COMMUNICATION TOOLS AND ISSUES AMONG THE CONSTRUCTION PROJECT TEAM

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Report submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Project Management with Honors

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Project Management with Honors.

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STUDENT'S DECLARATION

I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. The project has not been accepted for any degree and if not concurrently submitted for award of other degree.

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This final year project is dedicated to my beloved parents Baharuddin bin Ahmad & Asiah binti Mohd Ratu, and to my siblings for their love, endless support and encouragement.

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ABSTRACT

Communication is crucial and it gives significant influence to the outcome of the construction project whether it may be success or a failure. In the construction project, various parties involved and one of them known as project team. The objectives of this study are to identify the communication tools commonly used among the construction project team and to analyze the issues commonly arise from each communication tool used during their involvement in the project. To gather the information for this study, the researcher used two (2) types of data collection methods which are primary data sources and secondary data sources. For primary data sources, the researcher applied quantitative method which is questionnaire. This questionnaire was designed as a close-ended question and it was circulated to the respondents via email and by hand method. Meanwhile, for secondary data sources, the researcher consume literature review from published printed sources such as journals, articles and books as well as published electronic sources. The researcher use stratified random sampling type disproportionate as a sampling technique because the researcher conducted the study in four (4) group and the number of respondents are different for each group. The population of this study is 260 respondents and the sample size is 140. Respondents for this study is contractor G7, architect, civil engineer and quantity surveyor at Kedah. Results obtained from data analysis shows that most of the respondents always used telephone (either mobile phone/direct line) as a tool to communicate between them while managing a project. Using facsimiles is the lowest ranking among all the tools. The finding also shows that issue from facsimiles tool which is impractical to send lots of documents have the highest ranking among all the issues. As a conclusion, the construction project team must know suitable tool to deliver the information because from past research shows that communication is one of the factor or causes that lead to the project success or failure. For further study, the researcher hopes a research can be done to analyze on the other various tools that commonly use since the technology has evolved so much these days.

ABSTRAK

Komunikasi adalah penting dan ia memberi pengaruh kepada hasil projek pembinaan samada projek akan diberjaya atau gagal. Di dalam projek pembinaan, terdapat pelbagai pihak yang terlibat dan satu daripada mereka dikenali sebagai pasukan projek. Objektif kajian ini adalah untuk mengenalpasti alat komunikasi yang sering digunakan antara pasukan projek pembinaan dan menganalisis isu-isu yang sering timbul daripada setiap alat komunikasi yang digunakan semasa penglibatan mereka dalam mengendalikan projek. Bagi mengumpulkan maklumat untuk kajian ini, pengkaji menggunakan dua (2) jenis cara untuk memungut data seperti sumber data asas dan sumber data sekunder. Untuk sumber data asas, pengkaji menggunakan kaedah kuantitatif yang merupakan soal selidik. Soal selidik ini direka sebagai soalan tertutup dan ia diedarkan kepada responden melalui e-mel dan kaedah tangan. Sementara itu, untuk sumber data sekunder, pengkaji menggunakan kajian literature dari sumber-sumber bercetak seperti jurnal, artikel, dan buku serta sumber elektronik. Pensampelan rawak berstrata jenis berkadar tidak seimbang merupakan teknik pensampelan yang digunakan dalam kajian ini kerana kajian ini dijalankan terhadap empat (4) kumpulan dan jumlah responden bagi setiap kumpulan adalah berbeza. Populasi untuk kajian ini adalah seramai 260 responden dan saiz sampel adalah seramai 140 responden. Responden untuk kajian adalah kontraktor G7, arkitek, jurutera awam dan jurukur bahan di Kedah. Keputusan yang diperolehi dari analisis data menunjukkan bahawa kebanyakkan responden selalu menggunakan telefon (sama ada telefon bimbit/talian terus) sebagai alat komunikasi antara mereka ketika menguruskan projek. Penggunaan faksimili menduduki tangga yang terbawah diantara kesemua alat komunikasi. Hasil dapatan juga menunjukkan bahawa isu dari faksimili seperti tidak praktis digunakan untuk menghantar banyak dokumen menduduki di tangga teratas diantara kesemua isu. Kesimpulannya, pasukan pembinaan mestilah mengetahui alat komunikasi yang sesuai digunakan untuk menyampaikan maklumat kerana daripada kajian terdahulu menunjukkan komunikasi adalah salah satu faktor yang menyumbang kepada kejayaan dan kegagalan bagi sesebuah projek. Untuk kajian dimasa hadapan, pengkaji berharap agar satu kajian dapat dibuat dengan menganalisis pelbagai alat komunikasi lain seiring dengan perkembangan teknologi dimasa sekarang.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In this chapter will provided the outline of the study. This chapter will explain the background of the study and problems that lead to this study carried out. Other than that, it also consists of objectives of study, research questions, scope of study, the significance of the study and operational definition. The researcher chooses communication tools and issues among construction project team as researcher study topic because communication in a construction project is important.

1.2 BACKGROUND OF STUDY

Communication was important in daily life and it cannot be denied. Every day we communicate with people, either at home, workplace, school, or in society. Generally, communication was a process of transferring information from a sender to a receiver by a medium and the information must be understood by both sender and receiver. Shawn (2015) states that the person sending the message is referred as the sender and the person receiving the information was called the receiver. This discipline focuses on how people will use messages that have been received for generate meaning and at the same time will promote the effective and ethical practice of human communication. Communication becomes more important, especially in the working world.

The construction is one of the most important economic activities that contribute towards the economic growth in Malaysia. A construction term that generally gives the meaning of art and science to form material or immaterial objects, systems or

organizations. Construction also will be translated as the process of preparing and build up buildings and building systems. Osman (2006) defines construction as economic activities that focus on the construction of physical projects such as buildings and infrastructure, regardless of the construction being land or marine based. Delays, cost overrun, poor quality, low productivity and so on are already identified as poor project performance and has been noted as the bane of construction industries of several countries especially developing countries.

The intention of this study towards communication in the construction industry because in this industry, there are a lot of activities and parties involved who work together along the project from start until completed the project. Besides that, critical deliverable of project success is communication (Dave, 2008). A good communication among the parties may result to better relationships and job performance. A good communication, especially among project team is important in order to achieve a goal and target that have been set for the project. Without communication, the information cannot be transferred and deliver clearly among them. Therefore, communication between the project team is important for the smoothness of delivering the information while doing a project.

1.3 PROBLEM STATEMENT

One of the largest job creators in developing countries is the construction industry. Two (2) outcomes for the construction industry are whether the project is a success or failure. According to Dave (2008), communication have large influence to the project success or failure. Decision to claim the project was success or failure are based from several criteria or factors. Alexandrova and Ivanova (2012) identify several criteria for project success consist of have clear project goals, competence project team members, effective communication between project stakeholder and effective coordination of project activities. According to Nguyen et al. (2004), there are four (4) categories under project success which are comfort, competence, commitment and communication. All this is known as four (4) COMs'. At least 71.6 % of project managers and 78.7 % of contractors considered the communication are extremely important and be a key success factor in the management of construction projects (Nguyen et al., 2004) . While, Hyvari

(2006) found that the top 10 of project success factors are projected mission, top management support, project schedule or plans, monitoring and feedback, client acceptance, client consultation, personnel, technical task, trouble shooting and last but not least is communication. In PMI's 2013 pulse of the profession report, it shows effective communication to all stakeholders is the most crucial success factor in project management. The report also stated based on the research that have been done, effective communication will lead to project success (Mei, 2014).

Furthermore, project failure has always been a hot topic. There are a lot of project-based company fails to develop a successful project. According to Mei (2014) in PMI's 2013 pulse of the profession report it shows not all projects success. In average, out of five (5), two (2) of the project does not meet the project objective and one of them is not successful because of having ineffective communication. In the articles "Top 10 main causes of project failure", Rosanne (2012) has listed all 10 main causes. Among them is the project has poor planning or inadequate process, inefficient way to document and track progress of the project, poor leadership at any level, failure to set expectations and manage it, inadequately trained project managers, inaccurate cost estimation of the project, lack of communication at any level, ethical misalignment, competing priorities and disregard of project warning signs. Refer to Ikediashi et al. (2014) poor risk management was rated the most critical failure factors follows by budget overruns as a second critical failure factors and poor communication in management as a third critical failure factors. While Hughes et al. (2004) outline the many reasons which cause project failure, including inadequate project management implementation, lack of communication, unfamiliarity with the project complexity and project scope and lastly is technological failures.

From the above statements, many of literatures agree that among the criteria or factors to claim either the project can be considered as success or failure is communication. Even though communication is not stated as the most critical factor to measure the project outcome, but by having a good communication will bring to the good performance of the project and at the same time the project will be claim as success project. Same goes to while having a poor communication in the project, it also will affect the project performance and will lead to the project failure. Communication is important

to all levels in construction project. Communication among project team is a very core as it connects every member of the project team to achieve the objective and goal of the project. The project team also is the important person while managing the project because they often involved in project and they are the person in charge to lead the project. The tools that project team used also important to deliver the information either before the project start or during project start. So, the researcher will focus on studying the communication tools used among the construction project team as well as issues arise from each of the tools used.

1.4 RESEARCH OBJECTIVES

The objectives of the research are as follows:

1) To identify the communication tools commonly used among the construction project teams.
2) To analyze issues commonly arises from each communication tool that is used among the construction project teams.

1.5 RESEARCH QUESTIONS

The research questions for the research are as follows:

1) What are the communication tools commonly used among the construction project teams?
2) What are the issues commonly arising from each communication tool that is used among the construction project teams?

1.6 SCOPE OF STUDY

This study is to determine the communication tools used by the construction project team in order to communicate with each other and what issues arise from each communication tool used by them while managing the project. Then, the scope of this study is restricted to construction projects. While, the limitation of this study is the

project-based company which located at Kedah. Targeted respondents for this study are the construction project team, which consist of contractor class G7, architect, civil engineer, and quantity surveyor. As for contractors since there are many personnel involved in the organization as a project team, the project manager is selected to represent their organization when answering the questionnaire. The researcher chooses project manager because project manager is the one who often manage and involve in the project. All the respondent will answer on behalf their organization.

1.7 SIGNIFICANCE OF THE STUDY

This study is conducted to help the project team in order to identify which communication tools that effectively use in the project in delivering the information efficiently. Thus, it allows the project team to become more concerned with the issues since communication is one of the criteria that affect the success of the project. It is expected that, the resemble will be able to know which communication tools are the most common use among project teams, especially in the construction project and at the same time will try to improve on the communication issues arise among them.

1.8 OPERATIONAL DEFINITIONS

1.8.1 Communication

Communication is a process or the act of transmitting a message from a sender to a receiver through a channel and with the interference of noise (DeVito, 1986).

1.8.2 Communication Tools

Face to Face

Face to face interaction is a reciprocal influence of individuals upon one another's actions when in one another's immediate physical presence (Smith, 2006).

Telephone (Mobile Phone/Direct Line)

The transmission of speech over a distance either by electric signals propagated along conductors or by radio signals; a type of telecommunication. Telephone communication permits conversations to be carried on between people (subscribers) separated by almost any distance (Gunhan et al., 2012). According to Oxford Dictionary, mobile phone is a telephone with access to a cellular radio system so it can be used over a wide area, without a physical connection to a network.

Electronic Mail (E-mail)

Electronic mail or e-mail know as simply the transfer of data from one person's computer files to another person (Onyegiri et al., 2011).

Facsimiles (Fax)

Facsimiles or fax is an application that used for sending a document from one terminal devices to other devices (Girish, 1999).

1.9 SUMMARY

The researcher will conduct the study of communication tools and issues among construction project team. It is because communication among the project team is one of the factors that contributed to the outcome of the project. From this study, the researcher wants to know the common communication tools used among project teams, especially in the construction project and what are communication issues arise from each tool that used among project team in construction project. This study will be done on a project-based company in the construction industry, which located at Kedah. Targeted respondent for this study is a project team in a construction project which consist of contractor class G7, architect, civil engineer, and quantity surveyor. The researchers hope by conduct this study, the researcher will help the project team to identify which tools of communication is effective to use in delivering information while managing the project.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter explained the overview of this study. In this literature review, researcher has divided it into two (2) parts which first part is about communication and the second part is about communication in construction. In communication section, researcher writes the explanation about the definition of communication based on different authors. The researcher also explained about communication model which have three (3) models such as linear models, interactive model and lastly is transactional model. To see the relevance between communication and construction, researcher put the second part which is communication in construction. Here, the researcher will explain briefly about the project team, the importance of communication, communication tools that project team used and what are issues arise from each tool.

