CHAPTER 1

IDENTIFICATION OF PROBLEM

1.1 Introduction:

The construction industry is organizationally fragmented so communication considers the cornerstone of effective project management therefore communication needs to be addressed as a critical activity and skill for project managers.

Although managers in different industries and sectors undertake diverse tasks and activities, it has long been recognized that they spend most of their time involved in communication (Baguley, 1994: 3; Huczynski and Buchanan, 2001: 178).

Communication can be viewed as a metaphorical 'pipeline' along which information is transferred from one person to another (Axley, 1984). Communication in construction industry as the flow of materials, information, perceptions and understandings among the various parts and members of an organization… all the methods, means and the media of communication (communication technology), all the channels, networks and systems of communication (organizational structure), all the person –to– person interchange (interpersonal communication)… it includes all aspects of communication: up, down, lateral, speaking , writing, listening, reading, methods, modes, channels, networks, flow**(**Vardaman and Halterman 1968).

1.2 Significance & Motivation of Research:

In recent years construction has been considered as fragment and dynamic sector with project based nature; according to this the need for communication increasingly growth in each phase of project cycle:

- The important of communication at initiating phase between the project parties to decrease the probability of conflict or dispute that may occur in the future when project executing.
- The clients requirement nowadays describe as complex and more fluctuation need to system of communication response to their desirable.

- In controlling and monitoring the process of communication is essential operation by advising Labor to avoid reworking, so the tasks will achieve in appropriate way and cost.
- The activities or tasks that linked to critical path need more effective communication, because any delay in critical activities and deliverable to internal customer reflect on project time duration.
- The construction industry connects to external factors that effect on projects (legal – suppliers – culture of local people around the project) need to handle the communication seriously avoiding the project emergency termination.

❖ The Statement of The Topic:

One of the main objectives in construction industry to achieve the goal of projects in appropriate time, cost and quality from initiated phase to closure phase by prepare an appropriate communication system connect Labour with mangers and external environment.

In Sudan, no published study explores the important of communication in Sudanese construction industry has being utilized. Due to this lack of knowledge, the need for such research has been existed to identify the important of communication in construction industry.

The purpose of communication would probably lead to less delays and lower expenses. In addition, all Clint's satisfaction about both the process and the quality of the project could rise when they would communicate in a better way.

1.3 Research Questions:

The purpose of this research to find answers for the following questions:

I. What are the main problems facing communication in the construction industry?
II. What factors that can affect communication process and how could they be ranked?
III. How could communications participate to solve the conflict among the Labor?
IV. How could communication minimize the delay and lower expenses?
V. How could arrange the communication channels to fit any phase of project?

1.4 Research Hypothesis:

The study includes a number of hypotheses related to the direct aim of the study that have been identified to describe and understand the problem research topic, which are:

- Appling effective communication process leads to the success of the project.
- Understanding the factors that affect communication assist in managing them.
- Using appropriate channel to deliver message reduce conflict.
- Applying communication minimize the delay and lower expenses.

1.5 Research Methodology:

1. In this study the research conducted through several phases namely literature review, data collection, data analysis, discussion and conclusion. A literature review was conducted encompassing all various means available to obtain the widest range of the relevant information from books, papers and websites related to the communication in construction sites and impacts of communication in construction companies.
2. Interviews were held with experts in the Sudan construction industry in Khartoum State. This provided a first impression of the situation in the practice, and use statistical method to review the role of communication through project life-cycle.

1.6 Scope and Limitation:

This research is directed toward communication during the project phases. The study plans to include several types of Sudanese construction projects across the construction market. Including but not limited to:

- Projects categories, according to the type of the projects that it taken by the company; (General building, Highway, Bridge ...etc.)
- Projects categories according to the level of complexity.
- Projects located in Khartoum.
- Number of Labour and the skill that can be required in the project.
- Long & short duration project.
- The way of awarding the project
- Type of technology for the communication management system

Due to the limited of resource (Time & Money), this research will be limited to several aspects as per the following:

It has done upon random samples of population, which can represent the construction industry in Sudan.

1.7 Research Organization:

In chapter one show the problem and hypotheses “Identification of Problem”. Then In chapter two and three the literature review divided in two parts, firstly communication in general “Organizational communication management”. Secondly to be more precisely in construction communication “Communication in construction industry”. Chapter four show the Research Methodology of this research. According to Questionnaire show “Result Analysis and Discussion” In chapter five. Finally in chapter six “Conclusions and Recommendations”.

CHAPTER 2

ORGANIZATIONAL COMMUNICATION MANAGEMENT

2.1 Introduction:

Although managers in different industries and sectors undertake diverse tasks and activities, it has long been recognized that they spend most of their time involved in communication, (Baguley, 1994: 3; Huczynski and Buchanan, 2001: 178). Communication is a process of transforming thoughts, the sharing and imparting of information; the given of understandable information and receiving and understanding of the message; the transmitting of messages and the linking of people; the conveying of ideas, attitudes and feelings; the creating, exchanging of messages within a network of independent relationship-(James Ode, 1990). Effective communication means that the information is provided in the right format, at the right time, to the right audience, and with right impact and efficient communication means providing only the information that is needed are vital to all organizations (PMBOK GUIDE, 5th Edition), so that no company could exist without communication, we defined organizations as groups of people who work interdependently toward some purpose; people can work interdependently only through communication. Communication is the vehicle through which people clarify their expectations and coordinate work, which allows them to achieve organizational objectives more efficiently and effectively.

Organization describe as human body, an organization is born when there are individuals who are able to communicate, (Chester Barnard, 1974). It's lifeblood of any system of human interaction as without it no meaningful or coherent activity can take place, (Thomanson, 1988: 400)

Communication usually involves the transfer of information, a generic term that embraces meanings such as knowledge, processed data, skills and technology (Cheng et al., 2001).

2.2 A Model of Communication:

Communication flows through channels between the sender and the receiver. The sender forms a message and encodes it into words, gestures, voice intonations, and other symbols

or signs. Next, the encoded message is transmitted to the intended receiver through one or more communication channels (media). The receiver senses the incoming message and decodes it into something meaningful. Ideally, the decoded meaning is what the sender had intended. Figure (2-1) explain the communication process (managing organizational behavior for quality and results)

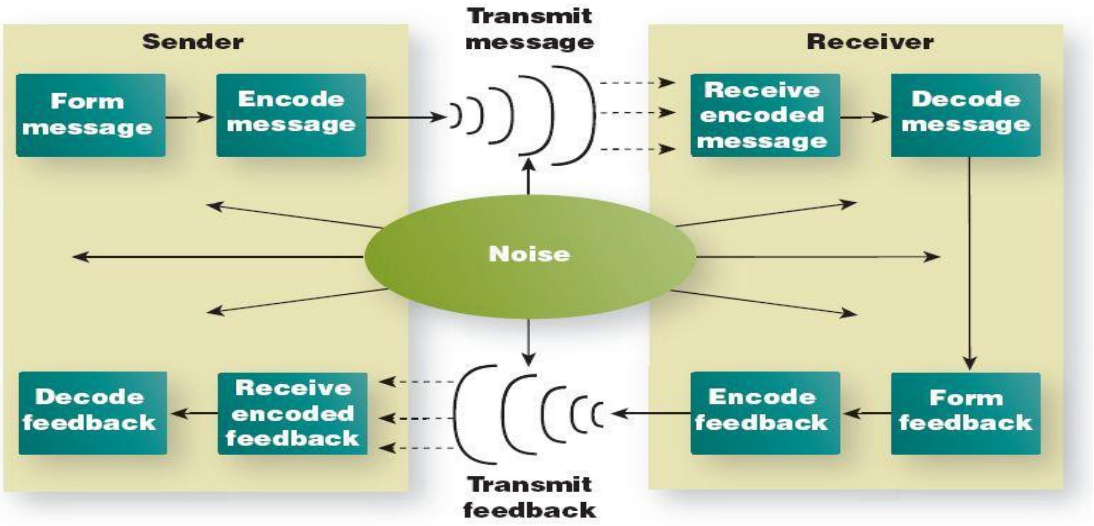


Figure (2-1) the communication process model (Adopted from managing organizational behavior for quality and results)

I. Sender:

The sender is an individual, group, or organization that desires or attempts to communicate with a particular receiver. Receivers may be individual, groups, or organization.

II. Encoding the Information:

Communication begins when a sender encodes an idea or thought. Encoding translate mental thoughts into a code or language that can be understood by others. Managers typically encode using words, numbers, gestures, nonverbal cues such as facial expressions. Or pictures. Moreover, different methods of encoding can be used to portray similar ideas. A growing number of management consultants recommend using visual communication, such as drawings. To analyze and improve group interaction and problem solving and to reduce stress.

III. The Body of the message:

The output of encoding is a message. The important point to keep in mind about message is that they need to match the medium used to transmit the message. This mismatch reveal how thoughtless managers can be when they do not carefully consider the interplay between a message and the medium used to convey it.

IV. Selecting a Medium:

conversations, telephone calls, electronic mail, voice mail, written memos or letters, photographs or drawings, meeting, bulletin board, computer output and charts or graphs. Choosing the appropriate media depends on many factors including the nature of message, its intended purpose, the type of audience, proximity to the audience, time horizon for disseminating the message and personal preferences.

All media have advantages and disadvantages; face-to-face conversations, for instance. Are useful for communicating about sensitive or important issue and those requiring feedback and intensive interaction. Telephones are convenient, fast and private but lack nonverbal information, although writing memos or letters is time consuming, it is good medium when it is difficult to meet with the other person

V. Decoding the Information:

Decoding is the receiver's version of encoding, decoding consist of translating verbal, oral or visual aspects of a message into a form that can be interpreted. Receivers rely on social information processing to determine the meaning of a message during decoding.

VI. Feedback:

The receiver's response to a message is the feedback loop, at this point in the communication process, the receiver becomes a sender and encodes a response and then transmits it to the original sender.

VII. Noise and Barriers:

Noise represents anything that interferes with the transmission and understanding of a message. It affects all linkage of the communication process, noise includes factors such as a speech impairment, poor telephone connections, illegible handwriting, inaccurate statistics in a memo or report, poor hearing and eyesight and physical distance between sender and receiver, managers can improve communication by reducing noise.

2.2.1 Information Richness

Richness is defined as the potential information-carrying capacity of data. If the communication of an item of data, such as a wink, provides substantial new understanding, it would be considered rich, if the datum provides little understanding, it would be low richness.

(Stephan P. Robbins) illustrate the factors could determine the Information richness:

1) Feedback: ranging from immediate to very slow.
2) Channel: ranging from combined visual and audio to limit visual.
3) Type of communication: personal versus impersonal.
4) Language source: body, natural or numeric.

MEDIA		**CHARACTERISTICS**		**MEDIA RICHNESS**	**BEST COMMUNICATIONS THAT ARE**
		FEEDBACK	**CUES AND CHANNELS**		
Face to Face	Oral	Immediate	Audio and visual	HIGH	Ambiguous, emotional, divergent in background
Telephone		Rapid	Audio		
Addressed documents	Written	Slow	Limited visual		
Unaddressed documents		Slowest	Limit visual	LOW	Clear, rational, official, similar in background

Table (2-1) Characteristics of Information Richness for Different Media (adopted from managing organizational behavior for quality and results)

2.2.2 Complexity of Managerial Problem/Situation

Managers face problems and situation that range from low to high complexity, low complexity situations as routine, predictable and managed by using objective or standard procedures, calculate an employ's pay is an example of low complexity. Highly complex situations as corporate reorganization are ambiguous, unpredictable, hard to analyze and too emotionally laden, managers spend considerably more time analyzing these situations because they rely on more resources of information during their deliberation.

2.2.3 Contingency Recommendation

The contingency model for selecting communication media consist of three zones of communication, effective communication occurs when the richness of the medium matched appropriately with the complexity of problem or situation, media low richness (formal numeric or formal written) are better suited for simple problems, and media high in richness (telephone or face-to-face) are appropriate for complex problems or situations.

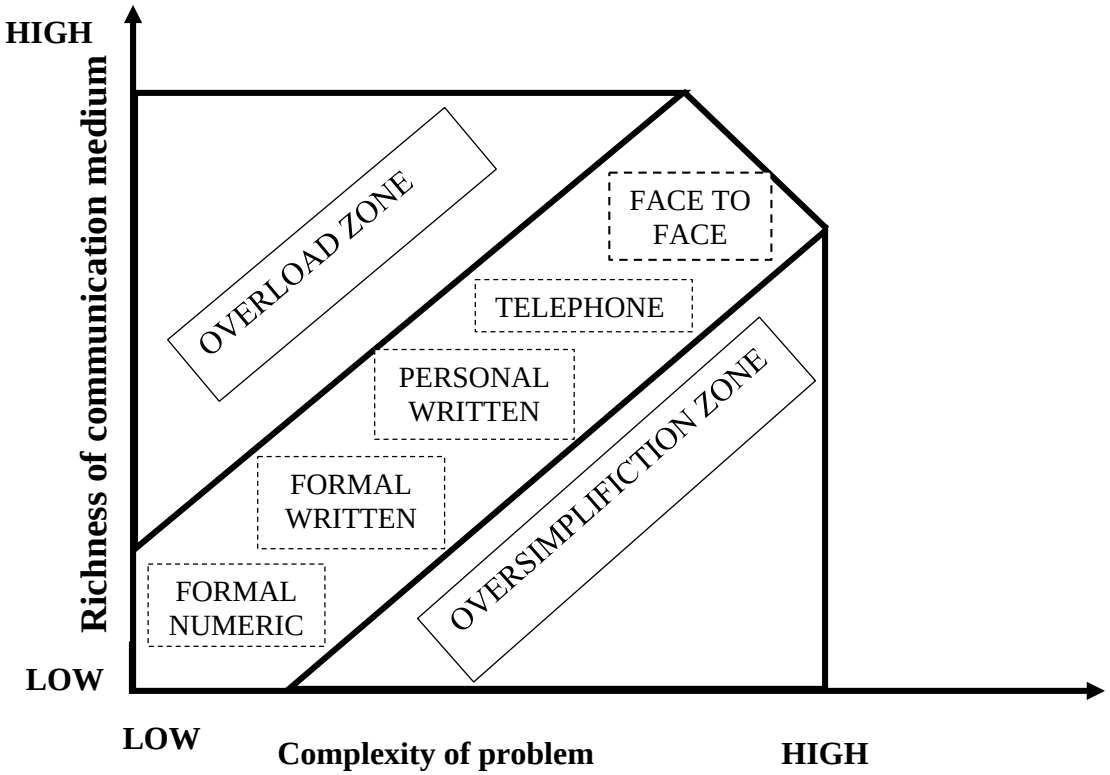


Figure (2-2) Zones of communication: Source (R. Lengel and R. Daft, 1984, pg. 199).

2.2.4 Communication Channels and Persuasion

Media richness and social acceptance lay the foundation for understanding which communication channels are more effective for persuasion**,** that is, changing another person's beliefs and attitudes.

Recent studies support the long-held view that spoken communication, particularly face-to-face interaction, is more persuasive than e-mails, Websites, and other forms of written communication.

There are three main reasons for this persuasive effect (Steven L.McShane:281):

- First, spoken communication is typically accompanied by nonverbal communication. People are often persuaded more when they receive both emotional and logical messages, and the combination of spoken and nonverbal communication provides this dual punch. A lengthy pause, raised voice tone, and (in face-to-face interaction) animated hand gestures can amplify the emotional tone of the message, thereby signaling the vitality of the issue.
- Second, spoken communication offers the sender high-quality immediate feedback on whether the receiver understands and accepts the message (i.e., is being persuaded). This feedback allows the sender to adjust the content and emotional tone of the message more quickly than is possible with written communication.
- Third, people are persuaded more under conditions of high social presence than under those of low social presence. In face-to-face conversations (high social presence), people are more sensitive to how they are perceived by others in that social setting, so they pay attention to the sender's message and are more willing to actively consider that viewpoint.

Written communication can also persuade others to some extent. Written messages have the advantage of presenting more technical detail than can occur through conversation. This factual information is valuable when the issue is important to the receiver. Also, people experience a moderate degree of social presence in written communication when they are exchanging messages with close associates, so messages from friends and coworkers can be persuasive.

2.3 Direction of Communication

Communication can flow vertically or laterally, we can subdivide the vertical dimension into downward and upward directions.

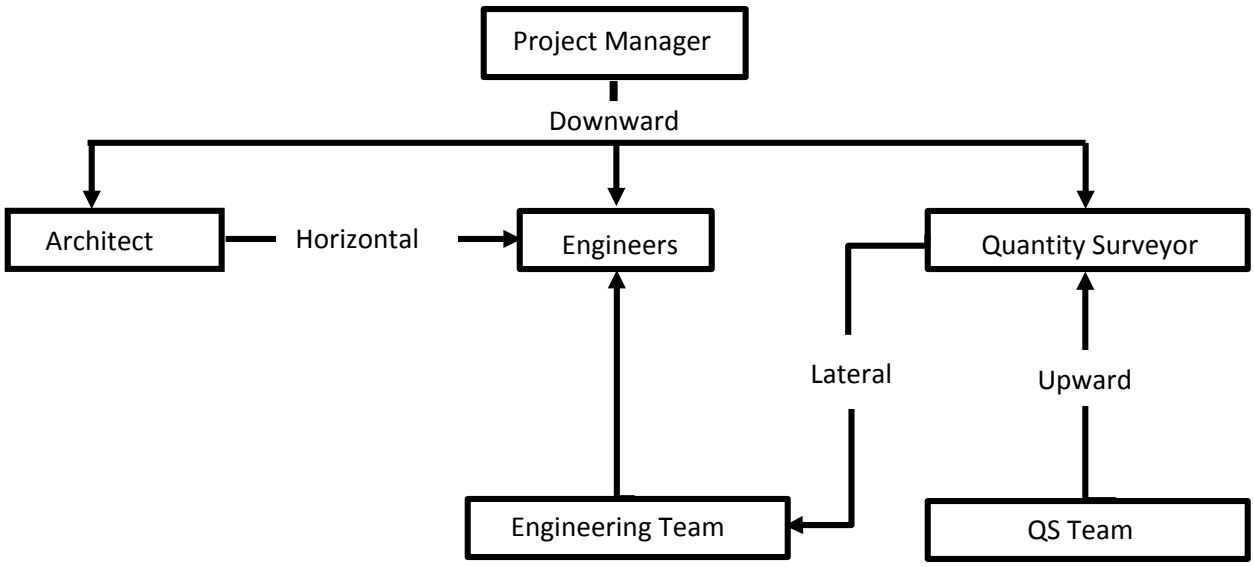


Figure (2-3) Communication Flows: (Source Adapt from Smith and Cronje, 2002)

2.3.1 Downward Communication

(Katz and Kahn, 1966:252) suggest that downward communication is usually one of the followings:

a. Communication dealing with specific task- activities in terms of instructions, orders, training sessions or job descriptions.

b. Communication dealing with the task and its relations to other tasks and departments in the organization, (how the work flow goes or how the job fits together).

c. Communication dealing with company policies, procedures, and practice.

d. Communication that essentially focuses on the subordinates' performance Communication that flows from one level of a group or organization to a lower level is downward communication. Group leaders and managers use it to assign goals, provide job instructions, explain policies and procedures, point out problems that need attention, and offer feedback about performance.

