ASSESSMENT MODEL FOR COMMUNICATION MATURITY LEVELS OF CONSTRUCTION COMPANIES

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ABSTRACT

ASSESSMENT MODEL FOR COMMUNICATION MATURITY LEVELS OF CONSTRUCTION COMPANIES

Communication management systems are vital parts of organizational development and performance. Organizations have complex characteristics including decision making, information aggregation, management control, career concerns, goal setting and vertical and horizontal communication. In recent years, it has been found out that communication has an important effect on all these characteristics. But quantifying the effectiveness of the communication is difficult because it has many non-measurable variables. An effective communication can increase the level of effectiveness of the organization and the level of the effectiveness of communication system can be assessed by using maturity models. A maturity model describes the activities of processes and it impacts the performance of the organization. To find out the structure and maturity level of the communication system in a construction company, the Communication Capability Maturity Model (CCMM) is developed and its levels for communication maturity. To define a maturity level for a construction company, some variables of communication are measured as speed, the purpose, spread, clarity, shortness, scope and the other variables. The developed methodology uses a questionnaire survey. Survey has two parts; (1) organizational communication system and (2) emotions/moods of the employees. The results and analysis show that developed CCMM working properly and there are strong interdependencies between the variables (i.e. organizational communication system and moods, information, organization, team, individual and product).

There is a negative moderate high correlation between communication capability maturity level (CCML) and negative moods. There is a moderate high correlation between the communication capability maturity level and level of emotional management behavior.

ÖZET

İNŞAAT ŞİRKETLERİNİN İLETİŞİM OLGUNLUK SEVİYELERİNİ DEĞERLENDİRME MODELİ

İletişim yönetim sistemlerinin organizasyonel gelişim ve performans açısından hayati önemi vardır. Organizasyonlar, karar alma, bilgi toplama, yönetim kontrolü, kariyer kaygıları, hedef belirleme ve dikey ve yatay iletişim de dahil olmak üzere bir cok karmaşık özelliğe sahiptir. Son yıllarda organizasyonlarda iletişimin, tüm bu özellikler üzerinde önemli bir etkisi olduğu tespit edilmiştir. Etkili bir iletişim organizasyonun etkinliğinin seviyesini düşürebilir ya da yükseltebilir fakat iletişimi nicel olarak tanımlamak zordur çünkü içinde birçok ölçülemeyen bileşen barındırır. Etkinlik düzeyi olgunluk modelleri kullanılarak tespit edilebilir. Olgunluk modelleri faaliyetleri veya süreçleri ve performansı veya etkinliği tanımlamak için kullanılan modellerdir.

Bir inşaat firmasının iletişimin yapısını ve olgunluk seviyesini tanımlayabilmek için Yetkinlik Olgunluk Modeli (CMM) tanımı ve iletişim seviyeleri model olarak alınacaktır. bir inşaat firmasındaki olgunluk seviyesini tanımlayabilmek için hız, amaç, yayılım, açıklık, kısalık/uzunluk ve kapsam gibi bazı değişkenler kullanmıştır. Geliştirilen model bir anketli bir araştırma yöntemi kullanır. Anket iki ana bölümden oluşur; (1) organizasyonel iletişim sistemi ve (2) çalışanların duyguları /ruh hali. Sonuçlar ve analizler oluşturulan modelin düzgün bir şekilde çalıştığını ve değişkenler arasında bağıntılar olduğunu göstermiştir.

Örneğin, organizasyonel iletişim olgunluk seviyesi ile negatif ruhsal durum arasında ters yönde orta seviyede yüksek bir ilişki vardır. Bunun yanında organizasyonel iletişim olgunluk seviyesi ile duygu surumu arasında orta seviyede yüksek bir ilişki vardır

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CHAPTER 1

INTRODUCTION

Human organizations have complex characteristics including decision-making, information aggregation, management control, career concerns among others, goal setting and vertical and horizontal communication (Jehiel, 1999). In recent years, it has been found out that communication has an important effect on all these characteristics. Not only in business organizations, in all society communication acts as glue that holds the people together (Bovee and Thill, 1989). An organization cannot function well without an effective communication because it has important roles as; setting goals and objectives, making and implementing decisions, measuring results, hiring and developing staff, exchanging necessary information and dealing with customers. The communication in an organization has a direct effect on the performance of a company with all these functions. Also communication has an important role on setting goals and objectives, decision-making process, solving conflicts and coordinating activities (Jehiel, 1999).

Although communication recognized as the major activity of management in a company, many organizations do not specify their communication policies (Greenbaum, 1974). Investigations claimed that there has been important problems and effectiveness in the downward and upward communication and also in horizontal communication. And some researchers stated that most of the organizations have a general lack of awareness about communication in the workplace and that has to be studied. While poor communication in a company can cause misunderstandings and conflicts, an effective communication can decrease the level of effectiveness of the organization (Greenbaum, 1974).

For an effective communication development, organizational communication system must be well defined and functional. A defined organizational communication system is essential for the effectiveness of the organization, to reach a desired maturity level and manage the processes, which enable change, adaptation and innovation. The subject of defining an organizational communication system is limited in the literature. General system definition is based on aim, separated units and interrelation of these

units. System theory helps to put together the separated units of communication together and linking the communication activities and elements. So by this approach it is important to visualize the factors as an integrated whole (Blazenaite, 2011).

In the organizational communication system, the factors defined can be categorized as verbal communication factors. But in recent years, it has been found out that emotions and moods are important for constructing an effective communication system. Emotions and moods cannot be separated from the work environment. In this thesis, to define an overall assessment model for effective organizational communication, models are used as PANAS and Emotional Behaviors Management as tools for assessing moods and emotions.

The level of effectiveness can be assessed by using maturity models. A maturity model describes the activities or processes and they classify the performance or effectiveness from ad hoc level (Level 1) to world class (Level 5). To climb from level 1 to level 5 requires more mature and systematic actions. Generally, maturity models have levels and one more level called level 0 as general lack of awareness. The organization survives in all levels and survival is basic in a hierarchy of organizational needs but if the company wants to move beyond survivals, it has to move to a new maturity level. So the assessed maturity level of the organization shows us the current position and where aims to be in the future.

In this study, the steps listed above are used for assessing the communication maturity level of a construction company,

- Organizational communication system is analyzed in terms of aim, organizational communication units and interdependencies between the units.
- Units that are called as organizational communication factors are defined for the internal organizational communication.
- A maturity grid approach for organizational communication system by using the Capability Maturity Model. A Communication Capability Maturity Model is defined
- Positive and Negative Affect Schedule for assessing the level of moods as non-verbal communication
- Emotion Management Behavior Level method is used for emotions as non-verbal communication that is related with the feelings.

- Interdependencies are both between the factors of organizational communication system and between the factors and emotions/moods.

An overall model for assessing the maturity level of a construction company is created within the boundaries of organizational communication system that defined in terms of the aim of the organizational communication process, factors that affect the organizational communication and interdependencies of these factors within the communication system.

1.1. Problem Definition

Communication has become an important topic since 1950's. Communication management system in complex projects, especially in the construction industry has become a major topic since 1970's. Architecture, engineering and construction projects have high complexity that need to meet the financial, social, and environmental goals (Senescu et al., 2013). To manage this complexity, project teams would communicate effectively and collaborate within the projects, understand the information generated and share information between the different phases of complex projects.

Communication is a major factor that affects the performace of a company. Maier et al. (2006) stated that for project success or failure communication has an essential role and communication must be understood and organized affectively. Especially in complex processes communication plays an important role because for a single individual, it is not possible to run all the construction process. Different professionals from related fields participate in the process. According to Mulcahy (2009), communication is the most frequent problem in every project and project managers spend 90 percent of their time communicating. It is important to find the gaps in the communication process.

Organizational communication system defines organizational communication in a systematic way that consists of aim, units and interdependencies. Effective communication is the main goal of the communication activities and the units are defined as the factors that effect communication.

Maier et al. (2004) claimed that many factors effect communication in design that can be classified under five factors as; environment, organization, team, personal

and product design. These factors directly or indirectly affect the communication process but communication is a multi-faceted process so it is not easy to fully understand the communication process or maturity of it in an organization. Although many researchers stated that communication has an essential role on project success (Blazenaite, 2011; Chiu, 2002; Maier et. Al, 2006;2011), there are a few studies assessing the level of communication maturity. Maturity literally means notion of development from an initial to a more advanced state (Maier et al., 2006).

Many organizations conduct maturity assessments for many different subjects (Project management, learning theory etc.). Assessment levels for any subject gives the advantage of the understanding the major opportunities to start an improvement program and measure the effectiveness of the improvement activities. Organizational communication maturity level can help the organization to have knowledge about communication gaps and increase the maturity level of the organization.

The goal of this study is to construct a Communication Capability Maturity Model (CCMM) for construction companies. Furthermore the study aims to analyze the CCMM levels and the interdependencies between the variables.

1.2. Background

1.2.1 Communication Effectiveness for the Construction Companies

Communication satisfaction and assessing the satisfaction level of the communication has the earliest example of Herzberg (1966). But one of the most important researches is the communication satisfactory questionnaire of Downs and Hazen (1977).

Communication in construction process has been an important topic since 1960's. In 1965 Higgin and Jessop made a detailed investigation about communication in construction projects (Murray et al., 2000). Their study was on the informal communication because they claimed that most of the uncertainties are occurred based on informal procedures in communication. Besides verbal communication and assessing communication, non-verbal communication and emotions has become an important topic since the end of 1980's.

There are few studies based on communication in construction, which is an important topic since 1970's. Some of them based on the research of Emmitt and Gorse (2007) are,

- Goffman (1974) made a study based on the site meetings of the construction industry.
- Kreiner (1976) conducted a research on the Danish construction sites, which analyze the social relationships on the construction site. The study is based on the communication during the construction phase.
- Wallace (1987) researched on the communication during the pre-contract phase between four actors as architects, clients, consulting engineers and quantity surveyor.
- Gameson (1992) investigated the communication between building clients and building professionals,
- Pietroforte (1992) worked on the communication during the construction phase and his study was based on the both formal and informal communication on the site.
- Bowen (1993) has conducted a cost communication questionnaire. This study is related with the cost data and price models.
- Loosemore (1996) studied on the patterns of communication process during the crisis on the construction site.
- Hugill (2001) worked on the team meetings in construction projects during the construction phase.
- Gorse (2002) worked on the real life project meetings in construction.
- Abadi (2005) analyzed the media factor of the communication. The study is based on the use of media in different stages of the construction process.
- Emmitt and Gorse (2007) made an overview about the interpersonal communication in construction and review of the methods used previously also for the other fields.

1.2.2. Maturity Levels

Researches based on maturity have been applied in many areas since 1990's in the areas of new product development, product cycle-time excellence, innovation, project management and assessing people with capability maturity model (Maier et al., 2006). Maturity grids are originated to the quality management maturity grid of Crosby. In order to improve product quality Crosby defined a five level quality grid which the levels are range from uncertainty, awakening, enlightenment, wisdom and certainty (Maier et al., 2006).

In this thesis, Capability Maturity Model is used and adapted which has roots on the Crosby's Maturity Grid and most commonly used maturity model. Capability Maturity Models are mostly used to measure the maturity level of an organization, which performs an action or product, by required processes. CMM is developed by Software Engineering Institute of Carnegie Mellon University and they define key performance areas from the initial level to optimized level CMM describes the improvement of a process from ad hoc level to a mature, disciplined and optimized level (Kumta and Shah, 2002).

1.3. Objectives

This thesis aims to develop an assessment model for communication maturity levels of construction companies (C-CMM). There are many studies about the maturity level of an organization and some researches about the maturity level of e-mail communication in an organization, but there is nothing about the maturity level of the overall communication in a company. The organizational communication maturity model has to include both organizational communication system and moods and emotions. A model for assessing the organizational communication maturity level is designed which has mainly two sections as for organizational communication system and emotions and moods communication. In the communication system part, a maturity grid approach is applied by using the Capability Maturity Model. In the moods and emotions part the emotional level are assessed by using PANAS and a method for Emotional Management Behavior for managers.

A questionnaire survey is conducted for assessing the overall communication maturity level of a construction company. The objectives of this thesis are,

- Define organizational communication as a system based on aim, units and interdependencies.
- Find out the factors that affect communication maturity of a construction company
- Construct an assessment model for the level of the organizational communication system in the construction companies by using Capability Maturity Model and Maturity Grid method
- Develop an assessment model for the level of emotions and moods in the construction companies by using PANAS and Emotional Management Behavior Model
- Analyze the current organizational communication maturity levels of the construction companies
- Analyze the findings and detect the gaps in the organizational communication process
- Analyze the correlations between the factors that effect the communication system.

1.4 Research Motivation

Although construction is a very complex project with the many participants such as architects and engineers, there is a little research about the communication between them. Besides that in a construction process the participants may be located in different zones and that makes the communication process more important. In every project, participants spent most of the time by communicating but very low importance is given to the communication problems. Researchers showed that communication must be planned, controlled and structured in an appropriate way. Mulcahy (2009) stated that project managers give different importance to the communication process based on the experience,

- Beginner project managers: They do nothing about communication except status reports

- Better project managers: They Might create a communication management plan and report information more than status
- Great project managers: They send status reports, create communication plan, share knowledge more than status, know what the participants need as information, visit team meetings and limit communication problems.

The maturity level of organizational communication is very important construction companies for efficient communication but in the literature there are few studies about the maturity levels of communication, fewer studies about the communication maturity level of construction companies and no studies based on both verbal and non-verbal communication which defined in this study as organizational communication system and moods and emotions and interrelations between them.

1.5 Methodology

In order to define a model for assessing the communication maturity level of a construction company the following steps are followed;

- Organizational communication system is defined based on aim, factors and interdependencies between these factors
- Key factors affecting the communication are defined by using the literature
- A pilot study is made based on the literature and results are analyzed
- A Delphi study is conducted with 5 experts for assessing the weighted values of the key factors in the questionnaire
- According to the results of the Delphi study a new questionnaire is formed
- Communication Capability Maturity Model is defined and applied to maturity-grid method
- Questions from the PANAS are selected from the literature and designed a questionnaire with 5-Likert scale
- Emotional Behavior Management questions are selected from the literature and designed a questionnaire with a 5-Likert scale
- Final questionnaire is applied to participants who are architects and engineers working for a construction company

- Questionnaire is analyzed in three parts and correlations/ interdependecies between elements are found.

1.6. Research Limitations

Construction is a complex process and communication in construction is not straightforward. As Maier et al. (2006) stated,

- It is hard to find a universally acceptable criteria for good communication
- Factors that affect communication are not independent from each other
- The process of communication is not straightforward

It is not easy to analyze communication maturity level of an organization because the factors that affect communication process are not independent from each other and assessing non-verbal communication is a complicated process.

Maturity grid method is chosen to assess the level of organizational communication system and in each question every maturity level has definitions separately. When applying the questionnaire to the participants is became a disadvantage to have a long questionnaire which every level has its own definition. For this reason, the participants of the research are limited by the people who admitted to answer the long questionnaire and completed the questions. Also, it has to be remembered that under different conditions, in a different context, in different times this research may produce different results.

CHAPTER 2

LITERATURE REVIEW

2.1. Organizational Communication

Communication acts like a binding element in the society. This is same in organizations and used to reach a common goal between the individuals of an organization. Some researchers claimed that in an organization, achieving the goal and objectives of the organization is the most important function of the communication.

Greenbaum (1974) claimed that organizational communication includes message sending and receiving activities between individuals around a common goal. The organizational unit may have different goals and objectives but the goal of the company includes all of them. He defined the organizational communication in terms of purpose, operational procedures and structure. Purpose is to reach the organizational goal. Operational procedures can be defined by adopting communication policies that are appropriate for communication network objectives, implementing them throught communication actions. Structural elements are organizational units, communication networks, communication policies and communication activities. Messages generally identified by verbal components of the communication but organizational communication must be identified by all communication types as verbal and non-verbal communication that affects the behavior of the individuals (Greenbaum, 1974). Chiu (2002) emphasized the same topic with Greenbaum (1974), as the organizational communication is highly important for achieving goals of the company, which the goal is the efficiency. Taylor and Cooren (1997) argues that ‘communication becomes explicitly organizational, when a collective agency finds expression in an identifiable actor, and the actor is recognized by the community as a legitimate expression of such agency’. The units of the organization can be defined under three terms which are functional relationships, personnel characteristics and situational factors. Communication skills can be found under the category of personnel characteristics (Greenbaum, 1974). Most of the organizational communication definitions include a common goal.

It is not suprising that recent researchers mostly studied on the effectiveness of the communication and performance of the organization. People in an organization has to work around a common goal as mentioned and the ways used to reach this goal and the probability of being successful is the heart of the performance of the company. Also this includes a high level of knowledge sharing which can be possible with an effective communication. After 1969, investigations found out that there is an important ineffectiveness in both vertical and horizontal levels of organization.

Jablin and Putnam (2001) stated that the theoretical backround of organizational communication date to 1960's. Tompkin (1967) analyzed the organizational communication by dividing it to two categories as,

- Formal and informal channels of communication
- Superior-subordinate relations of the communication

Redding (1972) claimed that every input in an organization could be understood as a potential message. So he gave importance to both verbal and non-verbal communication. His study is essential for connecting the communication theory to the roots of organization (Jablin and Putnam, 2001). Jablin and Putnam (2001) stated that there are three ways to conceptualize the organizational communication that are,

- To study on the development of organizational communication subject in departments. The main concern is the history of organizational communication, how many people are working on the subject and what publications are made,
- Second way is to study communication as a phenomenon, which exists in organizations. The main condern is the logic behind the organizational communication, the variables of it and subdivisions of organizational communication. Jablin and Putnam (2001) claimed that, this way is more richer and the main point of organizational communication act,
- The third way is to study on communication to understand the organization.

2.2. Communication Management

Communication management is one of the knowledge areas of project management. According to PMBOOK (2000), communication management consists of

processes to generate, collect, disseminate the knowledge and project information timely and appropriately. Communication management provides important connections between people, ideas and information.

Table 2.1. Project Management Knowledge Areas

Project Management Knowledge Areas
Project Integration Management
Project Scope Management
Project Time Management
Project Cost Management
Project Quality Management
Project Human Resources Management
Project Communications Management
Project Risk Management
Project Procurement Management

Communication management includes four phases which are;

1. Communications Planning- basically, who needs information when and how. Communication planning is linked to organizational planning but the choice of organizational structure has an important effect on the communication requirements.
2. Information Distribution- making the information available. In the information distribution phase communication skills are essential and communication dimensions can be listed as;
    - Written and oral, listening and speaking
    - Internal and external
    - Formal and informal
    - Vertical and horizontal
3. Performance Reporting- performance information. The process of performance reporting includes phases as;
    - Status reporting which describes where the project now stands
    - Progress reporting which describes what the project team has accomplished
    - Forecasting which describes the predicted future

4. Administrative Closure- generating and gathering information. This process includes the documenting the project results and archiving.

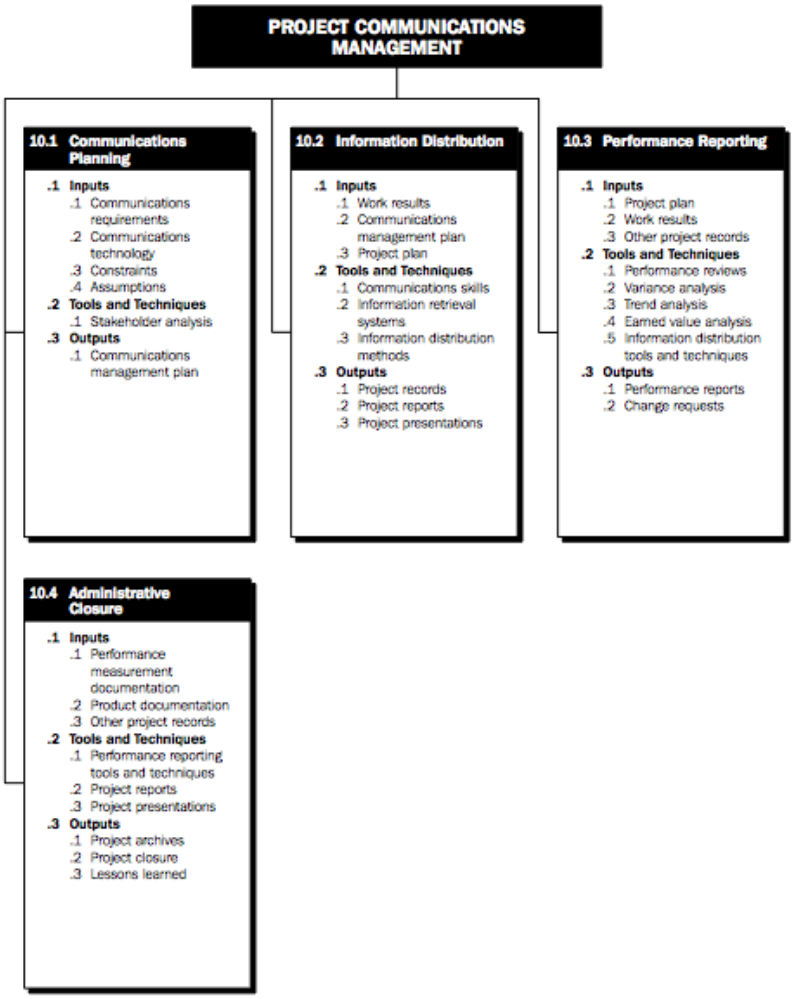


Figure 2.1. Project Communication Management
(Source: PMBOOK, 2000)

In this study, communications planning and information distribution and partly performance reporting processes are taken as a consideration. Administrative closure phase and partly performance reporting phase starts after achieving the project objectives. In this study, processes during the project will be analyzed. During all projects, information is distributed in different ways but it is important to know how it will be shared, who need which information and which method is suitable. The answer of these questions constitutes the communication management plan at the end of the communications planning phase (PMBOOK,2000). Although the project communication management is similar with general management skills of

communicating, communicaiton is a broader subject that includes sender-receiver models, choice of media, writing style, presentation techniques and meeting management techniques (PMBOOK, 2000).

