km northwest of Addis Ababa the capital of Ethiopia. It is located at 11.59 latitude and 37.39 longitudes at an elevation 1799 meters above sea level. Currently, the City covers a total area of 256.4km². Bahir Dar is one of the leading tourist destinations in Ethiopia, due to the nearby Lake Tan2a and Blue Nile River.

2.2. Research Approach

Three research approaches are advanced: qualitative, quantitative, and mixed methods. Qualitative research is an approach for exploring and understanding the meaning individuals or groups assigned to a social or human problem. Quantitative research is an approach for testing objective theories by examining the relationship among variables. Mixed methods of research

is an approach to an inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data. In this research, mixed approaches are used. Because the research described by both qualitative and quantitative.

2.3. Research Strategy

In here, the research has both quantitative and qualitative approaches and explanatory because the research was initiated from practical problems. It is also descriptive because it tries to describe the so far exercised and ongoing communication practices and its impact on the performance of public building projects among stakeholders.

2.4. Source of Data and Data Collection Methods

While deciding on the source of data for the study, the researcher should keep in mind two types of data, which are primary and secondary. The primary data are those, which are, collected a fresh and for the first time and thus happen to be original in character. Whereas, the secondary data are those which someone else has already collected and which have already passed through the statistical process. This study used interviews, questionnaire and panel discussion for collecting data.

2.5. Population and Sample Size for the Study

The study uses key construction project parties who participated in the completed and ongoing public building construction projects in Bahir Dar City among stakeholders. Those are project owners, project consultants, project contractors, and Urban Development and Housing Construction Bureau. The study covers Grade/Category one to five contractors and consultants. The researcher uses own judgment which respondents to choose and picks those who best meet the purposes of the study. This is carried out to enable the researcher to select active and experienced main stakeholders for the study. It is the purposive sampling technique, which is a non-probability-sampling technique that was used for the study. According to Bahir Dar City municipality data, public building construction projects in Bahir Dar City from Grade I to V public buildings construction projects, forty-eight (48) contractors with eleven (11) Clients, thirteen (13) consultants and one (1) Urban Development and Housing Construction Bureau.

$$n = \frac{n'}{1 + \frac{n'}{N}} \dots \dots \dots \text{(Eq. 2.1)}$$

Where: -

n' = is the sample size from infinite population, which can be calculated from the above formula

$n' = \frac{S^2}{V^2}$ The definitions of all variables can be define as the following:

n = sample size from finite population.

N = Total population (48 contractors, 13 consultants, 11 clients and 1 UDHCB)

V = Standard error of sample population equal 0.05 for the confidence level 95% was used for this study.

S^2 = Standard error variance of population elements, $S^2 = P(1 - P)$;

maximum at $P = 0.5$

2.6. Pilot Study

A pilot study for the questionnaires was conducted by distributing the draft questionnaire to a number of experts in the field of the research topic. The pilot procedure was conducted by selecting three contractors, three consultants, three clients and one Urban Development and Housing Construction Bureau professionals. Experts' suggestions and comments were, collected, discussed and evaluated during the piloting. The questionnaire was then finalized and ready for distribution. The piloting stage increased the effectiveness of the questionnaire.

2.7. Validity and Reliability Test

2.7.1. Validity Test

There should be multiple strategies for the researcher to assess the accuracy of the findings and convince the readers of that accuracy. Construct validity primarily takes place in the data collection phase. Key strategies are multiple sources of evidence, establishing a chain of evidence, and having key stakeholders. The collected data are from interviews, observations, questionnaires and panel discussion.

2.7.2. Reliability

The study utilizes consistency method in determining the instrument reliability with the Cronbach's Coefficient Alpha. As the relevant coefficient to evaluate the consistency of items such

as individual questions in a questionnaire. the statistical procedures such as Cronbach’s alpha coefficient, randomly splitting all the responses to a question into two sets, calculating the scores on the two sets, and working out the correlation between the two sets. This is known as a ‘split-half’ test. Reliability of 0.95 means 95 percent of the variability in the observed score is true and due to error at determining P-value is five percent (5%).