When engaging in downward communication, managers must explain the reasons why a

decision was made. One study found employees were twice as likely to be committed to changes when the reasons behind them were fully explained.

Although this may seem like common sense, many managers feel they are too busy to explain things. Evidence clearly indicates, though, that explanations increase employee commitment and support of decisions, although managers might think that sending a message one time is enough to get through to lower-level employees, most research suggests managerial communications must be repeated several times and through a variety of different media to be truly effective.

Another problem in downward communication is its one-way nature; generally, managers inform employees but rarely solicit their advice or opinions. A study revealed that nearly two-thirds of employees say their boss rarely or never asks their advice. The study noted, "Organizations are always striving for higher employee engagement, but evidence indicate they unnecessarily create fundamental mistakes. People need to be respected and listened to." Companies listen to employee's suggestions, a practice the companies thinks is especially important to innovation.

The best communicators explain the reasons behind their downward communications but also solicit communication from the employees they supervise. That leads us to the next direction upward communication.

2.3.2 Upward Communication

(Katz and Kahn, 1966:252) identify four types of communication that might be found going up the organizational chart and they are:

a. What the subordinate may say about himself, his performance and his problems
b. What the subordinate might say about others and their problems.
c. What the subordinate might say about organizational procedure and policies
d. What the subordinate might say about what top needs to be done and how it can be done

Upward communication flows to a higher level in the group or organization. It's used to provide feedback to higher-ups, inform them of progress toward goals, and relay current problems. Upward communication keeps managers aware of how employees feel about their jobs, co-workers, and the organization in general.

Managers also rely on upward communication for ideas on how conditions can be improved.

Given that most managers' job responsibilities have expanded, upward communication is increasingly difficult because managers are overwhelmed and easily distracted. To engage in effective upward communication, try to reduce distractions (meet in a conference room if you can, rather than your boss's office or cubicle), communicate in headlines not paragraphs (your goal is to get your boss's attention, not to engage in a meandering discussion), support your headlines with actionable items (what you believe should happen), and prepare an agenda to make sure you use your boss's attention well.

2.3.3 Lateral Communication

When communication takes place among members of the same work group, members of work groups at the same level, managers at the same level or any other horizontal Equivalent workers, we describe it as lateral communication. Lateral communication saves time and facilitates coordination. Some lateral relationships are formally sanctioned. More often, they are informally created to short-circuit the vertical hierarchy and expedite action. So from management's viewpoint, lateral communications can be good or bad. Because strictly adhering to the formal vertical structure for all communications can be inefficient, lateral communication occurring with management's knowledge and support can be beneficial. But it can create dysfunctional conflicts when the formal vertical channels are breached, when members go above or around their superiors to get things done, or when bosses find actions have been taken or decisions made without their knowledge.

2.4 Interpersonal Communication

Ivancevich and collaborators (Ivancevich et al., 2008:82) identified the following characteristics of organizational behavior:

- It is a way of thinking about individuals, groups and organizations;
- Is multidisciplinary - uses principles, models, theories and methods from other disciplines;
- It has a distinctly humanistic orientation - people and their attitudes, perceptions, learning abilities, feelings and goals are of a paramount importance;

- It is geared towards performance - studying factors affecting the performance and how it can be improved;
- The use of the scientific method is important in the study of variables and relations;
- It is oriented on the applied part of things in that it can provide answers when questions arise regarding the management of organizations.

Armstrong (Armstrong, 2009:295) argues that there are few factors affecting organizational behavior like the actions, reactions and interactions of people that constitute organizational behavior are influenced by the following factors:

- The characteristics of people at work – individual differences, attitudes, personality, attributions, orientation and the roles they play;
- How people are motivated;
- The process of employee engagement;
- The process of organizational commitment;
- How organizations function;
- Organizational culture.

Figure (2-4) summarizes how each of the main organization behavior disciplines contribute, first to different aspects of organization behavior theory

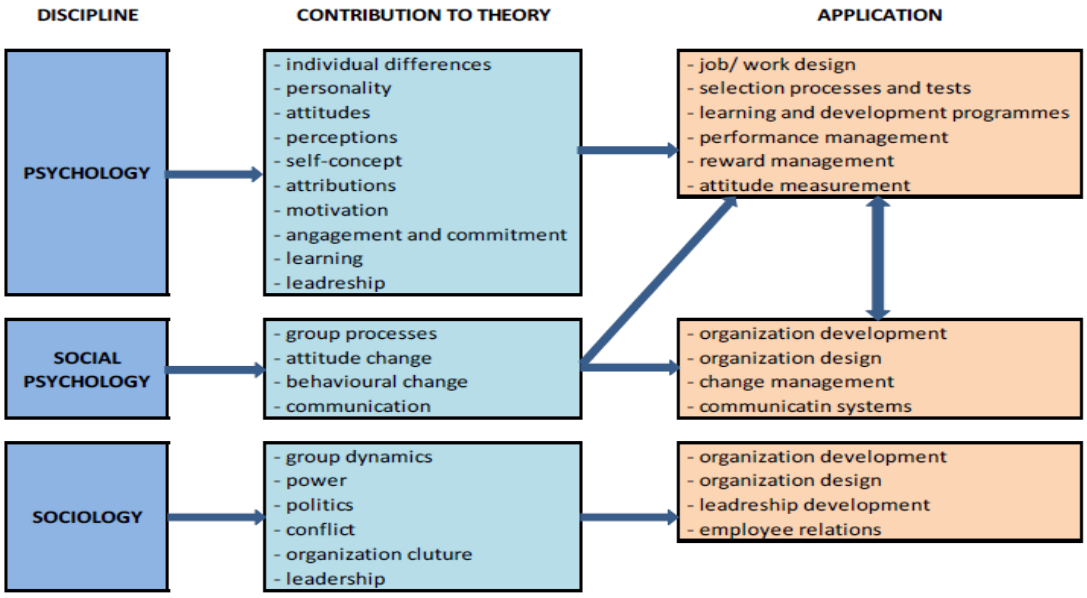


Figure (2-4) the sources and application of organization behavior theory (Armstrong, 2009:295)

Group members essentially rely on oral, written, and nonverbal communication transfer

meaning between and among each other.

2.4.1 Oral Communication

The chief means of conveying messages is oral communication. Speeches, formal one-on-one and group discussions, and the informal rumor mill or grapevine are popular forms of oral communication.

The advantages of oral communication are speed and feedback. We can convey a verbal message and receive a response in minimal time. If the receiver is unsure of the message, rapid feedback allows the sender to quickly detect and correct it. As one professional put it, "Face-to-face communication on a consistent basis is still the best way to get information to and from employees."

The major disadvantage of oral communication surfaces whenever a message has to pass through a number of people: the more people, the greater the potential distortion. Each person interprets the message in his or her own way. The message's content, when it reaches its destination, is often very different from the original. In an organization, where decision and other communiqués are verbally passed up and down the authority hierarchy, considerable opportunities arise for messages to become distorted.

2.4.2 Written Communication

Written communications include memos, letters, fax transmissions, e-mail, instant messaging, organizational periodicals, notices placed on bulletin boards (including electronic ones), and any other device that transmits via written words or symbols. Choose written communication often tangible and verifiable. Both the sender and receiver have a record of the communication; and the message can be stored for an indefinite period. If there are questions about its content, the message is physically available for later reference. This feature is particularly important for complex and lengthy communications.

The marketing plan for a new product, for instance, is likely to contain a number of tasks spread out over several months. By putting it in writing, those who have to initiate the plan can readily refer to it over its lifespan. A final benefit of all written communication comes from the process itself. People are usually forced to think more thoroughly about what they want to convey in a written message than in a spoken one. Thus, written communications are more likely to be well thought out, logical, and clear.

Of course, written messages have drawbacks. They're time consuming. In fact, what you can say in 10 to 15 minutes might take you an hour to write. The other major disadvantage is lack feedback mechanism. Oral communication allows the receiver to respond rapidly to what he thinks he hears. But emailing a memo or sending an instant message provides no assurance it has been received or that the recipient will interpret it as the sender intended.

2.4.2 Nonverbal Communication

Every time we deliver a verbal message, we also impart a nonverbal message. Sometimes the nonverbal component may stand alone. In a singles bar, a glance, a stare, a smile, a frown, and a provocative body movement all convey meaning. No discussion of communication would thus be complete without consideration of nonverbal communication —which includes body movements, the intonations or emphasis we give to words, facial expressions, and the physical distance between the sender and receiver. We could argue that every body movement has meaning, and no movement is accidental (though some are unconscious). We act out our state of being with nonverbal body language. We lift one eyebrow for disbelief. We rub our noses for puzzlement. We clasp our arms to isolate ourselves or to protect ourselves. We shrug our shoulders for indifference, wink for intimacy, tap our fingers for impatience, and slap our forehead for forgetfulness.

The two most important messages body language conveys are:

I. The extent to which we like another and are interested in his or her views
II. The perceived status between a sender and receiver.

We're more likely to position ourselves closer to people we like and touch them more often. Similarly, if you feel you're of higher status than another, you're more likely to display body movements—such as crossed legs or a slouched seated position—that reflect a casual and relaxed manner.

2.5 Barriers Affect on Communication

According to Baguley (1994: 13) the types of factors causing communication difficulties can be further refined thus:

● Lack of clear objectives – without a clear intention, this leads to uncertainty of the message, and to confusion between the transmitter and receiver.

● Faulty transmission – usually occurs because the message is sent via an inappropriate medium or channel. It can also occur when a receiver is expected to absorb too much

information or when they lack an insight into the circumstances around the transmission.

● Perception and attitude problems – are related to misunderstood messages where transmitter and receiver attribute different meanings so that a shared understanding is not possible.

● Environmental problems – from distractions and noise, a lack of appropriate communications media and physical distance.

A number of barriers can retard or distort effective communication, and the most barriers are (Stephan P. Robbins, 2013):

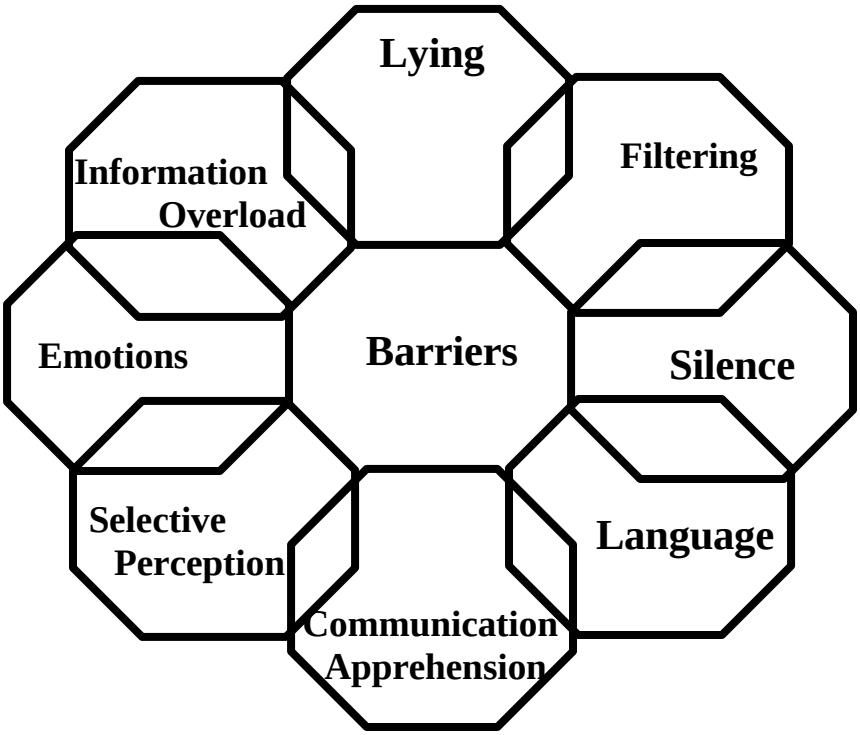


Figure (2-5) Communication Barriers (Adopted from Stephan P. Robbins, Organizational Behavior, 2013)

1) **Filtering information:**

Filtering refers to a sender's purposely manipulating information so the receiver will see it more favorably. A manager who tells his boss what he feels the boss wants to hear is filtering information. The more vertical levels in the organization's hierarchy, the more opportunities there are for filtering. But some filtering will occur wherever there are status differences. Factors such as fear of conveying bad news and the desire to please the boss often lead employees to tell their superiors what they think they want to hear, thus distorting upward communications.

2) **Selective Perception:**

Selective perception appears here because the receivers in the communication process selectively see and hear based on their needs, motivations, experience, background, and other personal characteristics. Receivers also project their interests and expectations into communications as they decode them. An employment interviewer who expects a female job applicant to put her family ahead of her career is likely to see that in all female applicants, regardless of whether they actually feel that way. We don't see reality; we interpret what we see and call it reality.

3) **Information Overload:**

Individuals have a finite capacity for processing data. When the information we have to work with exceeds our processing capacity, the result is information overload. We've seen that dealing with it has become a huge challenge for individuals and for organizations.

When individuals have more information than they can sort and use; they tend to select, ignore, pass over, or forget. Or they may put off further processing until the overload situation ends. In any case, lost information and less effective communication results, making it all the more important to deal well with overload.

4) **Emotions Judgment:**

You may interpret the same message differently when you're angry or distraught than when you're happy. For example, individuals in positive moods are more confident about their opinions after reading a persuasive message, so well-crafted arguments have stronger impacts on their opinions. People in negative moods are more likely to scrutinize messages in greater detail, where as those in positive moods tend to accept communications at face value. Extreme emotions such as jubilation or depression are most likely to hinder effective communication. In such instances, we are most prone to disregard our rational and objective thinking processes and substitute emotional judgments.

5) **Language:**

Even when we're communicating in the same language, words mean different things to different people. Age and context are two of the biggest factors that influence such differences.

In short, our use of language is far from uniform. If we knew how each of us modified the language, we could minimize communication difficulties, but we usually don't know.

Senders tend to assume the words and terms they use mean the same to the receiver as to

them. This assumption is often incorrect.

6) Silence and withholding:

It's easy to ignore silence or lack of communication, precisely because it is defined by the absence of information. However, research suggests silence and withholding communication are both common and problematic. One survey found that more than 85 percent of managers reported remaining silent about at least one issue of significant concern. Employee silence means managers lack information about ongoing operational problems. And silence regarding discrimination, harassment, corruption, and misconduct means top management cannot take action to eliminate this behavior. Finally, employees who are silent about important issues may also experience psychological stress. Silence is less likely where minority opinions are treated with respect, workgroup identification is high, and high procedural justice prevails.

Practically, this means managers must make sure they behave in a supportive manner when employees' voice divergent opinions or concerns, and they must take these under advisement. One act of ignoring or belittling an employee for expressing concerns may well lead the employee to withhold important future communication.

7) Communication Apprehension:

An estimated 5 to 20 percent of the population suffers debilitating communication apprehension, or social anxiety. These people experience undue tension and anxiety in oral communication, written communication, or both. They may find it extremely difficult to talk with others face-to-face or may become extremely anxious when they have to use the phone, relying on memos or e-mails when a phone call would be faster and more appropriate.

Studies show oral-communication apprehensive avoids situations, such as teaching, for which oral communication is a dominant requirement.

But almost all jobs require some oral communication. Of greater concern is evidence that high oral-communication apprehensive distort the communication demands of their jobs in order to minimize the need for communication.

So be aware that some people severely limit their oral communication and rationalize their actions by telling themselves communicating isn't necessary for them to do their job effectively.

8) Lying or misrepresentation of information:

The final barrier to effective communication is outright misrepresentation of information, or lying. The manager can have full confidence in a subordinate without the certainty that, in turn, that subordinate has the same feeling for him as leader, with his qualities and capacities. "Trust is the highest form of human motivation. It brings out all that is best in people". (Covey, 2004:56) lying playing opposite role against trust. People differ in their definition of what constitutes a lie. For example, is deliberately withholding information about a mistake you made a lie, while the definition of a lie will continue to befuddle both ethicists and social scientists, there is no denying the prevalence of lying. In one diary study, the average person reported telling one to two lies per day, with some individuals telling considerably more. Compounded across a large organization, this is an enormous amount of deception happening every single day!

Evidence also shows that people are more comfortable lying over the phone than face-to-face and more comfortable lying in e-mails than when they have to write with pen and paper. Despite a great deal of investigation, research generally suggests most people are not very good at detecting deception in others. The problem is, there are no nonverbal or verbal cues unique to lying—averting your gaze, pausing, and shifting your posture can also be signals of nervousness, shyness, or doubt. Moreover, most people who lie take a number of steps to guard against being detected, so they might deliberately look a person in the eye when lying because they know that direct eye contact is (incorrectly) assumed to be a sign of truthfulness. Finally, many lies are embedded in truths; liars usually give a somewhat true account with just enough details changed to avoid detection.