2.2 COMMUNICATION

2.2.1 Definition

According to the Oxford dictionary, communication can be explained as the activity or process of expressing ideas and feelings or of giving people information. While, new world encyclopedia defined communication as a process that allows entities to exchange information by several methods. Communication is the degree to which information is transmitted among people and communication as well can be referred to as the imparting or interchanging of data or intelligence. Based on Slater (1990) research, he found that the Weekly (1967) was explained the communication is related to both

“communion” and “community” which arrived from the Latin word “communicare” which means “to make common” or “to share”. Different to DeVito (1986) he states the communication can be determined as the process or the act of transmitting a message from a sender to a receiver through a channel and with the interference of noise. Same goes to Putnam and Cheney (1985) in their research, they have stated the communication is the process of sending and receiving messages. In addition, Conrad and Poole (2011) state that the means of communication as a process through which people, acting together, create, preserve, and manage meanings through the use of verbal and nonverbal signs and symbols within a particular context.

Besides that, Tourish and Hargie (2004) refers communication as individuals who are involved in emotional intelligence. This means those people hold the skills to balance their emotions and also the emotions can motivate and creating a new relationship. According to Price (1997) communication commonly has four (4) dimensions. First is formal and informal communication, second is vertical and horizontal communication, third is personal and impersonal communication and fourth is instrumental and expressive communication. While Adeleke et al. (2008) describes communication can be seen as a two (2) way process of information which involve the sender and the receiver. Then, communication also can occur across distance in time and place. Furthermore, Christensen and Shenk (1991) found that basically communication relates to the satisfaction of people while accepting a communication. For example, the employee in the workplace must have good communication with customers to satisfy the customers and at the same time will create a good relationship with the customers.

2.2.2 Models of Communication

According to Foulger (2004) there are three (3) models of the communication process which are linear, interactive, and transactional. Each model has a slightly different perspective on the communication process.

a) Linear or Mathematical Model

The linear model of communication is an early communication model created by Shannon and Weaver (1949) which visualizes the transfer of information being done to the receiver by the sender. This model suggests communication move only in single way (Andrgnola, n.d.).

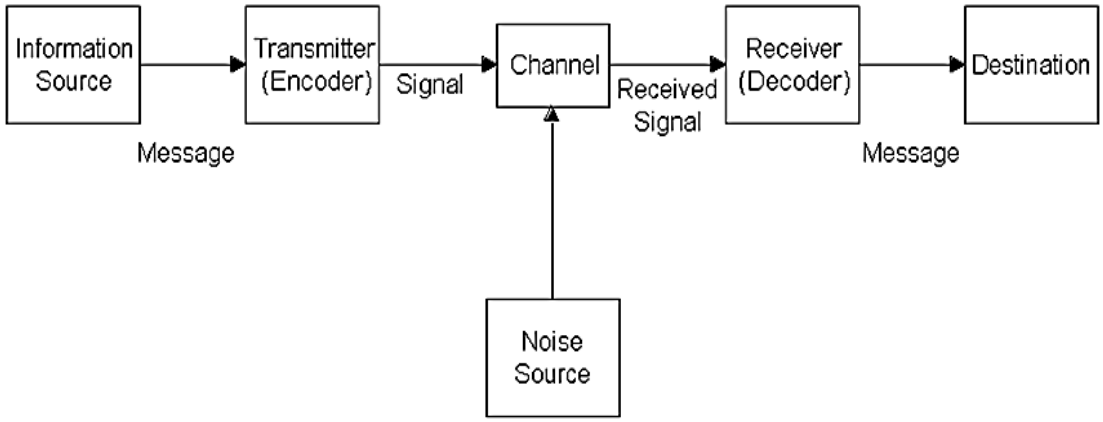

Figure 2.1: A linear model of communication

Source: Wood, J. T. (2009)

This Figure 2.1 shows that the process of the linear model of communication occurs when have the information, transmitter, channel, receiver, destination, noise sources and message.

b) Interactive Model

This interactive model was proposed by (Schramm, 1954). This model was rooted from Shannon and Weaver model. Interactive model saw the receiver or listener, providing feedback to the sender or speaker. Feedback can be made either verbally or nonverbally or in both ways (Foulger, 2004).

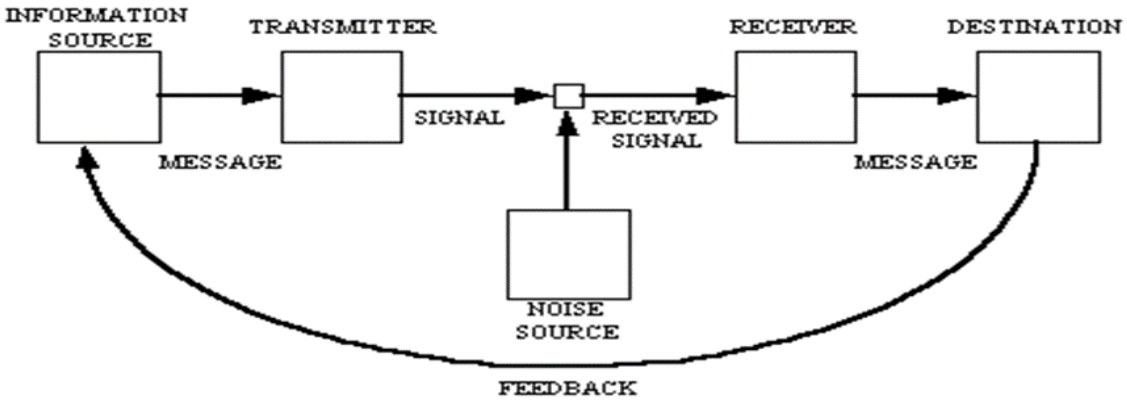

Figure 2.2: An interactive model of communication

Source: Wood, J. T. (2009)

This Figure 2.2 shows that the process of interactive model of communication occurs when have the information, transmitter, channel, receiver, destination, message noise sources and feedback.

c) Transactional Model

Barnlund (2008) was adjusted the linear model and from that he proposed a transactional model of communication. The transactional model of demonstrating the communication participant is an individual that simultaneously engaging in the sending and receiving of messages. In a slightly more complex form a sender and a receiver are linked reciprocally (Andrgnola, n.d.).

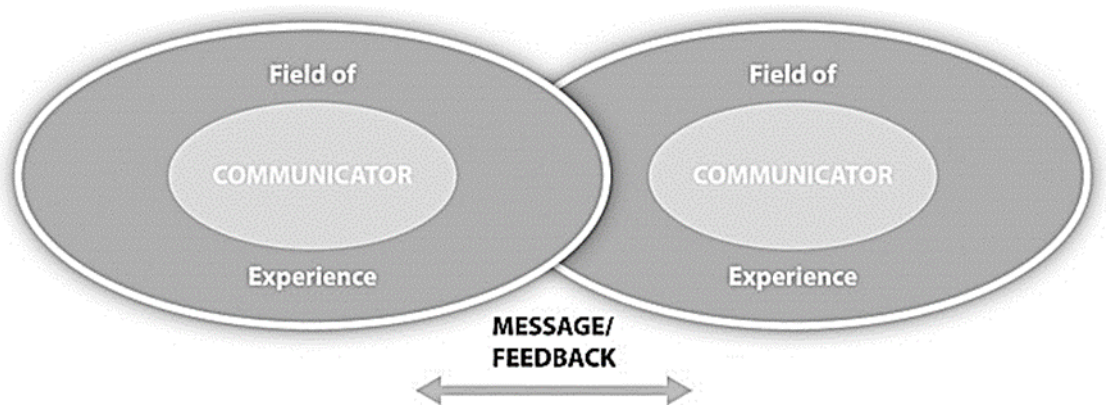

Figure 2.3: A Transactional model of communication

Source: Wood, J. T. (2009)

This Figure 2.3 shows that the process of transaction model of communication. The transactional model contains ellipses that symbolize the communication environment (how you interpret the data that you are given). Where the ellipses meet is the most effective communication areas because both communicators share the same meaning of the message.

The overview of all the three (3) models and its definitions of key concepts are as below:

i. **Information source:** Originator of the communication.
ii. **Transmitter/Encoder:** Translates the message into a form that can be communicated.
iii. **Channel:** Transmission system used to convey the message from one place to another and method used by sender to send a message to a receiver.
iv. **Receiver/Decoder:** Reverses the encoding process and destination if communication.
v. **Destination:** Recipient of the message. The message must be sent to the destination because the destination is place of recipient receive the message
vi. **Message:** Particular meaning or content of information that the sender wishes the receiver to understand.

vii. **Feedback:** Mechanism between the source and the receiver, regulates the flow of communication

viii. **Noise:** Anything that interferes with the sending or receiving the message. Noise is in every communication and no message is received exactly as in transmitter without noise.

2.2.3 Types of Communication

Generally there are two (2) types of communication based on direction which are based on communication channels and based on purpose and style (Lucky and Emmanuel, 2011).

a) Communication Based on Communication Channels

According to Ron (2012) under communication based on communication channel there are two (2) types which are verbal communication and nonverbal communication.

Verbal Communication

According to (Nayab, 2014), verbal communication has two (2) types which are oral communication and written communication. The oral communication refers to the spoken words in the communication process. Oral communication can take the form either face-to-face, through phone, voice chat, video conferencing or any other medium. Oral communication also used in an interview, meetings, discussion, speech and so on. While in written communication, it may be a printed message, hand writing message, written signs or symbols are used while communicate. In writing communication, message can be transmitted via email, notes, letters, reports, memos and so on.

Nonverbal Communication

Nonverbal communication is the sending or receiving of wordless messages. Communication other than oral and written, such as gesture, body language, posture, tone of voice or facial expressions are called as nonverbal communication. In addition, (Nayab,

2014) state under nonverbal communication, there are three (3) types which are body language, paralanguage and visual communication. Commonly express by facial expression is the most common example of nonverbal communication for body language. Other examples are an eye contact, body posture and gestures, tone of voice, touch, and others. The paralanguage refers to all nonverbal communication actions include intentional and unintentional non-verbal messages. Paralanguage can be voice quality, intonation, pitch, stress, emotion, tone, and style of speaking. While, visual communication can be seen through visual aids such as signs, typography, drawing, graphic design, illustration, color and other electronic resources. Usually written communication like the report will use visual communication such as graphs and charts to present the information.

b) Communication Based on Purpose and Style

According to Ron (2012), there are two (2) types of communication based on purpose and style which are formal communication and informal communication.

Formal Communication

Refer to Lucky and Emmanuel (2011), formal communication is the official communication that follows the formal channel. Formal channel usually a path that has been established by the organization. Formal communication can be as oral or written. Formal communication can be classified into three (3) types which are downward communication, upward communication and horizontal communication.

First, downward communication refers to communication from top levels of management downward to middle management then to lower levels of management. For example, in organizing all the information from top management will be passed to the supervisor and the supervisor will pass the information to the employees.

Next, upward communication refers to communication from lower level of management to the top level management. For example, in organization if there is a

problem with the factory, the employees will pass the information to the supervisor. The supervisor will pass the information to the next level of management.

Third, horizontal communication means the information was transferred between people on the same level. Horizontal communication also known as lateral communication. For example, in an organization when the head of department required some information from another department, he or she tends to directly contact him to get the information.

Informal Communication

Informal communication also known as grapevine will be translated as communication between individuals or groups which does not follow the official hierarchy or channels. Information that has been transferred may be related to work or something else. Using the informal communication will create a social networking among people in the organization (Lucky and Emmanuel, 2011).

2.3 COMMUNICATION IN CONSTRUCTION

Communication plays an important role in all stages in the construction such as initiation, planning and design, executing, monitoring and controlling and closing the project. Statistics show over 50 % project is unsuccessful and one of the factors that contribute to the failure is poor or insufficient communication. All information must be properly managed, transferred and understood between the parties involved in the project (Luka and Patricia, 2014). The key reasons communication is important in the construction industry is because there are large amount of information being transmitted between parties to meet the requirements of the project (Tam, 1999). According to Chen and Kamara (2008), communication becomes more difficult because there are numerous professionals are collaborating together in a short period of time to complete the project.

2.3.1 Project Team in Construction

The unique environment in construction projects requires the individual effort within a team to deliver the project requirement for the whole project. Set up of the project team from different companies are needed to deliver the project. As highlighted by Antoniadis (2012) effective team selection and formation is a critical determinant for the achievement of project objectives. In selecting the project team for construction, several factors such as selection criteria and its process, scope of services or works, commitments, responsibilities, experience, teamwork, communication, action plan, and so on need to be assessed and considered properly (Ong, 2007).

