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Civil and Environmental Engineering
Vol. 17, Issue 1, 58-65, DOI: 10.2478/cee-2021-0007

MEASURING THE INFLUENCE OF COMMUNICATION PLANNING TOWARDS CONSTRUCTION PROJECT PERFORMANCE

Andre Feliks SETIAWAN[1,*], Seng HANSEN[1], Antonius FUJIONO[1]

[1] Construction Engineering and Management Program, Universitas Agung Podomoro, Jakarta, Indonesia.
[*] corresponding author: andre.feliks@podomorouniversity.ac.id

Abstract

Effective communication is necessary for the success of construction project performance. Due to its nature, effective communication is required to coordinate all parties involved in construction projects such as owners, project managers, engineers, subcontractors, etc. Few previous studies have addressed the issues of construction project communication, particularly in the communication planning stage. This paper aimed to investigate how far the communication planning has been effectively implemented in several construction projects in Jakarta and measure how big the influence to project performance. It adopts a quantitative method by distributing questionnaire surveys to contractors and consultants in Jakarta. Descriptive statistics were used to analyse the data which presents that communication planning has been implemented by 78.02 % of the responses and significantly impact the project performances. This paper offers useful implications for practitioners on how construction project teams (from contractors and consultants) should carefully manage the communication process particularly during its planning stage.

Keywords:

Effective communication;
Communication planning,
Consultants;
Contractors;
Project performance.

1 Introduction

Construction industry has been regarded as one of the most information-dependent industries [1]. Previous studies show that construction project teams spend majority of their time communicating with other parties [2]. Hence, effective communication is deemed necessary for the success of construction project performances. It is a fundamental factor that must be implemented to achieve project success [3]. On the other hand, poor communication has been identified as one of the most common project risks in construction [4] which causes lower project performance and a higher staff turnover [5]. According to Bakhtiyar, Soehardjono & Hasyim [6], organization system, coordination and communication has the biggest influence for project delays from owner's perspective. Similarly, Soliman [7] has identified communication as key factor for project delays in Kuwait.

The common types of communication carried out in construction projects including routine meetings, safety talks, and the distribution of construction drawings as means of delivering information from one to another. Communication management can be divided into 3 stages: planning, execution, and monitoring [8]. This paper focuses on the first stage, i.e. communication planning. It aimed to explore how far the communication planning has been effectively applied in several construction projects in Jakarta and measure how big the impact to project performance. It adopts project communication variables as identified in the Project Management Bodies of Knowledge (PMBOK), particularly the construction extension. The adoption is essential since most studies on construction communication have failed to link to PMBOK [2]. In addition, this study is also crucial since it is difficult to find research that measures the implementation of communication planning in construction field although it is the dominant factor affecting project performance [9].

2 Literature review

Communication is essential for efficient performance of construction project teams [10]. However, it is complex in nature given that project teams have different values and interests to a construction project [11]. According to Tai, Wang & Anumba [12], there are three features that complicate communication [12] in construction: many fragmented parties, long life cycles, and multiple organization structures. Previous studies have identified the effect of communication effectiveness on construction project performance. In a study conducted by the Project Management Institute/PMI [13], the success rate of projects with poor communication was only 52 %, while the success rate of projects with good communication reached 80 %. In addition, communication also requires a substantial cost; this is evidenced by data from the Project Management Institute [13] which states that communication costs 56 % of the project risk costs. This survey was conducted based on 80 executives who are members of the PMI.

Thus, lack of communication planning in construction projects can cause various problems such as increased costs and time that exceeds project estimates. Tam [14] agrees by stating that the causes of cost and time overruns on projects are a combination of various communication problems. According to Eddie et al. [3], some examples of problems faced in communication are protocol differences, ineffective communication channels, and differences in communication methods.

In general, communication management can be divided into 3 stages: planning, execution and monitoring [8]. At each of these stages, there are 3 parts namely inputs, tools and techniques, and outputs. This research focuses on the communication management planning stage. According to Wijaya [15], communication planning is a systematic and sustainable effort in managing communication activities efficiently in order to meet communication policies. Fig. 1 illustrates the details of communication planning.