In sum, the frequency of lying and the difficulty in detecting liars makes this an especially strong barrier to effective communication in organization.

CHAPTER 3

COMMUNICATION IN CONSTRUCTION INDUSTRY

3.1 Introduction:

"I believe that social study should begin with careful observation of what may be described as communication; that is, the capacity of an individual to communicate his feelings and ideas to another, the capacity of groups to communicate effectively and intimately with each other. This problem is, beyond all reasonable doubt, the outstanding defect that civilization is facing today", (Elton Mayo, 1945). The sender is the individual or group responsible for issuing the initial message. The sender's responsibility is to "consciously construct" the information to convey. The message is the body of information the sender is attempting to communicate. As the sender builds the message to develop an idea into a comprehensive whole and to share information with clarity. Avoiding the risk may cause by providing information that is unnecessary, extraneous, or superfluous and losing the receiver in a sea of data, (Carl Pritchard, 2004). So done properly communications can change the entire project experience for the better, effective communications can and will build more lasting customer relationships, expedite activities, and keep projects in control by ensuring that responsible parties are aware of what they need to be aware of when they need to be aware of it. Good communications are consistent. That is not to say that communications modes and styles won't be different from communicator to communicator, but for each communicator, there will be certain expectations of consistency. One-on-one communication is relatively simple and clear. That's because there is only one recipient to the message, there is only one other person on the other side of the equation. But as more and more participants are engaged, the challenges in communications and communications plan increase geometrically through the project life-cycle.

In construction project management, communication is the function in the management process that assists planning, organizing, leading and control that transforms resources into goals, products, services and therefore performance, According to Four management functions constituting the management process (Smit & Cronje, 2002) (Figure 3-1).

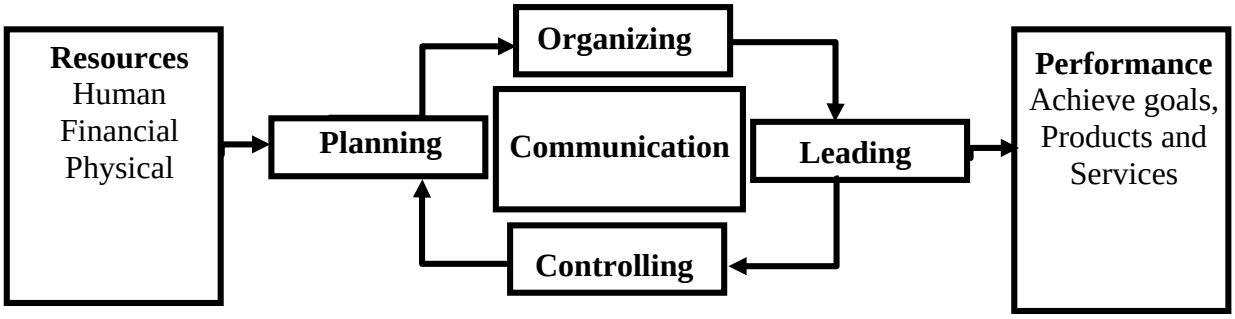


Figure (3-1) Four management functions constituting the management process (Adapted from Smit & Cronje, 2002: 9)

The functions of management do not occur in a systematic sequence. At any given time, a project manager may be engaged in several management functions, simultaneously applying resources such as finances and personnel to achieve goals and deliver products and services. The complex process of management and the flow of information between the project manager, the team members and parties involved during the project are shown in (Figure 3-2). The bold lines indicate how, in theory, the functions of management are linked. The solid lines represent the process of management. It is important to note that communication is central to all the functions.

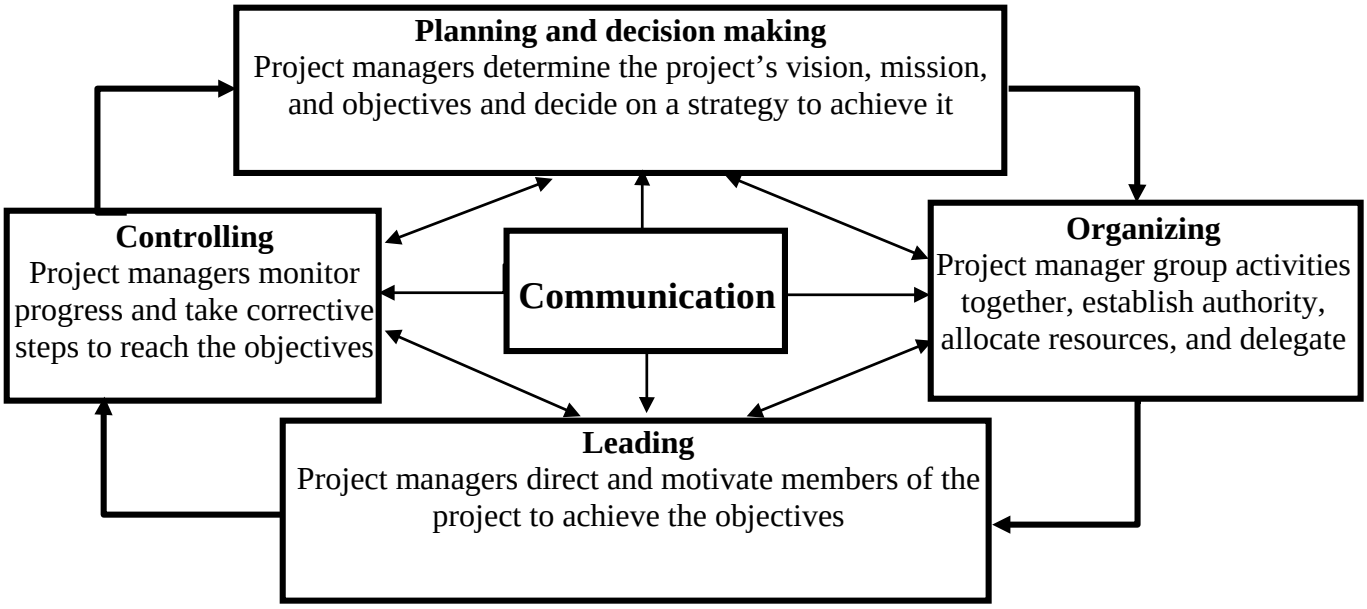


Figure (3-2) the management process (Adapted from Smit & Cronje, 2002: 10)

3.2 The Important of Effective Communication

The importance of effective communication to individuals, teams and organizations cannot be overstated. Virtually every text on how to manage people will contain important principles of how to communicate effectively with the workforce. At an individual and team level, people find it difficult to function in the industry if they do not develop a mutually agreed communication modus operandi to underpin their work activities. Similarly, the management of organizational processes also demands that robust and effective communication channels are developed which enable their various components to be conjoined appropriately. The importance of communication to organizations is succinctly summarized by Armstrong (2001:807):

● **Achieving coordinated results**: organizations function by means of the collective actions of people, but independent actions lead to outcomes incongruent with organizational objectives. Coordinated outcomes therefore demand effective communications.

● **Managing change**: most organizations are subject to continuous change. This, in turn, affects their employees. Acceptance of and willingness to embrace change is likely only if the reasons for this change are well communicated.

● **Motivating employees**: the degree to which an individual is motivated to work effectively for their organization is dependent upon the responsibility they have and the scope for achievement afforded by their role. Feelings in this regard will depend upon the quality of communications from senior managers within their organization.

● **Understanding the needs of the workforce**: for organizations to be able to respond effectively to the needs of their employees, it is vital that they develop an efficient channel of communication. This two-way channel must allow for feedback from the workforce on organizational policy in a way that encourages an open and honest dialogue between employees at all levels and the top-level managers of the organization.

The efficiency and effectiveness of the construction process strongly depend on the quality of communication. There are four reasons why improvement in communication are needed. The first reason is that an improvement in the communication within the building team (Higgin and Jessop 1965), in project teams (Thomas et al 1998) and between project manager

and contractors (Franks 1998), (Somogyi 1999) could reduce failure. Second, more open communication at all levels could lead to innovations (Lenard and Eckersley 1997) and better technical solutions (Sörensen, in Atkin et al 2003). Third, communication improvements in early phases of projects would positively influence the quality as perceived by all stakeholders involved (Emmit and Gorse 2003); (Brown 2001); (Usmani and Winch 1993). Finally, improved communication during the briefing might lead to better decision-making, for example less haste in moving to solutions and better ways of looking at the requirements first (Nutt 1988); (Barrett 1995); (Salisbury 1998)

3.3 Communication Structure:

Structure defines the lines of authority and communication and specifies the mechanism by which tasks and programs are accomplished. The performances depends on the coordination between the parties involved, the system of communication, the culture of the project, the staff members and the communication structure. (Akar, D.A., 1992)

In many ways, intercultural communication is far more complicated because participants need to be aware of an increased possibility of misunderstanding. Project team members are part of different sub-cultures. In a project team, there may be communication problems because of these differences and expressions in different professions. (Peltoniemi, M. and T. Jokinen, 2004)

People, system, cultures and structures may be used as communication strategies to ensure the performance of the project. Every sub-project has a set of people, systems and culture different to those of the main project. These differences strain the project, increase communication problems and make it less likely to complete a project without incidents. People in organization use the proper system implemented by the organization to communicate effectively. Whether internally or externally. This proper system also helps in improving communication within the organization. It plays a vital role among the stakeholders because it result in good understanding within the organization and among the different parties. Organization structure influences the coordination and flow of the organization system. A proper organization structure should be formed to encourage good flow of information and enhance effective communication in the organization and in the

industry. A good organization structure leads to the practice of better time, quality and cost management as well as to the increase in organization performance (Akar, D.A., 1992)

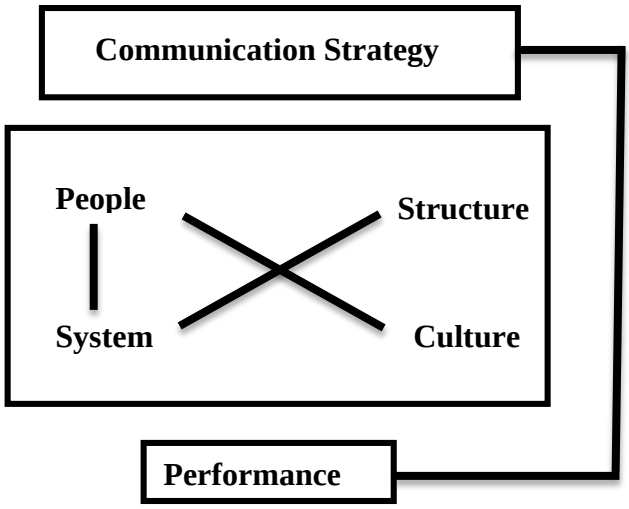


Figure (3-3) the framework for analyzing projects adopted from (Aakar, 1992)

3.4 Communication Tools in the Initiating Processes

Many communications tools are introduced early in a project's life. That's because the need for communications is at its highest when a project is new.

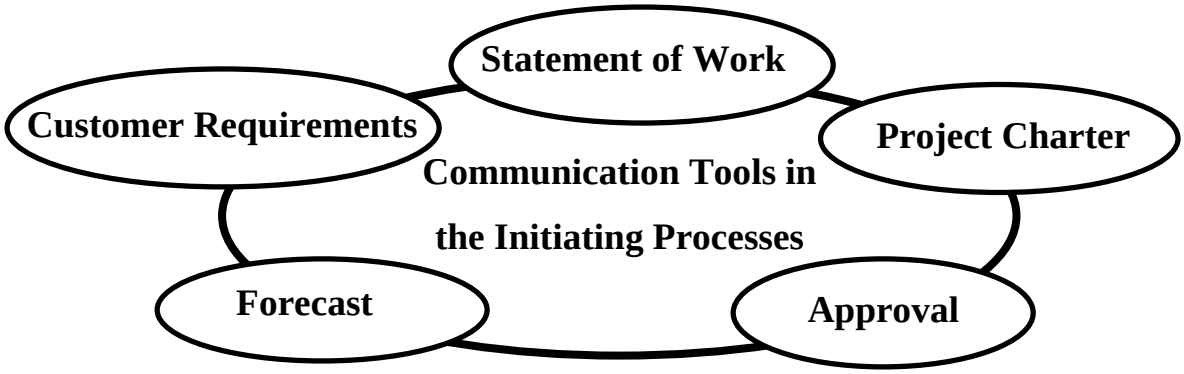


Figure (3-4) the communication tools in the initiating processes by researcher adopted from (Carl Pritchard, 2004, the project management communication toolkit)

3.4.1 Customer Requirements

The customer requirements delineate, in detail, what the customer needs and how the project will serve those needs. Requirements represent a detailed breakdown of the customer's expectations for the project, as well as how the project organization will serve those requirements. Depending on the nature of the document (functional or technical), it will have radically different applications (Carl Pritchard, 2004:43).

- The functional requirements document addresses the needs of the customer as expressed in terms of performance.
- The technical requirements document addresses how those needs are to be met.

The functional requirements document is outlined in terms of performance, capability, and customer expectations. The technical requirements document is also outlined in those terms, coupled with the technical response about how those needs will be served. Some organizations use the project requirements documentation as a catch-all tool for every issue from project risk to change control. Although the requirements document may capture a wide range of issues, however, it should focus on the needs that much be met to ensure project success.

In building the project requirements document, managers may be tempted to fill in every field, even when the information is not yet available. If information is lacking for a particular component of the template, it is prudent to document such information as "currently unavailable," rather than filling the void with guesswork. If guesses are mixed with the validated project information, it becomes challenging to discern which information is real and current and which is the best guess.

3.4.2 Forecast for Future Performance

Forecasts are used to assess potential future business performance. They are predictions as to the outcomes of a project. They provide project managers and their management insight on how well the project is expected to perform in terms of cost, schedule, or overall deliverable performance. They also identify the range of possible outcomes for planning purposes.

Because of their varied applications, forecasts may take on a variety of forms:

- They may provide a graphic perspective on the likelihood of completion within a given time frame.
- They may also include information from a statistical sampling or Monte Carlo analysis, providing information on the number of samples that met a certain time or cost projection.
- They may simply be statements of intended or expected outcomes, highlighting the elements that may have the greatest direct impact on the accuracy of the forecast.

For less statistically driven analyses, projections are often provided by individuals performing the work or by those familiar with the nature of the work and who have assessed progress to date. In addition to time and cost projections, these analyses may also incorporate some assessment of project performance and deliverable performance, particularly because it may vary from the original assessments and projections. This information is frequently provided by individuals who understand the nature of the work and the progress to date. Anyone providing performance information should be intimately familiar with customer expectations, the contract (or statement of work or memorandum of understanding).

3.4.3 The Depth of Approval

Approvals should always include a statement of what is being approved and the depth or range of the approval, many organizations promote a culture that is accountability averse, the manager who can introduce accountability into the approvals process can find their projects easier to promote.

While approvals may be given verbally, written approvals are perceived as inherently carrying more weight and value. Even if the approvals are for issues of a seemingly minor nature, requesting signatures serves the dual function of affirming that the other stakeholder is aware of what is approving and that the approval has significance and meaning. Although verbal approvals are among the most commonplace in industry, they carry little long-term weight. To be effective, the manager should seriously consider following up with affirmative documentation.

3.4.4 Project Charter

The project charter is a foundation communications tool in project management. It serves to grant the project manager the authority that needs to manage resources and to clarify the scope of the project (in general terms). In theory, it is drafted by senior management as their means to clarify roles and responsibilities among their staff, but in practice it is most frequently developed by the project manager, who then directs it to management for their approval.

The charter is used as a reference document to affirm the level of resource commitment and organizational support for a project. After it is created, it is maintained by the project manager, and provided to functional managers on request to confirm intended resource utilization and rationale. The charter normally incorporates a general scope statement, as well as a list of the resources that will be applied to support the project objective. It may include both internal and external resources, as well as the signature(s) authorizing their use through the life of the project. The charter should also include a specific time frame in which those resources will be applied, indicating when they will be returned to their traditional or functional responsibilities.

3.4.5 Statement of Work

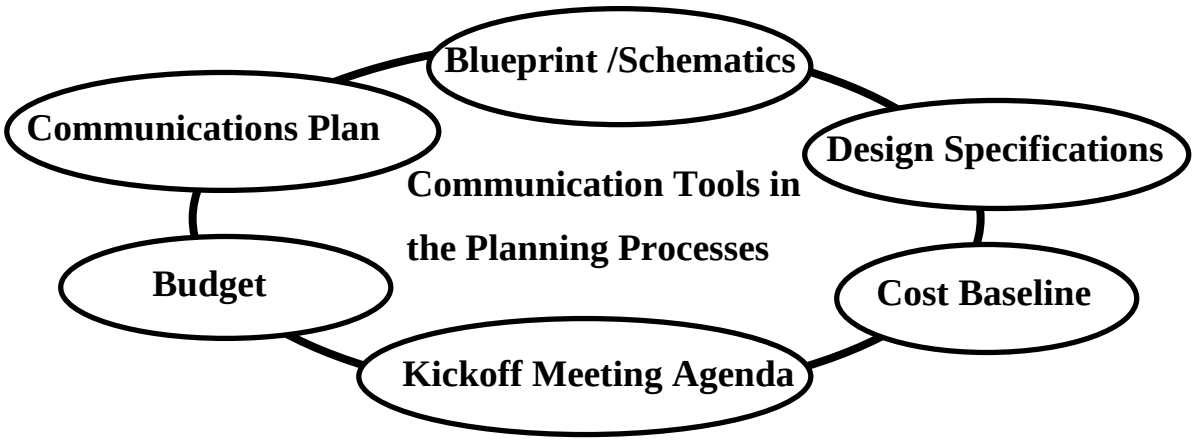
The statement of work (SOW) serves as a guideline of the agreements on performance between a purchasing organization and a seller of goods and/or services. It is frequently an attachment to a contract or a memorandum of understanding between two organizations. The SOW affirms how the purchasing organization wants the work to be performed and the context of that performance, including any specific management practices or protocols the contractor must follow.