According to Mulcahy (2009), in the project management communication process the communication management can be seen at phases which are;

- Identify stakeholders
- Develop stakeholder management strategy
- Determine how you will do planning
- Determine all roles and responsibilities
- Plan communications
- Go back-iterations
- Finalize the “how to execute and control” parts of all management plans
- Develop final Project management plan and performance measurement baseline that are realistic
- Request changes
- Send and receive information
- Hold meetings
- Take action to control the project
- Measure performance against other metrics determined by the project manager
- Determine variances and if they warrant a change request
- Influence the factors that cause changes
- Request chances
- Create forecasts
- Report on project performance

Mulcahy (2009) defined some types of communication and in which circumstances the project manager will each of them as seen in Table 2.3. To have a clear and effective communication, the project manager must choose the best type of communication.

Table 2.2. Usage of Types of Communication
(Source:Mulcahy, 2009)

Types of Communication	**When**
Formal Written	Project managent plans Complex projects Communicaitong over long distances
Formal Verbal	Presentation Speeches
Informal Written	E-mail Hand written notes
Informal Verbal	Conversations Meetings

2.3. Communication in Construction

Construction is a goal and project oriented process which every person work for different tasks and need different kind of information but around the same goal. Emmitt and Gorse (2007) stated that effective communication is very important in construction between teams and individuals to be successful of the construction process.

In construction, the effectiveness of the communication process has an important role in the success of the project. Communication between organizations and individuals are important in the construction process but the communication between different actors from different disciplines is the main interest point. In construction project management, communication is the most important factor for success because leadership and decision-making process depends mostly on the effectiveness of the communication. In a very dynamic environment as construction where uncertainty is common and nothing is stable for a longtime, interaction between individuals and the effcetiveness of that interaction becomes the most important factor for success. Best practices and experiences should be shared through communication to optimize the construction processes (Emmitt and Gorse, 2007).

Relational qualities are necessary for effective communication that is important for improving the construction process. There are a few studies about construction communication research starting 1970's. According to (X), communication between different actors of process is used to,

- Resolve professional differences
- Clarify conflicting requirements
- Overcome crisis (X)

Communication can be analyzed in many stages of construction process as;

- Communication research during the feasibility stage
- Communication research during the pre-contract phase
- Communication research during the construction phase

Diekmann et al. (2008) stated that construction projects are based on two factors;

1. Technical components of the construction process must be planned and managed effectively
2. High performance team must be developed by the project participants.

In his study, the main focus point is the social network model. The main idea of the social network model is teams that have knowledge sharing principle, shared values and trust among the participants can achieve results that exceed expectations. This model has two main components as dynamics and mechanics as seen in Figure 2.2. The component mechanics means what items in a project are exchanged to finish that project. The components dynamics means the items in a project that motivates project teams for exchanging the items in the mechanics list (Diekmann et al., 2008).

Both components have a high important for completing a task in construction companies and Diekmann et al.(2008) defined these components which have high importance in the project effectiveness and project success. Most of them are effective factors for the construction communication maturity level as,

- Reliance: The schedule of the construction process is means that every participant of the process is responsible for completing the task and the other participants rely on this. There is no emotional breakdown when the job is not done according to the schedule.
- Trust: Trust is the third level of dynamics. Reliance and trust are often used instead of each other but they are different. Trust is a personal issue which means that
- Values: The network which the members share same values as responsibility, integrity, honesty, morality, quality and timeliness can achieve higher performance.

- Communication: It is the most general parameter. Communication exists as a body in the construction process and in the current context communication focuses on the informal network between the members of the construction project, which is critical for success.
- Information Exchange: There are two directions in information exchange which are; one direction can be defined as when a member has a group of individuals which are needed to complete the own assigned task, second direction can be defined as there are individuals that need information for completing their assigned tasks.
- Knowledge exchange: This is a strategic component that is important to get higher performance results. Focusing on the information process creates reactive process while focusing on the knowledge exchange creates proactive process.

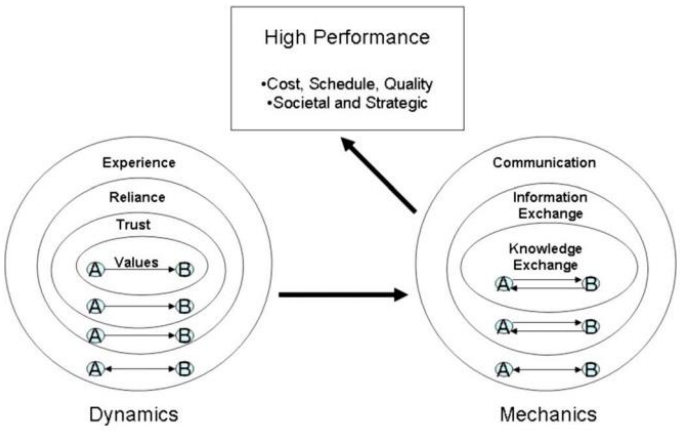


Figure 2.2. Social Network Model for Construction
(Source: Diekmann et al., 2008)

2.4. Organizational Communication as a System

Ference (1970) stated that many factors affect the process and the information processing in the communication system. He analyzed the decision process of the individuals and at the communication system definition focused on the information sending and receiving process of the individuals. He defined a model with three stages, which are,

- Defined five stages in the organization's problem-solving efforts
- Defined variables which are related with the process

- Propositions are made about the effects of the variables

Greenbaum (1974) defined organizational communication in terms of message sending and receiving activities as Ference (1970) but defined the communicaiton system in terms of pupose, operational procedures and structure. He stated that these parts of the systems are interdependent and affects each other. There are many variables that he defined as,

- Policy statements
- Procedures
- Rules
- Problem solving
- Adaptation to change
- Implemantation of new idea processing
- Promotion
- Information
- Instruction that enables the work done

Greenbaum (1974) stated that the purpose of the assessment of the communication system is to analyze if communicaiton network objectives are being achieved related with policies and activities within the system. Communicaiton networks are interdependent and organizational goals are essential for defining the objectives of the communication.

Table 2.3 References of the System of Organizational Communication

No	Referance	Subject of the Study	Outcome	Year
1	Ference, T.P.	Organizational Communication Sytems Based on Decision Process	Examined the organizational decision process from the perspective of organizational communication system	1970
2	Greenbaum, H.	Audit of Organizational Communication	Organizational communication is defined in terms of purpose, operational procedures and structural elements	1974
3	Shelby, A.N.	Organizational, Business, Management and Corporate Communication	Defined the boundaries and interralationships of communication for many perspectives	1993
4	Beck et al.	System Theory and Human Communication as a System	Defined Communication from a transactional process model including rhetorical processes	2005
5	Blazenaite, A.	Effective Organizational Communication	Defined an overall model for organizational communication system	2011

Shelby (1993) analyzed the boundaries of communication in terms of organizational, management and business communication and stated that the system is essential for communication. Constructing a conceptual model based on the structure and system of organizational communication starts with the finding out the variables of the system and interactions between them. Some researchers limited the scope of the organizational communication based on communication system as follows;

- Koehler and Taugher (1982) stated as "Comprehensive, systematic treatment of measurable communication variables and relationships"
- Witkin and Stephans stated as "Those interdependencies and interactions among and within subsystems through the act of communication, which serve the purposes of the organization" (as cited in Shelby, 1993)

Beck et al. (2005) claimed that the model of a system must identify the elements, the linkages between the elements and the principles. This model can be used by any kind of system theory and a basic system model can be visualized as Figure 2.3.

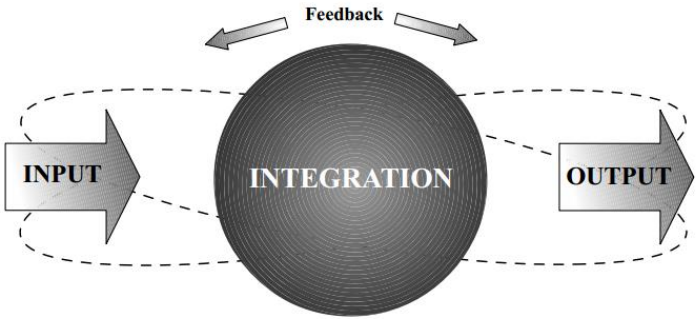


Figure 2.3. Basic System Theory Model
(Source: Beck , 2005)

Communication system is a number of related units that operate together to reach a common goal (Blazenaite, 2011). Some of the interconnected sub-systems of organizational communication are technological, managerial, verbal, non-verbal, formal, informal etc.

2.5. Basic forms of Communication

There are some basic forms of communication. Bovee and Thill (1989) stated that these basic forms are verbal and nonverbal communication types, also verbal communication includes oral and written verbal communication types. Some researchers as Bovee and Thill (1989) take the computer based communication as verbal communication form, some of them analyzed it different from other types (Barret and Turtz, 1998) because nowadays computer and technology based communication has a great effect on organizations.

2.5.1 Verbal Communication

Verbal communicaiton includes both oral and written communication. In verbal communication it is always important to know how to put the words together. Sending messages process includes writing and speaking and taking messages process includes reading and listening.

Computer-focused communication is a kind of verbal communication and in recent years there has been a great interest in the effects of computer-focused communication in the workplace (Barrett and Turtz, 1998). E-mail is one of the most used communication tools used in organizations which is an effective tool for communication between people independent of time and space (Gottschalk, 2008). The most common ones are email, voice mail, video conferencing and fax. Also telephone communication can be count as computer focused communicaiton tool.

In the communication in construction, there is a development in using information technologies by the use of new technologies used in design and drawing processes. But there is no link between the sequence of using the information technologies and effective communication. The effective use of technologies has an important role in the communication process (Emmitt and Gorse, 2007).

Level (1972) stated that there has been a long discussion about if the oral or written communication is more effective. He concluded as;

- The combination of two forms of communication is more effective most of the time
- In any situation, any of the two forms cannot be selected as more effective

- Written communication is more effective if you are writing for a future action
- Oral communication seems to be more effective if the purpose is behavioral change or immediate feedback (Level, 1972).

2.5.2. Nonverbal Communication

Nonverbal communication is the most basic form of communication but analyzing the a nonverbal communication is very difficult although human being is using it till ancient times because compared with the verbal communication it is less structured. Also understanding the gestures and expressions is very difficult because most of them differ from culture to culture. Nonverbal communication is spontenous and comes naturally. You can plan how to write or say a sentence but you cannot plan your mimics and expressions. Besides these disadvantages, nonverbal communication has some advantages. One of the most important advantages of nonverbal communication is its reliability. People can lie by using the words but cannot lie using the body language.

Verbal or non-verbal, it has been found out that face-to-face communication is the most effective communication during the construction process (Emmitt and Gorse, 2007).

There are two kinds of communication in an organization according to the aim; relational communication and task-based communication. Relational communication aims to develop and maintain relationships between the actors and individuals of the communication process. Besides that relational communication is used to solve conflicts. Task-based communication arranges communication to complete the task (Emmitt and Gorse, 2007). In this study, factors that affect communication effectiveness can also be grouped under these two categories; some examples can be seen in table.

Table 2.4. Factors that affect Communication
(Source:Emmitt and Gorse, 2007)

Relational Factors	**Task-Based factors**
How Hierarchy affects communication process	Knowledge about competitors
Usage of procedures	Knowledge about own organization
Roles and responsibilities	Knowledge about procedures
Solving technical conflicts	Knowledge about project specifications
Transparency of the decision-making	Which knowledge the other party needs
Common goals and objectives	Which party do you need
Mutual trust	Knowledge about the form of the information
Trust about the accuracy of the information	Clarity of the message
Sharing best practices and experiences	Form and size of the message
Collaboration in the organization	How the information processed
Strength of belonging to the team	Adequacy of the message
Formal and informal reviews	Knowledge about vision and mission of the organization
Sharing Lessons learned	People involved in the process
Realize capabilities and rewarded	Involve in information flow
Support for alternative and new ideas	Degree of information flow
	Degree of education and information flow
	Degree of understanding the representations
	Knowledge about the terminology
	Knowledge about the media

2.5.3. Formal and Informal

In 1965 Higgin and Jessop made a detailed investigation about communication in construction projects (Murray et al., 2000). Their study was on the informal communication because they claimed that most of the uncertainties are occurred based on informal procedures in communication. Informal communication is needed for three reasons that are,

- If the current structure is not working, we have to maintain the links of communication, problem-solving and coordination
- Even if the structure is working, we use informal communication in order to interpret and translate the needs of structure
- To make build groups to get the job done by avoiding the complexity of the structure (Murray et al., 2000).

Boyd and Wild (1999) made an analogy on iceberg which means that the iceberg above the surface is formal communication and the part of the iceberg under the water is informal communication.

2.5.4. Internal and External Communication

But there are two main sub-systems, which are internal and external communication. Blazenaite (2011) stated that to structure a system model for communication the determinants or factors of the communication must be analyzed.

External factors

External factors can be defined as factors that affect the system apart from the internal system as economical, political, social factors that have direct and indirect effect on clients, competitors, suppliers, partners, freelancers, resources and regulations.

Internal Factors

The main internal factors that effect organizational communication are organizational culture, organizational objectives, managerial philosophy, management

style, organizational structure, technology and reward system. Organizational values can be listed as;

- Strategic orientation
- Integrity and integration
- Dignity and respect
- Flow of the strategic information
- Clarity and power of the messages
- External perspective
- Roles and responsibilities
- Listening and visible presence
- Training and support
- Structure and process
- Measurement systems
- Continuous improvement

In this thesis organizational communication system is analyzed based on goals, units or factors that operate together and the interdependencies of the factors (Blazentine, 2011).

2.6. Key Factors Affecting the Communication Satisfaction

Before started to work on communnication maturity level of construction companies, the factors that effect communicaiton must be analyzed. In the Literature, there are many classifications about the variables/factors that have an impact on the effectiveness of the organizational communication.

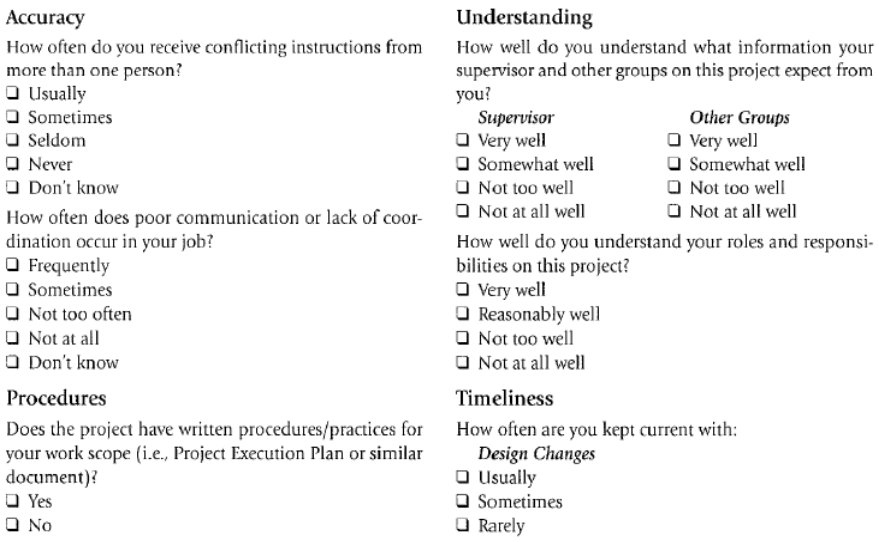
Downs and Hazen (1977) studied on a questionnaire for the communication satisfaction. In the early example of Redding (1972), it has been stated that there are some components of communication satisfaction, which are,

- Explanation of the policies
- Understanding the expected job performance
- Advanced notice of changes
- Freedom to make suggestions
- Adequacy of information about the company

- Which important information can be gathered from the sources or media
- Freedom to make complaints
- Accessibility of superiors
- In which degree the supervisor make an effort to understand feelings
- In which degree the supervisor appreciate to good performance
- In which degree management or supervisor opens to communication (Downs and Hazen, 1977).

Downs and Hazen (1977) has made a three staged questionnaire analyzed and concluded that the primary dimensions of communication satisfaction are; general organizational perspective, organizational integration, personal feedback, relation with supervisor, horizontal-informal communication, relation with subordinates media quality and communication climate. The factors of communication satisfaction are used in the first and third part of my questionnaire. There are two questions about the quality of the information in the first part of the questionnaire, which reflects the level of verbal communication, and more questions about the relation with the supervisor in the third part of the questionnaire, which reflects the non-verbal communication, in this study.

The Construction Industry Institute stated that there are six categories of communication variables that are accuracy, procedures, barriers, understanding, timeliness and completeness (Thomas et al, 1999).



Accuracy

How often do you receive conflicting instructions from more than one person?

❑ Usually
❑ Sometimes
❑ Seldom
❑ Never
❑ Don't know

How often does poor communication or lack of coordination occur in your job?

❑ Frequently
❑ Sometimes
❑ Not too often
❑ Not at all
❑ Don't know

Procedures

Does the project have written procedures/practices for your work scope (i.e., Project Execution Plan or similar document)?

❑ Yes
❑ No

Understanding

How well do you understand what information your supervisor and other groups on this project expect from you?

Supervisor	*Other Groups*
❑ Very well	❑ Very well
❑ Somewhat well	❑ Somewhat well
❑ Not too well	❑ Not too well
❑ Not at all well	❑ Not at all well

How well do you understand your roles and responsibilities on this project?

❑ Very well
❑ Reasonably well
❑ Not too well
❑ Not at all well

Timeliness

How often are you kept current with:

Design Changes

❑ Usually
❑ Sometimes
❑ Rarely

Figure 2.4. Questionnaire based on the key factors of The Construction Industry Institute (Source: Thomas et al, 1999).

Also Murray (2000) made a comparative study of US and UK construction industries by using the six critical communication variables of The Construction Industry Institute.

Table 2.5. Six critical categories of communication
(Source:Murray, 2000)

Category	**Description**
Accuracy	Accuracy of the information by means of frequency of conflicting information, poor communications, and coordination
Procedures	If the procedures exist, being used and effective
Barriers	Existence of the interpersonal, accessibility barriers between supervisor and others
Understanding	Understanding information needs between supervisor and others
Timeliness	Timeliness of information sending and receiving
Completeness	The amount of relevant information received

In this study, the research of Maier and Eckert (2006; 2008; 2011) taken as a base when designing the questionnaire for assessing the maturity level of organizational communication, but two questions are added from the study of Murray (2000), which are;

- Do you need to communicate again to complete a task?
- Are the procedures useful for communication process?

Emmit and Gorse (2007) claimed that some of the main factors that affect communication are team building, sharing values, solution of minor differences and conflicts, asking questions and creation of trust between team members in construction companies.

Te'eni (2001) suggested a cognitive-affective model to make the organizational communication more effective by changing the medium and attributes of the message itself. The aim of the study of Te'eni is to design a technology to make communication more effective. This model is developed based on the three main factors of the organizational communication that are impact, process and inputs.

Figure 2.5. Main Factors of Te'eni That Affects Communication

Communication Impact

Habermas (1984; 1987) claimed that there must be four conditions for communicative act at the communication impact stage which are; act must be understandable, act must be true, receiver must trust the sender and act must be appropriate for the shared value system. In his view Habermas does not separate understanding and relationship but Te'eni (2001) separates them as;

- Mutual Understanding can be defined by the property of understandable and true which are mostly related with the action oriented communication
- Relationship can be defined by the properties being trustable and appropriate which are mostly related with the relationships.

In a successful communication mutual trust and commitment is very important and the properties mutual understanding and relationship cannot be defined as independent, they are interdependent with each other. They are highly related and create and affect each other. If communication complexity increases, the level of mutual understanding and relationship decrease (Te'eni, 2001).

Communication Process

Communication process consists of goals, strategies, medium and message form. Starting with goals, according to Habermas (1987) communication goals can be categorized as; reaching understanding, coordination action, building relationships and influence others. In the study of Te'eni (2001) they respectively defined as;

- Instructing action can be defined as making receiver act according to the senders' wishes

- Managing inter-dependent action can be defined as coordinating the actors
- Managing relationships can be defined as making stronger relationships between people at work

Communication strategies can be defined as how communication goals can be achieved. Communication strategies are used to handle the complexity of the communication process. Te'eni (2001) claimed that they could be analyzed as follows;

- Contextualization is to build the context of the message that issues are designed around a core message.
- Affectivity is used to include the emotions and moods in the message which are affective components
- Control-testing and adjusting can be described as getting feedbacks about the affectivity of the communication during the process
- Perspective taking means taking the receiver's view as consideration
- Attention focusing can be defined as highlighting the important parts of the communication by manipulating the message processing of the receiver (Te'eni, 2001)

Choosing media in the communication process is directly depends on the chosen strategy. Te'eni (2001) described three important classifications for choosing media, which are; channel capacity, interactivity and adaptability. Interactivity level of the media is related with the simultaneous and continuous feedback. An appropriate feedback speeds the communication. Channel capacity becomes important if a high capacity information as drawings, voice mails or languages are transmitting (Te'eni, 2001). In construction companies, for sharing drawings or large size information, channel capacity becomes very important. Adaptability of the media means if the sender can personalize and adapt a message according to receiver.

Message is the last attribute of the communication process. The characteristics that are important about the message are; size, distribution, organization and formality.

- Message size is the number of the units of the message. If the message is too long for its purpose the receiver can miss the focus point.
- Distribution is; message sent to how many destinations
- Organization of the message means how the message support the mutual understanding

- Formality can be described as if the message is organized according to the rules of the communication for the organization (Te'eni, 2001).

Communication Inputs

Communication inputs can be categorized as task, sender-receiver characteristics and values and norms. Tasks shape the communication goals and have three dimensions as task analyzability, task variety and task temporality. Task analyzability is to define the procedures and rules that are needed to complete the task. Task variety is the variation among different instances of the task. Task temporality can be defined as the time needed to complete the task.

The second category of communication inputs is sender-receiver distance. There are two kinds of distances between sender and receiver as cognitive and affective distance. Affective distance is the emotional distance between sender and receiver before transmitting the message. Cognitive distance is the psychological distance between sender and the receiver that can be caused by organizational context (Te'eni, 2001).

The last category of communication input is values and norms. Values are constructed by the culture and norms are constructed by the organization itself. Interdependence category of the values and norms can be described, as the act of the person is independent from other but interdependent by means of acting as a strong group that function for very long periods.