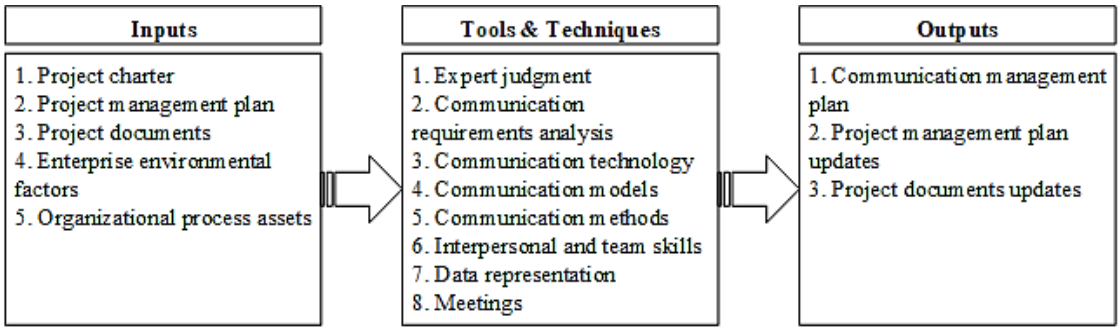

Fig. 1: Communication management planning (adopted from: PMI 2017).

The synthesis of various existing literature related to construction project communication management with focus on communication planning stage is summarized in Table 1. Here, there are various communication planning variables consisting of five input variables, 8 tool and technique variables, and 3 output variables.

Table 1: Communication planning variables.

No.	Variables/Factors	Descriptions	References
A	**Inputs**		
1	Project charter	A key document issued by the project owner that authorizes the existence of a project.	[8], [16]
2	Project management plan	Project management plan provides information on how the project will be executed, monitored, controlled, and closed.	[8], [17]
3	Project documents	Documents used to execute the project including activity cost estimates, project staff assignments, risk register, etc.	[8], [18], [19]
4	Enterprise environmental factors	It plays a crucial role in creating harmony both internal and external. It includes organizational structure, organizational culture, political conditions, etc.	[8], [20]
5	Organizational process assets	These assets include organizational policies and procedures learned from previous experiences and historical information which can be provide insights regarding communication issues.	[8], [21]
B	**Tools and Techniques**		
1	Expert judgment	A technique used to manage communication planning based on the opinions of experts.	[8], [2]

2	Communication requirements analysis	A technique used to determine the information needs of the project stakeholders The sources of information including organizational charts, responsibility relationships, internal & external communication needs, etc.	[8], [2]
3	Communication technology	It refers to the methods used to transfer information among project stakeholders, including written documents, databases, websites, etc.	[8], [12], 22]
4	Communication models	It represents the model of communications and exchange of information.	[8], [22], [2]
5	Communication methods	It refers to the type of communication methods used within the organization, e.g. interactive type, push type, and pull type communication.	[8], [23]
6	Interpersonal and team skills	Behavioral competencies in communicating information between one person to another.	[8], [25], [26]
7	Data representation	A set of techniques used to represent data.	[8], [27]
8	Meetings	A technique to provide updates on project information and discuss necessary issues.	[8], [28]
C	**Outputs**		
1	Communications management plan	A component of the project management plan that particularly describes how project communication will be planned, structured, monitored, and controlled.	[8], [29], [30]
2	Project management plan updates	Updates on project management plan such as scope baseline, schedule baseline, cost baseline, risk management plan, human resource management plan, etc.	[8], [31]
3	Project documents updates	Updates on project documents such as project schedules and stakeholder register.	[8], [32]

3 Methods

This study adopts a quantitative approach to measure the influence of project communication planning towards construction project performance. Project performance, as described by Ward, Chapman, & Curtis [33] and Kagioglu, Coper, & Aouad [34], is project performance that traditionally can be evaluated with three indicators namely, time, cost, and quality. According to Toor and Ogunlana [35], these three indicators are the key criteria for achieving project success.

This study was conducted by distributing random sampling questionnaires to the target population that met the following criteria: (1) have a bachelor degree in construction related disciplines, (2) practitioners involved in construction projects, and (3) have positions as project managers or department managers. The collected data was analysed quantitatively using descriptive statistics. Due to research constraints, this research was conducted within the scope of construction projects in Jakarta, the capital and largest city in Indonesia.