The SOW is normally used as an attachment to the contract or agreement and is one of the very earliest documents developed to clarify communications between organizations. As a component of the contract, it is frequently used to settle disputes over what work should or should not be included in a project. It establishes expectations for a variety of issues in the contract relationship. The SOW is the only customer-authored documentation the project manager ever sees. The project managers may not have access to the full contract, but they

almost always have access to the statement of work. As the guiding force for project performance, regardless of legal consequence, the SOW is likely to be seen by the project organization as the final determinant of what the customer wants.

3.5 Communications Tools in the Planning Processes

Applied communication tools in project plans reflect the need to express a clear understanding of both the intent of the project and the deliverables that are to be produced "road maps for project". And get the information to point closer to final point of project objective.



(Figure 3-4) The communication tools in the planning processes by researcher adopted from (Carl Pritchard, 2004, the project management communication toolkit)

3.5.1 Blueprint /Schematics

The term blueprint has now come to mean any detailed drawing or rendering. The modern technical equivalent would be the schematic drawing. Blueprints and schematics are used to provide consistent guidance on what the final deliverable should look like, including dimensions, relative size, and configuration. The project parties must ensure they speak a common language in terms of their understanding of what the final outcome of the project should look like.

3.5.2 Sharing Budget Information

Sharing budget information with management and the team may depend largely on organizational protocols, but unless there are overriding reasons, budget information may be shared openly with the team. Some organizations advocate “open book” management, which means that budget information is readily available to team members in a secure internal environment. If the information is to be made readily available to team members in such an environment, consistent forms and formats become crucial to ensure consistent interpretations of the data.

3.5.3 Communications Plan

The communications plan provides direction on which stakeholders should be discussing project business with which other stakeholders, the tools they should use, and the degree to which they should be sharing, documenting, and storing that information. Because of the number of stakeholders involved in a single project and their diverse roles, the communications plan orchestrates project communication through a cohesive approach to information sharing. It is a critical deliverable to the planning process.

The communications plan is shared openly with all internal project stakeholders to help them understand how they should communicate and with whom. For external project stakeholders, the communications plan is normally filtered to present information only germane to their role and use.

The communications plan should reflect communications as dictated by the contract, memorandum of understanding, or statement of work, as well as any other protocols that became self-evident during the project’s evolution.

Different project participants will use the communications plan in different ways by (Carl Pritchard, 2004:73):

- **The project manager** uses the communications plan to ensure that the various stakeholders are aware of their communications responsibilities to each other and to the organizations.
- **Team members** use the communications plan as a combination contact list and guide, with an interest in the types of communication preferred by the various users.

- **Senior management and customers** may use an abridged version of the communications plan to be clear on when to expect certain reports and documentation, and for contact information on their primary points of contact.

Because it is built in a spreadsheet format, the communications plan can be sorted and reordered in a variety of ways. If the types of communication (status reports, team meetings) are most important, they may be the first column, followed by frequency of communication and stakeholders (recipients and attendees, respectively).

If physical proximity is an issue, the primary consideration may be the postal mail address, which can be sorted to determine which stakeholders are in common regions or locales. Because communications breakdowns are frequently rooted not in miscommunication, but by a lack of communication, the notion of the "best time" for meetings, reports, contacts, and phone calls is crucial. If certain team members can only attend project meetings before 3 p.m. because of personal concerns, the project communications plan should highlight those interests. If a customer is never available before 10 a.m. for phone calls, such concerns should be noted as well.

The communications plan is one of the most publicly available of the project documents.

Because it serves as the framework for open communication among team members, the customer, and other stakeholders, complete and abridged versions of the document may exist, depending on the audience. The communications plan serves as more than just a phone directory. It provides information on the communications sensibilities and sensitivities of all of the personnel involve.

While the plan is widely available, some stakeholders are proprietary about their contact information, and those concerns need to be respected. The communications plan should not become a medium for those who wish to broadcast information randomly to all project parties. It should be used to focus communications on an as-needed basis.

3.5.4 Cost Baseline

The cost baseline is a real or theoretical construct that captures the approved budget distributed over time. It is used to provide a comparison or contrast with the actual costs and their application over time. The cost baseline is used to determine if performance to date is within acceptable parameters.

The baseline is normally maintained with other project information in either project management or spreadsheet software. It is used both for comparison and reporting and is normally a critical element in project status reports, progress reports, and forecasts. The cost baseline serves as affirmation of what the project's cost structure looked like when the project was originally approved. According to (The Project
Management Institute), the cost baseline incorporates any approved changes.

The cost baseline is developed by aggregating the costs of the individual work elements and then combining them at time (or work) intervals where meaningful actual cost information will be available.

Baselines are not malleable. They do not change with the vagaries of project life.

While changes should be reflected with the baseline, the original baseline should remain intact. The only time a baseline should change is when it is rendered meaningless by the sheer volume of changes (either planned or unplanned). Because the baseline serves as the primary metric for evaluating performance as the project progresses, the stability of the baseline is crucial. Because it is such a critical metric, communicating it to the team through open book budgets, regular e-mail communications, or as a component of the project plan is vital to ensuring a consistent understanding of the budget.

3.5.5 Design Specifications

Design specifications, like blueprints, provide detailed guidance on what the project outputs will look like and how they will be expected to perform. The key difference is that design specifications provide that guidance through the written word, coupled with graphics and drawings, whereas blueprints are strictly graphic in nature. The purpose is to provide clear direction to the project organization on what the final outputs of the project must look like and the tolerances and standards those outputs must meet.

Design specifications are used as soon as they are available to determine some components of the work to be performed and to prepare for the purchasing and allocation of materials to the project. Because design specifications incorporate information about certain performance standards, the specifications can even be helpful in determining which resources are best suited to assist in or perform some of the work, because some work requires more highly specialized workers than others. The design specifications are used to flesh out the customers' functional requirements and technical requirements, expressing specifically how those needs will be addressed by the look and feel of the final deliverables. The components

of the design specification should be traceable back to the functional and technical requirements, and there should be evidence that each component of the design specification will be addressed by some component of the work breakdown structure.

3.5.6 Kickoff Meeting Agenda

The kickoff meeting is one of the most critical elements of the planning phase, because this is the meeting at which team members, project managers, vendors, and the customer gather together for the first time. It is the opportunity to set the stage for the remainder of the relationship. Thus, the kickoff meeting agenda becomes one of the first true planning documents to be shared universally with all project stakeholders. It provides the outline of what will happen at the kickoff meeting. A kickoff meeting agenda is used for both the internal and external kickoff meetings to inform participants about the topics to be covered, the schedule, and the general intent of the meeting. It is provided, in advance, to all participants to allow them time to evaluate the meeting approach and to determine if there is any supplemental information they will need to gather prior to the meeting.

These meetings can be used internally to ensure that all participants convey the same messages to the customer. They can be used with external stakeholders to build a sense of excitement about the project and to ensure that the project organization's vision for the effort is aligned with the vision of the customer. Internal and external kickoff meetings are normally different meetings with different objectives.

The common elements for both include the effort to build the team and the clarification of project objectives.

Kickoff meetings must include a general overview of the project and the project organization's approach to delivering the project. But the meeting often affords the first (and in some cases, only) opportunity for all of the project stakeholders to be introduced and to clarify their roles in the project. An outline for a rather exhaustive kickoff meeting may also include a lot of initial planning activities as well.

Depending on the scope of the project, meetings of this nature may last an hour or several days. In any case, the determination on duration should reflect the relative project size and complexity. A 6-week project involving 3,000 team members may, out of necessity, need a 2-day kickoff. A 2-year project with a team of three may only need an hour or two of review to get the project going. In addition, the project team should ensure that the right meeting is

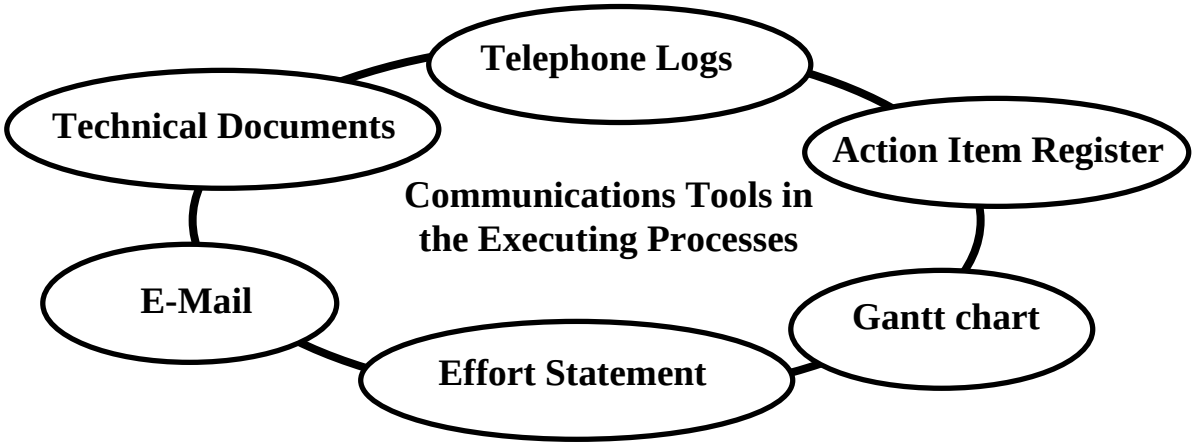
being held. Internal kickoff meetings allow for a common understanding of internal operations, communications, and interactions in a free and open environment. External kickoff meetings integrate customer and project organizations, and as such, some of the communications must be couched in terms that are acceptable in both environments. A more cautious approach to sharing information is necessitated by the external kickoff meeting.

An invitation to a kickoff meeting can be seen as a badge of honor by those who are invited, because it indicates their role in the project is sufficient to warrant the invitation. Thus, kickoff meeting invitations may become politically charged, because some representatives will want to be invited simply to affirm their political standing in the organization(s). Clear criteria should be established regarding who should attend the meeting so that the rationale used to create the attendees list is unambiguous.

Also, while internal kickoff meetings allow for the free flow of discussion about internal organizational machinations, the external kickoff meetings should not. In some instances, `it will be necessary to coach team members (especially subcontractors) about what is appropriate for discussion in the external kickoff meeting and what is not.

3.6 Communications Tools in the Executing Processes

Planning is the core of project management, only because it enables execution. In executing or implementing projects, organizations have the opportunity to make modest changes to the original plans. More importantly, they have the opportunity to capture insight and information as it is developing. The communications tools of implementation are those that capture or share information, reflecting the realities of day-to-day project life.



(Figure 3-5)The communication tools in the Executing processes by researcher adopted from (Carl Pritchard, 2004, the project management communication toolkit

3.6.1 Telephone Logs

Just as phone calls are intended for the quick transfer of information with some measure of immediacy, the telephone log is intended for quick documentation of what transpired in those telephone calls. Phone calls are used liberally in modern business, but should be limited to those situations where an extensive documentary record is not essential or where time is of the essence. That said, the one tool that can provide a reasonable ongoing documentary record of phone calls is a telephone log. The telephone log, used effectively, is updated every time a telephone call is received

Telephone logs detail the highlights of telephone call times, callers, and subject matter.

They do not normally incorporate the details of the call, except to identify any specific promises or action items that were a result of the conversation. Consistency is the key for telephone logs, because ongoing maintenance of the telephone log record ensures credibility that all germane conversations have been tracked and documented.

3.6.2 E-Mail and Sharing Internal Information

E-mails are generally informal internal documents for sharing information. They create a document record and provide a history of information transactions. Although considered informal, e-mail transactions can carry formal weight in legal proceedings and are considered part of the organization's historical record.

E-mails can be used in virtually any setting and for almost any type of information sharing or transfer. They are used whenever there is a need to share information quickly, thoroughly, and asynchronously. They are used when the record may be important to success of the communications loop, but are not necessarily of historical significance.

The informational content within the e-mail may be short or long form. It may be of a formal or informal nature, but should always be treated as if it might be maintained as part of the permanent record. E-mail is helpful in the project environment because of the frequent need for immediate information transfer.

3.6.3 Technical Documents

Technical documents have a wide range of uses and, as such, they have a wide range of purposes. However, they share the common mission of being designed to convey, store and

reproduce technical information for a technical audience. By virtue of their common audience and goals, some specific common approaches can be applied.

Technical documents are used in any environment where complex technical information needs to be shared. They should not be applied in environments where general information is required or where detailed information is needed by nontechnical personnel.

3.6.4 Action Item Register

Every project has small, seemingly inconsequential tasks that are the fuel of day-to-day operations. There are phone calls to be made, team members to be nurtured, vendors to be checked on. As such, myriad action items, too small to be labeled as “tasks” or “work packages,” must be documented and tracked. The action item register is a log for cataloging and tracking these items and for ensuring that they are addressed in a timely fashion. The action item register is used as a team-oriented document, posted in a common team location (virtual or physical). It is used to affirm that team members know their role in these smaller tasks and understand their responsibilities and the timing for those responsibilities.

Action item lists are normally separate and distinct from the work breakdown structure and the task or deliverable information included therein. That’s because the

WBS covers information at a higher level. The action item list is designed to ensure that lesser tasks that are not directly associated with the deliverables are still resolved. It may be appropriate to place some limitations on the size of action items, because the action item list can become a “back door” means to build in some scope creep into the project.

3.6.5 Effort Statement

Effort statements may be required by regulation. They are used to certify how employees have invested their time on a project. They identify not only the employee’s classification, but also the specific tasks worked on and the amount of time invested in those tasks. The depth of reporting will be determined by contract or regulation. In some organizations, effort statements are used to augment the monthly status report with detail on resource allocation and activity. They contain a limited amount of information, consisting of the resource name or type, the task on which employees worked, and the amount of time consumed while working on the task.

Effort statements are certifying documents. As such, the expectation is that the information contained therein is going to be accurate. The level of reporting in the effort statement should

reflect the level of team member reporting within the time management system used by the organization. If a higher level of detail is required by contract, then before the project begins, tracking mechanisms should be put in place to serve that specific level of reporting to ensure accuracy.

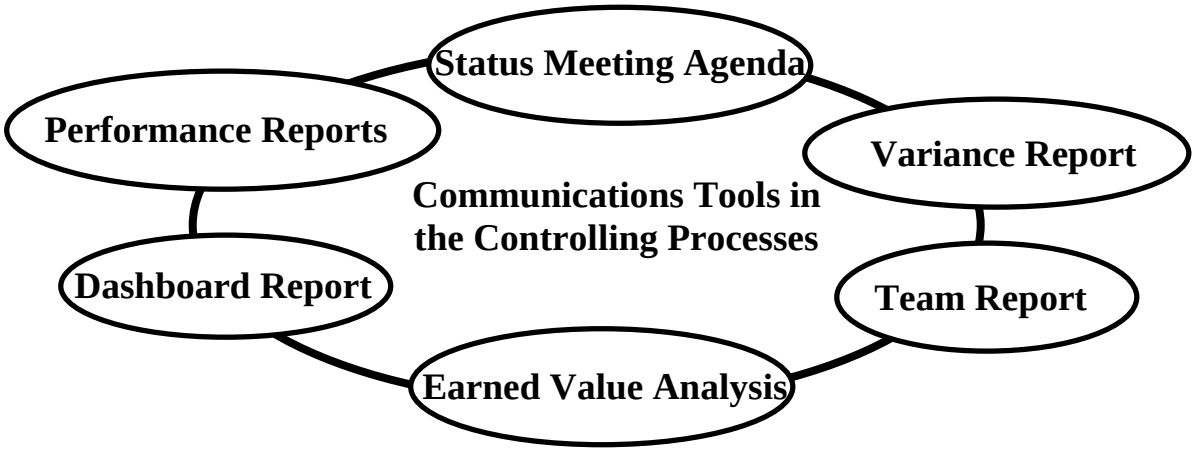
3.6.6 Gantt Chart

The Gantt chart is the single most popular information presentation tool for project management. It gives an at-a-glance perspective on the names and timing of tasks, as well as their current status. It is used to highlight a project's triple constraint of time, cost, and requirements and affords an at-a-glance perspective on project variance. Gantt charts are used to present information to management, team members, and customers at a variety of different levels. Some Gantt charts are used at a summary level to provide a one-page or few-page perspective on project activity. Some are used with work package-by-work package information to allow team members to see the range of tasks being performed and the status and timing of those tasks.

Software that will produce Gantt charts also generates spreadsheet information. With dozens of fields available, it is possible to display the Gantt chart along with information about resources, timing, task status, predecessors, and a host of other information types. Keep in mind, though, that the Gantt chart should not be overloaded with too much information. Only the information germane to the presentation should be included.

3.7 Communications Tools in the Controlling Processes

Controlling is what project managers do to ensure that what was promised is what is delivered. Controlling tools are those tools that allow the project manager, the team, and senior management to see how the project is doing, what directions it may be taking, and how those directions may affect the individuals, the project(s), and the organizations involved. Many of the tools and templates in this book serve the controlling processes in one way or another, because they ultimately provide the project manager with tools to compare what was promised to what is actually happening on the project.



(Figure 3-6)The communication tools in the Controlling processes by researcher adopted from (Carl Pritchard, 2004, the project management communication toolkit)

3.7.1 Dashboard Report

The dashboard report is a report to senior management that provides an at-a-glance perspective on the current status of the project in the context of predetermined metrics for that project. Depending on the organization, those metrics may include cost, time, requirements, risk, customer satisfaction, or other measures critical to the management team. It provides management with a quick understanding of the current project posture, without a detailed explanation of the causes or solutions.