Table 2.6. Main factors of Te'eni

IMPACT	
MUTUAL UNDERSTANDING	RELATIONSHIP
Clearity of the Message	Accuracy
The Act Must be True	The Act Must be Appropriate

INPUT		
TASK	SENDER-RECEIVER DISTANCE	VALUES
Analyzability	Cognitive Distance	Interdependence
Variety	Affective Distance	
Temporality		

PROCESS		
COMM. STRATEGIES	FORM OF THE MESSAGE	THE MEDIA
Instructing action	Size	Interactivity
Coordination	Distribution	Channel Capacity
Fostering Relationships	Organization	Adaptiveness
Influencing	Formality	
contextualization		
Affectivity		
Feedback System		
Planning		
Perspective Taking		

Most of the factors that Te'eni (2001) defined are adapted to the communication maturity questionnaire both in verbal and non-verbal communication. Factors such as affective distance, cognitive distance and some communication strategies are adapted to non-verbal part of the questionnaire. Besides that, factors that effect verbal communication are adapted to the verbal communication part of the questionnaire.

Eckert and Stacy (2001) stated that many researchers report that in complex processes communication depends on the social processes of argumentation and

negotiation. Eckert and Stacy (2001) made a research focusing on the dimensions of communication need for computer tools for effective interaction between people or team in an organization. Communication can be in different situations and those situations or dimensions can cause breakdowns. Dimensions of the communication can be listed as;

- Form of Communication: this dimension consists of place, time, size and identity. Participants of the communication process can be physically near or not. Communication can be interactive or not and size can be change according to the group or individual.
- Form of Task: From of the task can cause many breakdowns in a communication based on information. The dimensions are objective of task, division of decision-making, hierarchy of decisions, duration, information type and time pressure.
- Subject Expertise: Subject expertise is mostly related with information caused breakdowns such as using different representations, having no knowledge about each other expertise. The dimensions of subject expertise are equality of expertise, balance of expertise, mental representations, familiarity and context.
- Tool Expertise: Using the medium is essential for communication so the skill of the participant for using that medium affects the affectivity of the communication.
- Organization: In the organization dimension, hierarchy, security and interest play an important role. Hierarchy determines the communication paths. Interest and security become important when communication is between two different organizations.
- Representation of Information: Representation of the given information has significant effect on communication affectivity that includes the medium, form of information and notation.

In their study Maier et al. (2001) claimed that there are some main manifestations of communication breakdown related with the information transmission that are; not understanding the big picture, missing information provision, information distortion and interpretation of representation.

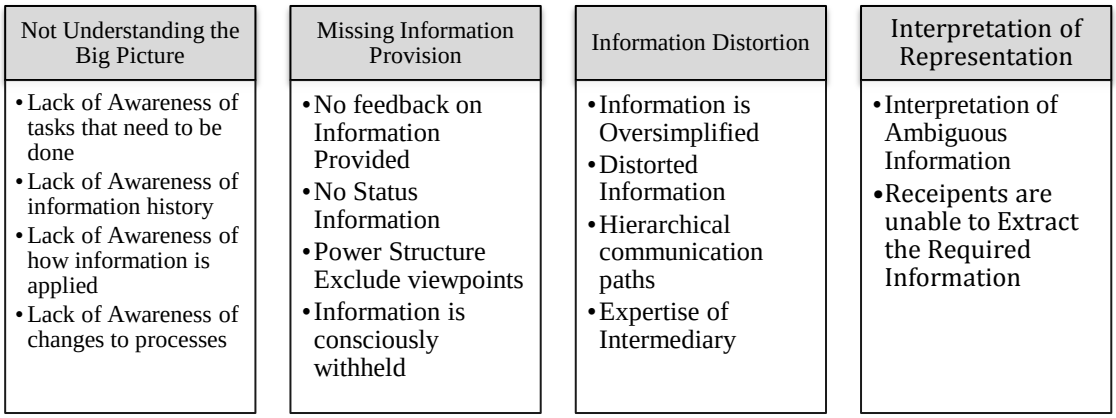


Figure 2.6. Main Manifestations of Communication Breakdown
(Source:Maier et al., 2001)

1. *Not understanding the big picture*: Participant must have knowledge about the requirements of the other team members and tasks that need to be done. As well as important tasks, insignificant tasks may have an important role on the process. In a complex organization, the team member does not ask the source of the information. But although the information is valid and true, the member who will use it has to know the source and how the decision is made to have chance to criticize and change the information. It is also important to know how the information is used. Process can change any time because of new requirements or new schedules. Participants must know the changes of the all process so they can re-plan their part.
2. *Missing information provision:* Members mostly do not know how the other member used the information so they never know the failures of the information. Also they do not care about the status of the information. For example, in a construction process when they send a detail drawing, they do not indicate if it is the final version or can be improved. People who are not a part of the company hierarchy such as contractors and suppliers are excluded from the meetings and they cannot help to improve the process they are included. Besides that knowledge about the contractors and suppliers processes are not given to them because of the privacy of the company but they have to know what goes around their processes.
3. *Information Distortion:* Sender should shorten the information to focus on the subject but sometimes too simplified information can be a problem. Besides that the information can be changed while passing through the receivers. Hierarchy

is useful in some manner in communication but when the hierarchy has many levels and the information has to go many levels to up and down again to reach the related person, hierarchy became an obstacle.

4. *Interpretation of Representation:* Sender of the message can express the ideas in a way that the receiver cannot understand. Also representation of the idea is as important as the information itself.

Maier and Eckert et al. (2006; 2008; 2011) developed a maturity-grid approach for communication effectiveness. In developing this method some items have to be decided which are key factors, subheadings of the key factors and maturity levels/scale points. In researches based on the factors of Maier and Eckert et al. (2006; 2008; 2011), four or five key categories are used. Maier et al. (2008) used five levels of influence in their research that are product, information, individual team member, project team, and organization that are subdivided into 11 areas of influence.

Similarly in the other study of Maier et al. (2006), five influence levels are used. The aim of this study was to assess the current communication maturity level and desired communication maturity level. In this study, a maturity grid approach is applied to assess communication. Before analyzing the maturity grid, key factors or key process areas have to be found.

Table 2.7. Categorization of the factors
(Source:Maier et al., 2008)

Level of Influence	**Areas of Influence**
Organization	Organizational Structure
	Organizational Culture
Project Team	Teamwork
	Reflection within the project team
Individual Team Member	Personal Development
	Awareness
Information	Information Transmission
	Availability of Information
Product	Media of Communication
	Expression of the product
	Product Requirements

In the study of Maier et al. (2011), they defined more than hundred recommendations to improve communication in design. 63 engineers are selected to

recommend factors and asked to define their position and the projects. Besides that some recommendations are taken from the literature. Results of the interviews are as follows,

- Four major sets of factors effects communication which are information, individual, team and organization,
- 24 out of more than hundred are selected as most frequently mentioned factors

Table 2.8. Four major sets of factors
(Source:Maier et al., 2011)

Information	**Individual**
• Availability of information • Availability of information about competitors • Availability of information about organization • Availability of information about company procedures	• Overview of sequence of tasks in the design process • Do you know what you need to know • Best use of capabilities • Autonomy of task execution • Education and training • Roles and responsibilities

Team	**Organization**
• Lessons learned • Collaboration • Design review • Common goals and objectives • Best practice • Team identity	• Activity at interface with other party • Usage of procedures • Hierarchies • Handling of Technical conflicts • Generation of innovative ideas • Mutual trust • Application of vision and values • Transparency of decision making

Maier et al. (2007) defined 27 factors that affect communication in their study which are representation, notation, terminology, needed information, availability of information about competitors, availability of information about company, availability of information about procedures, availability of information about product specifications, hierarchies, usage of procedures, roles and responsibilities, activity at interface with the other party, handling of technical conflicts, transparency of decision

making, application of corporate vision and values, common goals and objectives, mutual trust, best practices, collaboration, team identity, project reviews, lessons learned, overview of sequence of tasks in the design process, autonomy of task execution, generation of innovative ideas, education and best use of capabilities. The definitions of these factors can be seen in Table 2.9.

Maier et al. (2009) analyzed the communication between design and simulation engineers. Maturity grid approach allows analyzing the current and desired values of each factor that affects communication process. There were 51 factors analyzed for gap analyzes in three dimensions,

- All participants
- Simulation
- Designer

The factors are analyzed according to the difference between current and desired situations. Differences less than 0,6 are defined as positive consensus; differences between 0,6 and 1 are defined as medium consensus and differences more than 1 are defined as negative consensus. Gaps are found which have higher difference than 1 between current and desired positions. Some factors that can be named as gaps are;

- **All Participants**: Roles and Responsibilities, application of corporate vision and values, mutual trust, project team identity, collaboration, lessons learned, best practices, notation, education, generation of innovative ideas, and availability of information about procedures.
- **Simulation**: Roles and responsibilities, application of corporate vision and values, mutual trust, handling of conflicts, project team identity, collaboration, staffing of team, overview of sequence of tasks in the design process, knowledge about the information the other party needs, other party's knowledge about the information that is needed, knowledge about the format of the information, knowledge about how the information is processed, notation, terminology, education, generation of innovative ideas, availability of information about procedures.
- **Designer:** Lessons learned, best practices, overview of sequence of tasks in the design process, education.

Table 2.9. Maier et al.'s Factors That Effect Communication
(Source:Maier et al., 2007)

	Factor	**Definition**
1	Representation	Understanding of the used representation systems as drawings and bill of materials
2	Notation	Understanding of the used notations such as mechanical o electrical notations
3	Terminology	Understanding technical terms
4	Do you know what information the other party needs?	Awareness about the other party's needs
5	Availability of information about competitors	Distribution of the information about the competitors
6	Availability of information about company	Distribution of the information about the organization
7	Availability of information about procedures	Distribution of the information about the procedures
8	Availability of information about product specifications	Distribution of the information about project specifications
9	Hierarchies	How hierarchies are used to reach a clear communication
10	Usage of procedures	How is the level of using procedures
11	Roles and responsibilities	Knowledge about the roles and responsibilities in the company and how to use them in the communication prpcess
12	Activity at interface with the other party	Degree of the activity at interface with the other party
13	Handling of technical conflicts	How often technical conflicts are solved
14	Transparency of decision making	Are right people involved in the process and if the process is transparent
15	Application of corporate vision and values	Distribution of the knowledge about vision and values and application of them
16	Common goals and objectives	Distribution of knowledge about common goals and objectives
17	Mutual trust	Degree of mutual trust and optimizing the process
18	Best practices	How often best practices are shared
19	Collaboration	If the collaboration is regular and process is optimizing
20	Team identity	Degree of belonging to the team
21	Project reviews	Quality and quantity of formal and informal reviews
22	Lessons learned	How often lessons learned are shared
23	Overview of sequence of tasks in design process	Degree of the process according to the job description
24	Autonomy of task execution	Freedom in the decision and task execution regarding the responsibilities
25	Generation of innovative ideas	Degree of supporting innovative ideas
26	Education	Degree of training plans and execution
27	Best use of capabilities	How the capablities are used

2.7. Interdependencies of the Units (factors) of the Organizational Communication

Maier et al. (2007) made a research on the correlations between factors that are affecting the communication maturity level. The ranges of the high, moderate high and moderate low correlations are defined and a visual representation is designed according to the correlation as seen in Figure 2.6.

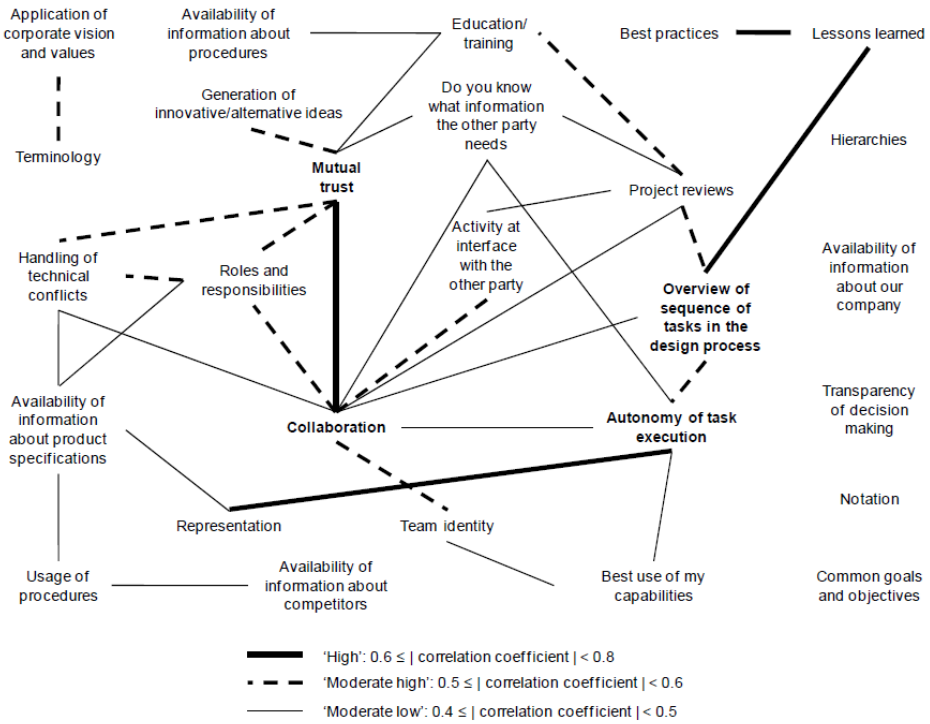


Figure 2.7. Correlation of the Factors That Affect Communication (Source:Source: Maier et al., 2007)

Correlations that are found out are;

- Mutual trust and collaboration has a high correlation
- Lessons learned and overview of the sequence of task tasks in the design process have high correlation
- Representation and autonomy of task execution has a high correlation
- Best practices and lessons learned has a high correlation

In the literature, some correlations between factors are supported as;

- Collarelli and Boos (1992), Vianen and Dreu (2001), Kuhn and Nelson (2002) stated that there is a high correlation between collaboration and team identity,
- Ajuha et al. (2003), Perry and Sanderson (1998) and Moenaert et al. (2000) stated that there is a high correlation between collaboration and roles and responsibilities,
- Krackhardt and Stern (1988), Bstieler (2006) and Ng and Chua (2006) stated that there is a high correlation between collaboration and mutual trust,
- Susman et al. (2003) and Newman (1999) stated that there is a high correlation between handling of technical conflicts and mutual trust,
- Thamhain (2003) stated that there I,s high correlation between generation of innovative ideas and mutual trust,
- Ayas (1997) and Klein et al. (2003) stated that there is a high correlation between overview of sequence of tasks in the design process and lessons learned,
- Perry and Sanderson (1998) stated that there is a high correlation between overview of sequence of tasks in the design process and project reviews,
- Eckert et al. (2003) stated that there is a high correlation between autonomy of task execution and representation (Maier et al., 2007).

Besides these correlation Maier et al. (2007) detected more moderate high correlations between roles and responsibilities and mutual trust, roles and responsibilities and handling of technical conflict, autonomy of task execution and overview of sequence of tasks in the design process, education and project reviews and terminology and application of corporate vision and values.

Factors that affect organizational communication system are mostly defined without the emotions and moods that can be called as non-verbal communication. Non-verbal communication variables including emotions and moods are defined and analyzed with the methods PANAS (positive and Negative Affect Schedule) and Emotional Behavior Management Method in the further chapters.

CHAPTER 3

ORGANIZATIONAL COMMUNICATION MATURITY MODEL FOR CONSTRUCTION COMPANIES

3.1 Methodology

A questionnaire is designed for assessing communication maturity level of construction companies. Maturity grid approach of Maier et al. (2006) is taken as a base for its maturity grid approach but the levels of maturity are changed according to Capability Maturity Model that the levels are defined again for Communication Capability Maturity Levels. Questions are from the literature, which defines the factors, and key factors that affect the communication process of the organization. Besides these questions, a Delphi study is conducted both for if extra questions are needed and to assess the weighted values of each question which means the weighted effects of each factor to the organizational communication.

Maturity literally means notion of development from an initial to a more advanced state (Maier et al., 2006). In order to improve the maturity level of an organization, the current maturity level must be analyzed. Assessing the maturity level should have a structured way starting with deciding the maturity levels and structurally apply that maturity level to the scales of the questionnaire. Maier et al. (2006) focused on a maturity-grid approach which both captures the current and the desired state. This maturity model is structured around a matrix by using a series of cells describing the maturity levels against the key factors of communication. In the maturity-grid approach cells contains text descriptions of performance at the levels of defined maturity level. Maier et al. (2006) stated that if one is working on the communication maturity of an organization there would be some limitations as;

- It is important to find a universally acceptable criteria for good communication
- Factors that affect communication are not independent from each other
- The process of communication is not straightforward

There are many maturity levels defined in the literature for the areas as project management, learning theory, product development, quality and capability models for assessing people. In the study of Maier et al. (2006) learning theory maturity levels of Argyris and Shön (1978, 1996) is used at the maturity grid.

•Collaborative climate (A)

•Collective understanding (B)

•Collective competency (C)

•Continual improvement (D)

Teamwork

Please answer for your project team

	Levels of maturity					
Factors	**A**	**B**	**C**	**D**	**Current score**	**Desired score**
Collaboration	Everyone looks solely after his or her tasks	Collaboration happens only if asked for in order to fulfil tasks	Collaboration happens proactively in order to learn from others and improve own approaches	Collaboration is constructive, happens regularly whenever necessary and there is continuous effort to improve it	[ ]	[ ]

Figure 3.1. Maturity grid of Maier et al.
(Source: Maier, 2011)

Maturity grids are originated to the quality management maturity grid of Crosby. In order to improve product quality Crosby defined a five level quality grid which the levels are range from uncertainty, awakening, enlightenment, wisdom and certainty (Maier et al., 2006). Besides that Crosby defined six aspects of quality management which are;

1. Management understanding and attitude
2. Quality organization status
3. Problem handling experience
4. Cost of quality as a percentage of sales
5. Quality improvement actions
6. Summation of company quality posture

Table 3.1. Quality Management Maturity Levels of Crosby

Quality Management Maturity Grid		
Level 1	Uncertainty	We don't know why we have problems with quality
Level 2	Awakening	Is it absolutely necessary to always have problems with quality?
Level 3	Enlightenment	Through management commitment and quality improvement we are identifying and resolving our problem
Level 4	Wisdom	Defect prevention is a routine part of our operation
Level 5	Certainty	We know why we don't have problems about quality

Quality Management Maturity Grid (Crosby) Assessor: Department:

Measurement Categories	Stage 1: *Uncertainty*	Stage 2: *Awakening*	Stage 3: *Enlightenment*	Stage 4: *Wisdom*	Stage 5: *Certainty*
Management understanding and attitude	No comprehension of quality as a management tool. Tend to blame quality department for "quality problems".	Recognising that quality management may be of value but not willing to provide money or time to make it all happen.	While going through quality improvement programme learn more about quality management; becoming supportive and helpful.	Participating. Understand absolutes of quality management. Recognise their personal role in continuing emphasis.	Consider quality management as an essential part of company system.
Quality organisation status	Quality is hidden in manufacturing or engineering departments. Inspection probably not part of organisation. Emphasis on appraisal and sorting.	A stronger quality leader is appointed but main emphasis is still on appraisal and moving the product. Still part of manufacturing or other.	Quality department reports to top management, all appraisal is incorporated and manager has role in management of company.	Quality manager is an officer of company; effective status reporting and preventive action. Involved with customer affairs and special assignments.	Quality manager on board of directors. Prevention is main concern. Quality is a thought leader.
Problem handling	Problems are fought as they occur; no resolution; inadequate definition; lots of yelling and accusations.	Teams are set up to attack major problems. Long-range solutions are not solicited.	Corrective action communication established. Problems are faced openly and resolved in an orderly way.	Problems are identified early in their development. All functions are open to suggestion and improvement.	Except in the most unusual cases, problems are prevented.
Cost of quality as % of sales	Reported: Unknown Actual: 20%	Reported: 3% Actual: 18%	Reported: 8% Actual: 12%	Reported: 6.5% Actual: 8%	Reported: 2.5% Actual: 2.5%
Quality improvement actions	No organised activities. No understanding of such activities	Trying obvious "motivational" short-range efforts.	Implementation of a multi-step programme (e.g. Crosby's 14-step) with thorough understanding and establishment of each step.	Continuing the multi-step programme and starting other pro-active / preventive product quality initiatives.	Quality improvement is a normal and continued activity.
Summary of company quality posture	"We don't know why we have problems with quality".	"Is it absolutely necessary to always have problems with quality?"	"Through management commitment and quality improvement we are identifying and resolving our problems."	"Defect prevention is a routine part of our operation."	"We know why we do not have problems with quality."

Figure 3.2.Quality Management Maturity Grid of Crosby
(Source : Crosby, 1979)

Gottschalk (2008) defined a maturity model for email communication in knowledge organizations. This maturity model has four stages as;

- Officer-to-technology
- Officer-to-officer

- Officer-to-Information
- Officer-to-Application

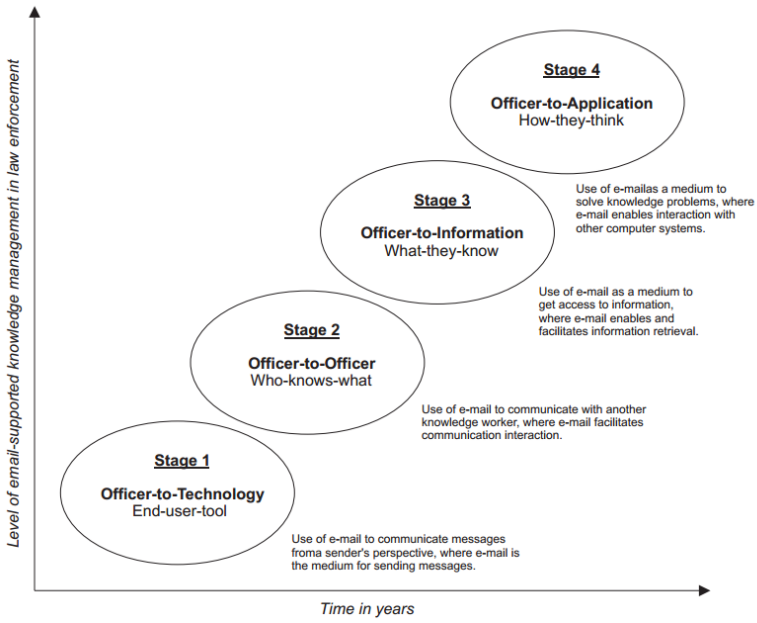


Figure 3.3.E-Mail Maturity Model of Gottschalk

The first stage of email maturity model consists of general email support which email is used to improve personal efficiency. Second stage is about the knowledge sources. In this stage, email is used to communicate with the people who have knowledge. In the third stage, the system stores what workers know and make the information available for everyone in the company. In stage four, the email helps to solve the problems and artificial intelligence and neural networks can be used in this system. The stages can be summarized as follows;

- Stage one is technology centric
- Stage two is people oriented
- Stage three is technology driven
- Stage four is process centric stage (Gottschalk, 2008).