Fig. 2 presents the study flowchart. It starts with problem identification, followed by a study of literature and synthesis. To validate the variables used in this study, a pilot study was conducted on 2 professional experts and 1 academic expert. Based on the feedback provided, the questionnaire was modified and then distributed to several construction projects in Jakarta both online (i.e. google form) and offline (direct distribution to project sites). The data obtained was analysed to obtain research findings and recommendations.

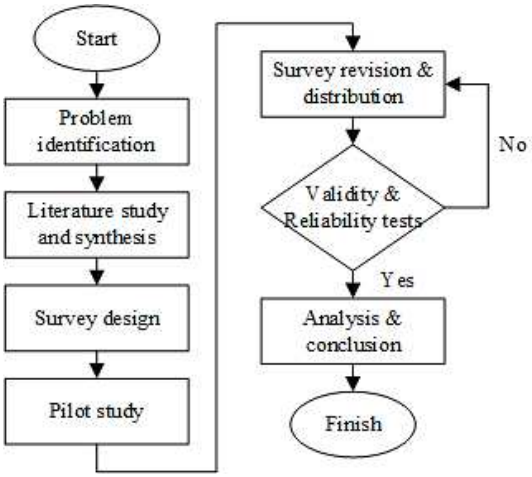

Fig. 2: Methodology adopted in this study.

4 Data collection

To measure the level of communication planning implementation, a 5-point Likert Scale was applied with 1 = has never been applied (0 %), 2 = rarely (25 %), 3 = sometimes (50 %), 4 = often (75 %), and 5 = always (100 %). Similarly, to measure the effect on project performance, a 5-point Likert Scale was applied with 1 = has no effect, 2 = little effect, 3 = somewhat, 4 = influential, and 5 = very influential.

Questionnaire distribution is calculated based on the formula by Lemeshow et al. [36] to obtain a target number of 97 samples. Of the 125 questionnaires distributed, 86 were returned (88.65 % from the target). However, after an in-depth check only 45 responses (46.39 %) were valid and completed. This is indicated because it is difficult to get respondents who fit the above research criteria, i.e. position as a project manager or department manager. As seen in Table 2, the respondent characteristics were mostly from SO (state-owned) contractors 49 %, followed by private contractors 33 % and consultants 18 %. Fourteen respondents 31 % served as project managers while 31 (69 %) served as division heads or equivalent.

Table 2: Respondent's profiles.

Company types		**Respondent positions**	
SOE contractors	22	Project managers	14
Private contractors	15	Department managers	31
Consultants	8	**Total**	**45**
Total	**45**		

5. Analysis and results

Prior to descriptive statistics analysis, the validity and reliability of the data collected were tested first. These tests apply the Pearson validity test and Cronbach Alpha reliability test using SPSS v25 program.

5.1 Validity test

Validity testing was done with a 95 % confidence level with 5 % margin of error. R_A indicating the implementation of communication planning and R_B indicating the influence of communication planning towards project performance. R_{table} obtained from table R with a value of 0.2940 based on the number of respondents.

Table 3: Validity test results.

No	**Variable**	**R_A**	**R_B**	**R_{table}**	**Conclusion**
1	Project charter	.680	.788	.294	Valid
2	Project management plan	.697	.825	.294	Valid
3	Project documents	.704	.717	.294	Valid
4	Enterprise environmental factors	.519	.567	.294	Valid
5	Organizational process assets	.695	.814	.294	Valid
6	Expert judgment	.714	.800	.294	Valid
7	Communication requirements analysis	.731	.806	.294	Valid
8	Communication technology	.606	.713	.294	Valid
9	Communication models	.768	.829	.294	Valid
10	Communication methods	.767	.749	.294	Valid
11	Interpersonal and team skills	.836	.744	.294	Valid
12	Data representation	.787	.812	.294	Valid
13	Meetings	.646	.818	.294	Valid
14	Communications management plan	.720	.783	.294	Valid
15	Project management plan updates	.628	.742	.294	Valid
16	Project documents update	.689	.770	.294	Valid

5.2 Reliability test

This test is used to see the level of consistency of a questionnaire. This reliability calculation uses the SPSS program. The results of data processing can be seen in Table 4. Both the reliability tests for the implementation part A and the influence part B show results that are far greater than the reliability standard .7, i.e. .929 and .953 respectively. This indicates that the data obtained is consistent and has a high level of reliability.

Table 4: Reliability test results.