2.8. Research Data Analysis

Both descriptive and inferential statistics are employed to analyze the data obtained from the questionnaire, interview, and panel discussion. The data were collected from respondents, analyzed properly by using Statistical Package for Social Scientist (SPSS) software computer program and Microsoft excel. In the research, both descriptive and inferential statistics were used for the analysis of the data collected through the survey.

$$RII = \frac{\sum W}{NA} = \frac{\sum(5n_5+4n_4+3n_3+2n_2+n_1)}{(5(n_5+n_4+n_3+n_2+n_1))} \dots\dots\dots \text{Equation.2.2}$$

Where:

RII= relative importance index

n₁ = Number of respondents who answered ‘Totally Disagree.

n₂ = Number of respondents who answered ‘Mostly Disagree.

n₃ = Number of respondents who answered ‘Neither Agree nor Disagree.

n₄ = Number of respondents who answered ‘Mostly Agree.

n₅ = Number of respondents who answered ‘Totally agree.

A = the highest weight (which is 5 in this case).

N = sample number.

3. Analysis, Results and Discussion

3.1. Interview and Panel Group Data Analysis

Semi-Structured interviews were carried out to develop and validate questionnaire responses as part of the research. As compared to the quantitative questionnaire survey, the qualitative experts’ interview provides a direct or face to face, more in-depth interaction with the respondents. Semi-structured interviews targeted fifteen (15) professionals working in different project companies:

which were contractors, clients, consultants, and Urban Development and Housing Construction Bureau.

Interviews have some questions, which were not included in the questionnaire in order to obtain more information, specific to the practices of communication and its impact on the performance of public building construction among stakeholders in Bahir Dar projects. The interviewees were sampled by using a purposive sampling method to obtain data from the selected stakeholders in the construction projects. This was understood as the best professionals in the field to provide the required information. The selection of a professional depended on experience in the construction industry, the level of education and the level to which they were involved in the building construction projects.

3.1.1. Impacts of project communication in an organization

All the panelists and participants involved on the discussion agreed that, ineffective communication has an impact on the organization or projects. Because awareness is not given for effective communication, especially communication between consultant and contractor was poor. As understanding from panelists and participants, the impact of communication is a dispute project delay, variation order, quality problems, and misinterpretation. Misinterpretation implies that the team does not perform at full capacity and they generate uncomfortable situations that confused each other. This all impacts were occurred due to a lack of proper or effective communication per panelists and participants stated.

3.1.2. Communication channels in the organization

All the panelists and other participants were agreed of that, communication channel was never determined in their organization. As understanding from panelists and other participants, they were new for this idea; everyone simply starts to talk to everyone. Nevertheless in the project management body of knowledge communication channel was determined using a formula $n*(n-1)/2$. For example, if communication takes place in four members of a team, there are six unique channels of communication that exist in the office, due to this everyone knows with whom he/she communicate.

Per the understanding from panelists' and participants', in the construction industry, the communication was managed through channels in all the organizations. Hence, each department in the organization is responsible for assigning information to his or her teams. To formulate a

complete communication system, due to the complexity of construction projects. If there is no proper channel is adopted, problems occurred in construction projects. Therefore, having proper channels in the organization made communication effective in the organization.

3.1.3. Improving project communication on the organization

All the panelists’ and participants’ opinions of that, improving the current practice of communication is needed and awareness should be given to stakeholders in the construction projects. As understanding from panelists and participants, they suggested that continuous training should be conducted to top management on communication. In order to convey knowledge and skills of communication to sustain successful project handover. Because the project success depends on communication-management factors to enhance communication effectiveness of project success. Based on the panelists and participants’ opinion of that, the suggested ways for improving project communication in the construction projects was by; using proper technology, having clear communication systems, using formal communication and using a clear communication channel.

3.2. Questionnaire Data Discussion and Analysis

In order to ensure a study, a sample well represented to the targeted population of the Bahir Dar City public building construction projects. The main respondents’ were contractors, clients, consultants, and Urban Development and Housing Construction Bureau were included, to reveal their perspective of project communication practice and its impact on the performance of public building construction projects. Questionnaires were distributed to seventy- (70) respondents with hand. Out of the targeted 70 respondents, sixty-five of (65) were returned.