Knowledge sharing is an important part of communication and in this study the technology driven stages are taken as a consideration.

3.2 Capability Maturity Model

Most commonly used and adapted maturity level is Capability Maturity Level, which has roots on Crosby's quality management maturity grid. Capability maturity Model has five stages as follows,

Level 1. Getting started/ awareness/ initial

Level 2. Developing/ focusing/ repeatable/ knowledge

Level 3. Computing/ practising/ competence/defined

Level 4. Sustaining/ managed/ excellence

Level 5. Advocating/transforming/ optimized

Capability maturity models are used to measure the maturity level of an organization to perform main processes required to deliver a product or action. Capability Maturity Model is developed by Software Engineering Institute of Carnegie Mellon University and they define key performance areas from the initial level to optimized level CMM describes the improvement of a process from ad hoc level to a mature, disciplined and optimized level (Kumta and Shah, 2002).

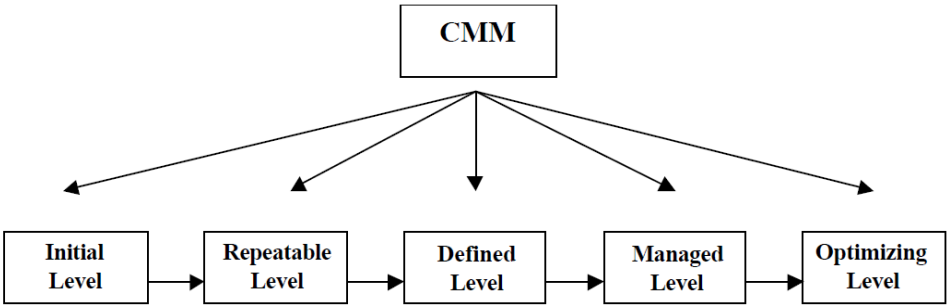


Figure 3.4.Levels of CMM
(Source:Kumta and Shah, 2002)

Level 1 Initial: In the initial level work is done by the performance of the people. This is also called ad hoc level. Kumta and Shah (2002) analyzed the people issues in CMM, which is very important factor for the maturity of the communication. Processes are not defined in this level and the performance of the action depends on the talents of the people. There are four important characteristics of Level 1;

- Inconsistency in performing practices
- Displacement of responsibility
- Ritualistic practices

- An emotionally detached workforce (Kumta and Shah, 2002)

Level 2 Repeatable: At this level, the most important aim is to complete the process. The policies of the organization do not drive the policies and best practices cannot be repeated if not documented. Basic problems can be solved by the experience of the manager of the group but when it comes to sophisticated problems they usually fail at this level. In this level, there can be some problems for people who do not work effectively which are;

- Work overload because of rework
- Unclear performance objectives
- Lack of knowledge or skill
- Poor communication channels
- Low morals because of the lack of organizational focus (Kumta and Shah, 2002)

Level 3 Defined: The organization has a common understanding about process, activities, roles and responsibilities. Measurements are systematically. Organization is focused on the standardizing the processes because common knowledge and skill needs are not identified. In this level, the focal point is not the individual; it is the process or activity. People in the organization began to share best practices and a database is building which brings the knowledge management that is very essential to move up to Level 4 (Kumta and Shah, 2002).

Level 4 Managed: In the level 4, there has to be data collected and all decisions are made based on this data. Focus point of this level is measurement and its interpretation (Kumta and Shah, 2002).

Level 5 Optimizing: Measured improvement can be seen at Level 5 by finding detects and innovating. Improving process can be measured and change can be controlled at this level (Kumta and Shah, 2002).

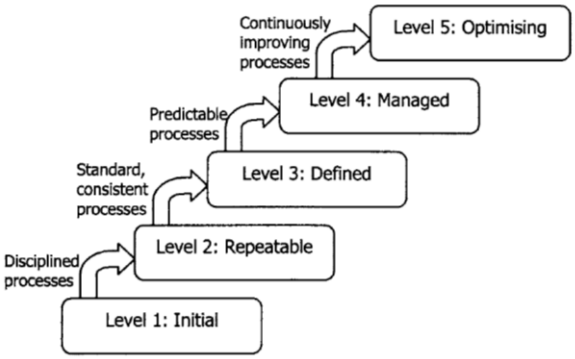


Figure 3.5.Levels of CMM and How to improve
(Source: Paulk et al., 1996)

3.3. ADAPTATION OF CMM TO C-CMM

Communication is a process used to develop product or action. Strutt et al. (2006) defined a Design safety Capability Maturity Model (DCMM) which is the application of Capability Maturity Model (CMM). In their model the main idea was to develop a model to assess the capability of an organization to perform the processes defined.

To Develop a Maturity Model Based on CMM;

1. Identify key processes and goals
2. Define maturity levels
3. Develop a Scoring System
4. Identify Characteristics that Define Maturity
5. Develop Improvement Steps (Strutt et al., 2006).

To develop a maturity model based on Capability Maturity Model, the steps above are applied one by one as follows.

3.3.1. Identify Key Processes and Goals

Key processes in communication process are defined which are key factors and the factors that define key factors. The literature is used for defining them as the studies of Maier et al. (2006; 2011), Downs and Hazen (1977) and Murray (2000). At the final questionnaire there are 42 factors with definitions. As mentioned before the communication processes which is called factors that affect communication process are defined under five categories which are

1. Information
2. Organization
3. Team
4. Individual
5. Project/ Action

Key organizational communication processes that can be defined can be seen in Table 3.2. The processes or factors consist of 28 main titles but it does not mean that there will be 28 questions. Some of them can create more than one question.

Table 3.2. Key Factors that Affect Organizational Communication
(Source:Maier et al., 2007;2011)

1	Evaluation of information about competitors	INFORMATION
2	Evaluation of information about company	
3	Evaluation of information procedures	
4	Evaluation of information about the project properties	
5	Having knowledge about what the other party needs	
6	Having knowledge about the how the other party needs information	
7	Defining Hierarchies	ORGANIZATION
8	Using of Procedures	
9	Defining roles and responsibilities	
10	Solving technical conflicts	
11	Having a clear decision-making process	
12	Applying corporate vision and values	
13	Applying common goals and objectives	
14	Creating mutual trust	
15	Sharing lessons learned	TEAM
16	Collaboration in the company	
17	Creating team identity	
18	Sharing best practices	
19	Work flow	INDIVIDUAL
20	Distribution of information about organizational changes	
21	Generation of innovative ideas	
22	Developing education planning	
23	Best use of capabilities	
24	Having a rewarding system	
25	Developing representation	PRODUCT/ ACTION
26	Developing terminology	
27	Developing procedures about the choice of media	
28	Developing archiving	

3.3.2. Define Maturity Levels

There are already defined Capability Maturity Levels in the literature but also there are more than one meaning of every level. The important point was to understand the meaning of each maturity level and adapt it to the organizational communication questionnaire.

The levels of communication maturity are defined by the terms data, information, knowledge, understanding, applicable and improving.

Data: Facts and statistics collected together for reference or analysis

Information: Facts provided or learned about something or someone

Knowledge: Facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject.

- **Uncontrolled Level**: No knowledge and no understanding about the factor. At the uncontrolled level the process can be defined as "Having no knowledge about it/ never heard it/ there is nothing about it in the organization. So this level can be summarized as "No knowledge". For example in the question "How often do you get information about competitors?" the first level communication capability maturity model is "No knowledge about competitors". Communication process has no standards.
- **Relatively Controlled Level**: At the relatively controlled level, the processes can be repeated if experienced before or by the effort of the individual. Data and information is included in this level and there is partly knowledge and understanding but knowledge is not applicable and there is no improvement in the process. There is no defined and fully controlled procedure or the usage of the procedures depends on the individual.
- **Controlled Level:** At the controlled level, there are defined processes and people are mostly using them. Data, information, knowledge and understanding are included in this level but they are partly applicable. No improvement about the process. For example in the question "How often do you get information about competitors?" the third level of communication capability maturity model is "Information is distributed but not regularly".
- **Controlled and Conservatively Improving Level:** At the controlled and conservatively improving level, the processes are defined and managed and

every individual in the organization knows them and use the processes. Data, information and knowledge are included in this level. They are fully applicable but the process is partly and consevatively improving. According to the same question "How often do you get information about competitors?" the fourth level of communication capability maturity model is "Information is distributed regularly".

- **Innovative Level**: At the innovative level, processes are defined managed and there must be an effort for optimizing it. According to the same question "How often do you get information about competitors?" the fifth level of communication capability maturity model is "Information is distributed regularly and there is an effort for optimizing the process". The most important characteristic of this level is knowledge and understanding is fully applicable besides that the process is improving.

Table 3.3. Identification of the Maturity Levels of C-CMM

Levels	Data	Information	Knowledge	Understanding	Applicable	Improving
Level1	**Yes**	**No**	**No**	**No**	**No**	**No**
Level2	**Yes**	**Yes**	**Partly**	**Partly**	**No**	**No**
Level3	**Yes**	**Yes**	**Yes**	**Yes**	**Partly**	**No**
Level4	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Partly**
Level5	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Table 3.4. Definitions of C-CMM

	Definition	**Communication Management System**	**Execution of Activities**
Level 1	Uncontrolled	Uncontrolled Communication Management System	Minor execution of activities
Level 2	Relatively Controlled	Relatively Controlled Communication Management System	Inactive execution of activities
Level 3	Controlled	Controlled Communication Management System	Fair execution of activities
Level 4	Controlled and Consevatively Improving	Controlled and Conservatively Improving Communication Management System	Good execution of activities
Level 5	Innovative	Innovative Communication Management System	Excellent execution of activities

3.3.3. Develop a scoring System

5 levels of capability are defined for the organizational communication maturity. Strutt et al. (2006) stated that it is not appropriate to analyze each process by its level. It would be more useful to analyze the system as a whole. A spider diagram can be used to understand the gaps in the organization.

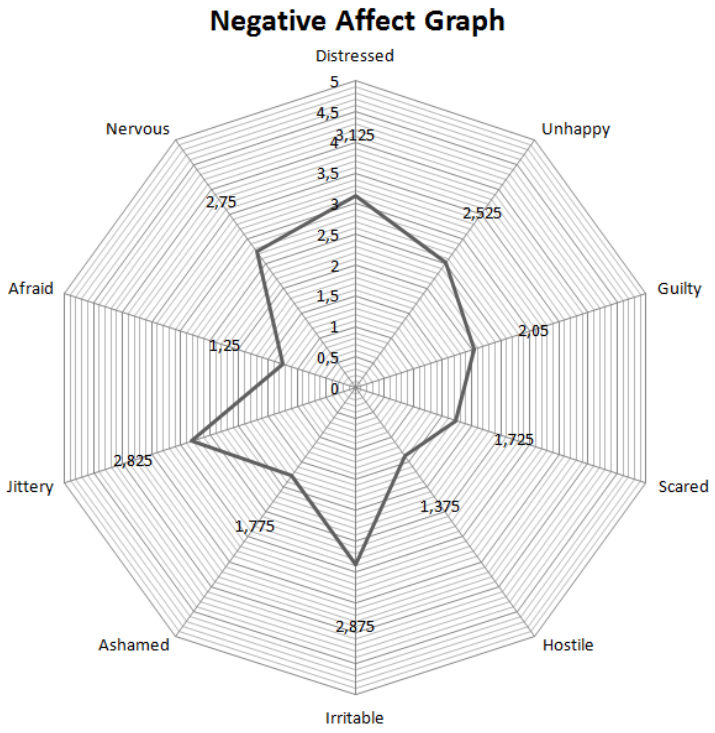


Figure 3.6.The example of a spider diagram

3.3.4. Identify Characteristics that Define Maturity

Strutt et al. (2006) stated that to identify a maturity level, it is important to define how the organizations act for each level of every process. So a maturity grid approach is used which all levels of maturity have a description that can be in the original questionnaire.

3.3.5. Develop Improvement Steps

Identification of the improvement steps depends on filling the requirements of the previous step.

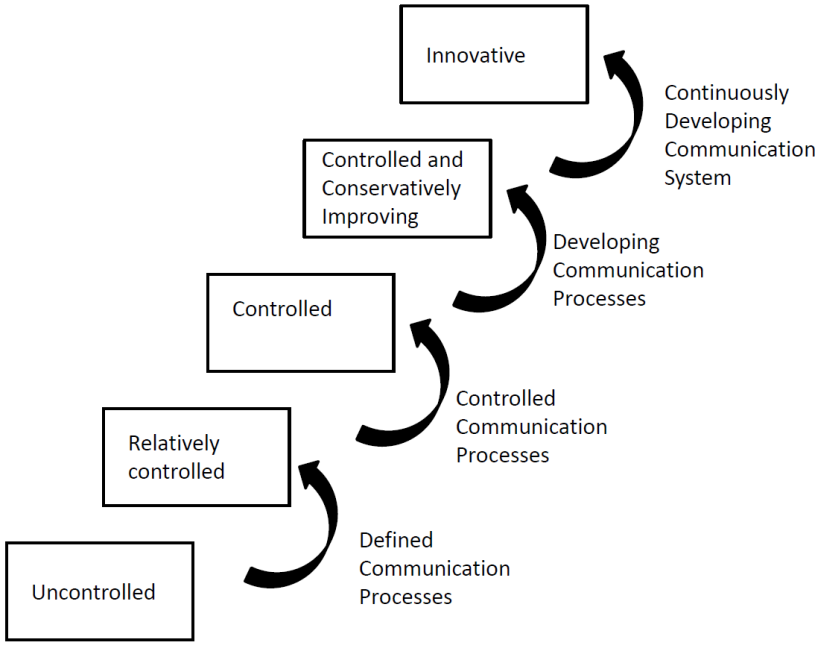


Figure 3.7.Improvement Steps of CCMM

3.4. Emotions and Moods as Non-verbal Communication

Emotions play an important role in non-verbal communication. Researches show that more than 50 percent of communication is effected by non- verbal communication. In recent years, emotions became an important topic in the organizational context. You cannot separate the emotions from the work environment especially organizations which the human factor is important for communication. Crawford (2007) stated that emotions consist of three different components as,

- Feelings are what we experience
- Emotions are feeling that we express. Emotion is defined as follows at the Oxford Dictionary,

  "A strong feeling deriving from one's circumstances, mood, or relationships with others."
- Moods are feelings that became stable. Mood is defined as follows at the Oxford Dictionary,

  "A temporary state of mind."

3.4.1. PANAS

It is hard to measure non-verbal organizational communication. It is important that how the participant feel about the non-verbal communication. PANAS will be useful for measuring those feelings. The Positive and Negative Affect Schedule is one of the most widely used affect schedule model which measures self-report mood.

According to Watson et al (1988), high PA means energy, pleasure engagement and concentration and low Pa means sadness and lethargy. Similarly, high NA means distress and unpleasurable engagement and low NA means serenity and calmness. There are many scales about PANAS but although strong models find out a high correlation between negative and positive moods, there are also anomalous findings that positive and negative moods have insignificant correlation. Watson et al (1988) states that short PA-NA scales are not reliable and also very long scales have reliability problem. Besides that, the sensitivity and reliability of the correlations of the PANAs model depends on the time frame. He developed a 10-item NA and PA scale as listed above (Table 3.4.).

Table 3.5.10-item PANAS model of Watson et al (1988)

Full From of PANAS	
PA	NA
Interested	Distressed
Excited	Upset
Strong	Guilty
Enthusiastic	Scared
Proud	Hostile
Alert	Irritable
Inspired	Ashamed
Determined	Nervous
Attentive	Jittery
Active	Afraid

Interested: It is a positive mood and forces the participant searching for the new and different.

Distressed: It is a negative mood that the participant feels unsecure and uncomfortable with inscrutable feeling. It is an uncertain feeling different from scared which includes discomfort, worry and anxiety.

Excited: It is a positive mood that consists of the energy of the participant.

Upset: It is a negative mood and ranges according to strength of the feeling. It can be caused by the death of colleague or not finishing the job due to the schedule.

Strong: It is the energy that provides the participant to move on. It is a positive mood and means having to manage.

Guilty: It is a negative mood and in the psychology it means that the participant feels regretful about something done.

Scared: It is a negative mood which is the high level of anxiety. Decrease in the level of communication can be seen.

Hostile: It is a negative mood and can be defined as malice opposite of the friendships

Enthusiastic: It is a positive mood that means the participant is concentrated on the job and feeling excited about it.

Proud: It is a positive feeling that means the self-esteem of the participant. Also this feeling is associated with the success of finishing a product or action.

Irritable: It is a negative mood and can be defined as a kind of stress and reaction to the alerter. Also can be seen when the action of the participant is blocked for a reason.

Alert: It is a positive mood that means that the participant is ready for motion and feeling conscious.

Ashamed: This negative mood is a result of feeling ashamed and being disgraced.

Inspired: It is a positive mood that reveals the creativity of the mind and feelings. It can be a sudden solution to a specific problem.

Nervous: It is a negative feeling that affects all nervous systems. The participant who feels nervous has two choices as to run away from that situation or fight with it.

Determined: It is the positive mood that means that the participant is concentrated on the action or product carefully and strongly.

Attentive: It is a different kind of positive concentration which is on the one subject but this mood can be destroyed by a strong noise or happening.

Jittery: It is negative feeling such as pressure and blockage that damages the function of the organism. This mood destroys the integrity of the individual psychologically.

Active: It is a positive feeling that means ready for movement and feeling energy.

Afraid: It is one of the main negative moods that is caused by hate or reaction to the real or unreal dangers and risks.

Besides that, the sensitivity and reliability of the correlations of the PANAS model depends on the time frame. Watson et al. (1988) used seven different time instructions that are;

- Moment
- Today
- Past few days
- Week
- Past few weeks
- Year
- General

As a conclusion he stated that, the model is sensitive to fluctuations when used with short term time instructions as moment and today, and more stable when used with long term time instructions as year or general. Some other researchers showed that there can be higher correlations between PA and NA when used with short term instructions (Schmukle et al., 2002).

The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent [INSERT APPROPRIATE TIME INSTRUCTIONS HERE]. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

We have used PANAS with the following time instructions:

Moment	(you feel this way right now, that is, at the present moment)
Today	(you have felt this way today)
Past few days	(you have felt this way during the past few days)
Week	(you have felt this way during the past week)
Past few weeks	(you have felt this way during the past few weeks)
Year	(you have felt this way during the past year)
General	(you generally feel this way, that is, how you feel on the average)

Figure 3.8.Final Version of PANAS of Watson et al (1988)

In this study, a 10-item PANAS model of Watson et al (1988) is used which consists of 10 positive moods and 10 negative moods by using the 5 point Likert scale where 1 means never and 5 means always.

3.4.2. Emotion Management Behaviors

"Emotion: A strong feeling deriving from one's circumstances, mood, or relationships with others." (Oxford Dictionary)

As oxford dictionary defined the emotions can be affected by the relationship with the others. Çoruk (2012) defined an assessment model for emotion management Behaviors of Administrators in Terms of management processes. According to literature he defined six dimensions of emotion management processes,

- Decision-making
- Planning
- Communication
- Organization
- Coordination
- Assessment

1. **Decision- Making**: The dimension of decision-making is how the manager's point of view to the emotions in the organization. The properties of this kind of managers;
    - Admit that the emotions are the part of organizations.
    - Believe that it would be easier to solve the problems if the individuals are in a better mood.
    - In case of conflicts, they made decisions by considering the emotions of both sides
    - Admit that individuals can have different emotional conditions
    - Admit that the behaviors of the individuals depend on the conditions away from the organization
2. **Planning**: The dimension of planning is how the managers take precaution against the inconsistencies in the workplace. The properties of this kind of managers;

- Point out the positive sides of the incidents in the organization
- Take precaution against the emotions that cause non-attendance to the work
- Offer common goals out of the routine jobs for the individuals to feel excited
- Take precautions against the negative reaction while managing the emotions
- Do not let the personal habits to cause anxiety in the organization
- Take precautions for increasing the positive emotions in the organization

3. **Communication**: The dimension of communication is creating a positive environment for sharing and optimizing the sharing between the individuals. The properties of this kind of managers;
    - Do not postpone the problems
    - Trust the co-worker without high control and shows it
    - Make the individuals active for a enthusiastic commitment based on collaboration
    - Do not let occurrences that cause emotional tensions in case of conflicts
    - Try to obtain easier collaboration by using positive feelings
    - Do not stress the individuals in the communication process
    - Use an open communication system by not allowing emotional problems between individuals
    - Support individuals for sharing their emotions
    - Show a real concern while communicating and helping with the subordinates
    - Provide opportunity for individuals to share their emotions and thoughts
    - Show that they are happy for working with people
    - Respect the sensibility and sensible subjects
    - Try to be open to different emotions and beliefs
    - Try to constitute a communication network that blocks the negative feelings
4. **Organization**: The dimension of organization is after determining organizational goals, creating a suitable emotional environment for it. The properties of this kind of managers;

- Plan activities for happy co-workers
- Try to create a corporate structure that the emotions are shared
- Plan celebrations for special events
- Lead the co-workers to use their talents to assess their work and come to a solution
- Plan activities for creating a structure for sharing emotions
- Let all organization know activities for celebration of one.

5. **Coordination:** The dimension of coordination is to coordinate the human resources, physical factors and functions to have more effective organizations. The properties of this kind of managers;
    - Offer instructions about what are the acceptable emotions
    - Inform individuals about how to express the emotions
    - Make the co-workers' emotions active to spend their energy to job
    - Direct the co-workers emotions for the organizational goals
    - Direct the co-workers to assess their emotions by using the past experiences
6. **Assessment:** The dimension of assessment is creating a common emotional environment between who is assessing the reached goals and who is assessed. The properties of this kind of managers;
    - Give feedbacks about the emotions in time
    - Give feedbacks about the emotions positively
    - In the evaluation process they pay importance to positive feelings
    - Give importance to positive feelings about increasing the corporate efficiency (Çoruk,2012)

In this thesis, the properties of communication and some properties from decision-making and planning are taken to conduct a questionnaire about emotion behavior management of managers in construction companies. A 5 level Likert scale is used for assessing the non-verbal managerial part of the communication maturity.