Mei (2014) sated project team is a diverse group of people. Project teams work together to deliver unique and customized benefits to an organization. Sometimes, among them are put together meanwhile they never worked together before. Among the diversity within a project team are geographical, cultural, organizational, age related, level of education and functional. This will be the biggest challenge for project managers.

Referring to Azmy (2012) the project team consists of typical construction project teams such as client, project manager, financier, legal consultant, design leader (architect or structural engineer), other design consultants, main contractor, subcontractors, cost consultant and other people which depending to the need of project. However, According to Anyanwu (2013), among the project team members are by project manager, main contractor, architect, civil engineer, mechanical engineer, electrical engineer, and quantity surveyor.

In this study, the researcher will focus on the project team in a construction project which consist of contractor class G7, architect, civil engineer, and quantity surveyor. In contractor, there are many parties involved in a project as a project team, but for this study, project manager for the contractor will represent their organization to answer the questionnaire. The researcher chooses project manager because project manager often manages and involve in the project. Each respondent will represent their organization.

2.3.2 The Importance of Communication

Communication is the most critical factor of construction projects. In order to complete projects, people need to communicate. Despite the advancements in communication technologies, construction project participants mainly prefer face-to-face communication (Gunhan et al., 2012). Dainty et al. (2007) summarize four (4) factors that enable communication. First the effectiveness of encoding and transmitting information through communication systems. Second channel and network which the suitability of communication medium and channels. Third the reactions of the receiver. Lastly is the abilities to control noise. According to Ulang (2012) from Cheng et al. (2001) ineffective communication is closed lines of communication due to protocols, unsuitable communication channels and unexpected communication breakdown.

2.3.3 Communication Tools

According to (Gunhan et al., 2012) majority of communication in construction project takes place among project team are using face to face, telephone and smartphone, electronic mail, letters, and facsimiles. This is similar to Ballan and El-Diraby (2011) where they identify that there are five (5) communication tools that used to communicate in construction such as face to face, telephone either mobile phone or direct line, facsimiles, hard copy (courier or delivery or pick-up) and electronic mail. According to PMBOK Guide (2001), there are some communication tools that commonly used such as email, fax, internet, phone and instant messaging.

Dave (2008) stated there are many different tools of communication available nowadays such as email, face to face, internet, intranet, regular mail, video conferences, phone and others. It also can be grouped into two (2) either push or pull communication. For this study, the researcher only chooses four (4) tools which are face to face, telephone (mobile phone/direct line), facsimiles and e-mail because this tool is commonly used by the project team to communicate between them in a project.

Face to Face

Face to face communication can have verbal communication and nonverbal communication. Project teams can communicate verbally with the words they speak as well as nonverbally through body language. Face to face communication is very powerful because the project team will communicate between them directly because they are in the same physical location. It also allows the project team to get immediate feedback from the discussion (Gunhan et al., 2012).

Telephone (Mobile Phone/Direct Line)

Telephone communication permits conversations to be carried on between people in separated by any distance. Telephone communication is one of the most widespread and expeditious forms of communication. It provides for the exchange of information in all areas of human endeavor (Gunhan et al., 2012). According to Oxford Dictionary, mobile phone is a telephone with access to a cellular radio system so it can be used over a wide area, without a physical connection to a network.

Electronic Mail (E-mail)

Electronic mail or known as E-mail simply transfer of data from one person's computer files to another. It works via the internet. Nowadays, not only is text and pictures transferable via mails, but videos programs etc. In construction, e-mail are very useful as they are very fast and convenient means of sending and receiving mails and files. E-mail does not simply speed up the exchange of information but leads to the exchange of new information as well (Onyegiri et al., 2011).

Facsimiles (Fax)

Facsimiles or Fax is an application that used for sending a document from one terminal devices to other devices. Generally, the fax transmission occurs over the telephone network. Terminal devices of fax consist of a paper input device which known as a scanner, a paper output device which known as printer and processing power. By using this tool will send the document without using a courier (Girish, 1999).

2.3.4 Issues in Communication Tools

The table below shows what are common issues arise from each tool. These issues are from the literature review.

Table 2.1: Communication issues from each tools

Issues	Bert (n.d)	Erin (n.d)	Grace (n.d)	Neil (n.d)	Widmar and Thome (n.d)	Phiri (1999)	Bowman (2004)	Steve (2006)	Carl (2010)	Patil (2013)	Rasel (2013c)
Face to Face											
a) Taking longer time					√			√			
b) Meeting location far					√						
c) Language barriers					√						
d) Emotional				√						√	
e) Poor retention by receiver										√	
f) Tend to lost focus								√			
g) Costly								√			
Telephone (mobile phone/direct line)											
a) Costly											√
b) Network problems											√
c) Miscommunication											√
d) Message confusing											√

Source: Bert (n.d); Erin (n.d); Keh (n.d); Neil (n.d); Widmar and Thome (n.d); Phiri (1991); Bowman (2004); Steve (2006); Carl (2010); Patil (2013), and Rasel (2013c)

Table 2.1: Continued

Issues	Anonymous (n.d.)	Bert (n.d)	Erin (n.d)	Keh (n.d)	Laurie (n.d.)	Neil (n.d)	Phiri (1999)	Bowman (2004)	Carl (2010)	Rasel (2013a)	Rasel (2013b)
e) No facial expression						√					
f) Receiver not listening closely											
g) Time consuming								√			
E-mail											
a) Less personal						√					
b) Missing context						√					
c) Security problem							√				
d) Spam and virus					√		√				
e) Delivery is not guaranteed									√		
f) No alert										√	
g) Complicated					√						
Fax											
a) Technology failure			√	√							
b) Security Challenge	√		√								√
c) Transmission quality		√		√							√
d) Costly	√	√		√							
e) Speed -slow				√							
f) Transmission failure	√										
g) Inefficient	√										

Source: Anonymous (n.d); Bert (n.d); Erin (n.d); Keh (n.d); Laurie (n.d); Neil (n.d); Phiri (1991); Bowman (2004); Carl (2010); Rasel (2013a), and Rasel (2013b)

Table 2.1 shows issues arise for each tool. The researcher chooses four (4) tools that is commonly used among the project team in construction which are face to face, telephone (mobile phone/direct line), e-mail and fax. For face-to-face tools, most issues arise from these tools are taking longer time and too emotional during the meeting. While other issues arise are location that has been set as a meeting place, language barriers when discuss, poor retention by the receiver, misinterpreted sender and receiver body language and lastly is costly (Neil, n.d; Widmar and Thome, n.d; Steve, 2006, and Patil, 2013).

Next, when used telephone (mobile phone/direct line) to communicate, there also has an issue arise. According to the literature reviews, this tool was costly in term of the bill, lack of facial expression while talking, less personal because other people will hear that also, time consuming, network or coverage problems, miscommunication between sender and receiver and lastly is voice not clear due to noisy environment (Neil, n.d; Bowman, 2004, and Rasel, 2013c).

Then, while using e-mail as a tool of communication, among the issues arise are e-mail that has send contain virus and sometimes it becomes spam, less personal, missing context because usually e-mail write in short and it will lead to misunderstanding or misinterpreted the context, security problem, delivery is not guaranteed to the receiver, no alert to the receiver and lastly it is complicated to handle (Laurie, n.d; Neil, n.d; Phiri, 1991; Carl, 2010, and Rasel, 2013a).

Last tool is fax. In this tool, most issues arise are transmission quality, security challenge and costly. Transmission quality becomes an issue because mostly content of the document was unclear. Security has also become an issue because everybody in the office can be the receiver of the documents and of course it is costly because when using fax, it need paper, tonner and it also depend on telephone network. Others issues that arise from this tool are technology failure, speed to send the document was slow, transmission failure and inefficient if there are lots of document want to send (Anonymous, n.d; Bert (n.d); Erin (n.d); Keh, n.d, and Rasel, 2013b).

2.4 SUMMARY

In this chapter, all information are from secondary data which based on literature review. To make a better understanding of this study, the researcher explained what are communication was about including definition of communication, models of communication which have three (3) model such as a linear model, interactive model and transactional model. Next, the researcher also stated types of communication. To see the relationship between communication and construction, the researcher put another subtopic to explain communication in construction. In this subtopic, the researcher stated about the project team in the construction industry, the importance of communication, communication tools that commonly used between project team and issues in communication tools. For issues in communication tools, the researcher listed all the issues that other researcher found. This will be used in developing the question for questionnaire.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

From the previous chapter, researcher have discussed about the literature review for this study. The purpose of this chapter is to identify the best way in conducting the research. In this chapter, the researcher will discuss on how to collect data in order to achieve the objectives of this study. The illustration of research methodology flowchart will give a better picture on how the research will be conducted. This chapter also cover about how researcher will develop the questionnaire, way to find sample, and how to analyze data.

3.2 RESEARCH PROCESS

For this study, there are four (4) stages of a research process involve while conduct the study. Stage one is about topic selection and proposal. Second stage is data collection. This stage will explain how the researcher will collect the data. The next stage is data analysis. Here, is the most important stage because at this stage, the researcher will analyze the data that have been collected in order to get the result from this study. The final stage is dissertation writing. The researcher will conclude and make some recommendation from this study.

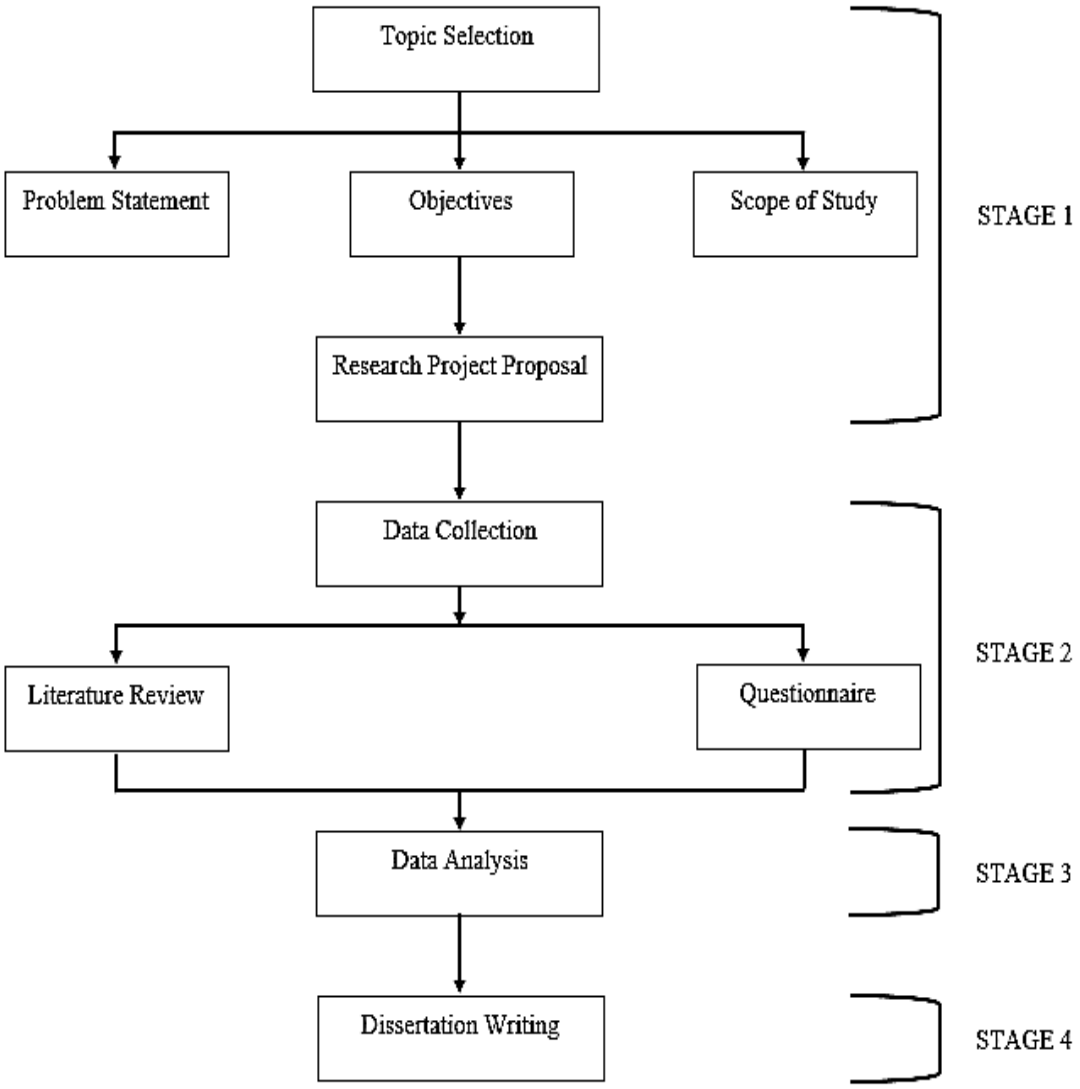

Figure 3.1: Research flowchart

Adapted from: R. Salina (n.d).