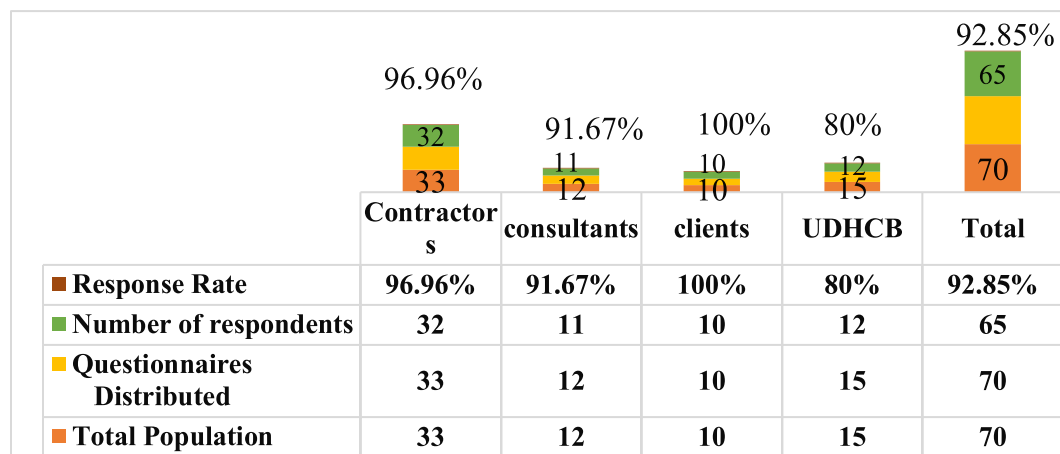


Figure 3. 1: Distributed questionnaires and response rates

The Figure 3.1. Above shown that, the distribution of the respondents' occupation were of that, ten (14.28%) are clients. Twelve (17.14%) were consultants. Fifteen (21.43%) were UDHCB and thirty-three (47.14%) were contractors. From the total seventy-(70) distributed questionnaires, sixty-five were returned. Thirty-two from contractors, eleven from consultants, ten from clients. Twelve are the Urban Development and Housing Construction Bureau. In which a total averages response rate is 92.85%, with a response rate of 96.96% contractors, 91.67% consultants, 100% clients and 80% from the Urban Development and Housing Construction Bureau.

Table 3.1: Impact of communication on building construction projects

Impact of communication on construction projects	Contractor		Consultant		Client		UDHCB		All	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Delay	0.86	2	0.86	1	0.86	1	0.85	1	0.86	1
Cost overrun	0.98	1	0.78	3	0.78	4	0.83	2	0.85	2
Poor quality of work	0.58	5	0.67	6	0.67	7	0.71	4	0.64	7
Variation order	0.79	3	0.82	2	0.82	2	0.69	5	0.81	3
Health and safety issue	0.56	6	0.77	5	0.77	6	0.68	6	0.70	5
Termination of project	0.56	7	0.77	4	0.77	5	0.72	3	0.72	4
Dispute	0.69	4	0.59	7	0.78	3	0.67	7	0.69	6