Table 3.6. Emotion Management Behavior Questionnaire

		Never	Seldom	Sometime	Often	Always
1	Do not postpone the problems					
2	In case of conflicts, they made decisions by considering the emotions of both sides					
3	Admit that the behaviors of the individuals depend on the conditions away from organization					
4	Do not let the personal habits to cause anxiety in the organization					
5	Trust the co-worker without high control and shows it					
6	Do not let occurences that cause emotional tensions in case of conflicts					
7	Make the individuals active for a n ethusiastic commitment based on collaboration					
8	Do not stres the individuals in the communication process					
9	Use an open communication system by not allowing emotional problems between individuals					
10	Support individuals for sharing their emotions					
11	Show a real concern while communicating and helping with the subordinates					
12	Show that they are happy for working with people					
13	Open and sensible to sensible feelings, emotions and beliefs					
14	Try to constitute a communication network that blocks the negative feelings					

3.5. Pilot Study

A questionnaire is designed to test the study both in terms of the questions and the stages of the maturity. In the pilot study the questions are derived from the studies of Maier et al. (2006;2011). The questionnaire consists of 35 questions from the key factors information, organization, team, individual and product/action. 24 participants are asked to complete the questionnaire who is architects and engineers working for a construction company. The questionnaire is applied with the method face-to-face. Participants are asked to mark a level which includes explanations for each maturity level. In the pilot study, the maturity level of Maier et al. (2006) used which are learning theory maturity levels of Argyris and Shön (1978, 1996).

Table 3.7.Distribution of the Questions of the Pilot Study

Key Factors	**Number of Questions**
Information	13
Organization	7
Team	6
Individual	5
Product /Action	4

Table 3.8.Reliability Statistics

CRONBACH'S ALPHA

Reliability Statistics

Cronbach's Alpha	N of Items
,947	35

Reliability is high.

According to the results from SPSS, Reliability is high. When "Item-Total Statistics" table is analyzed, it can be seen that when we remove any of the questions "Cronbach's Alpha if Item deleted" column does not change significantly.

Table 3.9.Item Total Statistics of Pilot Study

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
s1	81,5417	315,042	,620	,946
s2	82,5000	317,130	,359	,948
s3	81,9583	310,650	,581	,946
s4	81,6667	305,536	,690	,945
s5	81,7083	312,129	,679	,945
s6	82,0000	303,391	,709	,945
s8	82,3750	325,723	,189	,948
s7	82,5417	320,259	,521	,947
s9	81,4583	320,781	,399	,947
s10	82,0417	307,868	,582	,946
s11	81,8333	315,623	,416	,947
s12	82,1250	312,462	,583	,946
s13	81,7917	310,781	,516	,946
s14	82,1667	303,623	,814	,944
s15	81,9583	310,216	,635	,945
s16	82,0833	299,297	,774	,944
s17	82,1250	312,723	,574	,946
s18	81,9167	303,471	,735	,944
s19	81,7917	315,998	,361	,948
s20	82,3750	304,245	,748	,944
s21	82,1250	311,766	,504	,946
s23	81,8750	312,027	,503	,946
s22	82,0417	311,433	,708	,945
s24	81,7917	313,650	,454	,947
s25	81,8333	304,058	,684	,945
s26	81,7500	306,630	,645	,945

The reliability of the questions is high so no question is removed from the main questionnaire. According to the results of the pilot study, the key factor organization has the lowest average. The gaps, which can be defined as most problematic areas in each key factor can be analyzed as follows;

- **Information**: Question “Does the information given is adequate or do you need to communicate again?” has the lowest average and standard deviation which means that there is a little variance between the answers of the participants. “How often do you get information about competitors?” is the second lowest average questions and that gives us the adequacy of the information and information about the competitors is the most problematic areas in the communication based on information.

Table 3.10.Averages of the Key Factors

KEY FACTORS	AVERAGES
Information	2,40
Organization	2,32
Team	2,47
Individual	2,46
Product / Action	2,43

- **Organization**: The averages of the organization questions very close to each other. The lowest averages questions are “Do you have information about the decision-making process?” and “Does the procedures are used for the action /product process?”
- **Team**: Team questions have close averages between Level 2 and Level 3. The lowest averages questions are “What is the collaboration level in your workplace?” and “Do you have enough knowledge about common goals and objectives?”
- **Individual**: Individual questions have close averages between Level 2 and Level 3. The lowest averages question is “Does your company have training plans and in what level they are applying?”
- **Product/Action:** Individual questions have close averages between Level 2 and Level 3. The lowest averages question is “Does the media used offer you instant answering?

Table3.11.Statistical Results of Pilot Study

Key Factor	Questions	Averages	Variance	standart deviation
Information	1	2,83	0,40	0,63
Information	2	1,88	0,80	0,89
Information	3	2,42	0,77	0,88
Information	4	2,71	0,91	0,95
Information	5	2,67	0,49	0,70
Information	6	2,38	1,02	1,01
Information	7	1,83	0,23	0,48
Information	8	2,00	0,26	0,51
Information	9	2,92	0,34	0,58
Information	10	2,33	1,01	1,01
Information	11	2,46	0,80	0,89
Information	12	2,25	0,63	0,79
Information	13	2,58	0,94	0,97
Organization	14	2,21	0,78	0,88
Organization	15	2,42	0,68	0,82
Organization	16	2,29	1,17	1,08
Organization	17	2,25	0,63	0,79
Organization	18	2,46	0,95	0,97
Organization	19	2,58	0,94	0,97
Organization	20	2,00	0,86	0,93
Team	21	2,25	0,89	0,94
Team	22	2,33	0,49	0,70
Team	23	2,50	0,86	0,93
Team	24	2,58	0,86	0,92
Team	25	2,54	1,04	1,02
Team	26	2,63	0,94	0,96
Individual	27	2,29	0,65	0,80
Individual	28	2,25	0,89	0,94
Individual	29	2,33	0,66	0,81
Individual	30	2,63	0,67	0,82
Individual	31	2,79	0,52	0,72
Product/Action	32	2,63	0,59	0,76
Product/Action	33	2,50	0,78	0,88
Product/Action	34	2,21	0,69	0,83
Product/Action	35	2,38	1,02	1,01

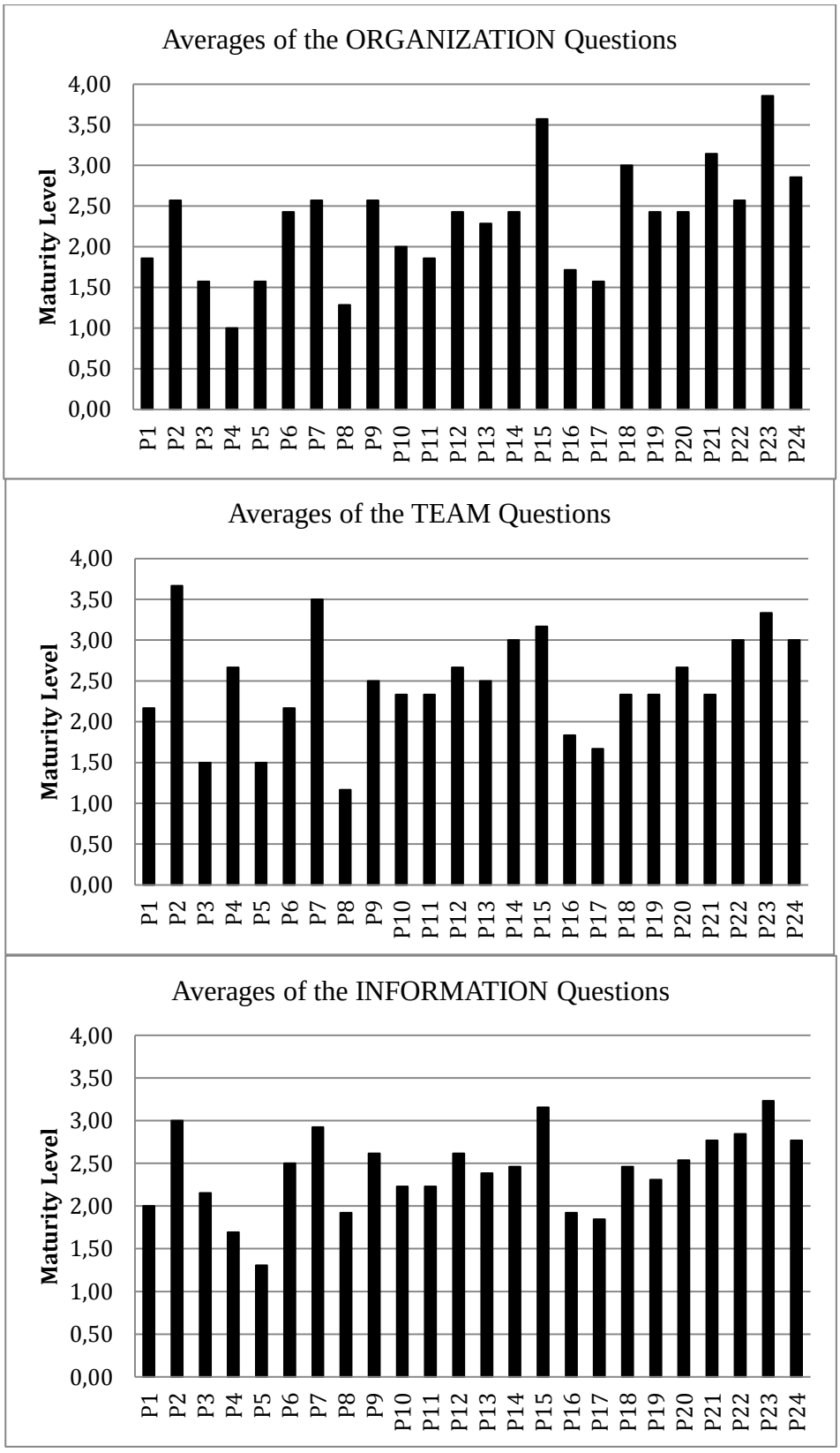


Figure 3.9. Averages of the Key Factors Organization Team and Information

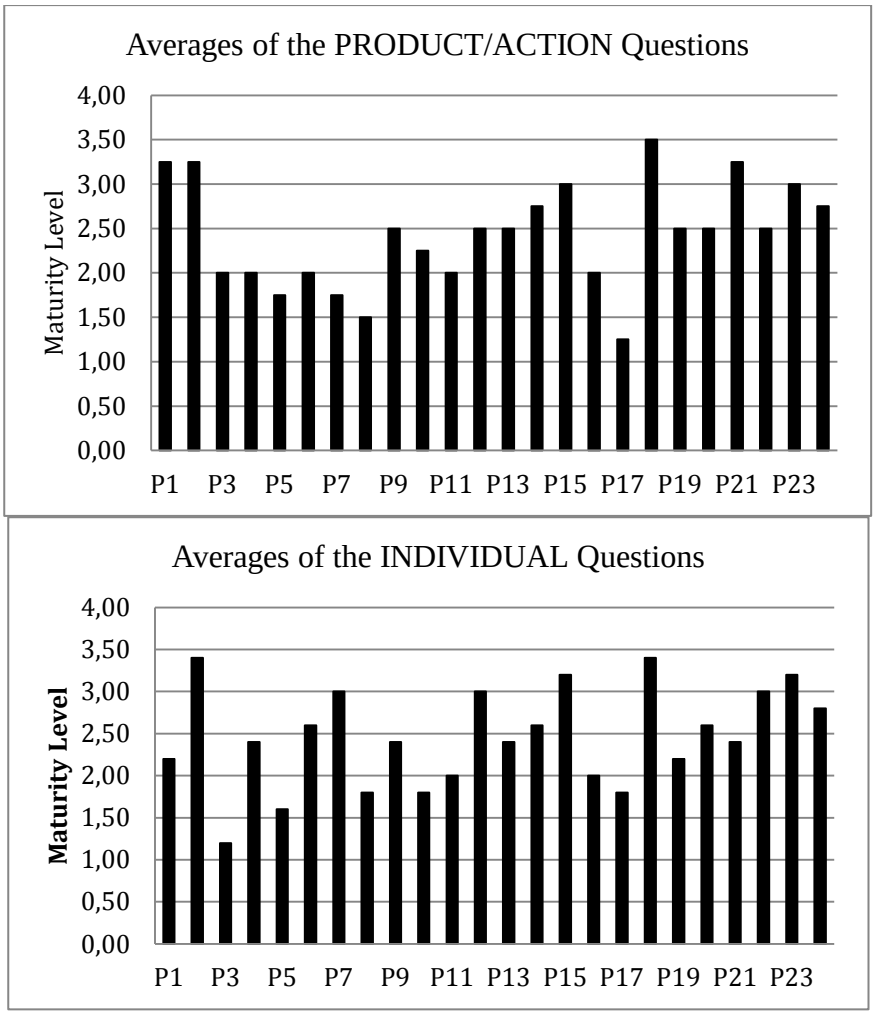
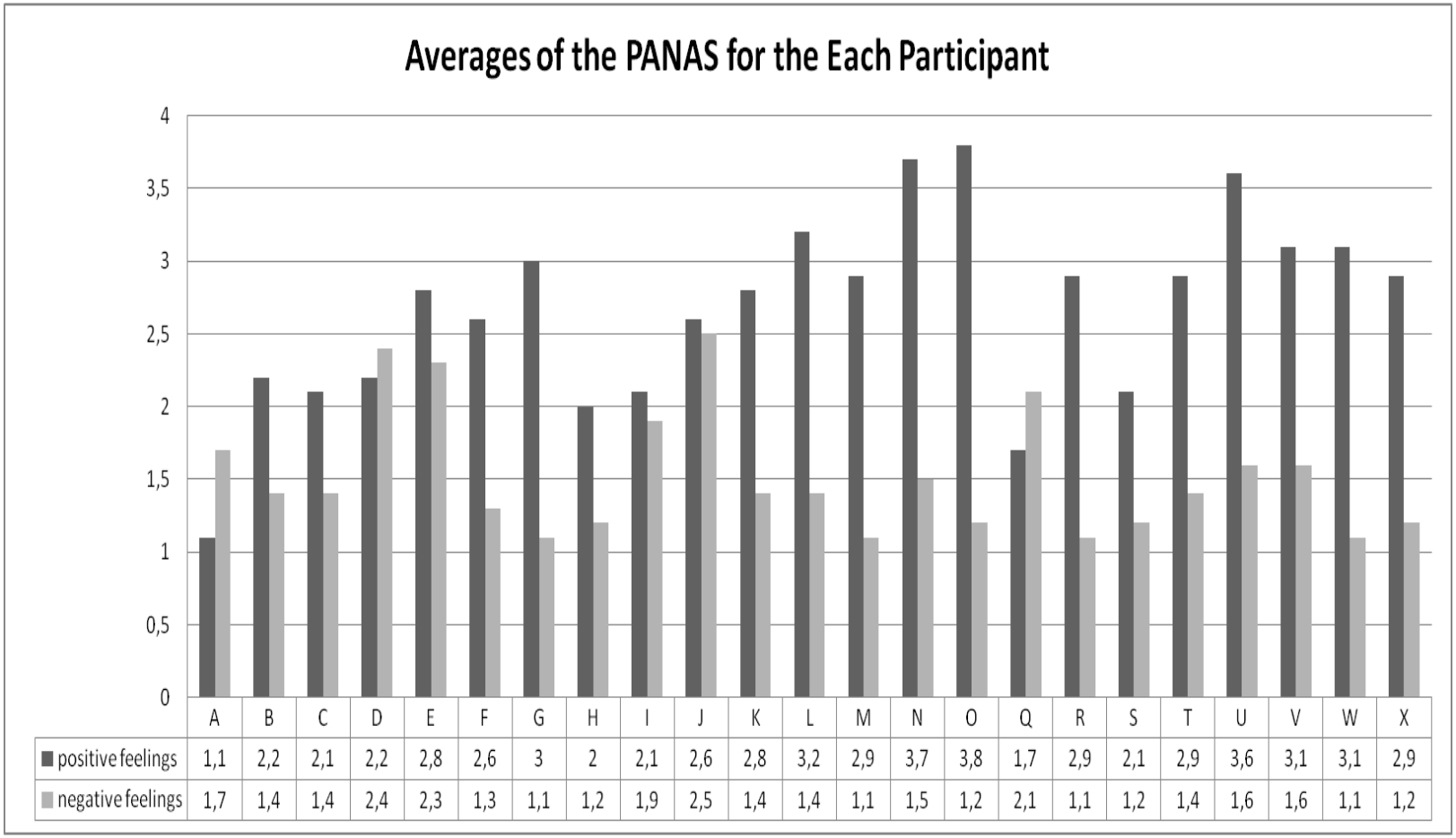


Figure 3.10. Averages of the Key Factors Individual and Product/ Action

When we analyze the results of NON-VERBAL communication based on the negative and positive feelings, the problematic areas are mostly on the negative side of the feelings.

Table 3.12. Results of the PANAS of the Pilot Study

Negative Feelings	**Average**
Gloomy	2,09
Angry	1,91
Nervous	1,82
Unhappy	1,73



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	T	U	V	W	X
positive feelings	1,1	2,2	2,1	2,2	2,8	2,6	3	2	2,1	2,6	2,8	3,2	2,9	3,7	3,8	1,7	2,9	2,1	2,9	3,6	3,1	3,1	2,9
negative feelings	1,7	1,4	1,4	2,4	2,3	1,3	1,1	1,2	1,9	2,5	1,4	1,4	1,1	1,5	1,2	2,1	1,1	1,2	1,4	1,6	1,6	1,1	1,2

Figure 3.11. Graph of the Averages of the PANAS According to Participants

When the correlation between negative and positive feelings is analyzed, correlation coefficient is -0, 3. The correlation coefficient is very low so we cannot say that there is a negative correlation between positive and negative feelings.

With the pilot study,

- Feedbacks from the participants are analyzed that some questions and answers are not understandable
- There can be missing questions that participants offer

3.6. Using Dephi Method to Identify the Weights of the Factors of Communication Process

Delphi method was developed in 1950's and taken its name from the Ancient Greek city which a man lives that predicts the future. It is a method for solving conflicts about subjects as the quality of a product, the importance of the activities and etc. This method is based on taking knowledge from a group of experts about the subject, statistically analyze the results and give controlled opinion feedback (Adler and Ziglio, 1996). Delphi method has three important characteristics as; privacy of the participants, statistical analysis of the group reaction and controlled feedback (Şahin, 2001).

There are many different variations of Delphi Method since it is developed in 1950's, but in this study the "ranking-type" of Schmidt (2001) will be used as a base.

In this study Delphi method is used to discuss the ranking and importance of the factors that affect communication. 40 factors or variables are defined to assess the communication capability maturity level (C-CMM). These factors are taken from literature but there are no studies which focus on the relative importance of the factors. Delphi Method is used for two objectives which are; the relative degree of importance/affect of the factors on the communication maturity level and discuss the factors is there are factors missed in the literature and if the factors derived from the literature are properly grounded.

First part of the Delphi method consists of a questionnaire about the factors that affect communication based on the literature. Participants decided if the factors are accurate and noted down the missing factors in the literature. In the second part, a new ranking-type questionnaire is designed to find out the relative importance of the factors. So, in this study Delphi Method answered three questions;

1. Are the factors derived from the literature really important?
2. Which factors that affect communication are missed in the literature?
3. What are the relative importances of the factors?

There are 5 participants who are architects and engineers, from the professional and academic environment. Participants are chosen from both architects and engineers because it is important to solve the conflict between the actors of the construction process. The process stated below has applied; the steps below are taken from the steps defined by Günaydın (2007);

1. Choice of the participants is an important step in Delphi study. It has been stated that number of the participants are based on the subject however small groups can perform better (Brockhoff, 1975). The participants are chosen from the academic and professional environments that are related with the subject of organizational communication in construction, a high degree of expertise is not needed. Five participants answered the questionnaire that three of them are from the construction industry (one architect and two civil engineers) and two of them are from the academic environment.
2. Development of the first round questionnaire: In the first part of the Delphi study, participants are asked to answer two questions; do the factors stated have an effect on the communication process and can you define more factors which are important but not stated?
3. Questionnaire is sent to participants by e-mail but before that they are informed by telephone.
4. The results of the first round questionnaire are analyzed. The answers showed that all factors that are taken from the literature are important for the maturity of the organizational communication besides those three new factors are added by the participants which are;

Table 3.13. Factors added with the Delphi Study

1	Rewarding Procedures
2	Use of reference to interpret the knowledge about the project
3	Knowledge about protecting and saving the project

5. In the first round, there are some misunderstandings appeared about the questions because of the proper wording and sentences. They are fixed for better results.
6. Second round questionnaire is prepared for the participants. A Five-Scale Likert scale is used to find out weighted values of the factors.
7. The answers of the second round questionnaire is analyzed as follows;
    - The averages of the importance (weight) of the factors are found from the answers of the experts.
    - The factors that affect communication maturity are defined in five key factors which are information, organization, team, individual and project/action. It is assumed that the weights of these five factors are equal, so the equation will be as follows;

      $CML=((w_{inf1}*inf1+\ldots+w_{inf14}*inf14)+(w_{o1}*o1+\ldots+w_{o9}*o9)+ (w_{t1}*t1+\ldots+w_{t5}*t5)+(w_{ind1}*ind1+\ldots+w_{ind8}*ind8)+ (w_{p1}*p1+\ldots+w_{p6}*p6))/5$

      Where;

      CML (Communication Maturity Level)

      $w_{inf\,1}$ = weight of the first question of the key factor information

      w_{o1} = weight of the first question of the key factor organization

      w_{t1} = weight of the first question of the key factor team

      $w_{ind1\,=}$ weight of the first question of the key factor individual

      w_{p1} = weight of the first question of the key factor project/action

      inf1 = maturity level of the first question of the key factor information

      o1 = maturity level of the first question of the key factor organization

      t1 = maturity level of the first question of the key factor team

      ind1 = maturity level of the first question of the key factor individual

      p1 = maturity level of the first question of the key factor project/action

- To find out the weighted values of the each questionnaire the averages of the weights are normalized that the sum of the weights of factors under each key factor must be 1.