The detail explanation about the research methodology flowchart in Figure 3.1 as shown below.

3.2.1 Stage 1: Topic Selection and Proposal

Topic selection was created based problem statements that researcher discovers. A researcher discovers that communication is important, especially to the construction

project because it will reflect on the outcome of the project either the project will be success or failure. Besides that, there are lots of parties involve and there also has lots of information that need to be delivered among parties involve during the project running. From this problem statement, researcher creates a proposal. In the proposal, researcher encloses the working title, background of study, problem statement, objectives, research questions, scope of study, research methodology and the significance of the study. A working title that researcher choose is Communication Tools and Issues among Construction Project Team. For objectives, researcher proposed two (2) objectives for this study. The first objective that researcher proposed is to identify the communication tools used among the construction project team and second, to analyze issues arise from each communication tool used among construction project teams. In the proposal also researcher does a limitation to the scope of study. The scope limitation of this study is based on the construction industry at Kedah and the respondent is project team and they will represent their organization.

3.2.2 Stage 2: Data Collection

Data collection is a term used to describe a process of preparing and collecting data. The purpose of data collection is to obtain information and keep on record, to make decision about important issues and to release the information for other people used. For this study, the researcher use two (2) types of data collection method which are from primary sources and secondary sources. For primary data sources, the researcher applies a quantitative method which is a questionnaire. This questionnaire will be circulated to the respondents. The respondent in this study will be a construction project team which their company located at Kedah. A Construction project team that will be chosen as the respondent was consist of contractor class G7, architect, civil engineer, and quantity surveyor. Next, for secondary data, researcher consume literature review from published printed sources such as journals, articles, books, magazine and newspapers as well as published electronic sources. For distribution of the questionnaire, the researcher will conduct it via electronic mail or e-mail delivery and also by hand method.

3.2.3 Stage 3: Data Analysis

After collecting data, the researcher will insert all the data in software Statistical Package for the Social Sciences (SPSS) and Microsoft Excel. This software's are used as a tool for analyzing data that researcher obtains from the questionnaires that have been distributed to the respondents. SPSS is a comprehensive and flexible statistical analysis and management of data solution. It collects data from any type of file and generate the data in tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and conduct complex statistical analyses. In this research, the data gained from 155 respondents from four (4) different strata are inserted into the SPSS in order to produce all the calculation in any types of statistical analyses.

3.2.4 Stage 4: Dissertation Writing

In writing a dissertation, researcher follow the University Malaysia Pahang format for dissertation structure. There are five (5) chapters in this dissertation. In the first chapter, it is an introduction to the topic and it consists of working title, background of study, problem statement, objectives, research questions, scope of study, research methodology and the significance of the study. Next, chapter two (2) is about literature review. In chapter two (2), all the information is from secondary data which print from published sources, journals, articles, books, magazine, newspapers and published electronic sources. Then, chapter three (3) is about research methodology. Chapter four (4) about data analysis, which here is about all the findings and results that the researcher obtain from the questionnaires that researcher distribute the respondents. Last but not least is chapter five (5) for the conclusion and recommendation of this study.

3.3 DEVELOPING QUESTIONNAIRE

3.3.1 Design of Questionnaire

According to Naoum (2012), there are three (3) fundamental stages in constructing a questionnaire which researcher must start with identifying the first thought questions, then formulating the final questionnaire and lastly is word of the questionnaire.

The researcher starts to formulating the first thought questions by refer to the literature review that the researcher has been done before. For this literature review, the researcher starts to list what kind of answer that researcher what to get from this study in order to meet the purpose of this study and from that researcher develop the questions. Next for the second stage, the researcher starts to categorize the questions according to the objectives of the study and give a title for each section. Then for the last stage, researcher try to make the questions simple and easier to understand by look to other past research questions. In this study, the researcher design the questionnaire in three (3) sections.

i. **Section A:** General Profile of Respondents (Demographic)
ii. **Section B:** Communication Tools used among the Project Team
iii. **Section C:** Communication Issues from Each Tools

There are two (2) types of questionnaire which are open form and closed form. For this study, the researcher design this questionnaire as a structural question and closed form because it is straightforward, easy to ask and quick to answer (Nachmias and Nachmias, 1996). The question in section A will be measure using a checklist meanwhile for section B and C using likert scales five (5) point. For section B, the researcher will use likert scale type frequency and likert scale type level of agreement for section C (Vagias, 2006).

Table 3.1: Likert scale type frequency

Interpretation	Never	Rarely	Sometimes	Often	Always
Range	1	2	3	4	5

Table 3.2: Likert scale type level of agreement

Interpretation	Strongly Disagree	Disagree	Neither Agree	Agree	Strongly Agree
Range	1	2	3	4	5

Source: Vagias (2006)

3.3.2 Pilot Survey

Usually pilot test conducted to see either substantial changes needed to the procedures or questionnaire. It is very helpful when the researcher need to testing new questionnaire. In other words, the purpose of the pilot test is to provide a trial run for the questionnaire, which involves testing the wording of the question, identifying ambiguous questions, testing the technique that the researcher use to collect data, measuring the effectiveness of researcher standard invitation to the respondents.

According to Treece and Treece Jr (1977) pilot test sample should be 10% of the project sample size and same goes to (Connelly, 2008). Nevertheless, Hill (1998) and Isaac and Michael (1971) suggest 10 to 30 participants for the pilot test. Hence, for this study the researcher will distribute 15 sets of questionnaire in order to get 10% sample for the pilot test. Collected data will be analyzed using SPSS and it will be tested using the Cronbach Alpha to see the value of reliability.

Reliability analysis means that repeatability or consistency of measurement. According to Joppe (2000) define that reliability is the accurate representation of the population number of studies that refer to reliability and if the result of the research study can be reproduced under same methodology which the result was consistent, then the instrument of research can be considered as reliable. The instruments are referring to the stability.

According to Radhakrishna (2007) the reliability coefficient (alpha) can range from 0 to 1, with 0 representing an instrument with full of error and 1 representing the total absence of error. A reliability coefficient (alpha) of 0.70 or higher is considered acceptable reliability. Table 3.3 below shows the rules of thumb for interpreting Cronbach’s Alpha coefficient (George and Mallery, 2003).

Table 3.3: Cronbach's Alpha coefficient interpretation

Cronbach's Alpha	**Interpretation**
$\alpha < 0.5$	Unacceptable
$\alpha \geq 0.5$	Poor
$\alpha \geq 0.6$	Questionable
$\alpha \geq 0.7$	Acceptable
$\alpha \geq 0.8$	Good
$\alpha \geq 0.9$	Excellent

Source: George and Mallery (2003)

3.4 SAMPLING

Sampling is a process of choosing a sample of respondents from a total population of respondents. The sampling for this study is a construction project team at Kedah.

3.4.1 Population

Population refers to the total number of respondents that act as a construction project team at Kedah. There are many parties in project team but the researcher only focus on four (4) party which are contractor from class G7, architect, civil engineer, and quantity surveyor. Each respondent will represent their organization. For contractor, project manager will answer the questionnaire.

3.4.2 Sampling Technique

Sampling technique can classify as probability sampling and non-probability sampling. A probability sample is a sample in which every unit in the population has a chance, greater than zero of being selected in the sample and this probability can be accurately determined. While, non-probability sample is any sampling method where

some elements of the population have no chance of selected or where the probability of selection can't be accurately determined (Doherty, 1994).

Stratified sampling is a one of probability sampling technique which the researcher will divides the entire target population into different strata. This type of sampling is used when the researcher wants to highlight specific subgroups within the population. The reasons why researchers choose stratified random sampling because the researcher wants to highlight a specific subgroup within the population and generally it require smaller sample sizes, which can save a lot of time, money, and effort for the researchers (Kadilar and Cingi, 2005).

In stratified sampling, there are two (2) types which are proportionate stratified random sampling and disproportionate stratified random sampling. For this study, the researcher will use this stratified sampling from type disproportionate stratified random sampling because the strata for this study have different size or fractions of each other (Kadilar and Cingi, 2005). The advantage that stratified random sampling has over simple random sampling is that is guaranteed better coverage of the population. The researcher has control over the subgroups that are included in the sample (Meng, 2013). For this study, there are four (4) subgroups or strata.

3.4.3 Sample Size

Sample refer to the number of observations. To identify the sample size for this study, the researcher start to find the population for each project team first. Population for contractor class G7, the researcher obtains it from website Construction Industry Development Board of Malaysia (CIDB). Next, population for architect, civil engineer, and quantity surveyor, the researcher obtains it from E-Perunding which all list are registered with Kementerian Kewangan Malaysia. Ensure the result is validated, the researcher use Krejcie and Morgan (1970) table to identify the sample size. Below show the population and sample size.

Table 3.4: Population and sample size

Respondent	**Population**	**Sample**
Contractor G7	177	106
Architect	22	13
Civil Engineer	49	29
Quantity Surveyor	12	7
Total	260	155

The sample size was obtained by referring to the Krejcie and Morgan (1970) table below.

Table 3.5: Table for determining sample size for a finite population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie and Morgan (1970)

3.5 DATA ANALYSIS METHOD

There are two (2) types of method for analyzing the data. The first method is descriptive statistic and the second method is an inferential statistic (also known as bivariate statistical analysis). For this study, the researcher will use descriptive method. All data will be analyzed using SPSS software. Descriptive statistics are used to describe the basic features of the data in a study. It will provide simple summaries about the sample and the measures. Other than that, the researcher also will used reliability test (Cronbach Alpha) for analyzing the pilot survey in order to see the reliability of the questionnaire. There are two (2) basic aspects that researcher will analyze for this study.

3.5.1 Frequency Distribution

The distribution is a summary of the frequency or range for a variable. Common ways to describe a single variable is by using frequency distribution. The result will be shown in percentage and displayed using tables and pie chart. This method will be used while analyzing section A, section B and as well as section C in the questionnaire.

3.5.2 Mean Analysis

Central tendency is an estimate of the center of distribution of values. There are three (3) types of estimates for a central tendency. First, mean or average is most commonly used in describing a central tendency. Second types is median. The median is a score that found at the exact middle of the set of values. Lastly is the mode. The mode is the most frequently occurring value in score sets. In this study, the researcher will use mean to analyze the result. This analysis will be applied in section B and section C. In order to interpret the mean result, the researcher will compare it with Majid and McCaffer (1997) rating scale. The indexes show the frequency of tools used and level of agreement for issues arise from each communication tool. Majid and McCaffer (1997) propose an average index scale based on frequency index and agreement attributes. The index attributes as shown in the table 3.6 below.

Table 3.6: Rating scale for Average Index

Rating Scale (5- Point Scale)	**Average Index Range**	**Attributes of Indexes**	
		Average Index (Majid and McCaffer, 1997)	
1	$0.00 \leq Ai < 1.00$	Never	Strongly disagree
2	$1.00 \leq Ai < 2.00$	Rarely	Disagree
3	$2.00 \leq Ai < 3.00$	Sometimes	Neither agree
4	$3.00 \leq Ai < 4.00$	Often	Agree
5	$4.00 \leq Ai < 5.00$	Always	Strongly agree

Source: Majid and McCaffer (1997)

3.6 SUMMARY

In short, this chapter will be as a short guideline to the researcher because in this chapter there is a research methodology flowchart. This flowchart gives the overall picture of the process for this study. In this flowchart, there are four (4) stages which are first stage are about topic selection and proposal, second stage is data collection, a third stage is a data analysis and a fourth stage is writing a dissertation. All data will be analyzed using the average index method and questionnaire for this study is designed in three (3) sections. The method uses to analyze the data is a descriptive analysis. In this study, the researcher will use stratified random sampling as a sample technique. The sample size of this study is determined using Krejcie and Morgan (1970) table.

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

This chapter will be focused on data analysis and result from the data that a researcher have collected. All the data was gathered from the questionnaire survey and then will analyze to get the result for this study. All data will be analyzed based on the data analysis method that have been stated in the previous chapter. The result of the study will be presented in this chapter.

4.2 RELIABILITY ANALYSIS

This reliability analysis was conducted on 15 sets of questionnaire as a pilot survey in order to see the reliability of the questionnaire. Cronbach's Alpha value are interpreted based on rules of thumb by George and Mallery (2003). According to table 4.1, alpha values for section B (0.819), section C (0.890) and both sections (0.862) can be interpreted as a good. From this result, the researcher can conclude that all the respondents have clear understanding about the questionnaire that they have answered.