Reliability statistics	A	B	Standard	Conclusion
Cronbach's Alpha	.929	.953	.7	Reliable

5.3 Descriptive statistics analysis

The analysis of the implementation level uses the mean value of all responses while the analysis of the influence on project performance uses the median value. For the implementation part, it uses a mean measurement because the value used is in the form of 0-100 % interval so that it can be calculated. As for the influence part, it uses a median measurement because the size used is the ordinal size.

The overall implementation of communication management planning is 3.901 % or 78.02 % which can be seen in Table 5. As for its influence towards project performance, the overall result is 4 indicating that the implementation of communication planning affects 'significantly' to the project performance.

Table 5: Descriptive statistics of the survey.

No.	Variable	Implementation (Mean)	Influence (Median)
I	**Inputs**		
1	Project charter	4.22	4
2	Project management plan	4.18	4
3	Project documents	3.84	4
4	Enterprise environmental factors	3.84	4
5	Organizational process assets	4.13	4
II	**Tools & Techniques**		
6	Expert judgment	3.98	4
7	Communication requirements analysis	3.89	4
8	Communication technology	3.87	4
9	Communication models	3.89	4
10	Communication methods	3.98	4
11	Interpersonal and team skills	3.69	4
12	Data representation	3.80	4
13	Meetings	4.07	4
III	**Outputs**		
14	Communications management plan	3.82	4
15	Project management plan updates	3.58	4
16	Project documents update	3.93	4
Total		**3.92**	**4**

5.4 Factors classification

To facilitate understanding, factors grouping was carried out based on the Sturges formula which grouped the level of implementation and influence into 3 classes, namely: "rare", "sometimes" and "frequent" for the classification of implementation levels, Table 6, and "less influential", "influential", and "very influential" for the classification of influence levels, Table 7.

Table 6: Factors classification for implementation levels.

Class	Range	Code	Number
Rare	161.0 – 170.7	11 15	2
Sometimes	170.7 – 180.3	3 4 6 7 8 9 10 14 16	10
Frequent	180.3 – 190.0	1 2 5 13	4

Table 7: Factors classification for influence levels.

Class	Range	Code	Number
Less	175 – 181	3 4 5 6	4
Significant	182 – 188	1 2 7 9 10 11 12 14 15	9
Very	189 – 196	8 13 16	3

6 Discussion

The analysis found four communication planning factors most frequently implemented, namely project charter, project management plan, organization process assets, and meetings. The project charter is the most frequently implemented factor with a mean value of 4.22 (84.4 %). However, in previous study it was found that project charter was rarely implemented in construction projects [37].

The project management plan follows with implementation level of 4.18 (83.6 %). According to Assefa [36], project management plan is very helpful in construction process. This was followed by organization process assets with implementation level of 4.13 (82.7 %). This factor incorporates ethical, safety and security, and organizational regulations. The implementation of these two factors is high due to the enforcement of Indonesian Law No. 2 of 2017 concerning Construction Services. Article 5 of this law reads developing work competency standards and construction services training; and establishing health, safety and sustainability standards in the delivery of construction services.

Meetings as a technique in communication planning have an implementation level of 4.06 (81.3 %). According to Indah [37], meeting planning is important and must be carried out often to reduce any potential risks since meetings can be used for quality control. On the other hand, two factors rarely implemented are interpersonal and team skills 73.8 % and project management plan updates 71.6 %. It is suggested that project managers provide better attention to these two factors.

Meanwhile, there are three most influential factors namely communication technology, meetings, and project documents updates. The choice of communication technology was found to be the most influential factor of communication planning towards construction project performance. It was followed by meetings which facilitate information distribution between parties involved in the project. The third most influential factor is project documents updates since updating project documents is essential to identify potential problems and minimized risks and errors when executing the project.

7 Conclusion

This paper provides a study on communication planning implementation and its influence towards construction project performance. Descriptive statistics were used to analyze the data. It was found that the overall implementation level of communication planning is 78.02 % of the surveyed projects. Four most frequently implemented factors are project charter, project management plan, organization process assets, and meetings. Meanwhile, three most influential factors are communication technology, meetings, and project documents updates.

These findings are crucial because communication planning has been long indicated to have a significant influence on project performance and success but is still rarely discussed in previous research. Thus, this paper offers useful implications for practitioners on how construction project teams (from contractors and consultants) should carefully manage the communication process particularly during its planning stage.

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