A dashboard report relies on metric content built on detailed reporting from the project team and the project manager. Dashboard reports frequently include earned value data, including the value of the work completed to date (earned value), the amount of work scheduled to date (planned value), and the actual costs. With those metrics and the overall project budget, basic information regarding schedule variance, cost variance, and updated estimates at completion may be generated.

Perhaps the greatest danger associated with dashboard reports is that management may believe they understand the intricacies of the project by virtue of this limited amount of information. It’s a quick, effective overview of critical metrics.

3.7.2 Earned Value Analysis

Earned value analyses provide status reports on project performance presented in the context of time and money. Normally generated within project management software, earned value analysis generates perspectives on the time and cost status of the work package and summary and project levels of the WBS, allowing for pinpoint assessments of where cost overruns and schedule delays are being generated. Earned value may be applied on smaller efforts if the tracking mechanisms are in place for both effort and actual costs at the project level. The analyses are used to assess relative cost and schedule variance, as well as to predict the future cost and schedule performance, based on performance to date.

One key consideration in earned value is the timing of the information provided.

Because some information (particularly actual cost) is only available after a thorough accounting process has been conducted, the date of the earned value analysis may be days, or even weeks, in the past. For any earned value analysis, the data date (the effective date of the analysis) should be consistent for all components (earned value, planned value, actual costs). If the earned value is assessed as of today, and the actual costs are from several days ago, the comparison will be invalid.

3.7.3 Performance Reports

Performance reports generate a mutually accepted understanding of how an individual, process, or deliverable is performing against a predetermined set of standards. Performance reports document the degree of acceptability of that performance and may include recommendations on how to improve performance. The emphasis on performance reports is the ability of the individual, process, or deliverable to meet desired standards or goals. Performance reports should be completed when a particular level of performance has been achieved or at the time at which that level of performance was anticipated. One key consideration in developing performance reports is establishing the objective measures by which the individual or the deliverable will be assessed. While it is relatively easy to evaluate the performance of a process or person relative to other processes and people, it is far more challenging to find the specific metrics by which to validate those findings.

3.7.4 Status Meeting Agenda

Project status meetings are designed to share information about project performance to date and to ensure that team members are communicating about their respective needs and integrated functions. The agenda for such meetings serve to communicate the timing and approach to serve those functions. The agenda should be delivered to all participants at least a day in advance of the meeting to allow for proper preparation and to ensure that any sensitive agenda items can be identified in some cases prior to the meeting.

Project status meetings are conducted at regular intervals to affirm that the project is in control and that progress is being made according to the plan. This makes developing the agenda easier, because the meetings are expected on a regular basis.

The agenda for a status meeting normally consists of a breakdown of the project into logical components. Therefore, the meeting may be divided according to the schedule, the WBS, or the organizational functions. For each of the breakdown elements, a brief synopsis should be provided on where that element of the project is supposed to be as of the meeting and where it actually is. Because the number of elements in a large project may count in the dozens at any given point in time, the reporting structures for these meetings may be (of necessity) very rigid and formal.

3.7.5 Team Report

The term team report actually refers to two types of standard reporting, only one of which will be discussed here. Team reports refer both to any report generated by an organized team and to a report focused on the status, performance, integration, and effectiveness of the team itself. The purpose of these team reports is to affirm for management that the team is functioning as a working whole toward its assigned goal.

Team reports are used early in projects to let management know that the team is performing to expectation, and later in the project (particularly with troubled teams) to reassure management that the same level of efficacy that was expected is being achieved.

A team report will list the roles and responsibilities of the individual team members and will identify their respective level of involvement or commitment. In addition to the specific roles of the individual team members, the team report will provide an overview paragraph regarding team performance, including any outstanding management support issues or any

commitments that are not currently being met. The report will also include recommendations regarding future team support or performance. The model team performance (Bruce Tuckman, 1965) assessment component refers to the model of group development in which teams are sorted into their relative development levels as forming, storming, norming, and performing. Project managers with some organizational development experience will be able to intuitively identify the team stage, whereas those without can use the following scale to determine where the team fits within the mode by (Bruce Tuckman, 1965):

- Forming—still getting to know one another and more focused on the individual, rather than the role in the project.
- Storming—mapping out roles and responsibilities both for the project and in team dynamics.
- Norming—working within established roles and responsibilities, but focusing largely on individual roles and duties, rather than the team.
- Performing—Working within established roles and responsibilities, sharing insight and information, and facilitating each other's roles.

The model is a standard of organizational development; it provides a common frame of reference by which to evaluate team performance.

The team report is drafted by the project manager and provides a human resources perspective that is sometimes lost in the project environment. By generating reports about the influx of new team members or the shifting roles and responsibilities, it is possible in some cases to diagnose team behavioral problems and to facilitate resolution.

Because the team report relates directly to individual performance, some team members will challenge it. They may have concerns about their title, roles, or responsibilities as documented in the report. The project manager should anticipate such objections and should strive to keep the report descriptions as objective as is humanly possible.

3.7.6 Variance Report

The variance report (also known as an exception report) identifies areas where the project has strayed from its original objectives, approaches, or targets and the degree to which such variance exists. It also provides a documentary history of the rationale for any variance. Variance reports are particularly common in organizations that use management by exception as their preferred management approach. The variance report identifies those areas where

exceptions have occurred, allowing for clear management attention to those areas for expedited resolution. A variance report will present the type of information under consideration (e.g., cost, schedule, contract line items) from both the original project plan perspective and the current status perspective, followed by a commentary on why the two do not match. Some variance reports will also include a recovery plan for the exceptions.

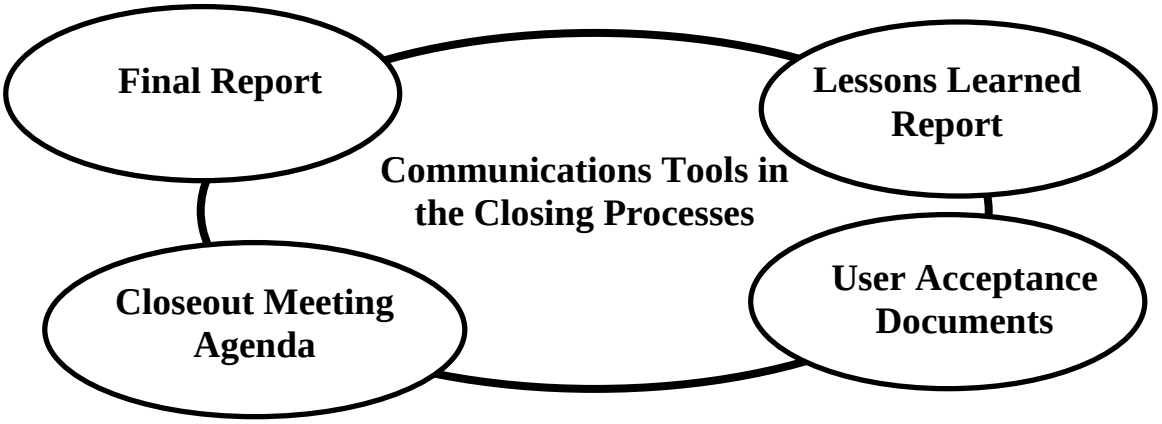
The nature of the organization and its cultural attitude toward cost, schedule, and scope variance may largely drive the type of exception report developed. The approach may also be driven by the availability of information, because actual costs may be elusive in some organizations. The key selection criteria for a particular type of variance report should be its ability to drive the organization to specific, actionable behaviors. If the variance cannot be acted on, there is limited utility to developing the documentation.

Variance reports may draw information from a variety of sources, but the commentary provided with a variance report should be developed independent of the other sources. The commentary should reflect the project manager's assessment of the information in the report, unless there are attachments to provide any supplemental insights the project manager used in the commentary.

In the controlling processes, the primary objective is to stay the course on which a project is supposed to go. The focus of most of the tools is to either serve that objective or to ensure that there is awareness when that objective is not being met. These tools should be deployed in that context.

3.8 Communications Tools in the Closing Processes

In the closing processes, the documentation takes on heightened significance, because it is often required in order to get customer acceptance, and yet the documentation is not generally ripe for amendment or correction because it represents the "final" version of whatever was originally generated.



(Figure 3-7)The communication tools in the Closing processes by researcher adopted from (Carl Pritchard, 2004, the project management communication toolkit)

3.8.1 Closeout Meeting Agenda/Key Review Meeting Agenda

Project closeout meetings, like project kickoff meetings, may be internal or external.

The external closeout meeting is designed to affirm that the customer's deliverables have been produced and accepted, while the internal closeout meeting is designed to ensure that administrative issues have been addressed and that the organizational resources are free to return to their other duties. The agenda for each must be modified to serve the proper purpose. The meetings are used to minimize the probability that outstanding project issues will surface at a later date, when resources are no longer available for the project within the organization. They are used with the customer to serve as a finalizing act, asserting that after the meeting issues are addressed, the project will be formally closed out. The agenda for such meetings should be forwarded to the customer and/or the team well in advance of the meeting to allow time for changes and alternatives to be presented. Because the meeting is a formal act (often contractually required), the agenda is subject to review prior to use.

Closeout meetings and their agendas should be focused on acceptance. The content of the meeting should be directed on affirming that all work packages within the

WBS has been closed and that all of the deliverables have been properly forwarded to the customer. External closeout meetings may also include an effort to get the customer's signature on acceptance documents.

Every project has some measure of success. A key component of the project closeout meeting is to identify that success. Even projects where relations with the customer have been tortured

include some aspects that can be deemed successful. Closing with success in both the internal and external closeout meetings builds the hope that project team members and customers will want to continue the relationship with the project manager and the project organization.

3.8.2 Final Report

Although the final report normally includes a wealth of information, its actual purpose is to draw conclusions about the project, the deliverables, and overall performance. It provides a documentary summary of what happened in synopsis format to allow for quick management, customer, or stakeholder analysis of how the project went.

The final report becomes the authoritative document to present ultimate project performance information. Because of that, and because if often becomes the only major surviving document in the archive, the depth to which it is written and the insights shared become crucial. It may be crafted by a single individual (to present a cohesive perspective), but approved by a larger body (either the original project team or their management). Because much of the lesser documentation will be lost, any outstanding or noteworthy performances should be acknowledged in this document. Also, any dramatic learning may be captured here as well.

3.8.3 User Acceptance Documents

Project managers develop user acceptance documents in preparation for more comprehensive project acceptance. As with other acceptance documentation, the earlier it is developed and accepted by the customer and other concerned parties, the better. User acceptance documents identify specific project elements that are used extensively by specific end-user groups and validate that a representative segment of that population has reviewed the elements and deemed them acceptable. Perhaps the single most common type of user acceptance document is the results form from user acceptance tests (UAT) in the information technologies environment.

These tests are a classic example of user acceptance documentation, in that they identify a specific subcomponent of the project to be tested, set down the acceptance criteria, define the environment in which the acceptance is being evaluated, and report both the anticipated and actual results. The data can be used to validate deliverables as acceptable, to capture minor variance, or as a rationale to modify existing deliverables.

The key consideration in user acceptance is what has agreed on in any project or contract documentation. If no user acceptance is required under the contract, it may still be conducted in order to ease the process of final project acceptance, later in the project. However, when it is not required under contract, the project team may not be obligated to provide the evaluation outputs to the customer.

3.8.4 Lessons Learned Report

Lessons learned are used at midpoints of the project and at project completion to catalog significant new understandings that have evolved as a result of the project.

They are used to build the knowledge base of an organization and to establish a history of best and worst practices in project implementation and customer relations.

Lessons learned should be applied across the organization to facilitate consistency.

They should be used and reused as new projects evolve with concerns similar to those addressed by the original lesson learned.

Lessons learned include detailed, specific information about behaviors, attitudes, approaches, forms, resources, or protocols that work to the benefit or detriment of projects. They are crafted in such a way that those who read them will have a clear sense of the context of the lesson learned, how and why it was derived, and how, why, and when it is appropriate for use in other projects. Lessons learned represent both the mistakes made on projects and the newer “tricks of the trade” identified during a project effort.

The content of a lesson learned report should be provided in context, in detail, and with clarity on where and how it may be implemented effectively.

Because lessons learned are often maintained in a corporate database, the lesson learned documentation will frequently include searchable keywords appropriate to the project and the lesson.

3.9 Verbal Communication

Most of the tools in project life-cycle are written tools. Only a few of those identified are verbal. But none of these tools can be applied isolated from verbal communication.

Verbal communications support the other tools, just as the other tools frequently support verbal communications. For virtually all verbal communications in the project environment, some form of previous documentation can be appropriate.

Verbal communications may be formal or informal, but should not be discounted just because they are verbal, rather than written. Promises made verbally are just as legally binding (but harder to prove) than those that are written. Verbal communications are frequently the “glue” that binds a project’s disparate communications elements together.

3.10 Informal Verbal Communication

Informal verbal communications are conducted to ensure the day-to-day operations of the project are moving ahead as planned. They are generally uncontrolled and unmonitored, but that does not mean that they are unimportant. There is still a need to ensure that these conversations (particularly when they involve customer, client, or sponsor personnel) are limited in scope. Whenever the conversations stray into commitments to a customer, reallocation of resources, modification of contractual arrangements, or anything requiring formal approval, the conversation should be redirected to a more formal setting (such as a meeting). Other limitations (such as limitations on the nature of conversations about other project stakeholders) may be ordained by the project team, but may be far more difficult to enforce. Limiting informal verbal communication is not dictatorial. It is a necessity of project life to discriminate between what the organization is committing to and what it is not.

3.11 Formal Verbal Communications

Formal verbal communications are generally far more constrained and controlled. Because they are normally planned out carefully, there is less chance that a casual remark will be misconstrued. Some common aspects of such communication are that the sender in the communications model must speak clearly and should ensure that the receivers have no significant filters that may inhibit communication. If a team member speaks only
French, for example, that is going to inhibit that person’s ability to interpret a conference call being conducted in English. The project manager’s responsibility in this environment is to eliminate as many of the distractions and filters from the communications model as possible to ensure clear, effective communications. And, because the communication is formal, there is of necessity some post-meeting documentation that should capture what was said and what commitments were made.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 Research Methodology

The study had been conducted through several phases namely literature review, data collection, data analysis, discussion and conclusion. A literature review was conducted encompassing all various means available to obtain the widest range of the relevant information from books, papers, previous researches and websites regarding the theoretical part contained thought data of communication management in construction industry.

4.2 data collection

A Questionnaire was used to obtain the data needed for answering research questions. It is one of the most reliable tools for collect the primary data and use it to achieve the objectives of the research.

The data collection is based on returned questionnaires from Google Forms besides handling method in two months, which Distributed to a group of construction companies and construction sites in the state of Khartoum.

The targeted respondents were persons who are very well about the construction works and in particular at sites and offices, such as project manager, site manager, site engineer, quantity surveyor, architecture and design engineer.

4.3 Questionnaire Design

The questionnaire (attached as an appendix to this research) was divided into three parts:

4.3.1 Part1: General Information

The first part of the questionnaire was about communication and company information.

1. Personal information
2. Company information

4.3.2 Part2: Importance of medium through the project life-cycle

Divide the project to 5 phases “initiation, planning, executing, controlling and closing” conduct similar mediums “Formal written, informal written, phones call, Email, signs and visual communication, face to face and nonverbal communication”.

4.3.3 Part3: The Importance of communication in the Construction industry:

The aim of this part is to identify and quantify the important of communication in the construction companies in the State of Khartoum through:

1. Customer Satisfaction
2. Supplying material Public Relation
3. Initiation Public Relation
4. Contract Condition Documents
5. Cost Estimating
6. Drawing, Design and specification
7. Work Breakdown Structure
8. Safety
9. Cost and Time Control
10. Project Status Report
11. Employee suggestion
12. Performance Evaluation
13. Solving problems among employee
14. Employee instruction

4.3.4 Part3: The Factors and Barriers which affect communication in construction Industry

The aim of this part is to carefully examine and focus on the factors and barriers affect communication that occur in projects inside Khartoum state.

Then a total of 13 factors effects on communication

- **Filtering/selective perception** manipulating information so the sender/receiver will see/hear it more favorably/selectively.
- **Dual reports** and dual bosses
- When individuals have more information than they can sort and use; they tend to select, ignore, pass over, or forget. Or they may put off further processing until the **overload information** situation ends.
- **Emotion judgment** may interpret the same message differently when you're angry or distraught than when you're happy.
- **Semantics** this infers difficulties in transferring the meaning of information from one person to another
- Employee **silence** means to managers lack of information about ongoing operational problems.
- **Communication Apprehension** difficult to talk with others face-to-face or may become extremely anxious when they have to use the phone, relying on memos or e-mails when a phone call would be faster and more appropriate.
- **Inappropriate time** for setting meeting
- **Time consume** for meeting arrangement
- **Lack of clear objectives** without a clear intention, this leads to uncertainty of the message, and to confusion between the transmitter and receiver.
- **Faulty transmission** usually occurs because the message is sent via an inappropriate medium or channel.
- **Environmental problems** from distractions and noise, a lack of appropriate communications media.
- **Physical distance** may causes problem to receiver and slowly the feedback procedure.
- **Lack of knowledge** to deal with modern method of communication

3.4 Data analysis

The first part of the questionnaire was analyzed using statistical analysis to obtain an overview of construction communication concept in Khartoum state.

And used **yes** or **no** mode to determine if the companies have a tendency to listen the worker's problems, and it had a department of communication or not. And it had a communication program/strategy or no. And to know if communication in the company play vital role to achieve project in appropriate time and cost or not.

Part 2 and part 3 was answered by choosing if they it highly agree, agree, is neutral, disagree, or highly disagree. Part 4 also answered by choosing if they it highly affected, affected, neutral, unaffected, highly unaffected.

This range used a 5-point scale. For example, a highly agree/affected answer Indicates the highest effect and a value of 5 was attached to it, while a highly disagree/unaffected answer has the lowest effect and a value of 1 was given to it.