Table 4.1: Reliability Analysis

	Cronbach's Alpha	N of Items
Section B	.819	4
Section C	.890	20
Both section (B & C)	.862	24

4.3 DEMOGRAPHIC ANALYSIS

Number of samples required for this study is 155. The researcher distributes the questionnaire to all the respondents by using email and hand method. However, only 140 respondents responded to the researcher's questionnaire due to some limitation such as time constraints and lack of cooperation from respondents. The response rate for this study is 90.32%.

Table 4.2: Data collection table

Items	**Number**
Sample size	155
Number of questionnaires distributed	260
Number of questionnaires responded	140

In this demographic analysis, there are six (6) variables to analyze. These variables are generally about the respondent's profile. Among the variables that have been researcher analyzes are gender, race, level of education, working experience, respondent's organization's role in the project team and lastly is types of project that respondents involve.

Table 4.3: Statistic table for respondent's profile

		Gender	Race	Level of Education	Years of working experience in construction	Organization role in the project team	Types of Project involved
N	Valid	140	140	140	140	140	140
	Missing	0	0	0	0	0	0

4.3.1 Gender

Figure 4.1 below shows the respondent's gender. 79.3% of respondents are male which equivalent to 111 and another 20.7% are female respondents which equivalent to 29. The finding shows that most of respondents for this study is male.

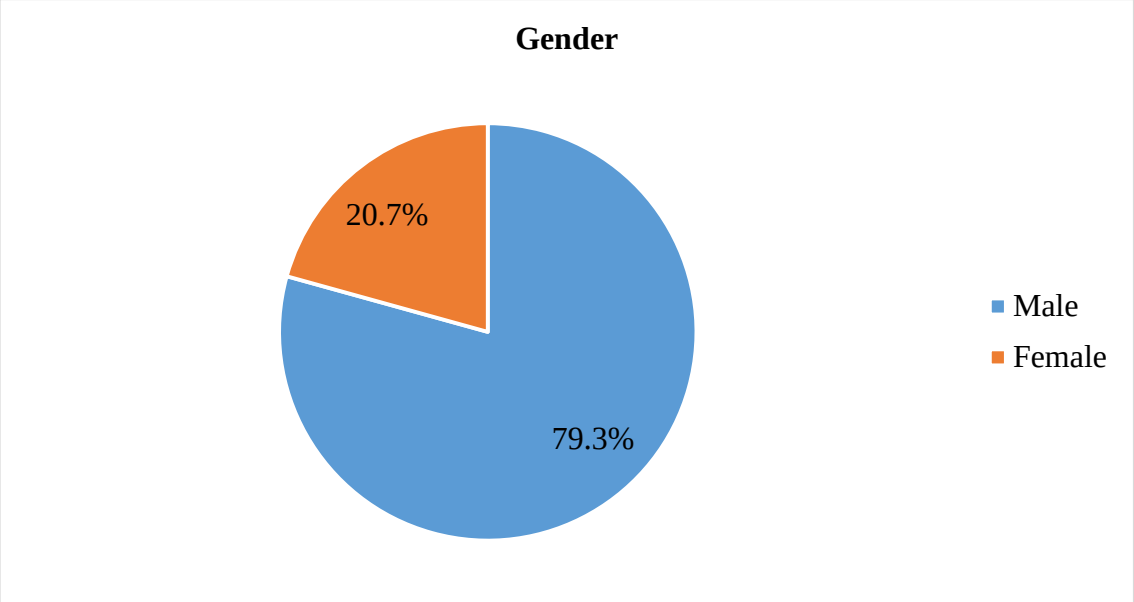

Figure 4.1: Respondent's gender

Details distribution of respondent's gender as shows in table 4.4 below.

Table 4.4: Frequency distribution of respondent's gender

		Frequency	Percent	Cumulative Percent
Valid	Male	111	79.3	79.3
	Female	29	20.7	100.0
	Total	140	100.0	

4.3.2 Race

Figure 4.2 below shows the respondent's race, 87.9% of respondents is Malay which equivalent to 123, 10.7% is Chinese respondents which equivalent to 15 and another 1.40% is Indian respondent which equivalent to two (2). The finding shows that most of respondents for this study is Malay.

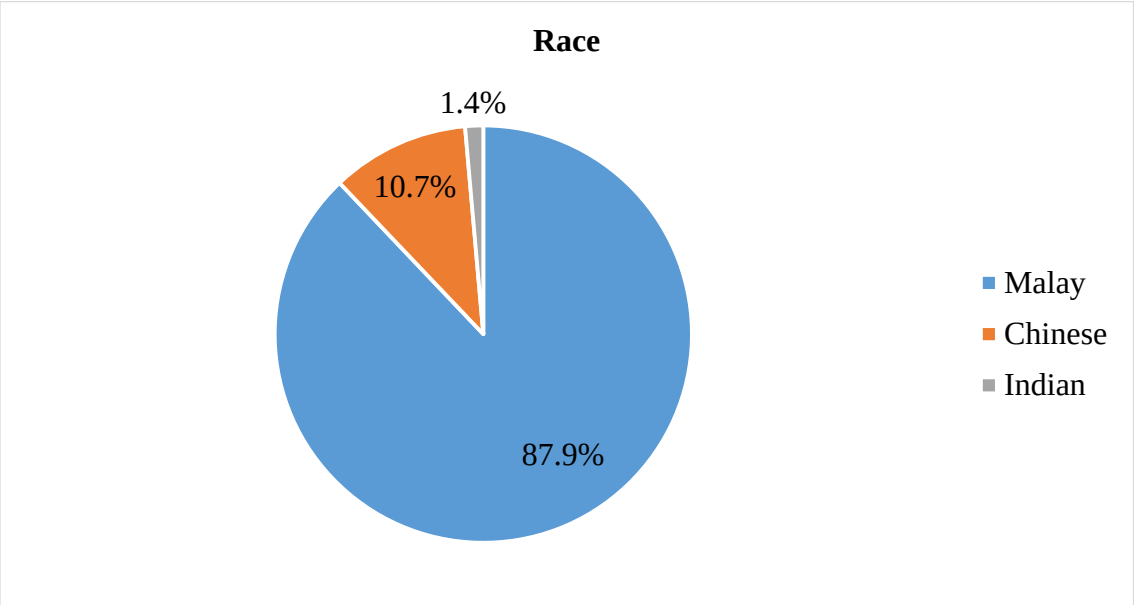

Figure 4.2: Respondent's race

Details distribution of respondent's race as shows in table 4.5 below.

Table 4.5: Frequency distribution of respondent's race

		Frequency	Percent	Cumulative Percent
Valid	Malay	123	87.9	87.9
	Chinese	15	10.7	98.6
	Indian	2	1.4	100.0
	Total	140	100.0	

4.3.3 Level of Education

Figure 4.3 below shows the respondent's level of education. 2.9% of respondents are certificate holder which equivalent to four (4), 19.3% is diploma holder which equivalent to 27, 68.6% is degree holder which equivalent to 96 and another 9.3% is a master degree holder from field architect and a business which equivalent to 13. The finding shows that most of respondents for this study is degree holder.

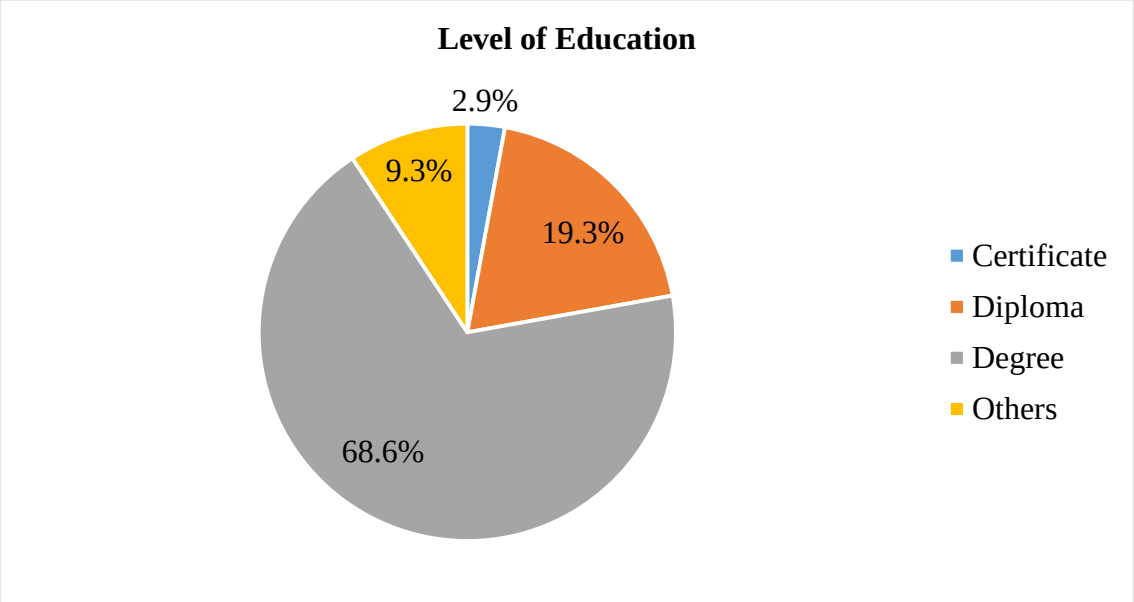

Figure 4.3: Respondent's level of education

Details distribution of respondent's level of education as shows in table 4.6 below.

Table 4.6: Frequency distribution of respondent's level of education

		Frequency	Percent	Cumulative Percent
Valid	Certificate	4	2.9	2.9
	Diploma	27	19.3	22.1
	Degree	96	68.6	90.7
	Others	13	9.3	100.0
	Total	140	100.0	

4.3.4 Years of Working Experience

Figure 4.4 below shows the respondent's years of experience. 2.1% of respondents have less than 1 year experience which equivalent to three (3), 15.7% have 1 year to 5 years' experience which equivalent to 22, 34.3% have 6 years to 10 years' experience which equivalent to 48 and another 47.9% have more than 10 years' experience which equivalent to 67. The finding shows that most of respondents for this study have more than 10 years' experience.

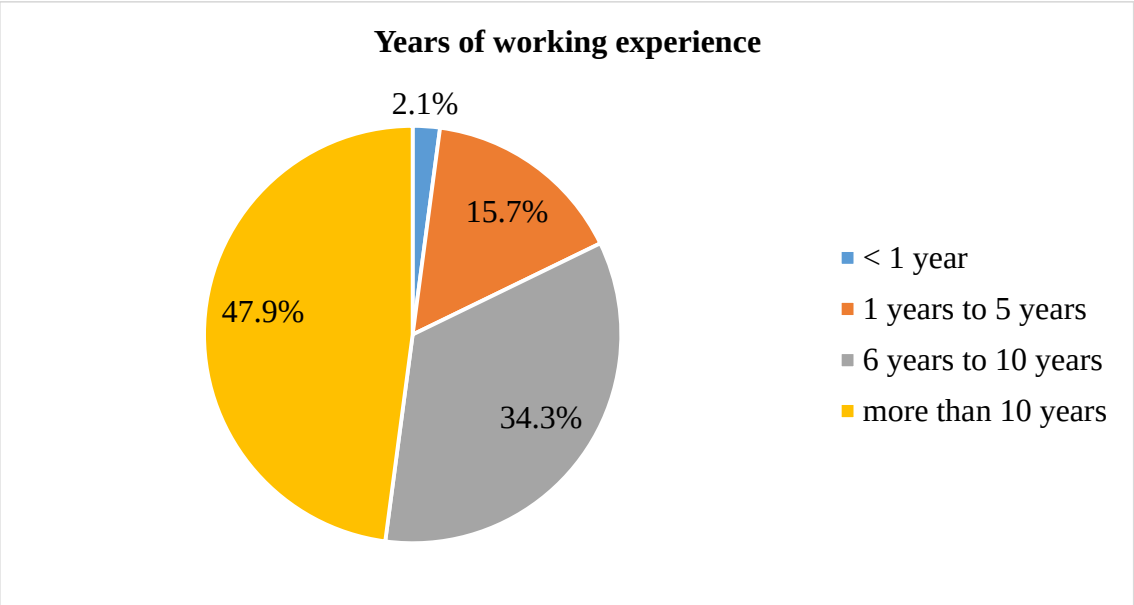

Figure 4.4: Respondent's years of working experience

Details distribution of respondent's years of working experience as shows in table 4.7 below.