Table 3.14.Weights of the Factors of Information

$W_{inf\ 1}$	0,0697
$W_{inf\ 2}$	0,0732
$W_{inf\ 3}$	0,0801
$W_{inf\ 4}$	0,0801
$W_{inf\ 5}$	0,0801
$W_{inf\ 6}$	0,0801
$W_{inf\ 7}$	0,0627
$W_{inf\ 8}$	0,0627
$W_{inf\ 9}$	0,0768
$W_{inf\ 10}$	0,0558
$W_{inf\ 11}$	0,0732
$W_{inf\ 12}$	0,0801
$W_{inf\ 13}$	0,0592
$W_{inf\ 14}$	0,0662

Table 3.15.Weights of the Factors of Organization

W_{o1}	0,0973
W_{o2}	0,1135
W_{o3}	0,119
W_{o4}	0,1297
W_{o5}	0,1027
W_{o6}	0,1135
W_{o7}	0,1135
W_{o8}	0,1027
W_{o9}	0,1081

Table 3.16. Weights of the Factors of Team

W_{t1}	0,2124
W_{t2}	0,2124
W_{t3}	0,1858
W_{t4}	0,1947
W_{t5}	0,1947

Table 3.17.Weights of the Factors of Individual

W_{ind1}	0,1281
W_{ind2}	0,1281
W_{ind3}	0,1158
W_{ind4}	0,1402
W_{ind5}	0,1281
W_{ind6}	0,1281
W_{ind7}	0,1341
W_{ind8}	0,0975

Table 3.18.Weights of the Factors of Product/Action

W_{p1}	0,1667
W_{p2}	0,1746
W_{p3}	0,1667
W_{p4}	0,1587
W_{p5}	0,1746
W_{p6}	0,1587

3.7. Final Questionnaire

Table 3.19.The References of the Questions of the Organizationa Communication System

KEY FACTOR	QUESTION	REFERANCE
Information	Availability of information about competitors	Maier and Eckert (2011)
Information	Availability of information about organization	Maier and Eckert (2011)
Information	Availability of information about procedures	Maier and Eckert (2011)
Information	Availability of information about product specifications	Maier and Eckert (2011)
Information	Do you know what information does the other party need?	Maier et al. (2006)
Information	Does the other party know what information do you need?	Maier et al. (2006)
Information	Do you know in what format does the other party need information?	Maier et al. (2006)
Information	Does the other party know in what format do you need information?	Maier et al. (2006)
Information	Is the information clear?	Downs and Hazen (1977)
Information	Is the size of the message appropriate for the subject?	Downs and Hazen (1977)
Information	Do you know how the other party uses the information?	Maier et al. (2006)
Information	Do you need extra information for completing the task?	Murray (2000)
Information	Do you know the source of the information?	Delphi Study
Information	Do you know how to reach the information?	Delphi Study
Organization	How the hierarchy affects the communication process?	Maier and Eckert (2011)
Organization	Are there any efforts for developing the procedures?	Maier and Eckert (2011)
Organization	Do you know the roles and responsibilities?	Maier and Eckert (2011)
Organization	How often technical conflicts are solved?	Maier and Eckert (2011)
Organization	What do you think about the transparency of the decision-making process?	Maier and Eckert (2011)
Organization	Do you have knowledge about application of corporate vision and values?	Maier and Eckert (2011)
Organization	Do you have knowledge about common goals and objectives?	Maier and Eckert (2011)

(Cont. on next page)

Table 3.19. (Cont.)

Organization	What is the level of mutual trust in the organization?	Maier and Eckert (2011)
Organization	Do you trust the accuracy of the information given?	Te'eni, 2001
Team	How often lessons learned are shared?	Maier and Eckert (2011)
Team	How is collaboration and level of collaboration?	Maier and Eckert (2011)
Team	How is the level of team identity?	Maier and Eckert (2011)
Team	What is the level of formal and informal reviews?	Maier and Eckert (2011)
Team	How often best practices are shared?	Maier and Eckert (2011)
Individual	Availability of information about the work flow	Maier and Eckert (2011)
Individual	Availability of information about who involved in which step	Maier and Eckert (2011)
Individual	How is the level of information flow in the organization?	Maier and Eckert (2011)
Individual	How is the distribution of information about the organizational changes?	Maier and Eckert (2011)
Individual	How is the level of generation of innovative ideas?	Maier and Eckert (2011)
Individual	Application of training plans and schedules	Maier and Eckert (2011)
Individual	How is the level of best use of capabilities?	Maier and Eckert (2011)
Individual	Do you have a rewarding system?	Delphi Study
Product/Action	How is the level of understanding the representation system?	Maier and Eckert (2011)
Product/Action	How is the level of understanding the terminology	Maier and Eckert (2011)
Product/Action	Do the media you are using offers immediate answer?	Te'eni, 2001
Product/Action	Do the capacity of media important?	Te'eni, 2001
Product/Action	Are the communication media adaptable?	Te'eni, 2001
Product/Action	How is the level of protecting and archiving the product?	Delphi Study

CHAPTER 4

FINDINGS AND ANALYSIS

The reliability of the questionnaire is tested and Cronbah's alpha of the organizational communication system is 0.9464, which means that the questionnaire is reliable. The findings of this thesis are analyzes under three headings as,

- Analysis of the Organizational Communication System's Maturity Level
- Analysis of the Levels of Emotions and Moods of the Organizational Communication
- Analysis of the interdependencies between the factors of the organizational communication system and between the maturity level of the system and level of emotions and moods

Before analysing the three heading it is important to have a general analysis about the results of the study. Communication Maturity Level Questionnaire is sent to nearly 100 people but only 45 of them responded which 5 of them are not completed.

The ages of the participants are between 24 and 63 mostly centered at the ages 30 and 35. 63 percent of the participants named under 'Architects' that are architects and interior designers and 37 percent of the participants named under 'Engineers' that are civil engineers, electrical engineers and mechnanical engineers.

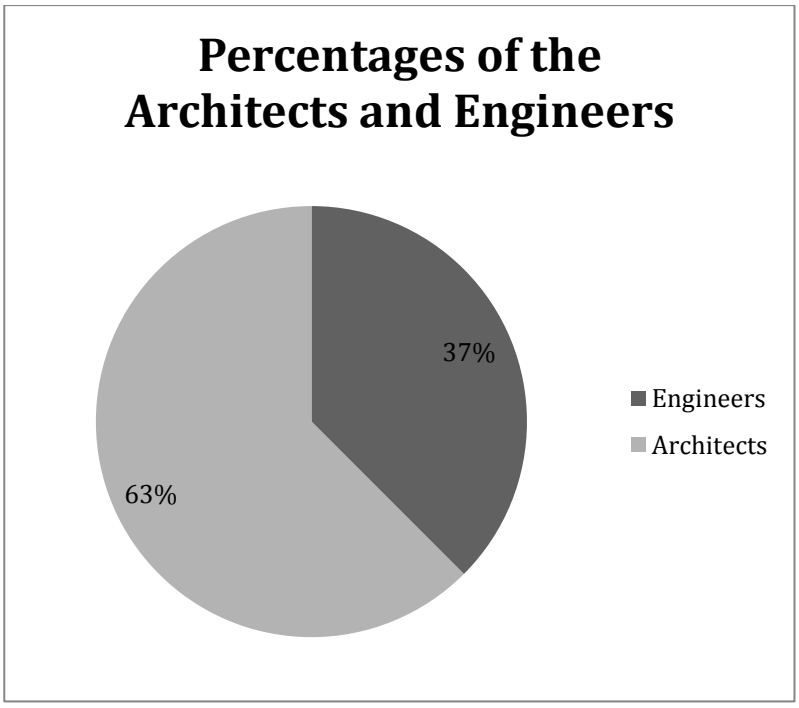


Figure 4.1.Percentages of the Architects and Engineers

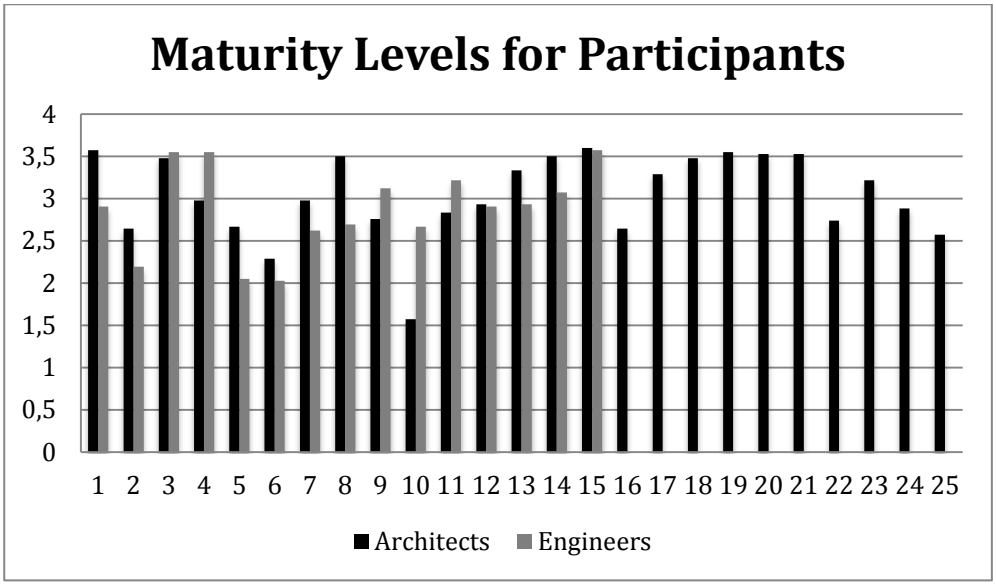


Figure 4.2.Average Maturity Levels for each Participant

General average maturity level of organizational communication system can be analyzed in two ways. By using the Delphi Method the weights of the each factor are found. So there can be two analyses about the organizational communication system's maturity level found with using the weights of each factor which is found out as 2.987. It means that the maturity level is very close to Level 3 which is controlled level. And two results of the methods are very close to each other

4.1.Analysis of the Organizational Communication System's Maturity Level

Factors affecting the organizational communication system are numbered as questions and the answers are analyzed. The results can be analyzed in many ways as,

- The averages of the key factors and found out which key factor is the most problematic one. According to the results the averages can be seen from the Table 4.1.

Table 4.1. Averages of the Key Factors

	Key Factor	**Average**
1	Information	3,025
2	Organization	2,797
3	Team	2,997
4	Individual	2,940
5	Product/Action	3,166

Table 4.2. Statistical Resuılts of the Key Factors

KEY FACTOR	NO	VARIANCE	STD. DEV.	WEIGHTS	AVERAGES
Information	1	0,45	0,67	0,070	2,1
Information	2	0,88	0,94	0,073	3,125
Information	3	0,69	0,83	0,080	3,075
Information	4	0,69	0,83	0,080	3,225
Information	5	0,66	0,81	0,080	3,45
Information	6	1,04	1,02	0,080	3,125
Information	7	0,61	0,78	0,063	3,425
Information	8	0,94	0,97	0,063	3,051
Information	9	0,79	0,89	0,077	3,075
Information	10	0,42	0,65	0,056	3,2
Information	11	1,05	1,03	0,073	2,85
Information	12	0,36	0,60	0,080	2,725
Information	13	0,95	0,98	0,059	2,85
Information	14	0,84	0,92	0,066	3,075
Organization	15	0,87	0,93	0,097	3
Organization	16	0,69	0,83	0,113	2,85
Organization	17	1,05	1,02	0,119	2,775
Organization	18	0,67	0,82	0,129	2,525
Organization	19	0,79	0,89	0,103	2,325
Organization	20	0,91	0,96	0,114	2,9
Organization	21	0,70	0,84	0,114	2,625
Organization	22	1,24	1,11	0,103	3,125
Organization	23	0,77	0,88	0,108	3,05
Team	24	0,77	0,88	0,212	3
Team	25	0,83	0,91	0,212	3,125
Team	26	1,25	1,12	0,186	2,975
Team	27	0,72	0,85	0,195	2,95
Team	28	0,74	0,86	0,195	2,925
Individual	29	0,56	0,75	0,128	3
Individual	30	0,90	0,95	0,128	3,15
Individual	31	0,54	0,74	0,116	3,15
Individual	32	0,69	0,83	0,140	3,325
Individual	33	1,12	1,06	0,128	3,05
Individual	34	1,12	1,06	0,128	2,45
Individual	35	0,90	0,95	0,134	3,025
Individual	36	1,01	1,01	0,098	2,375
Product	37	0,94	0,97	0,167	3,075
Product	38	0,87	0,93	0,175	3,275
Product	39	0,47	0,69	0,167	3,125
Product	40	0,72	0,85	0,159	3,05
Product	41	0,89	0,94	0,175	3,075
Product	42	0,81	0,90	0,159	3,4

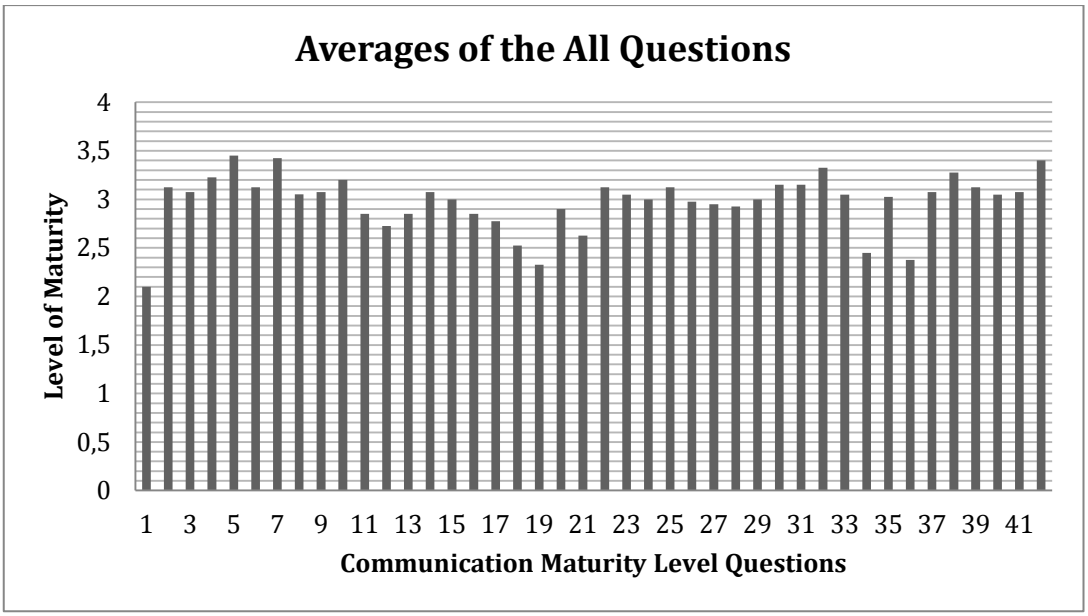


Figure 4.3.Averages of the Questions

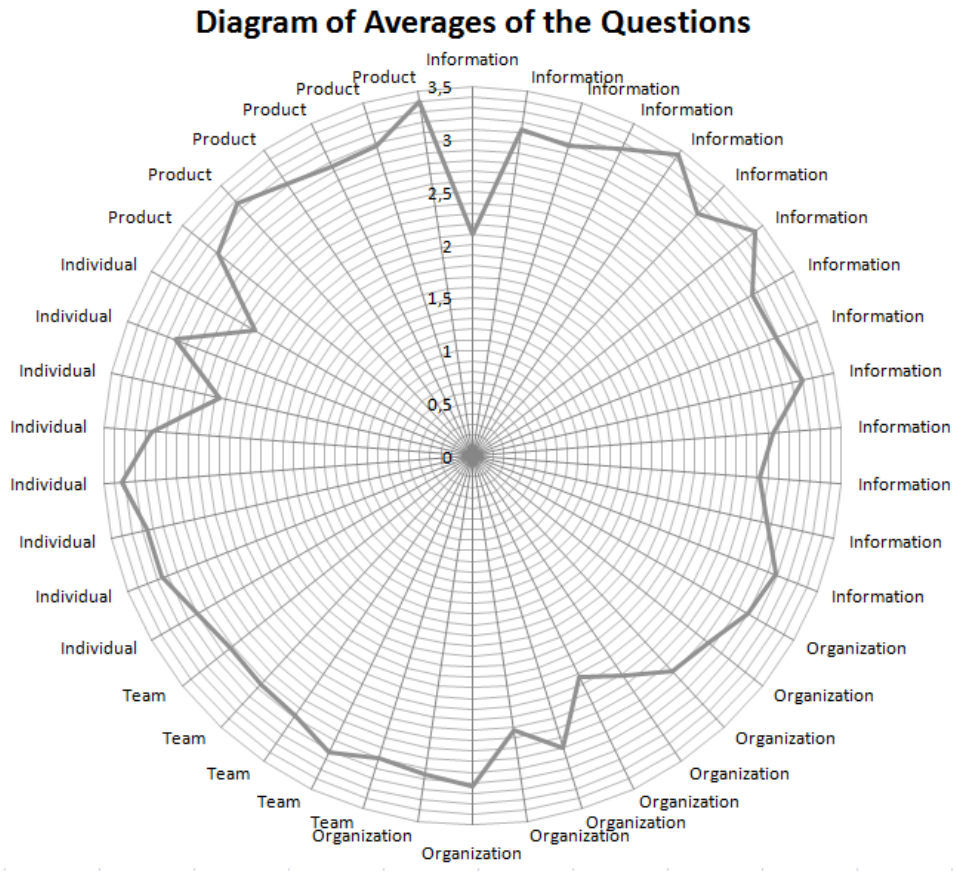


Figure 4.4.Diagram of the Averages of the Questions

From the spider or radar diagram, the problematic points can be seen more quickly. The answers of the team questions have a smooth line which is very close to the Maturity Level 3. This finding means that communication maturity level of the key factor is at the controlled level. So for the key factor team, it is important to define the steps to move to the next Organizational Communication Maturity Level. At the key factor information, the first question is problematic for the most of the participants. The first information question was about the availability of information about the competitors. It is the one of the gaps of organizational communication according to the results of the questionnaire. All questions are analyzed one by one under the headings of key factors which are information, organization, team, individual and product/action.

4.1.1. Analysis of the Questions about the Key Factor Information

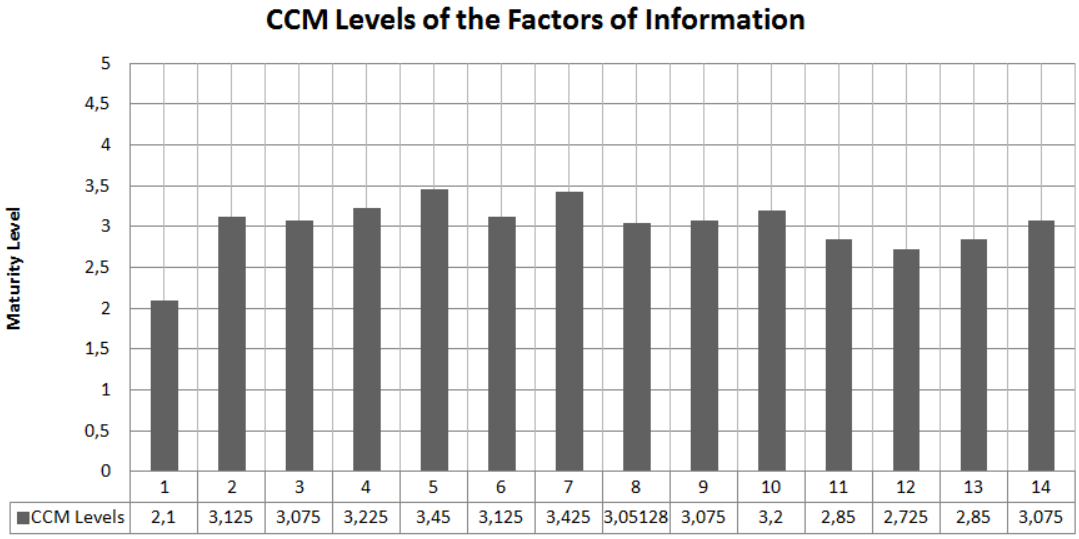


Figure 4.5. Maturity Levels of the Factors of Information

For the Information key factor, the first four questions are about availability of information about the competitors, organization, procedures and project specifications. These four questions are related with the organization, if the organization gives information effectively. Availability of information about competitors has the minimum average with 2,1. It means that in most of the companies, distributing information about competitors is a problematic area and in Level 2, which is, repeatable but not defined procedures about it. When the questions are analyzed,

- As mentioned the first information question that is related with the information about competitors has the lowest average communication maturity level in information questions with the average of 2,1. This is very close to Organizational Communication Maturity Level 2 that can be characterized by sufficient data and information but the knowledge is based on personal abilities and named as relatively controlled level. It means that, in most of the construction companies, architects or engineers have knowledge about competitors by their own effort. In this factor, the aim must be going up a level in organizational communication maturity by distributing information in the company about the competitors and the knowledge about the competitors in the company must be equal.
- The second information question is about the availability of information about the company. The average of this question is 3.125 which is very close to Organizational Communication Maturity Level 3 that can be characterized by sufficient data, information and knowledge but the application of the knowledge is partly become reality. It means that the information about the procedures is distributed but not regularly. To go up a level in organizational communication maturity, the information must be distributed regularly and everyone in the company has same knowledge. It can be seen that the level of information about the company is better than the level of information about the competitors.
- The third information question is about the information about the procedures in the company. The average of this question is 3.075 which is very close to Organizational Communication Maturity Level 3 that can be characterized by sufficient data, information and knowledge but the application of the knowledge is partly become reality and this level is named as controlled level. The information about the procedures must be distributed regularly in the company.
- The fourth information question is about the information about the product or action specifications. The average of this question is 3,225, which is the third highest average in the information questions. There is sufficient knowledge about the product specifications and the information is applicable in some level but not fully applicable. According to analysis, this high average is not related with reaching a high level of communication but it is highly related with getting the work done.
- Following two questions about the information should be analyzed together that are, “Do you know what information does the other party need?” and “Does the other

party know what information do you need?" .The average of the first question is 3.45 and the average of the second question is 3.125.