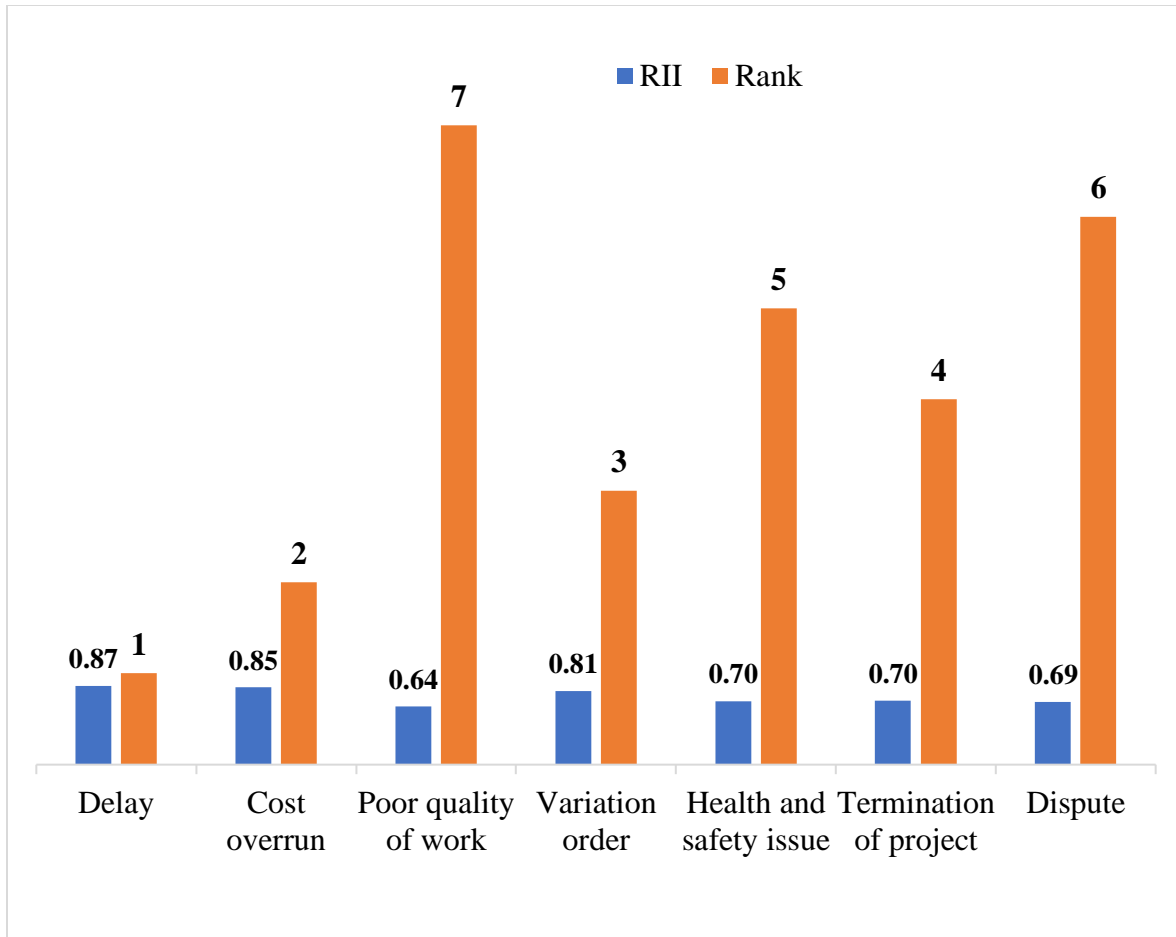


Figure 3.2: Impact of communication on building construction projects

As shown in Figure 3.2 above, the ranking of seven (7) impacts of communication on building construction projects. From the above Figure, it is clearly showing that delay was ranked first with an average relative importance index of 87.0. Cost overrun was ranked second, with an average importance index of 85.0. Variation order ranked third with an average relative importance index of 81.0. Termination of project, health and safety issue, dispute and poor quality of work were ranked 4th, 5th, 6th, and 7th respectively. The average relative importance indices of 70.0, 70.0, 69.0 and 64.0 follows the ordinal order.

According to respondents rated, the additional impacts of communication on their construction projects were poor teamwork, misinterpretation, misunderstanding, design error and low productivity. Thus, impacts have influenced the entire construction project and it needs effective communication management to minimize such negative impacts from construction projects.

3.2.1 Top five impacts of poor communication on construction project

I. Delay

Based on the respondents' response rated, the delay was ranked first with an average relative importance index of 87.0 in building construction projects. Due to a lack of effective communication in the organization, the delay has occurred. It is mostly contractor related causes; it leads the construction projects to the rework and termination of the project. If there is no effective communication among stakeholders in the organization, certain delays occur, because of the contracted work causing the project to become delay. A common impact of delay in the organization was contributed to a lack of team solidity, unclear messaging, and wasted time. In addition, the delay was contributed to wastage of resources, low employee confidence, higher turnover rates, lost profits, and even injury or death.

II. Cost overruns

According to respondents' rated, cost overrun was ranked second with an average relative importance index of 85.0. Poor communication has effects and consequences in construction projects. Among such effects, cost overruns were the major impact in Bahir Dar building construction projects. A cost overrun, also known as a cost increase or budget overrun and comprises unexpected incurred costs. When these costs are excess of planned amounts due to an underestimation of the actual cost during budgeting. Due to this, cost should be managed well and making clear communication is one of the tasks for project managers. During managing cost resource planning, cost estimating, cost budgeting and cost control were the necessary steps to minimize the cost overrun in the construction projects.

III. Variation order

As rated from respondents', variation order was ranked third with an average relative importance index of 81.0. Variation orders were made when changes occur. An official document states the changes made into the original agreement between the client and the contractor. When a variation order is created, it brings several negative effects on the entire construction projects. Variation orders influenced the project performance with regard to cost and time overruns and disputes between parties. Most variation orders involved additional works. Variation is common in construction projects due to the complex nature of the construction industry and lack of proper communication among team members. Variation order is observed as one of the most frequently

occurring issues in construction projects. In addition, variation order influence various aspects of construction projects and lead to cost overrun and unnecessarily resource wastage.