Relative Important Index (RII) was used to determine the ranking of the different construction communication medium as outlined in the second part and the important of communication in construction companies as outlined in the third part, and barriers or obstacles on construction communication in fourth part by using the following expression:

$$\boldsymbol{RII = \frac{\sum_{i=1}^{5} aixi}{5 \times N}}$$

Where:

ai is a constant expressing the weight of the *ith* response.

xi is the frequency of the *ith* response of the total responses for each causes.

i is the response category index where ***i*=** 1,2,3,4 and 5 respectively.

N is the total number of respondents.

RII value is ranged between (0-1).

CHAPTER 5

RESULTS ANALYSIS AND DISCUSSION

5-1 Communication Mediums through Project Life-cycle:

- **Communication mediums in initiation phase:**

Initiation Phase				
Medium	**SD**	**Average**	**IRR**	**Ranking**
Formal Written	0.35	4.91	0.99	**1**
Informal Written	0.76	3.67	0.72	**6**
Telephone Calls	1.03	4.08	0.81	**5**
E-mail	0.99	4.17	0.83	**4**
Signs and Visual Communication	1.03	4.30	0.87	**3**
Face to Face	0.49	4.83	0.97	**2**
Nonverbal Communication	1.17	2.96	0.59	**7**

Table (5-1) Show ranking of mediums at Initiation phase

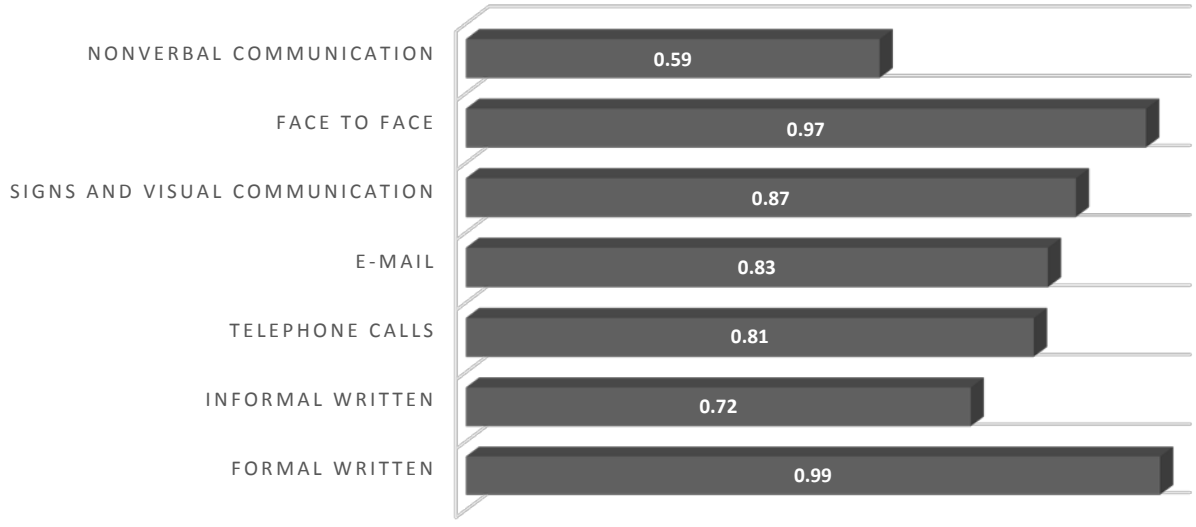


Figure (5-1) Show ranking of mediums at initiation phase, Researcher

From figure (5-1) formal written took the first rank (0.99) showing that the priority of formal written to

initiated any project, according to description of this phase “meeting phase” the face to face took the second ranking (0.97) follow that the rest of medium until the nonverbal commination last ranking with RII (0.59) showing that the body language in this phase not necessarily enough comparing with the other medium.

- **Communication mediums in planning phase:**

Planning Phase				
Medium	**SD**	**Average**	**RII**	**Ranking**
Formal Written	.54	4.74	0.95	**1**
Informal Written	.88	4.0	0.80	**6**
Telephone Calls	.79	4.304	0.86	**5**
E-mail	.77	4.39	0.87	**4**
Signs and Visual Communication	.69	4.52	0.89	**3**
Face to Face	.48	4.76	0.94	**2**
Nonverbal Communication	1.1	3.13	0.62	**7**

Table (5-2) Show ranking of mediums at planning phase

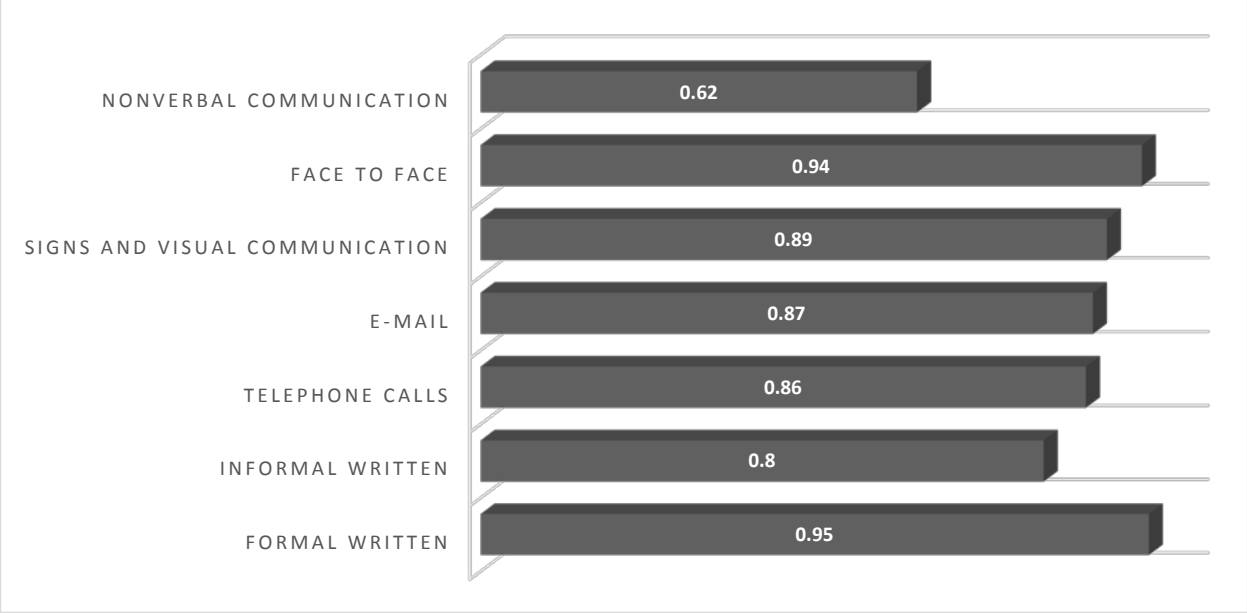


Figure (5-2) Show ranking of mediums at planning phase

Figure (5-2) show that the planning phase simmilar raking as initiation phase with formal written in first ranking (0.95) with RII less than in the intiation, contain design ,drawing, and WBS .And non-verbal

communication at last ranking (0.62) more than the RII in intiation so body language involve little bit in this phase. And the face to face in the second ranking due to kickoff meeting.

- **Communication Mediums in Executing Phase:**

Executing Phase				
Medium	**SD**	**Average**	**RII**	**Ranking**
Formal Written	0.5	4.87	0.97	**1**
Informal Written	0.86	4.2	0.84	**6**
Telephone Calls	0.6	4.65	0.93	**3**
E-mail	0.88	4.41	0.88	**5**
Signs and Visual Communication	0.75	4.52	0.9	**4**
Face to Face	0.5	4.8	0.96	**2**
Nonverbal Communication	1.12	3.83	0.77	**7**

Table (5-3) Show ranking of mediums at executing phase

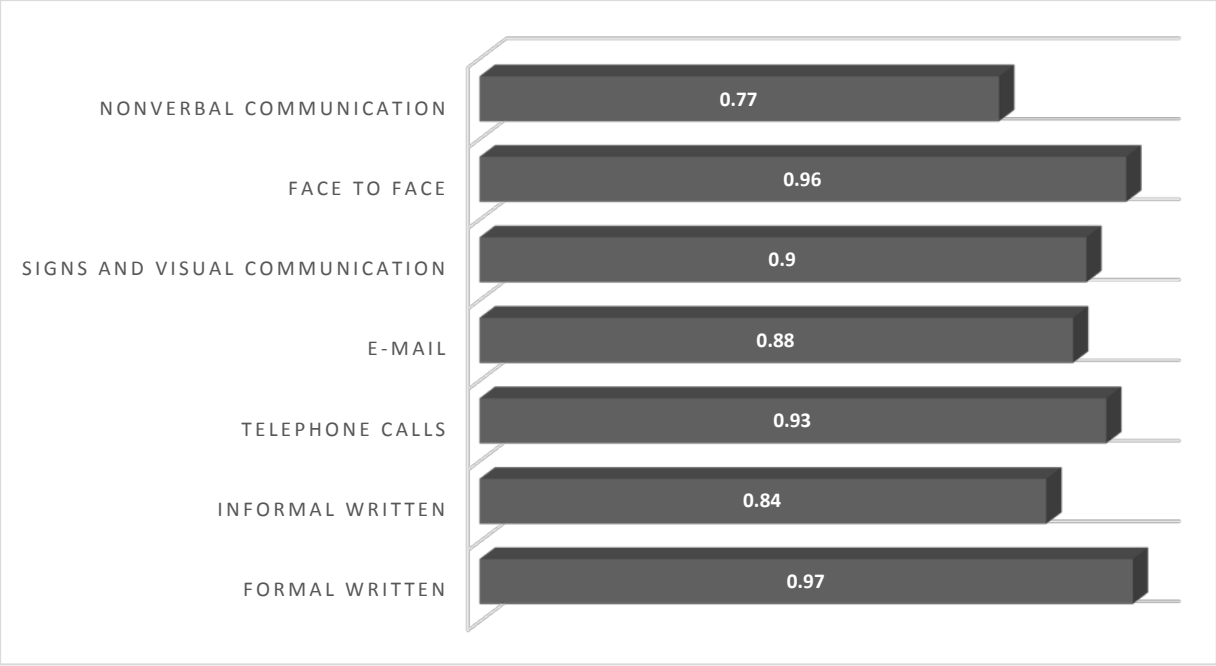


Figure (5-3) Show ranking of mediums at executing phase

Figure (5-3) show that formal written still in top of raking (0.97) and non-verbal at bottom of ranking with developing in RII from pervious phases (0.77) that developing due to noise in executing phase that need to

non-verbal communication, and phone calls took the third ranking for first time shifting signs and visuals communication fourth rank.

- **Communication mediums in controlling phase:**

Controlling Phase				
Medium	**SD**	**Average**	**RII**	**Ranking**
Formal Written	0.35	4.9	0.98	**1**
Informal Written	0.9	3.87	0.77	**6**
Telephone Calls	0.85	4.37	0.87	**4**
E-mail	0.78	4.44	0.89	**3**
Signs and Visual Communication	0.97	4.37	0.87	**4**
Face to Face	0.6	4.65	0.93	**2**
Nonverbal Communication	1.1	3.78	0.76	**7**

Table (5-4) Show ranking of mediums at controlling phase

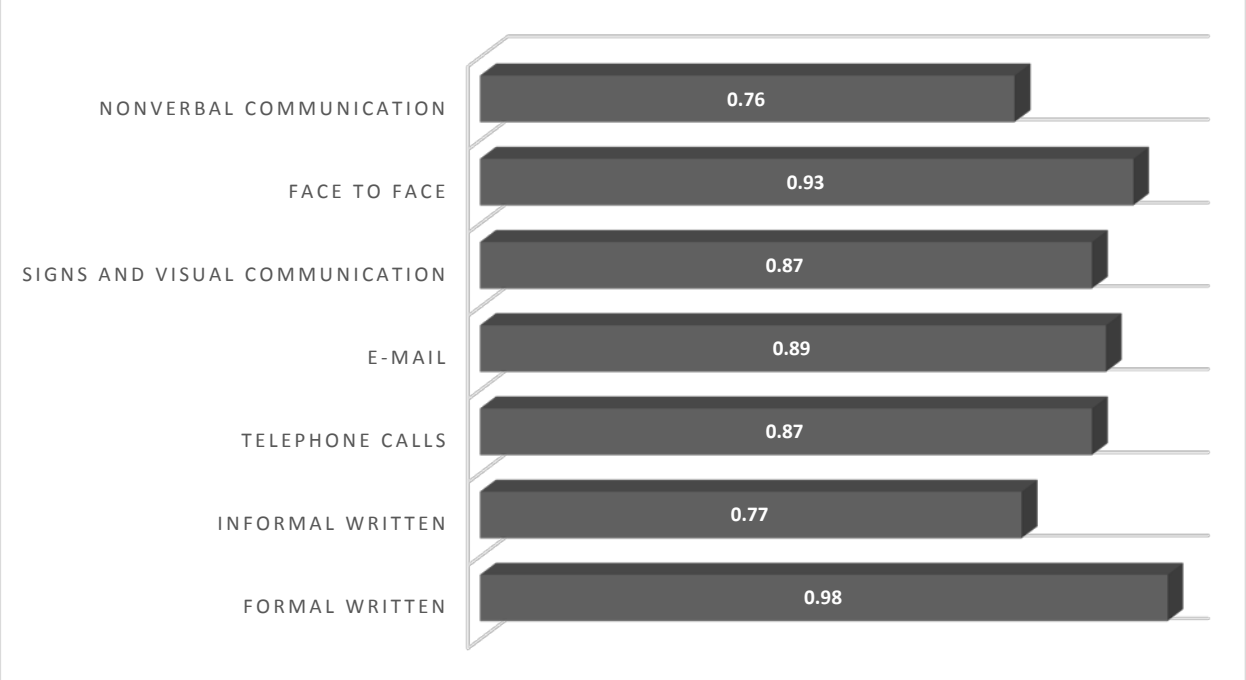


Figure (5-4) Show ranking of mediums at controlling phase

From figure (5-4) also formal written took top of ranking with RII (0.98) like dash report team report, and the non-verbal also in bottom of ranking with little bit developing according to monitor and raise the degree

of caution with RII (0.76) and E-mail took third place to connect parties of project due to circumstance of distance with RII (0.89)

- **Communication mediums in closing phase:**

Closing Phase				
Medium	**SD**	**Average**	**RII**	**Ranking**
Formal Written	0.15	4.98	0.99	**1**
Informal Written	1.04	3.57	0.71	**6**
Telephone Calls	0.99	4	0.80	**4**
E-mail	0.76	4.3	0.86	**3**
Signs and Visual Communication	1.19	4.13	0.83	**4**
Face to Face	0.58	4.74	0.95	**2**
Nonverbal Communication	1.37	3.07	0.61	**7**

Table (5-5) Show ranking of mediums at closing phase

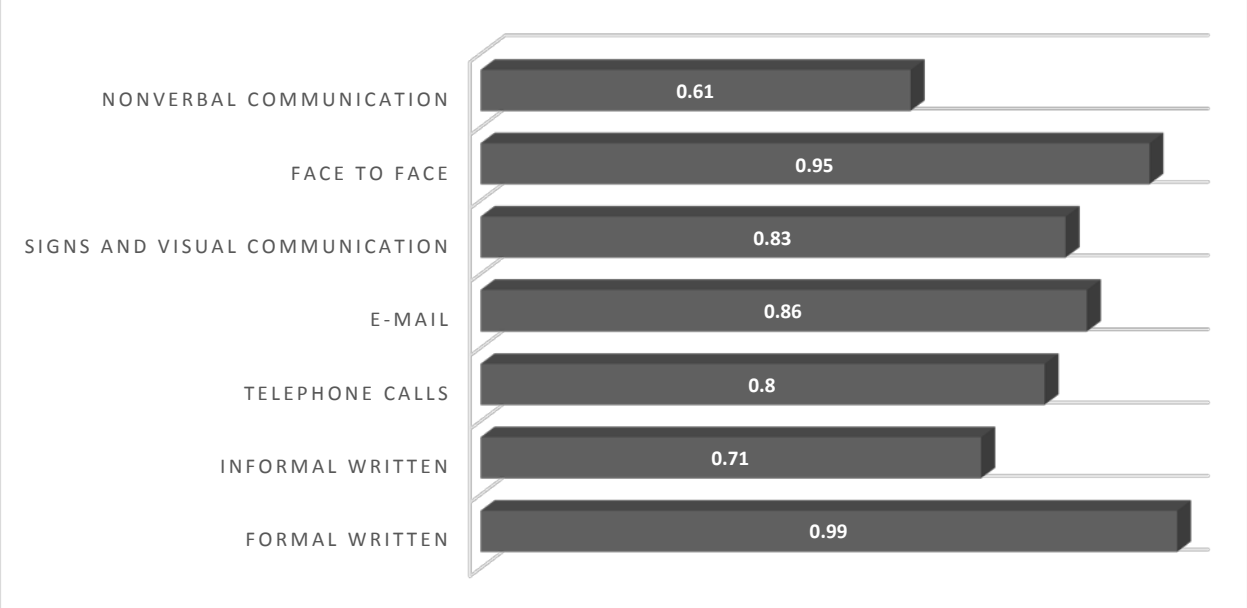


Figure (5-5) Show ranking of mediums at closing phase, Researcher

Figure (5-5) show there are tendency to formal written with RII (0.99) besides the face to face with RII (0.95) because the closing phase need more formal and a lot of meeting to handle project follow that the

rest of medium until the non-verbal at the bottom of ranking RII (0.61) with the wide range to nearest medium.