Table 4.7: Frequency distribution of respondent's years of working experience

		Frequency	Percent	Cumulative Percent
Valid	< 1 year	3	2.1	2.1
	1 year to 5 years	22	15.7	17.9
	6 years to 10 years	48	34.3	52.1
	More than 10 years	67	47.9	100.0
	Total	140	100.0	

4.3.5 Respondent's Organization Role in the Project Team

Figure 4.5 below shows the respondent's organization's role in the project team. 65.0% of respondents are contractor which equivalent to 91, 9.3% of respondents are architect which equivalent to 13, 20.7% of respondents are civil engineer which equivalent to 29 and another 5.0% of respondents are quantity surveyor which equivalent to seven (7). The finding shows that most of respondents for this study are contractor.

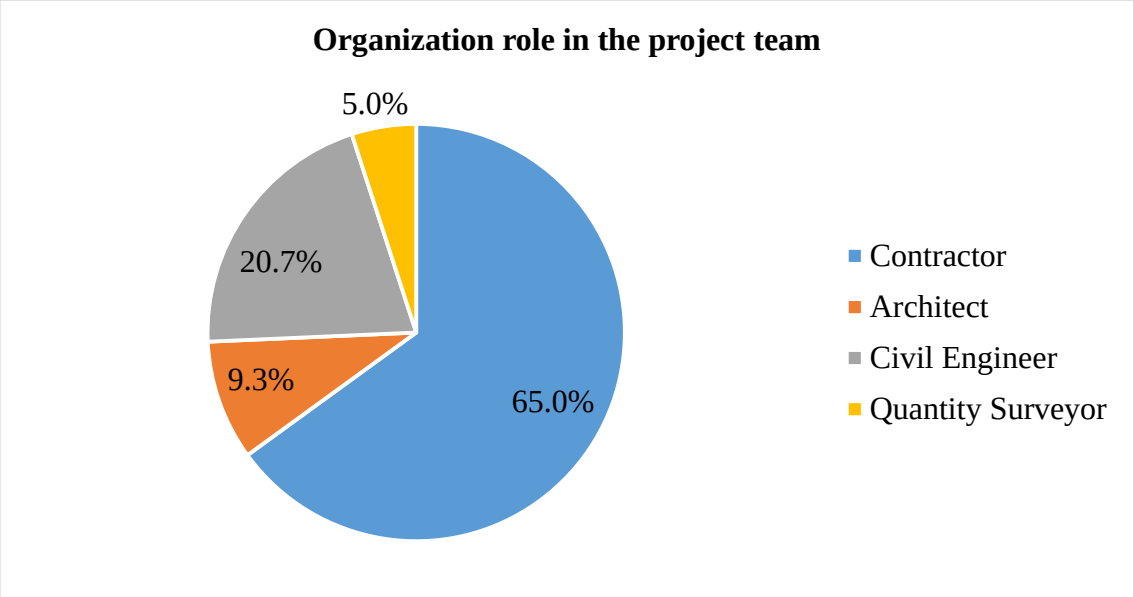

Figure 4.5: Respondent's organization's role in the project team

Details distribution of respondent's organization's role in the project team as shows in table 4.8 below.

Table 4.8: Frequency distribution of organization's role in the project team

		Frequency	Percent	Cumulative Percent
Valid	Contractor	91	65.0	65.0
	Architect	13	9.3	74.3
	Civil Engineer	29	20.7	95.0
	Quantity Surveyor	7	5.0	100.0
	Total	140	100.0	

4.3.6 Types of Project Involved

Figure 4.6 below shows the respondent's types of project involved. 27.1% of respondents involve in residential building which equivalent to 38, 7.9% of respondents involve in industrial building which equivalent to 11, 12.1% of respondents involve in commercial building which equivalent to 17, 26.4% of respondents involve in infrastructure and civil which equivalent to 37, 25.0% of respondents involve in all project that have been stated above which equivalent to 35 and other 1.4% of respondents involve in other project such as roadwork and public facilities which equivalent to two (2). The finding shows that most of respondents for this study are involved in residential building project stated above.

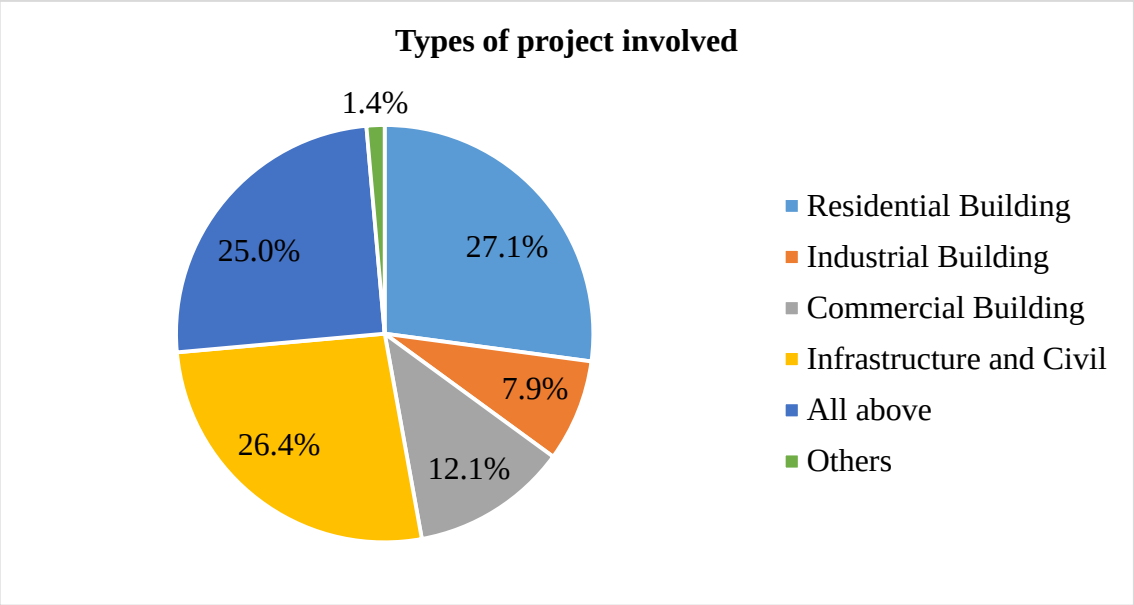

Figure 4.6: Respondent's types of project involved

Details distribution of respondent's types of project involved as shows in table 4.9 below.

Table 4.9: Frequency distribution of respondent's types of project involved

		Frequency	Percent	Cumulative Percent
Valid	Residential Building	38	27.1	27.1
	Industrial Building	11	7.9	35.0
	Commercial Building	17	12.1	47.1
	Infrastructure and Civil	37	26.4	73.6
	All above	35	25.0	98.6
	Others	2	1.4	100.0
	Total	140	100.0	

4.4 COMMUNICATION TOOLS USED AMONG THE PROJECT TEAM

4.4.1 Face to Face

Table 4.10 below shows the percentage of respondents using communication tools types' face to face. Out of 140 respondents, one (1) respondent (0.7%) rarely, 15 respondents (10.7%) sometimes, 47 respondents (33.6%) often and 77 respondents (55.0%) always used it. This shows most of the respondents in this study always used face to face while managing projects.

Table 4.10: Face to Face

		Frequency	Percent	Cumulative Percent
Valid	Rarely	1	.7	.7
	Sometimes	15	10.7	11.4
	Often	47	33.6	45.0
	Always	77	55.0	100.0
	Total	140	100.0	

4.4.2 Telephone (Mobile Phone/Direct Line)

Table 4.11 below shows the percentage of respondents using communication tools types' telephone (mobile phone/direct line). Out of 140 respondents, one (1) respondent (0.7%) rarely, 11 respondents (7.9%) sometimes, 39 respondents (27.9%) often and 89 respondents (63.6%) always used it. This shows most of the respondents in this study always used telephone (mobile phone/direct line) while managing projects.

Table 4.11: Telephone (Mobile phone/Direct Line)

		Frequency	Percent	Cumulative Percent
Valid	Rarely	1	.7	.7
	Sometimes	11	7.9	8.6
	Often	39	27.9	36.4
	Always	89	63.6	100.0
	Total	140	100.0	

4.4.3 Email

Table 4.12 below shows the percentage of respondents using communication tools types' email. Out of 140 respondents, seven (7) respondents (5.0%) rarely, 27 respondents (19.3%) sometimes, 41 respondents (29.3%) often and 65 respondents (46.4%) always used it. This shows most of the respondents in this study always used email while managing projects.

Table 4.12: Email

		Frequency	Percent	Cumulative Percent
Valid	Rarely	7	5.0	5.0
	Sometimes	27	19.3	24.3
	Often	41	29.3	53.6
	Always	65	46.4	100.0
	Total	140	100.0	

4.4.4 Facsimiles

Table 4.13 below shows the percentage of respondents using communication tools types' facsimiles. Out of 140 respondents, 10 respondents (7.1%) never, 32 respondents (22.9%) rarely, 39 respondents (27.9%) sometimes, 35 respondents (25.0%) often and 24

respondents (17.1%) always used it. This shows most of the respondents in this sometimes used facsimiles while managing projects.

Table 4.13: Facsimiles

		Frequency	Percent	Cumulative Percent
Valid	Never	10	7.1	7.1
	Rarely	32	22.9	30.0
	Sometimes	39	27.9	57.9
	Often	35	25.0	82.9
	Always	24	17.1	100.0
	Total	140	100.0	

4.5 COMMUNICATION ISSUES FROM EACH TOOLS

4.5.1 Face to Face

Taking Longer Time to Finish the Meeting

Table 4.14 below shows the level of agreement on the issue taking longer time to finish the meeting (e.g. due to lots of idea or objection from parties) for face to face tool. Out of 140 respondents, 15 of them (10.7%) strongly disagree, 14 of them (10.0%) disagree, 39 of them (27.9%) neither agree, 59 of them (42.1%) agree and 13 of them (9.3%) strongly agree. This shows most of the respondents agree on the issue which is face to face is taking longer time to finish the meeting (e.g. due to lots of idea or objection from parties).

Table 4.14: Taking longer time to finish the meeting

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	15	10.7	10.7
	Disagree	14	10.0	20.7
	Neither Agree	39	27.9	48.6
	Agree	59	42.1	90.7
	Strongly Agree	13	9.3	100.0
	Total	140	100.0	

Too Emotional During Meeting

Table 4.15 below shows the level of agreement on the issue too emotional during meeting for face to face tool. Out of 140 respondents, 16 of them (11.4%) strongly disagree, 26 of them (18.6%) disagree, 58 of them (41.4%) neither agree, 27 of them (19.3%) agree and 13 of them (9.3%) strongly agree. This shows most of the respondents neither agree on the issue which is face to face will lead to the too emotional during meeting.

Table 4.15: Too emotional during meeting

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	16	11.4	11.4
	Disagree	26	18.6	30.0
	Neither Agree	58	41.4	71.4
	Agree	27	19.3	90.7
	Strongly Agree	13	9.3	100.0
	Total	140	100.0	

Language Barriers

Table 4.16 below shows the level of agreement on the issue language barriers for face to face tool. Out of 140 respondents, 30 of them (21.4%) strongly disagree, 30 of them (21.4%) disagree, 44 of them (31.4%) neither agree, 26 of them (18.6%) agree and 10 of them (7.1%) strongly agree. This shows most of the respondents neither agree on the issue which is language barriers will occur in face to face tool.

Table 4.16: Language barriers

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	30	21.4	21.4
	Disagree	30	21.4	42.9
	Neither Agree	44	31.4	74.3
	Agree	26	18.6	92.9
	Strongly Agree	10	7.1	100.0
	Total	140	100.0	

Meeting Location

Table 4.17 below shows the level of agreement on the issue meeting location (e.g. far or difficult to reach) for face to face tool. Out of 140 respondents, 28 of them (20.0%) strongly disagree, 30 of them (21.4%) disagree, 42 of them (30.0%) neither agree, 35 of them (25.0%) agree and five (5) of them (3.6%) strongly agree. This shows most of the respondents neither agree on the issue meeting location (e.g. far or difficult to reach) for face to face tool.

Table 4.17: Meeting location

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	28	20.0	20.0
	Disagree	30	21.4	41.4
	Neither Agree	42	30.0	71.4
	Agree	35	25.0	96.4
	Strongly Agree	5	3.6	100.0
	Total	140	100.0	

Tend to Lost Focus

Table 4.18 above show the level of agreement on the issue tend to lost focus for face to face tool. Out of 140 respondents, 29 of them (20.7%) strongly disagree, 44 of them (31.4%) disagree, 31 of them (22.1%) neither agree, 27 of them (19.3%) agree and nine (9) of them (6.4%) strongly agree. This shows most of the respondents disagree on the issue tend to lost focus for face to face tool.