IV. Termination of project

According to respondents' rated, termination of the project was ranked fourth with an average relative importance index of 70.0. Termination occurs when an owner instructs a contractor to permanently stop the performance of work and leave the construction site. A construction project manager has to take care of and follow these steps. Put together the budget and negotiate cost estimates, arrange the work timetables, choose the most efficient construction method. This is done due to having effective communication among parties unless it contributed to the failure of the project. Thus, using clear communication to minimize termination in construction projects is mandatory for stakeholders.

V. Health and safety issue

According to respondents' were rated, health and safety issue was ranked fifth with an average relative importance index of 70.0. In the health and safety in construction, employees are expected to work at great heights with heavy machinery and potentially dangerous building materials on project sites. It is crucial that health and safety regulations are closely followed to reduce the chance of injury and protect the lives of workers.

Health and safety in construction are particularly important. Because the industry is likely to hazardous situations and can be dangerous at times. The most common health and safety risks are; Slips, trips and fall, noise, hand-arm vibration syndrome and it lead to collapse. Thus, using effective and clear communication is mandatory for construction projects to minimize such a negative impact on the entire construction project.

3.2.2 “Yes” or “No” Results and Discussion

This section of the study assesses the communication practice and the resulting impact on the performance of public building construction projects among stakeholders. The section focuses on ten yes or no questions to be answered by the surveyed construction firms or targeted respondents. The first question was whether they have to use face-to-face discussions in their organization.

3.2. Impact of communication in construction project

Response	Contractor		Consultant		Client		UDHCB		All	
	frequency	%	frequency	%	frequency	%	frequency	%	frequency	%
YES	26	81.25	10	90.91	9	90	6	58.33	12.75	78.46
NO	6	18.75	1	9.09	1	10	6	41.67	3.5	21.54
Total	32	100	11	100	10	100	12	100	16.25	100
Total	32	100	11	100	10	100	12	100	16.25	100

As indicated in Table 3.2 above, 78.46% of all the respondents said that communication, have an impact on construction projects. Only 21.54% of respondents said that communication was not impacted by their communication. However, poor or inadequate communication leads to a problem such as sending information to the wrong audience, delay in information and misunderstanding or misinterpretation of the message.

As per respondents' opinion, project success depends on effective communication and this is the importance of communication in any project. Improving communication maximizes success and minimizes risk. The use of a collaboration program can greatly help in managing communication within a team. Poor communication has many effects and consequences in the construction industry. Such as cost overruns, time overruns, dispute and finally project failure. It also found that highly effective communication could achieve better time and cost management in producing successful projects.

Table 3.3: Improvement on current communication in the organization

Response	Contractors		Consultants		Clients		UDHCB		All	
	frequency	%	frequency	%	frequency	%	frequency	%	frequency	%
YES	23	71.88	10	90.91	9	90	7	58.33	12.25	75.38
NO	9	28.13	1	9.09	1	10	5	41.67	4	24.62
Total	32	100	11	100	10	100	12	100	16.25	100
Total	32	100	11	100	10	100	12	100	16.25	100

As indicated in Table 3.3: above, 75.38% of all the respondents were rated that its needs for improving the current communication practice of public construction projects. Only 24.62% of all the respondents were rated that, it does not need improving communication. Due to this, there is a strong need for improvement in project communication management for the enhancement of project success.

As per respondents’ opinion, communication is the key to successful community involvement in communicating with external project stakeholders early and often. Respondents suggested that some of the improved methods for strong communication practices on any construction projects are: - establish a formal communication chain, make sure that messages are clear, concise and timely. In addition, choosing the right platform for the message, embrace technology and stay positive with stakeholders.

3.3.Statistical Analysis

3.3.1. Validity test

I. Validity test for quantitative data

Validity is determining whether the findings are accurate from the standpoint of the researcher, participants, and readers. Validity primarily takes place in the after data collection stage [66]. The questionnaire is reviewed with a group of experts in the field of the study like contractors, consultants, clients, UDHCB. The collected data were from interviews, observations, questionnaires, and panel discussion.