- **Communication mediums in whole project life cycle:**

Project Life-cycle				
Medium	**SD**	**Average**	**RII**	**Ranking**
Formal Written	0.38	4.88	0.97	**1**
Informal Written	0.89	3.87	0.77	**6**
Telephone Calls	0.85	4.28	0.86	**5**
E-mail	0.84	4.34	0.87	**3**
Signs and Visual Communication	0.93	4.34	0.87	**3**
Face to Face	0.53	4.76	0.95	**2**
Nonverbal Communication	1.18	3.25	0.67	**7**

Table (5-6) Show ranking of mediums through project life-cycle

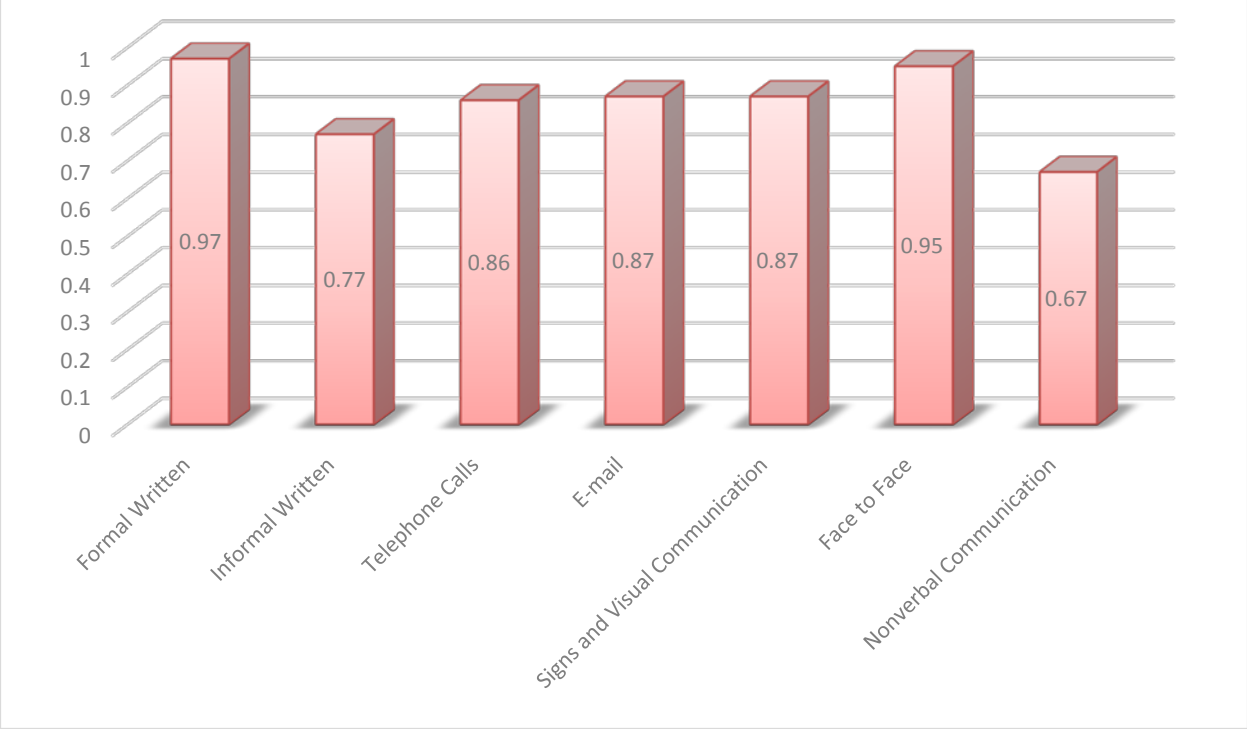


Figure (5-6) Show ranking of mediums through project life-cycle, Researcher

For whole project life-cycle the formal written in the top of ranking more than any other mediums, the information through formal formation be more biding with RII (0.97). After that face to face the second

place because project need integration of opinion from project managers, designers, and other parties. Then visual and place took third place with RII (0.87), Phone calls took fifth place to help site engineering to coordinate the labors and get material (External communication). The sixth place to informal written to make project more social. Finally nonverbal communication in bottom of ranking with RII (0.67).

5-2 Importance of communication:

Importance of communication	***Site Eng.***		***Project Mangers***		***Architect***		***designer***		***Quantity Surveyor***		***Others***		***Total***	
	RII	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**
Customer Satisfaction	0.96	**2**	0.96	**1**	1	**1**	1	**1**	1	**1**	1	**1**	1	**1**
Supplying material	0.99	**1**	0.93	**4**	0.95	**2**	0.95	**2**	1	**1**	0.94	**7**	0.94	**7**
Initiation Public Relation	0.8	**15**	0.89	**9**	0.8	**13**	0.85	**14**	0.67	**15**	0.83	**13**	0.83	**13**
Contract Condition Documents	0.92	**7**	0.93	**4**	0.9	**5**	0.95	**2**	1	**1**	0.97	**3**	0.97	**3**
Cost Estimating	0.91	**8**	0.89	**9**	0.85	**8**	0.95	**2**	0.93	**6**	0.94	**7**	0.94	**7**
Drawing, Design and specification	0.94	**4**	0.96	**1**	0.95	**2**	0.95	**2**	0.87	**8**	0.91	**9**	0.91	**9**
Work Breakdown Structure	0.94	**4**	0.91	**6**	0.9	**5**	0.9	**10**	0.8	**12**	0.89	**10**	0.89	**10**
Safety	0.9	**9**	0.91	**6**	0.8	**13**	0.9	**10**	0.87	**8**	0.97	**3**	0.97	**3**
Cost and Time Control	0.88	**12**	0.87	**13**	0.85	**8**	0.9	**10**	1	**1**	0.83	**13**	0.83	**13**
Productivity	0.87	**13**	0.91	**6**	0.85	**8**	0.95	**2**	1	**1**	1	**1**	1	**1**

Importance of communication	**Site Eng.**		**Project Mangers**		**Architect**		**designer**		**Quantity Surveyor**		**Others**		**Total**	
	RII	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**	**RII**	**#**
Project Status Report	0.94	**4**	0.89	**9**	0.9	**5**	0.95	**2**	0.93	**6**	0.97	**3**	0.97	**3**
Employee suggestion	0.89	**11**	0.84	**14**	0.75	**15**	0.85	**14**	0.8	**12**	0.83	**13**	0.83	**13**
Performance Evaluation	0.87	**13**	0.89	**9**	0.85	**8**	0.9	**10**	0.87	**8**	0.86	**11**	0.86	**10**
Solving problems	0.9	**9**	0.82	**15**	0.85	**8**	0.95	**2**	0.8	**12**	0.97	**3**	0.97	**3**
Employee instruction	0.96	**2**	0.96	**1**	0.95	**2**	0.95	**2**	0.87	**8**	0.86	**11**	0.86	**10**

Table (5-7) Show importance of communication to processes of construction projects

From table (5-7) Importance of communication for the site engineering to facilities the activities with non-stop so that demand high degree of proper communication with vendors, according to that supplying material in the top of priorities to site engineering with RII (0.99), raise customer awareness about what happening in site during executing so the customer will be involve to the project and will be satisfy, Customer satisfaction sharing second rank (0.96) with employee instruction “daily conversation”. Follow that rest of project process with close variance in RII until the initiation public relation with lowest RII (0.8).

For project managers the customer satisfaction in the top of ranking because the project managers consider the connection between the client and the project also in first rank drawing, specification and employee instruction, and solving problems among employee in last rank admit to auto-solving without any communication with them, so that problems don’t effect on the project.

Architecture and designer rely on communication to achieve customer satisfaction in first place, follow that supplying material and employee instruction, and ignorance employee suggestion.

Quantity surveyor tendency to use communication to achieve customer satisfaction, supplying material, contract condition documents, cost and time control and to develop productivity. Ignorance communication to initiation public relationship with RII (0.67).

Others job titles give all concern to customer satisfaction and develop productivity through communication with IRR (1).

Figure (5-7) Show importance of communication to processes of construction projects, Researcher

Form figure (5-7) importance of communication represent with high degree in customer satisfaction and develop productivity, after that solving problems, safety (in this case need more sign to guide labor), project status report (powerful method to update the information need to get information continuously), contract condition documents (need to high degree of communication to decrease the dispute that may occur during the project life-cycle) sharing second place, cost estimating in third place demand daily contact with marketing because the fluctuating that occurs in Sudan. And at last place sharing cost and time control, employee suggestion (not important so that upward communication not excites) and finally initiation public relationship (just enough sign out of site to inform public).

5-3 Factors and barriers effect on communication:

Factors effect on communication	RII
Filtering/selective perception	0.97
Dual reports	1
overload information	0.8
Emotion judgment	0.88
Semantics	0.8
silence	0.77
Communication Apprehension	0.74
Inappropriate time for setting meeting	0.94
Time consume for meeting arrangement	0.89
Lack of clear objectives	0.97
Faulty transmission	0.97
Environmental problems	0.77
Physical distance	0.74
Lack of knowledge	0.86

Table (5-8) Show factors and barriers effect on communication in construction industry

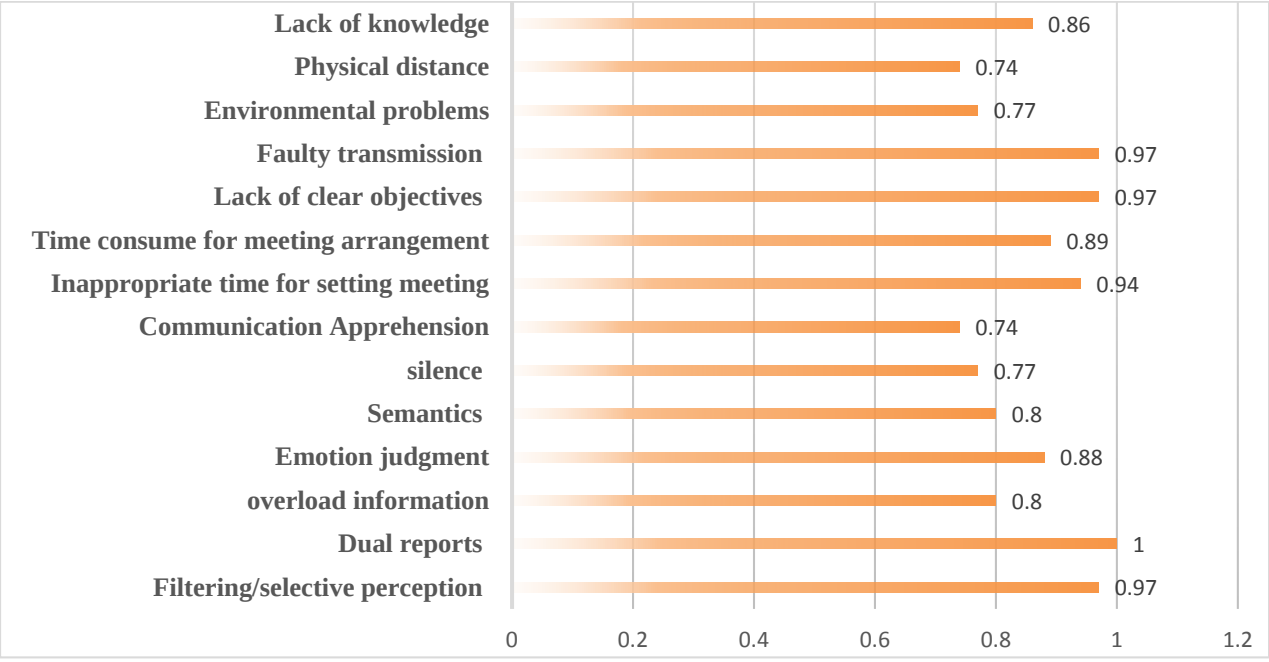


Figure (5-8) Show factors and barriers effect on communication in construction industry

From figure (5-8) Dual report consider the highest barriers among other factors in Sudan construction projects causes misunderstanding of information. Follow that faulty transmission (choose wrong medium) according to situation on hands. And also lack of clear objective in second place because the message lose the main principle (deliver information). One of major barriers of communication especially face to face are when and where meeting will set to collect all parties of project. The factor of interpersonal also involve through emotion by RII (0.88). The world develop and the method of communication also develop so learn how to use modern method be imperative, and lack of knowledge consider barriers with RII (0.86). And in bottom of barriers physical distance because the medium development decreases the effect of this barriers, and communication apprehension.

5-4 Company information:

- Communication strategy:

Figure (5-9) shows that the communication plan in construction companies, where analysis of questionnaire show that (50%) of companies don't have communication plan or strategy and (50%) have their own plan.

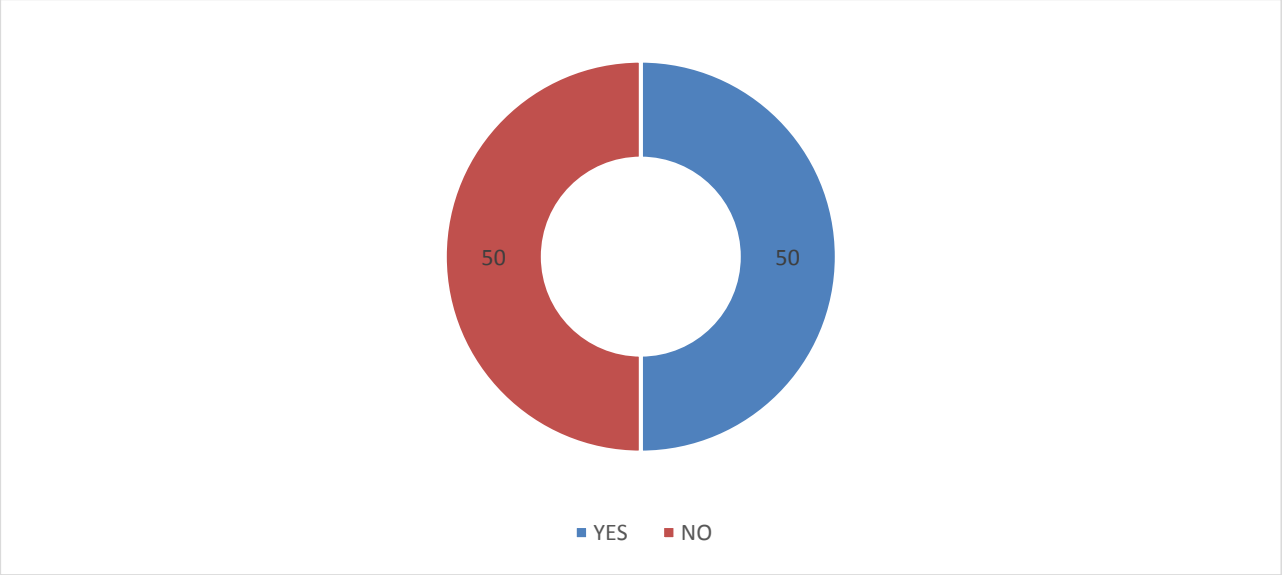


Figure (5-9) communication plan or communication strategy in the companies in Khartoum state, by Researcher

- **Communication Department in Sudan Companies inside Khartoum state:**

Figure (5-10) show that if there communication department in construction companies, where analysis of questionnaire show that (71.7%) of companies don't have communication plan or strategy and (28.3%) have it.

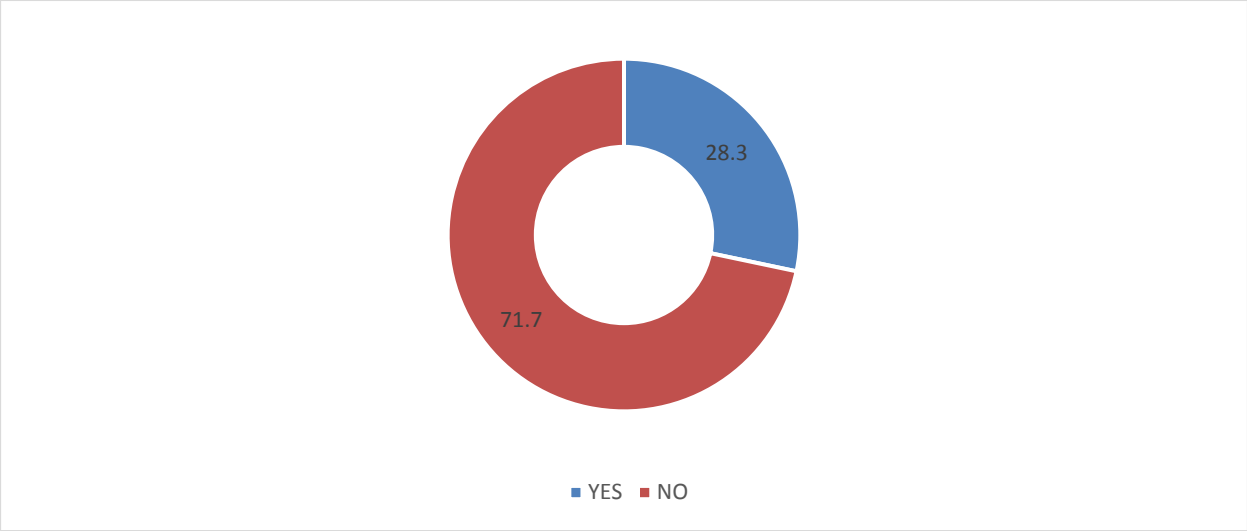


Figure (5-10) Department of communication and gathering information in Sudan Industry companies, by Researcher

- **Upward Communication:**

Figure (5-11) show the tendency to listen the workers' problems in Khartoum state, where analysis of questionnaire show that (23.9%) of companies listen to workers' problem and (76.1%) don't listen workers' problem.