Table 4.18: Tend to lost focus

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	29	20.7	20.7
	Disagree	44	31.4	52.1
	Neither Agree	31	22.1	74.3
	Agree	27	19.3	93.6
	Strongly Agree	9	6.4	100.0
	Total	140	100.0	

4.5.2 Telephone (Mobile Phone/Direct Line)

No Facial Expression

Table 4.19 below shows the level of agreement on the issue no facial expression for telephone (mobile phone/direct line). Out of 140 respondents, seven (7) of them (5.0%) strongly disagree, 13 of them (9.3%) disagree, 41 of them (29.3%) neither agree, 54 of them (38.6%) agree and 25 of them (17.9%) strongly agree. This shows most of the respondents agree on the issue no facial expression for telephone (mobile phone/direct line).

Table 4.19: No facial expression

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	7	5.0	5.0
	Disagree	13	9.3	14.3
	Neither Agree	41	29.3	43.6
	Agree	54	38.6	82.1
	Strongly Agree	25	17.9	100.0
	Total	140	100.0	

Voice Not Clear Due to Noisy Environment

Table 4.20 below shows the level of agreement on the issue voice not clear due to noisy environment for telephone (mobile phone/direct line). Out of 140 respondents, 10 of them (7.1%) strongly disagree, 18 of them (12.9%) disagree, 44 of them (31.4%) neither agree, 55 of them (39.3%) agree and 13 of them (9.3%) strongly agree. This shows most of the respondents agree on the issue voice not clear due to noisy environment no facial expression for telephone (mobile phone/direct line).

Table 4.20: Voice not clear due to noisy environment

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	10	7.1	7.1
	Disagree	18	12.9	20.0
	Neither Agree	44	31.4	51.4
	Agree	55	39.3	90.7
	Strongly Agree	13	9.3	100.0
	Total	140	100.0	

Network or Coverage Problems

Table 4.21 below shows the level of agreement on the issue network or coverage problem for telephone (mobile phone/direct line). Out of 140 respondents, nine (9) of them (6.4%) strongly disagree, 20 of them (14.3%) disagree, 49 of them (35.0%) neither agree, 46 of them (32.9%) agree and 16 of them (11.4%) strongly agree. This shows most of the respondents neither agree on the issue network or coverage problem for telephone (mobile phone/direct line).

Table 4.21: Network or coverage problems

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	9	6.4	6.4
	Disagree	20	14.3	20.7
	Neither Agree	49	35.0	55.7
	Agree	46	32.9	88.6
	Strongly Agree	16	11.4	100.0
	Total	140	100.0	

The Message Was Confusing or Disorganized

Table 4.22 below shows the level of agreement on the issue message was confusing or disorganized for telephone (mobile phone/direct line). Out of 140 respondents, seven (7) of them (5.0%) strongly disagree, 26 of them (18.6%) disagree, 48 of them (34.3%) neither agree, 49 of them (35.0%) agree and 10 of them (7.1%) strongly agree. This shows most of the respondents agree on the issue message was confusing or disorganized for telephone (mobile phone/direct line).

Table 4.22: The message was confusing or disorganized

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	7	5.0	5.0
	Disagree	26	18.6	23.6
	Neither Agree	48	34.3	57.9
	Agree	49	35.0	92.9
	Strongly Agree	10	7.1	100.0
	Total	140	100.0	

The Receiver Not Listening Closely and May Lead to Misinformation

Table 4.23 below shows the level of agreement on the issue receiver not listening closely and may lead to misinformation for telephone (mobile phone/direct line). Out of 140 respondents, five (5) of them (3.6%) strongly disagree, 22 of them (15.7%) disagree, 43 of them (30.7%) neither agree, 53 of them (37.9%) agree and 17 of them (12.1%) strongly agree. This shows most of the respondents agree on the issue receiver not listening closely and may lead to misinformation for telephone (mobile phone/direct line).

Table 4.23: The receiver not listening closely and may lead to misinformation

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	5	3.6	3.6
	Disagree	22	15.7	19.3
	Neither Agree	43	30.7	50.0
	Agree	53	37.9	87.9
	Strongly Agree	17	12.1	100.0
	Total	140	100.0	

4.5.3 Email

Contain Virus and Become Spam

Table 4.24 below shows the level of agreement on the issue contain virus and become spam for email. Out of 140 respondents, 19 of them (13.6%) strongly disagree, 40 of them (28.6%) disagree, 49 of them (35.0%) neither agree, 17 of them (12.1%) agree and 15 of them (10.7%) strongly agree. This shows most of the respondents neither agree on the issue contain virus and become spam for email.

Table 4.24: Contain virus and become spam

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	19	13.6	13.6
	Disagree	40	28.6	42.1
	Neither Agree	49	35.0	77.1
	Agree	17	12.1	89.3
	Strongly Agree	15	10.7	100.0
	Total	140	100.0	

Some Content of Document May Loss

Table 4.25 below shows the level of agreement on the issue some content of document may loss for email. Out of 140 respondents, 19 of them (13.6%) strongly disagree, 44 of them (31.4%) disagree, 35 of them (25.0%) neither agree, 32 of them (22.9%) agree and 10 of them (7.1%) strongly agree. This shows most of the respondents disagree on the issue some content of document may loss for email.

Table 4.25: Some content of document may loss

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	19	13.6	13.6
	Disagree	44	31.4	45.0
	Neither Agree	35	25.0	70.0
	Agree	32	22.9	92.9
	Strongly Agree	10	7.1	100.0
	Total	140	100.0	

Security Problem

Table 4.26 below shows the level of agreement on the issue security problem (e.g. criminal can infect computer systems with malicious software that can steal passwords and login information and read the document) for email. Out of 140 respondents, 16 of them (11.4%) strongly disagree, 32 of them (22.9%) disagree, 47 of them (33.6%) neither agree, 37 of them (26.4%) agree and eight (8) of them (5.7%) strongly agree. This shows most of the respondents neither agree on the issue security problem (e.g. criminal can infect computer systems with malicious software that can steal passwords and login information and read the document) for email.

Table 4.26: Security problem

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	16	11.4	11.4
	Disagree	32	22.9	34.3
	Neither Agree	47	33.6	67.9
	Agree	37	26.4	94.3
	Strongly Agree	8	5.7	100.0
	Total	140	100.0	

Delivery Not Guarantee Due to Wrong Email Address or Network Problem

Table 4.27 below shows the level of agreement on the issue delivery not guarantee due to wrong email address or network problem for email. Out of 140 respondents, 13 of them (9.3%) strongly disagree, 24 of them (17.1%) disagree, 51 of them (36.4%) neither agree, 47 of them (33.6%) agree and five (5) of them (3.6%) strongly agree. This shows most of the respondents neither agree on the issue delivery not guarantee due to wrong email address or network problem for email.

Table 4.27: Delivery not guarantee due to wrong email address or network problem

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	13	9.3	9.3
	Disagree	24	17.1	26.4
	Neither Agree	51	36.4	62.9
	Agree	47	33.6	96.4
	Strongly Agree	5	3.6	100.0
	Total	140	100.0	

Complicated to Handle

Table 4.28 below shows the level of agreement on the issue complicated to handle (e.g. require internet connection and devices like smartphone or laptop and other) for email. Out of 140 respondents, 23 of them (16.4%) strongly disagree, 28 of them (20.0%) disagree, 40 of them (28.6%) neither agree, 44 of them (31.4%) agree and five (5) of them (3.6%) strongly agree. This shows most of the respondents agree on the issue complicated to handle (e.g. require internet connection and devices like smartphone or laptop and other)

Table 4.28: Complicated to handle

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	23	16.4	16.4
	Disagree	28	20.0	36.4
	Neither Agree	40	28.6	65.0
	Agree	44	31.4	96.4
	Strongly Agree	5	3.6	100.0
	Total	140	100.0	

4.5.4 Facsimiles

Low Transmission Quality

Table 4.29 below shows the level of agreement on the issue low transmission quality for facsimiles. Out of 140 respondents, eight (8) of them (5.7%) strongly disagree, 30 of them (21.4%) disagree, 38 of them (27.1%) neither agree, 49 of them (35.0%) agree and 15 of them (10.7%) strongly agree. This shows most of the respondents agree on the issue low transmission quality for facsimiles.

Table 4.29: Low transmission quality

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	8	5.7	5.7
	Disagree	30	21.4	27.1
	Neither Agree	38	27.1	54.3
	Agree	49	35.0	89.3
	Strongly Agree	15	10.7	100.0
	Total	140	100.0	

Security Challenge

Table 4.30 below shows the level of agreement on the issue security challenge for facsimiles. Out of 140 respondents, eight (8) of them (5.7%) strongly disagree, 19 of them (13.6%) disagree, 46 of them (32.9%) neither agree, 54 of them (38.6%) agree and 13 of them (9.3%) strongly agree. This shows most of the respondents agree on the issue security challenge for facsimiles.

Table 4.30: Security challenge

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	8	5.7	5.7
	Disagree	19	13.6	19.3
	Neither Agree	46	32.9	52.1
	Agree	54	38.6	90.7
	Strongly Agree	13	9.3	100.0
	Total	140	100.0	

Expensive

Table 4.31 below shows the level of agreement on the issue expensive (e.g. require physical consumables such as paper and toner to work) for facsimiles. Out of 140 respondents, 11 of them (7.9%) strongly disagree, 26 of them (18.6%) disagree, 52 of them (37.1%) neither agree, 45 of them (32.1%) agree and six (6) of them (4.3%) strongly agree. This shows most of the respondents neither agree on the issue expensive (e.g. require physical consumables such as paper and toner to work) for facsimiles

Table 4.31: Expensive

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	11	7.9	7.9
	Disagree	26	18.6	26.4
	Neither Agree	52	37.1	63.6
	Agree	45	32.1	95.7
	Strongly Agree	6	4.3	100.0
	Total	140	100.0	

Slow Speed While Sending Documents

Table 4.32 below shows the level of agreement on the issue slow speed while sending documents for facsimiles. Out of 140 respondents, eight (8) of them (5.7%) strongly disagree, 21 of them (15.0%) disagree, 36 of them (25.7%) neither agree, 54 of them (38.6%) agree and 21 of them (15.0%) strongly agree. This shows most of the respondents agree on the issue slow speed while sending documents for facsimiles

Table 4.32: Slow speed while sending documents

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	8	5.7	5.7
	Disagree	21	15.0	20.7
	Neither Agree	36	25.7	46.4
	Agree	54	38.6	85.0
	Strongly Agree	21	15.0	100.0
	Total	140	100.0	

Impractical to Send Lots of Documents

Table 4.33 above shows the level of agreement on the issue impractical to send lots of documents for facsimiles. Out of 140 respondents, two (2) of them (1.4%) strongly disagree, 20 of them (14.3%) disagree, 28 of them (20.0%) neither agree, 60 of them (42.9%) agree and 30 of them (21.4%) strongly agree. This shows most of the respondents agree on the issue impractical to send lots of documents for facsimiles

Table 4.33: Impractical to send lots of documents

		Frequency	Percent	Cumulative Percent
Valid	Strongly Disagree	2	1.4	1.4
	Disagree	20	14.3	15.7
	Neither Agree	28	20.0	35.7
	Agree	60	42.9	78.6
	Strongly Agree	30	21.4	100.0
	Total	140	100.0	

4.6 SUMMARY

4.6.1 Communication Tools Used Among the Project Team

To get the results for the first objective of this study which is to identify communication tools commonly used among construction project team, the researcher analyze the data using mean analysis. The findings for objective one (1) as shown in table 4.34 below.

Table 4.34: Mean of communication tools commonly used among construction project team

Tools	N	Mean	Rank
Telephone (mobile phone/direct line)	140	4.54	1
Face to Face	140	4.43	2
Email	140	4.17	3
Facsimiles	140	3.22	4
Valid N (listwise)	140		

Table 4.34 shows the mean results for each tool. Explanation of the findings will be given based on Majid and McCaffer (1997) rating scale. With the mean level of agreement is 4.54, findings show most of respondents strongly agree that telephone (mobile phone/direct line) is the tools that commonly used by project team while managing projects. Next, follow by face to face tools with mean 4.43. Then follow by email with mean 4.17. For facsimiles, respondents also agree that it is commonly used while managing project with mean 3.22. As a conclusion, the construction project team always used telephone (mobile phone/direct line) as their tools to communicate with each other.

4.6.2 Communication Issues from Each Tools

Face to Face

To get the results for the second objective of this study which is to analyze issues arise from each communication tool that is used among construction project team, the researcher analyzes the data using mean analysis. The findings of objective two (2) as shown in the tables below.