To ensure the validity of the questionnaire responses there are two statistical tests: criterion-related validity test (Pearson test) and structure validity test. In this thesis, the researcher applied the Pearson validity test. This validity measures the correlation coefficient between one field and all other fields of the questionnaire that has the same level of similar scale. Pearson’s correlation coefficients were checked, with the help of the following table.

Table 3.4: Correlation coefficient of each field and the whole of questionnaire

No.	Section	Pearson correlation coefficient	P-Value (Sig.)
1	Impact of communication on construction projects among stakeholders in Bahir Dar city	0.744	0.001

** . Correlation is significant at the 0.05 level.

As it is indicated in Table 3.4, the values of Pearson’s correlation coefficients are more than 0.7 and *p*-values are less than 0.03. If the *p*-value is less than 0.05, and the Pearson correlation coefficient is above 0.7, then researchers have evidence of test-retest validity. It is clear that a high-reliability Pearson correlation coefficient supports the validity of the questionnaires, so the collected data is valid.

II. Validity test for qualitative data

As understanding from interviewees’ opinion 85% of the impact of poor communication on public building construction projects were similar to the result of findings. As understanding from interviewees’ opinion, 90% of the suggested ways of improving current communication practice on public building construction projects were similar to the result of findings.

3.3.2. Reliability test

According to Litwin M.S. (2003), Cronbach’s alpha measures the internal consistency of a group of items by measuring the homogeneity of the group of items. “It is an indication of how well the different items complement each other in their measurement of different aspects of the same variable or quality”. Cronbach’s Alpha ranges in value between zero and one. Values closer to one indicate a higher internal consistency; values closer to zero indicates a lower internal consistency.

Table 3.5: Correlation between respondents on impact of communication

Correlation	Contractor	Consultant	Client	UDHCB
Contractor	1			
Consultant	0.748	1		
Client	0.835	0.632	1	
UDHCB	0.781	0.742	0.678	1

As clearly shown in Table 3.5, the correlation between respondents on the impact of communication in the performance of public building construction projects. The correlation between contractor and consultant is 0.748(74.8%). This suggests that there is a strong positive association between the two respondents. This shows also, there is a good communication between two parties. The correlation between contractor and client is 0.835(83.5%), this suggests that there

is a very strong positive association between two respondents. The correlation between contractor and UDHCB is 0.781(78.1%) this also suggests that there is a strong positive association between two respondents. The correlation between consultant and client is 0.632(63.2%) this suggests that there is a strong positive association between two respondents. This shows also, there is a good communication between two parties. The correlation between consultant and UDHCB is 0.742(74.2%) this suggests that there is a strong positive association between two respondents. The correlation between client and UDHCB is 0.678(67.8%) this suggests that there is a strong positive association between two respondents. This shows also, there is a good communication between two parties.

4. Conclusions and Recommendations

4.1. Conclusions

The objective of the study was to assess the resulting impact and suggest ways of improving communication method on public building construction projects in Bahir Dar City. Based on the analysis and discussion:

- The study revealed that the top five impacts of communication in building construction projects due to ineffective communication is: delay of project, cost overrun, variation order, termination of project and health and safety.
- Based on the findings, communication has an impact on building construction projects and influence the entire project progress, leads to poor teamwork, conflict among parties, rework and redesign occurrence, misinterpretation and misunderstanding among project teams.
- The suggested ways to improve communication in the project is using clear communication line, using communication plan, using a communication model and determine the number of channels in the organization, strong organizational structure, and experience sharing.
- Finally, based on the respondents' opinion regulatory bodies provide viable solutions to improve project communication by, improving project communication practices, through continuous training and appropriate procedure for stakeholders allocate sufficient time for communication and allocate the appropriate fund towards that.

4.2. Recommendation

- The researcher recommends that, in higher education institutions, project communication should be given as course work in all relevant programs.
- Stakeholders in construction projects should follow formal communication rather than informal method and give an attention for effective communication.
- The top management in the construction firms should develop communication management manual, understand its implementation, and prepare a communication plan for the organization.
- Construction companies should use a clear communication channel to avoid misunderstanding between stakeholders in construction projects.
- The key stakeholders should realize that project communication is the foundation for the successful completion of projects.
- Finally, the Ministry of Urban Development and Construction Bureau should improve project communication guidelines and code of conduct.

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