- As the previous questions the questions "Do you know in what format does the other party need information?" and "Does the other party know in what format do you need information?" question must be analyzed together. First question has one of the highest averages in the information questions by the average of 3.42 and the second question has the average of 3.05. The results mean that the knowledge about the format of the message is sufficient but there is no management and application is partly. Besides that it can be seen that the question about the participants' own knowledge has higher average than the knowledge of the other party.
- The nineth information question is about the clearity of the information that is claimed as a very important factor for communication since 1970's (Downs and Hazen, 1977). The average of the question is 3.07, which means that there is sufficient knowledge about the clearity of the message but there are some gaps about the application of the subject.
- The question "Is the size of the message appropriate for the subject?" has the average of 3.2 that is higher than the clearity of the message but it still means that there is sufficient knowledge about the size of the message but there are some gaps about the application of the subject.
- The following question is about the knowledge about how the other party uses the information sended. The average maturity level of this question is 2.85, which means that the information included but knowledge is not sufficient.
- The question "Do you need extra information for completing the task?" has the average of 2,72, which is the one of the lowest averages in the information questions. It means that the knowledge is not sufficient so participant has to communicate again for the extra information to complete the task.
- Thirteenth information question is about the information about the sources of the information as rules, regulations and references. The average of this question is 2,85 that is very close to Level 3. This question is asked based on Delphi study because two experts mentioned that there is a gap about this factor, which causes dealys and loss of time. Time and time management is highly important in construction companies so for this factor, information and knowledge is not enough. The knowledge must be applicable in all areas to get the job done. Nearly Level 3 is not

appropriate, this factor should be at least at the Level 4, which is the controlled and conservatively improving level.

- The last question about information is “Do you know how to reach the information?” . As the previous question, this question is asked based on Delphi study. If there is a gap in this factor, it will cause delays. The average of this question is 3,075. So it can be seen that when compared with the previous question, knowledge about the source and where to find it questions have very similar averages.

4.1.2. Analysis of the Questions about the Key Factor Organization

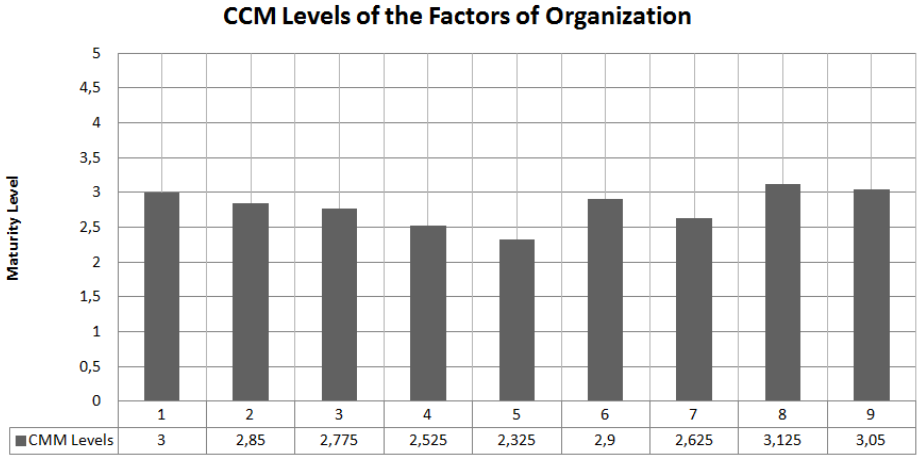


Figure 4.6. Maturity Levels of the Factors of Organization

- The first question about organization is about the hierarchy and its effect on the communication. The average of the organization questions are around 3, and this question has the average of 3. It means that the maturity level of this question is at level 3 that can be called as controlled level. People have sufficient knowledge about the effects of hierarchy on the communication and the hierarchy on the communication is defined but it is partly applicable and there is no improvement about this factor.
- The second organizational question is based on the effort for developing procedures. As mentioned before knowledge about the procedures is an information question. But developing of these procedures is an organizational procedure. The average of this question is 2.85, which is under the Level 3. So it can be said that knowledge

about developing procedures is not sufficient. When compared with the third information question, it can be seen that, the maturity level of information about procedures is above level 3, but effort about developing procedures is under. This result means that generally, organizations have defined procedures but not managed besides that, developing procedures is not even sufficiently defined.

- One of the unexpected results about organization is that the average of the information about roles and responsibilities is 2.77. This result does not mean that participants do not know the roles and responsibilities in the organization. The true meaning of this result is the construction companies do not have defined roles and responsibilities according to the interviews.
- The question "How often technical conflicts are solved?" has the average of 2.52, which is the one of the lowest averages for the organizational questions. It is not recorded but during the face to face interviews, some of the participants mentioned that in fact technical conflicts can be solved easily for a construction project but the solving method is not defined so it is based on the personal experiences and for this reason technical conflicts are confused with personal conflicts.
- Transparency of the decision-making process of a company is related with the trust issues. The question about this factor has the average of 2.32, which is the lowest average of the organization questions. The question "What do you think about the transparency of the decision-making process?" is mostly related with the people included in the decision-making process and the objectivity of the decision-making process. The results showed that this factor is at the maturity level 3, which is repeatable and based on the personal experinces but not defined. There is partly knowledge about the decision-making process but is not applicable.
- Following two questions can be analyzed together that are about the knowledge application of the corporate vision and values and about common goals and objectives. Regardless from the departments and area of the expertise these two factors must have high levels of maturity for the common understanding in the company. Averages are low as 2.9 for the corporate vision and values and 2,62 for the common goals and objectives. These results mean that participants have knowledge about the corporate vision and values but not applicable, there are defined and controlled vision and values but they are not managed. It is suprizing that knowledge about common goals and objectives has lower average than the vision

and values. According to the inteviews, it is observed that this is because companies define corporate vision and values at least as only written documentaries.

- The last following two questions are direcyly related with the trust in the company between people or between departments. Level of mutual trust has the highest average for the organization questions with the average of 3.12. It means that there is sufficient knowledge about the mutual trust and need for mutual trust in the organization and very low level of application about it. Level of mutual trust is at the defined level and going up to the managed level. The other question is "Do you trust the accuracy of the information given?" and the average of this question is 3.05 and can be interpreted as same with the mutual trust that this factor is at controlled level, which means that if the process is controlled they trust the accuracy of the information but not managed effectively.

4.1.3. Analysis of the Questions about the Key Factor Team

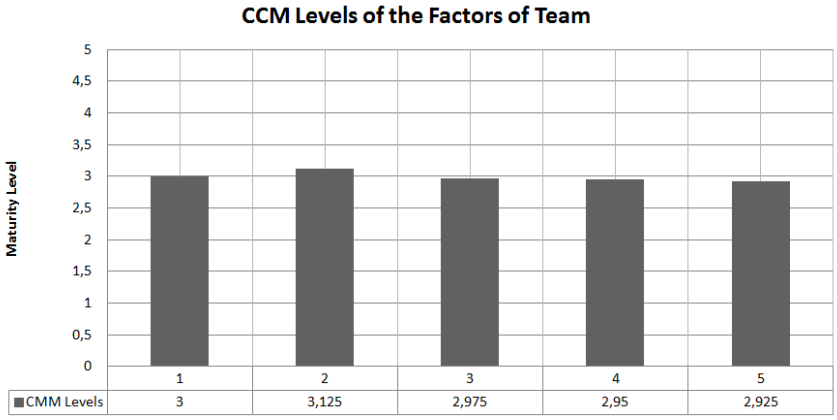


Figure 4.7. Maturity Levels of the Factors of Team

The first team question is about sharing the lessons learned. This question can be analyzed with the question about sharing best practices. Two questions have very similar average with 3 and 2.92. Maturity level of sharing lessons learned is exactly at level 3, which can be defined as controlled level. The maturity level of sharing best practices is near the controlled level that is level 3. There is sufficient information and knowledge for both of the factors but it can be seen that from the results although there is sufficient knowledge and defined process about sharing best practices and lessons

learned, the application of this processes are not managed, the application is based on people.

- Collaboration is highly important for efficient communication as stated before. The question about the maturity level of collaboration has the highest average between the team questions with the average of 3.12. When the result is analyzed it can be seen that there is sufficient knowledge about the factor and it is partly applicable. The factor collaboration is above the maturity level 3, which is controlled level.
- Team identity is important both for the key factor team and organization. The average maturity level of team identity is 2.97, which is, controlled level. This results means that there is sufficient knowledge and information about the team identity but there are gaps about the application of this knowledge.
- The last question about team is about formal and informal reviews. Reviews are important but the way of communication during this process is important too. So the process of formal and informal reviews must be managed effectively. The average maturity level of this question is 2.95, which is very close to controlled level. And there is sufficient knowledge about the process but there are some problematic areas about the application of it.

4.1.4. Analysis of the Questions about the Key Factor Individual

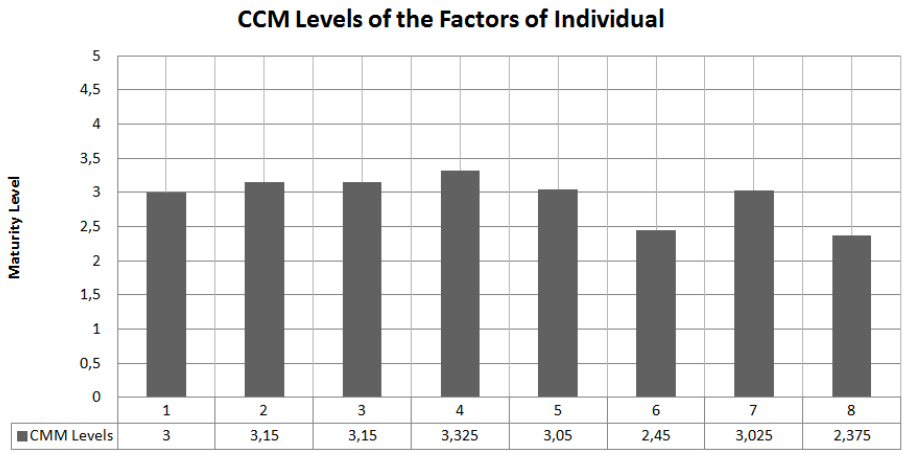


Figure 4.8. Maturity Levels of the Factors of Individual

- The first question about the key factor individual is about the information about the work flow. The average of this question is exactly 3, which means that this factor is

at maturity level 3. This level is called controlled level where the information and knowledge is sufficients but there problems during application of this knowledge.

- The following question is about the availability of information about who involved in which step. This question is partly related with the key factor organization. The distribution of information about it is based on organizational factors but having knowledge about it is based on individual factor. The average of this question is 3,15, which can be defined as controlled level of maturity. The knowledge is sufficient but the management of the knowledge has some gaps.
- The following two questions can be analyzed together because they are relevant to each other. "How is the level of information flow in the organization?" and "How is the distribution of information about the organizational changes?" questions are partly related with the key factor organization. But the application of these factors are related with individual. Average of the level of information flow is 3,15 and the level of distribution of information about organizational changes is 3,325. The factor distribution of information about organizational changes has the highest average in the individual questions. It means that highest maturity level is at this factor and besides sufficient knowledge and information, with a little effort this factor can go up to managed level.
- Generation of innovative ideas is important in an organization and this factor is related directly with individual. The average of this factor is 3,05, which means that the information and knowledge is sufficient but the application of them are insufficient. The maturity level of the factor generation of innovative ideas is at the controlled level.
- Two questions, which means two factors, for the individual key factors has the lowest averages which can be analyzed as most problemmatic areas of the key factor individual. First one is application of training plans and schedules. This factor has the average of 2,45 that is between the relatively controlled and controlled level. The result give the idea that not only the training plans of the organization are not applicable, there are some companies that do not have any training plans. According to the answers, it can be seen that training schedules are taken into consideration only for special cases. There are no regular and applicable traning plans and schedules in the construction companies. The second question has the lowest average with 2,37 which the question is about rewarding system. As the previous question,

answers are analyzed and it is found out that the rewarding system is neither managed nor defined. The rewards are organized for special cases. These two factors have same problem as not being defined and controlled so the individual do not have any idea about both training schedules and rewarding system.

- The last question of key factor individual is “How is the level of best use of capabilities?”. The average of this factor is 3,02 which means that it is at the defined level. There is sufficient knowledge about it but the application of the factor has some gaps. According to the answers that is because it is more important to get the job done than the best use of capabilities. But with some effort the maturity level of this factor can go up to managed level and at that level the job gets done with the best use of capabilities.

4.1.5. Analysis of the Questions about the Key Factor roduct/Action

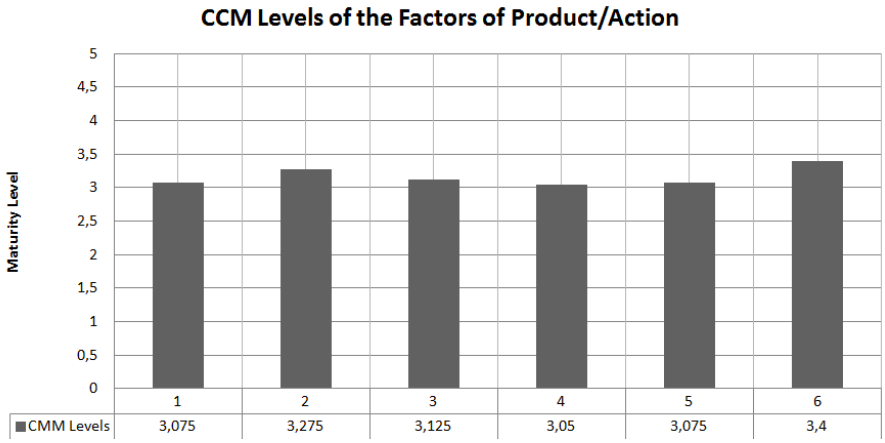


Figure 4.9. Maturity Levels of the Factors of Product/Action

- The first two questions of key factor Product/Action are based on the representation system and terminology which are relevant to each other. When communicating, it is important to understand the information . It is important to creat a common language and for the accuracy of the product or action. The average of the factor about representation system is 3,07 and the average of the factor about the terminology is 3,27. The maturity level of terminology is hihger than the maturity level of representation system. The reason can be that an individual working for a construction company has knowledge about the terminology even for the different departments. But the representation system can change according to the expertise as

architects, civil engineers or mechanical engineers. Even there is a difference between the maturity level, in fact they are both at the controlled level, which the information and knowledge is sufficient but the application of the knowledge has some gaps.

- The next three questions of the key factor product/action is related with the media and the questions asked are about if the media offers immediate answer, capacity of the media and if the media is adaptable. These three questions have nearly same average and the averages are respectively 3.12, 3.05 and 3.07. the averages are at the controlled level which means that the knowledge is sufficient but management of the factor is poor.
- The last question of the key factor product/action has the highest average between the all the questions and has the average of 3.4. the question is "How is the level of protecting and archieving of the product?". The protection and archieving of the product is important for many reasons as protecting the knowledge to use it later and archiving the knolwedge for other parties. The maturity level of this factor is between 3 and 4, that means the knowledge is nearly applicable and managed.

4.2.Analysis of the PANAS and Emotional management Behavior Levels

When the results of the PANAS are analyzed, it can be seen from the Figure 4.10 that positive moods have nearly same averages between 3 and 3,5. The averages of the positive moods are very close to each other. The most problematic moods are excited and proud. The moods interested, determined and attentive are in good level by being above the 3.5 which means that they are very close to level 4. Level 4 can be defined as they are at that mood mostly, that is why being mostly in a positive mood can be interpreted as a high level.

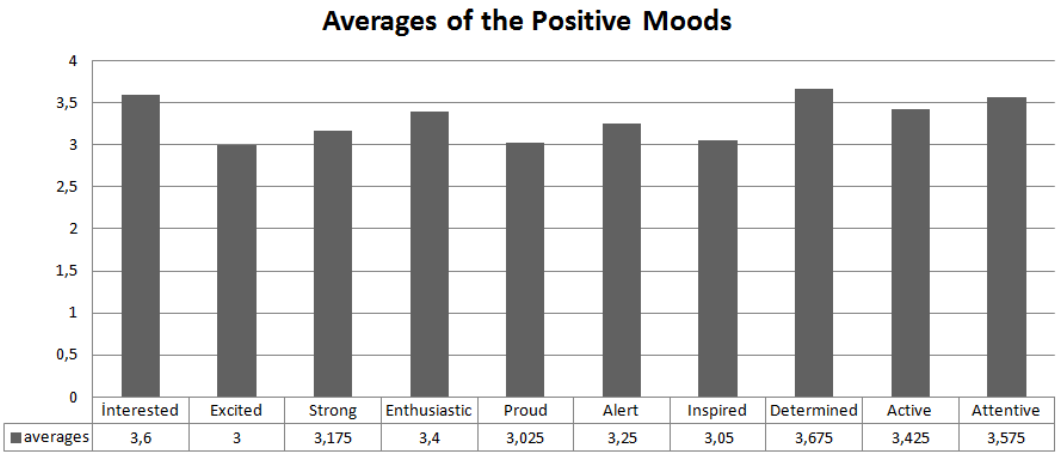


Figure 4.10. Averages of the Positive Moods

The spider graph gives an idea about the level of positive moods visually. As it can be seen from the Figure 4.11 the level of the mood excited is a little bit down. According to interviews it is because most of the time participants are working on the same subject everyday. Paperworks, calculations and drawings are mentioned as the main reasons for not feeling excited.

The mood determined has the highest average with the average of 3.67. Determined defined at the Oxford Dictionary as,

Determined: “Having made a firm decision and being resolved not to change it”

The following highest averages are interested and attentive. Interested can be defined as showing curiosity and concern about something and attentive can be defined as playing attention to something (Oxford Dictionary).

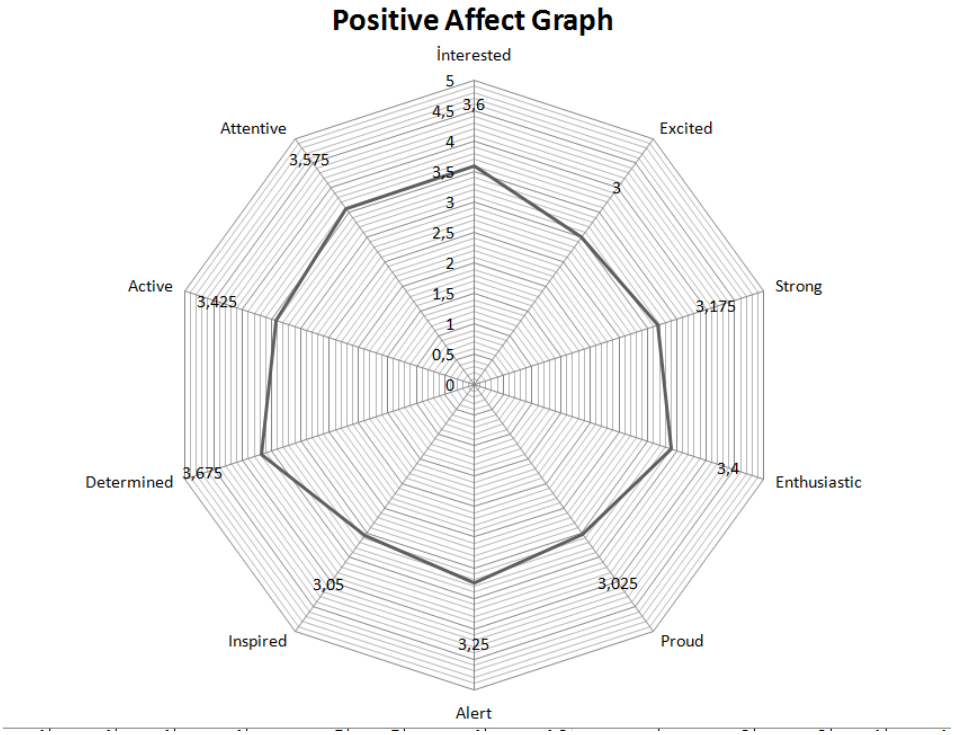


Figure 4.11. Positive Affect Spider Graph

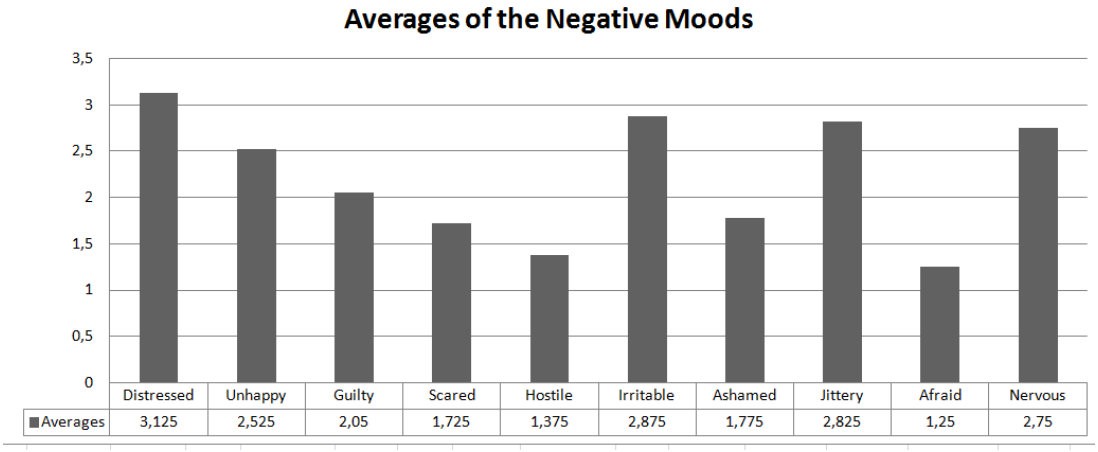


Figure 4.12. Averages of the Negative Moods

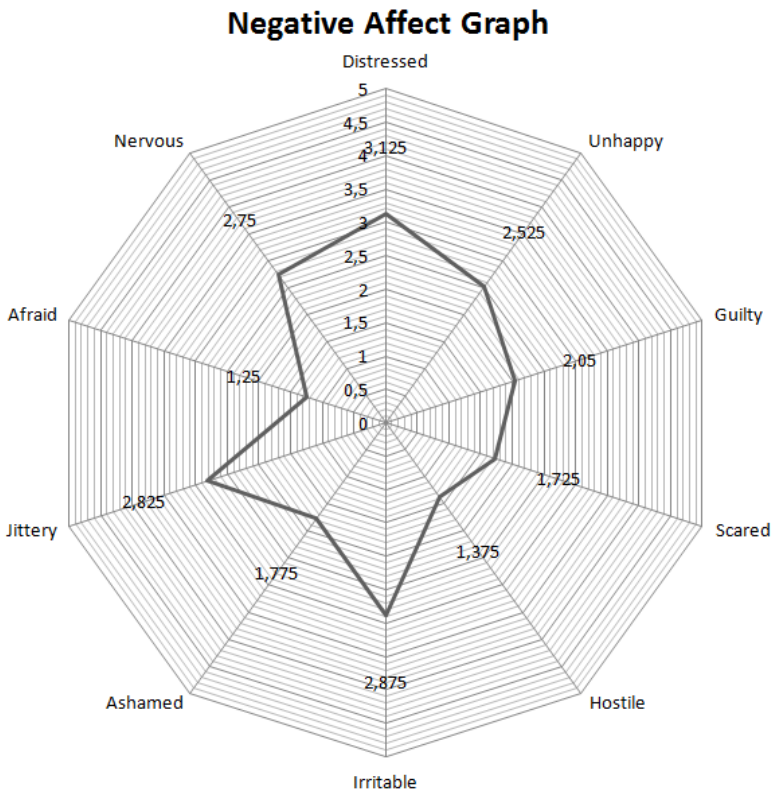


Figure 4.13. Negative Affect Spider Graph

While analyzing the spider diagram of the negative feelings, the gaps points are the highest averages in contrast with the positive feelings. For negative feelings, there are minimum five gap points can be found out, which are;

- Distressed has the average of 3.12 that is above the level 3. Distressed is a negative mood, which includes discomfort, worry and anxiety. This average of this mood means that participants feel distressed more than sometimes.
- Irritable has the average of 2.87, which is very close to, level 3 but it means that participants feel irritable less than sometimes. Irritable is a mood similar to stress but reacts to the alerter.
- Nervous is a mood similar to irritable but stronger feeling than irritable. It affects all nervous systems. This mood has the average of 2.75, which is very close to, level 3 but it means that participants feel nervous less than sometimes.
- Jittery destroys the integrity of the individual physicologically, this mood has the average of 2.82, which is very close to level 3 but it means that participants feel jittery less than sometimes.