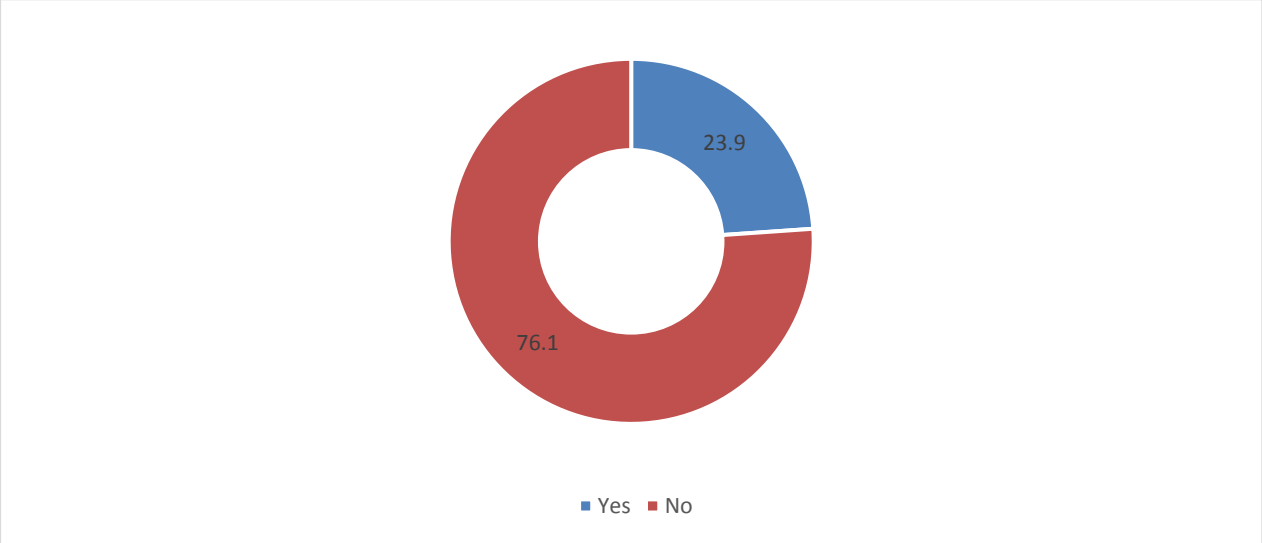


Figure (5-11) upward communication in Khartoum state, by Researcher

- **Communication playing vital role to deliver project in appropriate time and cost:**

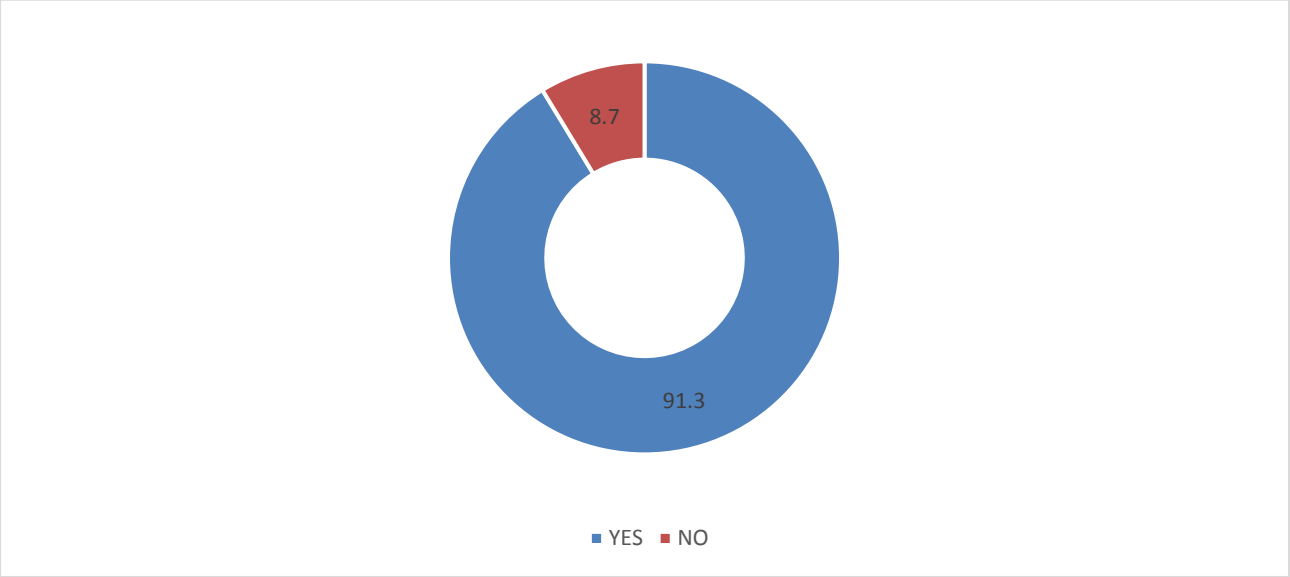


Figure (5-12) vital role of communication, by Researcher

Figure (5-12) show that if communication play vital role in construction companies, where analysis of questionnaire show that (91.3%) agree that communication play vital role and (8.7%) disagree that.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6-1 Conclusions:

The study was conducted in order to focus on the communication and information transfer between all parties involve the project life-cycle, and also to figure out the role and importance of communication as tool to achieve desirable goals, in addition to know and ranked the factors effect on communication. The following results were obtained:

I. (91.3%) from Construction company in Khartoum state admit that communication play vital role to achieve desirable goals

II. Lack of upward communication in Sudan construction industry by rate (23.9%). that may shifting top manager from on-going operation and operators so the project affected.

III. (71%) of construction companies in Khartoum state don't have communication department

IV. In initiation phase 1) formal written consider best way of making transfer of information follow that in order 2) face to face, 3) sign and visual communication, 4) E-mails, 5) telephone calls, 6) informal written and finally non-verbal communication

V. In planning phase formal written also consider best way of transmission of information then in order follow 2) face to face, 3) sign and visual communication, 4) E-mails, 5) telephone calls, 6) informal written and finally non-verbal communication

VI. In executing phase formal written also consider best way of transmission of information then in order follow 2) face to face, 3) telephone calls 4) sign and visual communication, 5) E-mails, 6) informal written and finally non-verbal communication

VII. In controlling phase formal written also consider best way of transmission of information then in order follow 2) face to face, 3) E-mails, 4) telephone calls 4) sign and visual communication, 6) informal written and finally non-verbal communication

VIII. In closing phase formal written also consider best way of transmission of information then in order follow 2) face to face, 3) E-mails, 4) telephone calls 4) sign and visual communication, 6) informal written and finally non-verbal communication

IX. In whole project life-cycle the priority of communication mediums in order, formal written

best way of transmission of information then in order follow 2) face to face, 3) E-mails, 3) sign and visual communication, 5) telephone calls 6) informal written and finally non-verbal communication

X. For site engineering the importance of communication represent in order to supplying material. 2) Employee instruction and Customer Satisfaction. 4) Drawing, Design and specification, WBS and Project Status Report. 7) Contract Condition Documents. 8) Cost Estimating. 9) Safety and solving problems. 11) Employee suggestion 12) Cost and Time Control. 13) Productivity and Performance Evaluation. And finally initiation public relationship

XI. For project manager the importance of communication represent in order to employee instruction, Drawing, Design and specification and customer satisfaction. Then 4) supplying material and contract condition documents. 6) Safety, WBS and productivity. 9) Initiation public relationship, cost estimating, project status reports and performance evaluation. 13) Cost and time control 14) Employee suggestion and finally solving problem

XII. In common the arrangement of importance customer satisfaction and productivity sharing first place, then 3) Safety, contract condition documents, solving problems and project status report. After that 7) supplying material and cost estimating. 9) Drawing, Design and specification. 10) Performance evaluation, employee instruction and WBS. And sharing last place Initiation public relation, cost and time control and employee suggestion.

XIII. The barriers affect communication in order:

1) Dual reports and two bosses.

2) filtering/selective perception, lack of clear objective and faulty transmission

3) Inappropriate time for setting meeting.

4) Time consume for meeting arrangement.

5) Emotion judgment.

6) Lack of knowledge to deal with modern method of communication.

7) Overload information and semantics.

8) Environmental problems and silence.

9) Physical distance in last place of barriers.

6-2 Recommendations:

I. Raise the awareness among the employee for importance of communication.

II. Bridging the gap between the top manager and employee by adopting the upward communication, giving more attention to problems concerning employees and work environment.

III. Making system or department of communication inside any company to sophisticate the whole operation in proper mechanism.

IV. Formal written consider the most important channel to deliver information, to decrease the dispute may occur later on when project in executing phase and grantee the rights for parties involve the projects by formal written.

V. Eliminate the dual bosses and dual report from the system, because the misunderstanding that may initiation by dual reports.

VI. Giving attention to interpersonal competence and their effect on communication.

6-3 Recommendations for future studies:

I. Modern communication methods

II. The role of communication in contractual phase

III. The economic effect of communication in construction industry

IV. The role of communication in solving conflict

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APPENDICES

Sudan University of Science and Technology
Postgraduate Collage

"Communication in construction Industry Questionnaire"

Supervised By Assistant Professor:
Awad Saad Hassan
Prepared by:
Mohamed Hassan Ahmed
Email: Kroooq13@gmail.com

This questionnaire focus on the communication and information transfer between all parties involve the project life-cycle according to chain of command. After that to figure out the role and importance of communication as tool to achieve desirable goals. Then to know and ranked the factors may effect on communication
The data collected through this questionnaires will be used only for the subject above MSc
Thank you for sharing your opinion

Part A) General Information

1- Personal Information:

Name (optional):_____
Company (optional):_____

Job title**:**

Project Manager ☐	Architect ☐	Site Engineer ☐
Quantity Surveyor ☐	Designer ☐	Other ☐

Work Experience**:**

0-2 ☐	3-5 ☐	6-10 ☐	11-15 ☐	Above 15 ☐

2- Company Information:

Does the company have a tendency to listen the worker's problems?
Yes ☐ No ☐

Does the company have department of communication and gathering information?
Yes ☐ No ☐

Is there a communication plan or communication strategy in the company?

Yes ☐ No ☐

Does communication play vital role in your company to deliver project in appropriate time and cost?

Yes ☐ No ☐

Part B) communication medium:

1- Important of medium or communication channel through the project life-cycle:

I- Initiation:

Response / Initiation	Extremely important	important	natural	Not important	Extremely not important
Formal Written					
Informal Written					
Telephone Calls					
E-mail					
Signs and Visual Communication					
Face to Face					
Nonverbal Communication					

II- Planning:

Response / Planning	Extremely important	important	natural	Not important	Extremely not important
Formal Written					
Informal Written					

Telephone Calls					
E-mail					
Signs and Visual Communication					
Face to Face					
Nonverbal Communication					

III- Executing:

Response / Executing	Extremely important	important	natural	Not important	Extremely not important
Formal Written					
Informal Written					
Telephone Calls					
E-mail					
Signs and Visual Communication					
Face to Face					
Nonverbal Communication					

-

IV- Controlling:

Response / Controlling	Extremely important	important	natural	Not important	Extremely not important
Formal Written					
Informal Written					

Telephone Calls					
E-mail					
Signs and Visual Communication					
Face to Face					
Nonverbal Communication					

V- Closing:

Response / Closing	Extremely important	important	natural	Not important	Extremely not important
Formal Written					
Informal Written					
Telephone Calls					
E-mail					
Signs and Visual Communication					
Face to Face					
Nonverbal Communication					

Part C): The importance of communication through the project:

Importance of communication in:	Highly Agree	Agree	Neutral	Disagree	High Disagree
Customer Satisfaction					
Supplying material					
Initiation Public Relation					
Contract Condition Documents					
Cost Estimating					
Drawing, Design and specification					
Work Breakdown Structure					
Safety					
Cost and Time Control					
Productivity					
Project Status Report					
Employee suggestion					
Performance Evaluation					
Solving problems among Employees					
Employee instruction					

Part D): The Factors and Barriers which effect on communication in construction Industry:

Factors may effect on communication:	**Highly Affected**	**Affected**	**Neutral**	**Unaffected**	**High Unaffected**
Filtering/selective perception manipulating information so the sender/receiver will see/hear it more favorably/selectively.					
Dual reports and dual bosses					
When individuals have more information **overload information** will occur.					
Emotion judgment					
Semantics this infers difficulties in transferring the meaning of information from one person to another					
Employee **silence** means to managers lack of information about ongoing operational problems.					
Communication Apprehension difficult to talk with others face-to-face					
Inappropriate time for setting meeting					
Time consume for meeting arrangement					
Lack of clear objectives					
Faulty transmission usually occurs because the message is sent via an inappropriate medium or channel					
Environmental problems from distractions and noise					
Physical distance					
Lack of knowledge to deal with modern method of communication					

Project Communication Plan
District 8
Project 34040K
SB-395
Permits and Environmental Studies Phase

Introduction and Background

The purpose of the Project Communication Plan is to provide consistent and timely information to all project stakeholders. This plan will assist the project team in building an effective communication strategy to enhance communication throughout project delivery.

The project manager assigns team members to create the communication matrix with input from the PDT members. Figure 4 shows the communication matrix template.
The project manager assigns team members to create the stakeholders analysis with input from the PDT members. Figure 3 shows the stakeholders analysis template.

This project is one of the two segments of the proposed improvements on US-395 from I-15 to SR-14. The location of this project is from the junction of I-15/US-395 to 0.5 miles south of Farmington Road. The first part of this segment from I-15 to Purple Sage Road will be realigned and widened to a 4 or 6-lane freeway. The second portion from Purple Sage Road to Farmington Road will be widened to a 4-lane expressway.

Project Team Representatives

Project Sponsor: Frank White
Project Manager: Lisa Gonzales
Assistant Project Manager: Maher Ahmad
The PDT is made up of the following Project Team Representatives:

Name	Division	Telephone
Lisa Gonzales	Project Management	(909) XXX-XXXX
Maher Ahmad	Project Management	(909) XXX-XXXX
Wendy Young	Design I	(909) XXX-XXXX
Donald Johnson	Planning	(909) XXX-XXXX
Michael Burns	Environmental Cultural Studies	(909) XXX-XXXX
Allen Wong	Construction	(909) XXX-XXXX
Ram Vapari	Design I	(909) XXX-XXXX
Tanya Khan	Materials	(909) XXX-XXXX
Mary Lee	Environmental Project Management	(909) XXX-XXXX
Ian Jones	Right of Way	(909) XXX-XXXX
Ricky Scott	Public Affairs	(909) XXX-XXXX

Stakeholders Analysis

EA Number: 34040K

District/Cty/Rte/PM: 08-SBD-395-0.5

Project Manager: Lisa Gonzales

RBS Group	Function	Name	Telephone	Stakeholders Goals on this Project	Preferred Method of Communication	Second Preferred Method of Communication	Preferred Method for Rewarding the Team
106	Project Management	Lisa Gonzales	(909) XXX-XXXX	Efficient project completion	email	cell phone	Team Celebration
140	Project Management	Peggy Wright	(909) XXX-XXXX	Project completed within cost, scope and schedule	email	telephone	Team Celebration
146	Program Management	Robert Johnson	(909) XXX-XXXX	Keep project on track	email	telephone	Certificate
147	Capital Outlay Mgmt	Fred Carter	(909) XXX-XXXX	Secure funding	email	telephone	Team Celebration
168	Envr-Biological/Permits	Slandra Vijay	(909) XXX-XXXX	Having all mitigation	email	telephone	Team Celebration
170	Envr-Mgmt	Jim Black	(909) XXX-XXXX	Environmental requirements covered	email	cell phone	Team Award
178	Envr-Cultural	Paul Hernandez	(909) XXX-XXXX	Complete mitigation	email	cell phone	Team Award
195	Forecasting	David Blake	(909) XXX-XXXX	To produce accurate data	email	in person	Team Celebration
233	Design P	Fathi	(909) XXX-XXXX	plans	telephone	email	Team Celebration
236	Design I	Wendy Young	(909) XXX-XXXX	Meet the functional design	cell phone	email	Team Award
303	Agreements	Cathy Pickett	(909) XXX-XXXX	Clear and concise agreements	email	telephone	Certificate
308	Surveys/RW Engineering	Nasreem Maljal	(909) XXX-XXXX	Accurate and timely right of way maps and deeds	email	telephone	Team Celebration
312	Hydraulics	Ron Ho	(909) XXX-XXXX	No change orders/As-Builts	email	telephone	Team Celebration

327	Materials Engineering	Ken Lee	(909) XXX-XXXX	Minimum amount of retesting	email	telephone	Team Celebration
332	Envr-Engineering	Norma Sanchez	(909) XXX-XXXX	To find acceptable mitigation sites	email	telephone	Team Celebration
340	L/S Architecture – Br. A	Peter Tanaka	(909) XXX-XXXX	Public Support	email	telephone	Team Award
341	L/S Architecture – Br. B	Loren Bird	(909) XXX-XXXX	Positive feedback from the public	email	telephone	Team Celebration
351	Truck Service Manager	Susan Wong	(909) XXX-XXXX	No equipment delays	email	telephone	Team Celebration
365	Operations Services	Mark Brown	(909) XXX-XXXX	No traffic accidents	email	telephone	Team Celebration
368	Operations-Surveillance	Amanda Flores	(909) XXX-XXXX	Positive feedback from the public on traffic lane	email	telephone	Team Award
370	Transportation Mgmt	Kamal Ghol	(909) XXX-XXXX	No complaints from the public	email	telephone	Team Celebration
375	TMP/District Traffic	Yang So	(909) XXX-XXXX	No traffic accidents	email	telephone	District Director Recognition
380	Traffic Design – SBD	Anita Moore	(909) XXX-XXXX	Meet the traffic design	email	telephone	Team Celebration
381	Traffice Design B	Ted Martin	(909) XXX-XXXX	Positive feedback on plans	email	telephone	Team Celebration
391	Freeway Systems	Nigel Gallagher	(909) XXX-XXXX	Constructability	email	telephone	Team Celebration
392	Electrical Operations	Samer Anssari	(909) XXX-XXXX	Electrical systems in place	email	telephone	Team Award
396	Electrical Design B	Frank Ortiz	(909) XXX-XXXX	Meet electrical design	email	telephone	Team Celebration
400	Right of Way	Jose Ferrer	(909) XXX-XXXX	RW Certification	email	telephone	Team Award
529	Field Construction	Kelly Flake	(909) XXX-XXXX	Construction per design	in-basket	telephone	District Director Recognition
External							
Local Governmen	SBd Co Transportation	Larry Floyd	(909) XXX-XXXX	Public Support	telephone	cell phone	Team Celebration
U.S. Governmen	Bureau of Land Management	Patty Zhu	(909) XXX-XXXX	Stay involved until project is complete	email	U.S. Mail	Team Celebration