Table 4.35: Mean for face to face issues

Tools	N	Mean	Rank
Taking longer time to finish the meeting	140	3.29	1
Too emotional during meeting	140	2.96	2
Meeting location	140	2.71	3
Language barriers	140	2.69	4
Tend to lost focus	140	2.59	
Valid N (listwise)	140		

Table 4.35 shows the mean results for face to face issues. All explanation on mean will be given based on Majid and McCaffer (1997) rating scale. The highest ranking for face to face issues are taking longer time to finish the meeting (e.g. lots of idea or objection from parties). Most respondent states this issue often happen with mean 3.29. The second highest issue is too emotional during the meeting and most respondent states it sometimes happens with mean 2.96. The third issue is meeting location (e.g. far or difficult to reach) and respondent's states it as sometimes happen with mean 2.71. Next is language barriers with mean 2.69 which means it sometimes happen and lastly is tend to lost focus also sometimes happen with mean 2.59. As a conclusion, issue that commonly happen while using face to face as a tool to communicate among construction project team is taking longer time to finish the meeting (e.g. lots of idea or objection from parties).

Telephone (Mobile Phone/Direct Line)

Table 4.36: Mean for telephone (mobile phone/direct line) issues

Tools	N	Mean	Rank
No facial expression	140	3.55	1
The receiver not listening closely and may lead to misinformation	140	3.39	2
Voice not clear due to noisy environment	140	3.31	3
Network or coverage problems	140	3.29	4
The message was confusing or disorganized	140	3.21	
Valid N (listwise)	140		

Table 4.36 shows the mean results for telephone (mobile phone/direct line) issues. All explanation on mean will be given based on Majid and McCaffer (1997) rating scale. The highest ranking for telephone (mobile phone/direct line) issues are no facial expression. Most respondent states this issue often happen with mean 3.55. The second highest issues is the receiver not listening closely and may lead to misinformation and most respondent states it often happen with mean 3.39. The third issues is voice not clear due to noisy environment and respondent's state it as often happen with mean 3.31. Next is network or coverage problems with mean 3.29 which means it often happen and lastly is the message was confusing or disorganized also often happen with mean 3.21. As a conclusion, issue that commonly happen while using telephone (mobile phone/direct line) as a tool for communicate among construction project team is no facial expression.

Email

Table 4.37: Mean for email issues

Tools	N	Mean	Rank
Delivery not guarantee due to wrong email address or network problem	140	3.05	1
Security problem	140	2.92	2
Complicated to handle	140	2.86	3
Some content of document may loss	140	2.79	4
Contain virus and become spam	140	2.78	
Valid N (listwise)	140		

Table 4.37 shows the mean results for email issues. All explanation on mean will be given based on Majid and McCaffer (1997) rating scale. The highest ranking for email issues is delivery not guarantee due to wrong email address or network problem. Most respondent states this issue often happen with mean 3.05. The second highest issues is security problem (e.g. criminal can infect computer systems with malicious software that can steal passwords and login information and read the document) and most respondent states it sometimes happen with mean 2.92. The third issues is complicated to handle (e.g. require internet connection and devices like smartphone or laptop and other) and respondent's states it as sometimes happen with mean 2.86. Next is some content of document may loss with mean 2.79 which means it sometimes happen and lastly is contain virus and become spam also sometimes happen with mean 2.78. As a conclusion, issue that commonly happen while using email as a tool for communicate among construction project team is delivery not guarantee due to wrong email address or network problem.

Facsimiles

Table 4.38: Mean for facsimiles issues

Tools	N	Mean	Rank
Impractical to send lots of documents	140	3.69	1
Slow speed while sending documents	140	3.42	2
Security challenge	140	3.32	3
Low transmission quality	140	3.24	4
Expensive	140	3.06	
Valid N (listwise)	140		

Table 4.38 shows the mean results for facsimiles issues. All explanation on mean will be given based on Majid and McCaffer (1997) rating scale. The highest ranking for facsimiles issues is impractical to send lots of documents. Most respondent states this issue often happen with mean 3.69. The second highest issues is slow speed while sending documents and most respondent states it often happen with mean 3.42. The third issues is security challenge (e.g. everyone can be the recipient and see the content of the document) and respondent's states it as often happen with mean 3.32. Next is low transmission quality with mean 3.24 which means it often happen and lastly is expensive (e.g. require physical consumables such as paper and toner to work) also often happen with mean 3.06. As a conclusion, issue that commonly happen while using facsimiles as a tool for communicate among construction project team is impractical to send lots of documents.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter provides summary for this study. This chapter also will discuss about the results of the research questions for this study. Then, will discuss on the limitations that the researcher faced while conducting this study and at the end of this chapter, the researcher will give some recommendation based on this study for management practices and as well as for future research.

5.2 CONCLUSION

Communication is crucial in the construction industry because there are many parties involved in the project and it also give large influence to the outcome of the project either project will be success or failure. For this study, the researcher set two (2) objectives. Research objective one (1) is to identify the communication tools commonly used among the construction project team and research objective two (2) is to analyze issues commonly arise from each communication tool that is used among construction project teams. In questionnaire, section B was designed to answer research objective one (1) and section C for research objective two (2). All the data are collected using two (2) types of method which are primary and secondary sources. In this study, for primary source, the researcher applied a quantitative method which is a questionnaire and for secondary sources, the researcher consume literature review of published printed sources, journals, articles as well as electronic sources. Questionnaire was distribute to the respondents via electronic mail or email and also by hand method.

For research objective one (1), finding shows highest rank for tools that commonly used while communicate among construction project team when doing a project was telephone (mobile phone/direct line) with mean 4.54. Next, follow by face to face with mean 4.43. Then, third ranking is email with mean 4.17 and lastly is facsimiles with mean 3.22. Based on this result, the researcher can conclude that most of respondents in construction like to used telephone (mobile phone/direct line) because it is the most suitable tool to used when they require instant feedback or when to deliver the information in fastest way.

For research objective two (2) which is about communication issues from each tool. The finding shows high ranking of issue that commonly occur while using face to face as a tool to communicate among construction project team is taking longer time to finish the meeting (e.g. lots of idea or objection from parties) with mean result is 3.29 and the lowest ranking issue is tend to lost focus with mean result is 2.59. Next, for telephone (mobile phone/direct line) high ranking of issues commonly occur is no facial expression with mean result is 3.55 and the lowest ranking issue is the message was confusing or disorganized with mean result is 3.21. Meanwhile, high ranking of issue for email is delivery not guarantee due to wrong email address or network problem with mean result is 3.05 and lowest ranking issue is contained a virus and become spam with mean result is 2.78. Last but not least is issue for facsimiles. High ranking of the issue for facsimiles is impractical to send lots of documents with mean result is 3.69 and lowest ranking issue is expensive with mean result is 3.06. As a conclusion, facsimiles issue is the highest ranking among all the issue with mean result is 3.69 and it concomitantly with the tool that have lowest raking between project team choice for the tools that commonly used while communicate during the project.

5.3 LIMITATIONS

The limitation in this study started from the beginning of this study when the researcher has difficulties to identify the problem statement and research objective. Apart from that, the researcher also need to design the questionnaire for the study and this take some difficulty to the researcher because this is a researcher first experience, but with help and guidance from researcher’s supervisor, researcher successfully completed the

questionnaire for the study. Other than that, the researcher taking a long time to collect data. It is because researcher use email as a tool to send questionnaires to all respondents. Then, most of respondents have no email and some respondents registered with invalid email. So, the researcher had to find again email address for every respondent and also not all respondents willing to answer the questionnaire. Last but not least is a limitation when to analyze the data. The researcher had confuse on what kind of analysis that researcher should use for this study.

5.4 RECOMMENDATION

Based on the finding in this study, the researcher can conclude that most of the respondents in construction project team comfortable to use the telephone (mobile phone/direct line) while communicate. The researcher would like to recommend for the construction project team to use a suitable tool in order to deliver the information because from past research shows that communication is one of the factor or causes that lead to the project success or failure. Tool used to communicate each other is important and each tool has their own strength and weakness. Then, the construction project team must alert with all the issues and try to find a solution to avoid it to happen again. For further study, the researcher hopes a research can be done to analyze on the other various tools that commonly use since the technology has evolved so much these days. Maybe, there is another technology that can be used in order to deliver an effective information among construction project teams.

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APPENDIX A

QUESTIONNAIRE SURVEY

COMMUNICATION TOOLS AND ISSUES AMONG THE CONSTRUCTION PROJECT TEAM

Dear Respondent,

I am Nadia Izaty Binti Baharuddin, a final year student in Bachelor of Project Management with Hons from Faculty of Industrial Management at University Malaysia Pahang. To fulfill my course requirements, I am currently conducting a study entitled "Communication Tools and Issues among the Construction Project Team". Since you are one of the parties involve as a project team, I am inviting you to participate in this study by completing the questionnaire.

The following questionnaire survey will require approximately 10 minutes to complete. Your participation in this study is voluntary and you are free to withdraw your participation from this study at any time. There are no risks associated with participating in this study. All of the response in the survey will be recorded anonymously and use for study purpose only.

By completing and submitting this survey, you are indicating your consent to participate in the study. Your participation in this survey is very much appreciated.

Nadia Izaty Binti Baharuddin
013-5048451
nadiaizaty.b@gmail.com
Faculty of Industrial Management,
Universiti Malaysia Pahang.

OBJECTIVE:

The objective of this survey is to identify the communication tools used among the construction project team and to analyze issues commonly arise from each tool.

SECTION A: GENERAL PROFILE OF RESPONDENT

The objective of this section is to get to know the general profile of the respondent. Please ***tick*** your answer.

1. Gender :

   ☐ Male ☐ Female

2. Race :

   ☐ Malay ☐ Indian

   ☐ Chinese ☐ Others : _____

3. Level of education :

   ☐ Certificate ☐ Degree

   ☐ Diploma ☐ Others : _____

4. Years of working experience in construction :

   ☐ < 1 year ☐ 6 years to 10 years

   ☐ 1 year to 5 years ☐ More than 10 years

5. What is your organization role in the project team :

   ☐ Contractor (Project Manager) ☐ Engineer

   ☐ Quantity Surveyor

   ☐ Architect

6. Types of project involved :

   ☐ Residential Building ☐ Infrastructure and Civil

   ☐ Industrial Building ☐ All Above

   ☐ Commercial Building ☐ Others : _____

SECTION B: COMMUNICATION TOOLS USED AMONG THE PROJECT TEAM

The objective of this section is to identify types of communication tools that most commonly used amongst project team.

Please ***circle*** your answer.

(1-Never 2-Rarely 3-Sometimes 4-Often 5-Always)

Communication Tools	**Rating**				
1. Face to Face	1	2	3	4	5
2. Telephone (mobile phone/direct line	1	2	3	4	5
3. Email	1	2	3	4	5
4. Fax	1	2	3	4	5

SECTION C: COMMUNICATION ISSUES FROM EACH TOOLS

The objective of this section is to identify issues arise from each communication tools commonly used amongst project team.

Please ***circle*** your answer.

(1-Strongly disagree 2-Disagree 3-Neither Agree 4-Agree 5-Strongly Agree)

Communication Tools	**Rating**				
1) Face-to-Face					
Taking longer time to finish the meeting due to lots of idea or objection from parties	1	2	3	4	5
Too emotional during meeting	1	2	3	4	5
Language barriers	1	2	3	4	5
Meeting location (eg: far or difficult to reach)	1	2	3	4	5
Tend to lost focus	1	2	3	4	5
2) Telephone (mobile phone/direct line)					
No facial expression	1	2	3	4	5
Voice not clear due to noisy environment	1	2	3	4	5
Network or coverage problems	1	2	3	4	5
The message was confusing or disorganized	1	2	3	4	5

The receiver not listening closely and may lead to misinformation	1	2	3	4	5
Communication Tools	**Rating**				
3) E-mail					
Contain virus and become spam	1	2	3	4	5
Some content of document may loss	1	2	3	4	5
Security problem (eg: criminal can infect computer systems with malicious software that can steal passwords and login information and read the document)	1	2	3	4	5
Delivery not guarantee due to wrong email address or network problem	1	2	3	4	5
Complicated to handle (eg: require internet connection and devices like smartphone or laptop and other)	1	2	3	4	5
4) Facsimile					
Low transmission quality	1	2	3	4	5
Security challenge (eg: everyone can be the recipient and see the content of the document)	1	2	3	4	5
Expensive (eg: require physical consumables such as paper and toner to work)	1	2	3	4	5
Slow speed while sending documents	1	2	3	4	5
Impractical to send lots of documents	1	2	3	4	5

THANK YOU FOR COMPLETING THE QUESTIONNAIRE

DISCLAIMER:
All information provided by the respondents participated in this questionnaire survey will be treated as private and confidential, hence, will be handle with due care.
To reply via e-mail, please kindly send to **nadiaizaty.b@gmail.com**
Any question can contact at number 013-5048451(Nadia Izaty)