When the results are analyzed, it can be seen that all problematic areas of the negative feelings are about being stressed and nervous and many kinds of that kind of moods. According to the interviews with the participants, it is found out that there can be two reasons for this that first reason is construction is a complex and stressed process, and second reason can be external reasons as political and social reasons, even for crowded cities traffic can be a reason for the negative feelings.

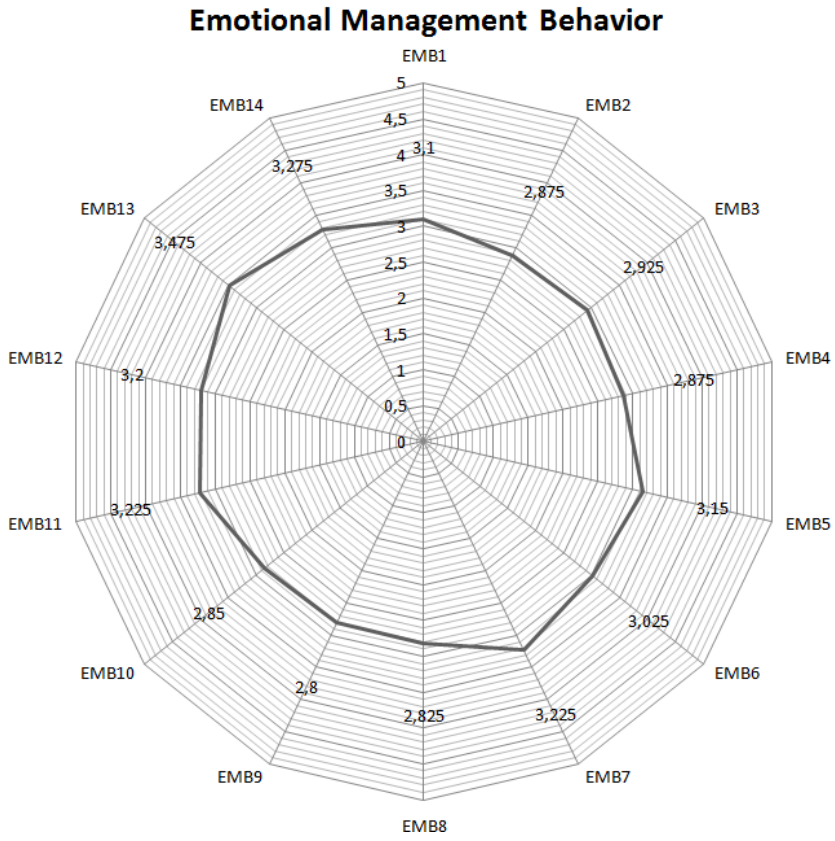


Figure 4.14 Emotional Management Behavior Spider Graph

The spider diagram of Emotional Management Behavior shows that the levels of each question are very close to each other. There are no sharp gaps observed, even problematic areas are smooth. The analysis of these questions is highly important because moods and the relations with others affect the emotions. The questions can be analyzed according to the gaps and successful factors besides that can be analyzed one by one by analyzing their averages as follows, gap and success point will be interpreted after this analysis.

- First managerial question is about if the supervisor postpone the probems. The level of this question is important because postponing the problems cause breakdowns in

the communication and besides that effect the mood of the individual. The average of the question is 3.1, which is a little higher thatn the level 3. The question was asked as “Do not postpone the problems” and the average means that the supervisor sometimes postpone the problems.

- Second question has lower average than the first question. The question is “In case of conflicts, they made decision by considering the emotions of both sides”. Conflicts and the method used to solve these conflicts is a wide research area, but the aim of this question is to have a point about the behavior of the supervisor in case of conflicts, which has highly important for construction companies that include many individuals from different professions. The average is 2.87, means that the supervisor made decisions by considering the emotions less than sometimes in case of conflicts. Another question is related with this one, which is “Do not let occurrences that cause emotional tensions in case of conflicts”. The average of this question is higher with the average of 3.02.
- There are three properties of the supervisors that are relevant while communicating, that are not stress the individual in the communication process, show a real concern while communicating and helping with subordinates and try to constitute a communication network that blocks the negative feelings. The question about not stressing the individual in the communication process has one of the lowest averages with the average of 2.82. It means that this is one of the gaps of the supervisors while communicating.
- Three questions are about how supervisor take into consideration the emotions during the communication process. The question about not allowing emotional problems between individuals has the average of 2.8, which is lower than the level 3. The question supporting individuals for sharing their emotions has the average of 2.85, and the question about being open and sensible to feelings and emotions has the average of 3.47. Only the last question between the levels 3 and 4.

All questions about supervisor have similar averages around level 3, which is the middle level and has the meaning ‘sometimes’.

4.3 Analysis of the Interdependencies between the Units of Organizational Communication System

When the correlations between the key factors of the verbal communication are analyzed, the interpretation of correlation coefficient is done according to literature as follows;

- High correlation if correlation coefficient is between 0.8 and 0.6
- Moderate high correlation if correlation coefficient is between 0.6 and 0.5
- Moderate high correlation if correlation coefficient is between 0.5 and 0.4

The results can be interpreted as follows;

- There is a correlation between information and organization which is 0, 72 and can be called as high correlation.
- The correlation between information and team is 0, 56 and this correlation can be classified as moderate high. It cannot be said that there is an exact correlation between the key factor information and team.
- The correlation between information and individual is 0, 70 which can be defined as high correlation.
- The correlation between information and product/action is 0, 56 and this correlation can be classified as moderate high.
- The correlation between organization and team is 0, 74 which can be classified as high correlation.
- The correlation between organization and Individual is 0, 62 which can be classified as high correlation.
- The correlation between organization and product / action is 0, 58 which can be classified as moderate high correlation.
- The correlation between individual and team is 0, 57 which can be classified as moderate high correlation.
- The correlation between product/action and team is 0, 62, which can be, classified as high correlation.
- The correlation between product action and individual is 0, 75, which can be, classified as high correlation.

There are high and moderate high correlations between all key factors of verbal communication. In the literature Maier et al. (2007) defined many high correlations

between the factors, which included in the key factors as team and organization, individual and team and individual and product/action. In this part of the thesis the factors are not analyzed one by one but the key factors analyzed. The correlations are stated below.

Table 4.3.Correlation Matrix of Key Factors of Organizational Communication

	Information	Organization	Individual	Team	Product/Action
Information		0,72	0,7	0,56	0,56
Organization	0,72		0,62	0,74	0,58
Individual	0,7	0,62		0,57	0,75
Team	0,56	0,74	0,57		0,62
Product/Action	0,56	0,58	0,75	0,62	

High correlations between the key factors of verbal communication;

- Information and Organization
- Information and Individual
- Organization and Team
- Organization and Individual
- Product/Action and Team
- Product/Action and Individual

Moderate High correlations between the key factors of verbal communication;

- Information and Team
- Product/Action and Information
- Product/Action and Organization
- Individual and Team

When interdependencies of the factors are analyzed and compared with the literature some similarities and differences can be found between the correlations. The most significant correlations are high correlations, which the correlation coefficient is between 0,6 and 0,8 (Maier et al., 2007). The analyses about the meaningful high correlations are stated as follows,

- There is a high correlation with the correlation coefficient 0,613 is between the factors availability of information about organization and about procedures. But in the study of Maier (2007) no correlation is defined between these two factors.

- There is a high correlation between the factors what information does the other party need and what information do you need with the correlation coefficient 0,765. This is not a suprizing result because these two questions are very similar.
- There is a high correlation between the factors does the other party know what information do you need and clearness of the information with the correlation coefficient 0,613.
- There is a high correlation between the factors knowledge about common goals and objectives and transparency of the decision making process with the correlation coefficient 0,616. In the study of Maier (2007) no significiant correlations are defined between these factors.
- There is a high correlation between the factors mutual trust and transparency of the decision making process with the correlation coefficient 0,683. In the study of Maier (2007) no significiant correlations are defined between these factors. The knowledge about transparency of decision mking process is interdependent with mutual trust.
- There is a high correlation between the factors mutual trust and common goals and objectives with the correlation coefficient 0,601. In the study of Maier (2007) no significiant correlations are defined between these factors.
- There is a high correlation between mutual trust and sharing lessons learned with the correlation coefficient 0,603. In the study of Maier (2007) no significiant correlations are defined between these factors.
- The factor collaboration has many interdependencies with other factors. There is a high correlation between collaboration and mutual trust, collaboration and sharing lessons learned, collaboration and team identity and collaboration and sharing formal and informal reviews. In the literature, there is a high correlation defined between collaboration and lessons learned. This is the result of sharing lessons learned is only possible with collaboration. This assumption is similar for the sharing formal and informal reviews, that in the literature (Maier et al., 2007) there is a moderate low correlation is defined. Also moderate high correlation is defined between collaboration and team identity in the study of Maier et al. (2007).
- Factors team identity and collaboration has high correlation with the correlation coefficient 0,610 in this study but in the literature there is no correlation defined.

- The interdependency between information about workflow and information needed is found out as high in this study and moderate low in the literature.
- The factor best use of capabilities has many interdependencies with other factors such as generation of innovative ideas, common goals and objectives and who involves in which step. In the study of Maier et al. (2007) best use of capabilities has moderate high correlation with team identity.
- One of the highest correlation coefficients of this study is between if the media offers instant messagin and adaptability of the media with the correlation coefficient 0,815.

The interdependencies with high correlations in this study are listed above. But there are many moderate high and moderate low correlations are found out. Correlations defined by Maier et al. (2007) are compared with the results of this study based on moderate high and moderate low correlations.

- In the literature it is defined that there is a moderate high correlation between terminology and application of corporate vision and values. But according to this study the correlation is lower than the moderate low level and not defined.
- In the literature it is defined that there is a moderate high correlation between mutual trust and handling technical conflicts. But according to this study the correlation is lower than the moderate low level and not defined.
- It is defined that there is a moderate high correlation between roles and responsibilities and handling technical conflicts. In this study, there is moderate low correlation between these two factors with the correlation coefficient 0,451.
- It is defined that there is a moderate high correlation between roles and responsibilities and mutual trust. But according to this study the correlation is lower than the moderate low level and not defined.
- It is defined that there is a moderate high correlation between roles and responsibilities and collaboration. In this study, there is moderate low correlation between these two factors with the correlation coefficient 0,442.
- It is defined that there is a moderate high correlation between education/training and formal and informal reviews. In this study, there is moderate low correlation between these two factors with the correlation coefficient 0,454.

- It is defined that there is a moderate high correlation between mutual trust and generation of innovative ideas. In this study, there is moderate low correlation between these two factors with the correlation coefficient 0,450.
- It is defined that there is a high correlation between sharing of best practices and lessons learned. In this study, there is moderate high correlation between these two factors with the correlation coefficient 0,578.

4.4. Analysis of the Correlations between Organizational Communication System and Emotions and Moods

It is important to analyze the interdependency of communication system and emotions and moods. As seen from the Table 4.4 there are many correlations are defined between communication capability maturity level, positive moods, negative moods and emotional management behavior.

Table 4.4. Correlations of C-CMM and Emotions/Moods

	Communication Capability Maturity Level	Positive Moods	Negative Moods	Emotional Management
Communication Capability Maturity Level		0,35	-0,55	0,64
Positive Moods	0,35		-0,44	0,43
Negative Moods	-0,55	-0,44		-0,44
Emotional Management	0,64	0,43	-0,44	

The correlations are as follows,

- There is a negative moderate high correlation between communication capability maturity level and negative moods. It means that negative moods have a negative effect on the effectiveness of the organizational communication.

- There is a moderate high correlation between communication capability maturity level and level of emotional management behavior with the correlation coefficient 0.64.
- There is a negative moderate low correlation between positive moods and negative moods with the correlation coefficient -0.44.
- There is a negative moderate low correlation between emotional management behavior level and negative moods with the correlation coefficient -0.44.
- There is a moderate low correlation between emotional management behavior level and positive moods with the correlation coefficient 0.43.

CHAPTER 5

CONCLUSION

5.1. Assessment Model for Organizational Communicaiton

The first goal of this study is to define an assessment model to analyze the maturity level of the organizational communication system. Organizational communication system is analyzed based on goal, units and interdependencies. The aim of organizational communicaiton system is defined as effectiveness and to reach common goals of the organization. The factors or variables of the organizational communication that affect the communication process are taken from the literature besides that a Delphi study is conducted with five experts of their fields if additional questions are needed and to find out the weight of each factor. The interdependencies between these factors and between organizational communicaiton system and emotions/moods are analyzed.

Maturity Grid method is taken as a base for the C-CMM (Communication Capability Maturity Model) which has different maturity level definitions in each maturity level of factors. Capability Maturity Model is redefined to define C-CMM. For assessing the level of emotions and moods in the communication process two questions types are applied to participants, which are PANAS questions and Emotional Management Behaviour questions. The factors or variables of the organizational communication that affect the communication process are taken from the literature besides that a Delphi study is conducted with five experts of their fields if additional questions are needed and to find out the weight of each factor.

Results of the assessment process provide a general knowledge about the maturity level of C-CMM and the organizational communication system. And besides that having knowledge about the maturity level and emotional and mood level of the organization, the results of the questionnaire give the advantage to know how to go up a level.

Although assessing the Organizational Communication Maturity Level of an organization is a new idea for construction companies, because of the complexity of the

job and people involved in the construction process it is highly important to have knowledge about the Organizational Communication Maturity Level. Problematic points and gaps can be found out by the questionnaire and the company can take action to increase the C-CMM of the organization. Generally, the C-CMM of the companies is very close to Level 3 which is the defined level. This level can be defined as the knowledge is sufficient but there are gaps at the application process of the factors, they are not managed. For a construction company that has C-CMM that is very close to Level 3, at the first stage the factors under the level 3 can be found out and repeat the questionnaire. When C-CMM move up to Level 3, the second stage of improvement is to analyze the factors and gaps and prepare an action plan about how to move up a level to level 4.

While analyzing the results based on key factors that affect organizational communication, it has been found out that the key factor organization has the lowest C-CMM between key factors. The highest C-CMM is at the product/action and information key factors. When the factors are analyzed one by one, it can be clearly seen that there are many problematic areas. The most problematic areas for the key factor information are knowledge abot competitors, knowledge about how the other party uses the information, need of extra information for completing the task, and knowledge about the source of the information. Solving technical conflicts, transparency of the decision-making process and application of the common goals and objectives are the problematic areas of the key factor organization. The other problematic areas are number of formal and informal reviews, application of training plans and schedules and knowledge about rewarding system. The averages of the factors of product /action are very close to each other.

When the results of the emotions and moods are analyzed, participants do not feel excited and inspired very often, it is less than sometimes and the main problem for the negative feelings are participants feel distressed, nervous, jittery and irritable very often during the communicaiton. Negative and positive moods are analyzed by using the method PANAS, and emotion which can be the cause of the negative or positive moods are analyzed by using Emotional Management Behavior Method. The main problems of the participants with the supervisors are allowing emotional promlems between individuals and stressing the individual while communicating.

One of the main contributions of this study is analyzing the interdependencies between the factors that affect communicaiton and between CCMM and emotions and

moods. It is not suprising that there is a negative moderate high correlation between communication capability maturity level (CCML) and negative moods. It means negative moods of the employees of the organization impact the maturity level of organizational communication. There is a moderate high correlation between the communication capability maturity level and level of emotional management behavior. It means the impact of managers on employee's emotions positively effect the maturity level of organizational communication. But it is suprizing that there is lower than the moderate low correlation between cammunicaiton capability model and positive moods.

When the interdependencies of the key factors are analyzed, it can be seen that there is high or moderate high correlation between all key factors. High interdependencies are between information and organization, information and individual, organization and team, organization and individual, product/action and team, product/action and individual. And moderate high correlations between information and team, product/action and information, product/action and organization and individual and team.

The assessment of the overall organizational capability maturity of an organization can be possible with the organizational communication system, moods, emotions and interdependencies between them. Interdependencies can be used for finding out the deep causes of the problematic points of the factors. This assessment it required for taking the organization to the next level in the effectiveness of organizational communication and also for the other areas such as productivity and organizational effectiveness which are affected by the level of organizational communication.

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APPENDIX A

DELPHI QUESTIONNAIRE (SECOND STEP)

Factors that affect organizational communication system are listed below, please mark the level of importance of the factors for the organizational communication system (1=very low , 5=very high)

Information

		1	2	3	4	5
1	Availability of knowledge about competitors					
2	Availability of knowledge about company					
3	Availability of knowledge about the procedures					
4	Availability of knowledge about the Project specifications					
5	Do you know what information does the other party needs?					
6	Does the other party know what information do yu need?					
7	Do you know in what format does the other party want information?					
8	Does the other party know in what format do you need information?					
9	Clearity of the message					
10	Appropriate size for the message					
11	Availability of information about how the information will be used					
12	Sufficiency of the information in the message					
13	Do you have information about the references needed? (rules and regulations)					
14	Do you have knowledge about how to obtain the requested information?					

Organization

		1	2	3	4	5
1	How hierarchies effect communication process					
2	Does the procedures about the activity are used?					
3	How is the affect of procedures to the communication process?					
4	How is the level of Knowledge about the roles and responsibilities while communicating?					
5	How often technical conflicts are addressed and solved?					
6	What do you think about transparency of decision making and involment of right people					
7	Do you know and apply the corporate vision and values?					
8	Do you know and apply the common goals and objectives?					
9	What is the degree of interpersonal trust in the communication?					
10	Do you trust the accuracy of the information given?					

Team

		1	2	3	4	5
1	Sharing of lessons learned					
2	Level of collaboration					
3	Level of team identity					
4	Quality and quantity of formal and informal reviews					
5	Sharing of best practices					

Individual

		1	2	3	4	5
1	Knowledge about work flow					
2	Who are involved in what stages and why					
3	Knowledge about information flow in the organization					
4	Knowledge about organizational changes					
5	Suppoting and rewarding the innovative ideas					
6	Training plans and execution of them					
7	How one's capabilities are realized and utilized?					
8	Rewarding system					

Product/Action

		1	2	3	4	5
1	Understanding representation system					
2	Understanding terminology					
3	Is the media offers immediate answer					
4	Is the capacity of the media important?					
5	Are the media adaptable					
6	Saving and protecting the project or product					

APPENDIX B

ORGANIZATIONAL COMMUNICATION MATURITY LEVEL QUESTIONNAIRE

Please, answer the questions according to the the company you are working;

Age:
Profession:

		1	2	3	4	5
1	How often information about competitors is distributed?	Not Necessary	If I ask for it	Not regularly	Regularly	Knowledge is sufficient and process is optimizing
		1	**2**	**3**	**4**	**5**
2	How often information about the organization is distributed?	Not Necessary	If I ask for it	Not regularly	Regularly	Knowledge is sufficient and process is optimizing
		1	**2**	**3**	**4**	**5**
3	How often information about the procedures is distributed?	Not Necessary	If I ask for it	Not regularly	Regularly	Knowledge is sufficient and process is optimizing
		1	**2**	**3**	**4**	**5**
4	How often information about the project specifications is distributed?	Not Necessary	If I ask for it	Not regularly	Regularly	Knowledge is sufficient and process is optimizing
		1	**2**	**3**	**4**	**5**
5	Do you know which information the other party needs?	No	Learning from mistakes	If it is documented	It is clear to me	Yes and process is optimizing
		1	**2**	**3**	**4**	**5**
6	Does the other party know which information do you need?	No	Learning from mistakes	If it is documented	It is clear to them	Yes and process is optimizing
		1	**2**	**3**	**4**	**5**
7	Do you know in what form does the other party needs	No	Learning from mistakes	If it is documented	It is clear to me	Yes and process is optimizing

	information?					
		1	**2**	**3**	**4**	**5**
8	Does the other party know in what form do you need information?	No	Learning from mistakes	If it is documented	It is clear to them	Yes and process is optimizing
		1	**2**	**3**	**4**	**5**
9	Is the information clear to you?	No	Learning from mistakes	Not always	Information is clear	Yes and the process is optimizing
		1	**2**	**3**	**4**	**5**
10	Is the size of the message appropriate for the subject?	No	Learning from mistakes	Not always	Mostly appropriate	Yes and the process is optimizing
		1	**2**	**3**	**4**	**5**
11	Do you know how does the other party process the information?	No	Learning from mistakes	If it is documented	It is clear to me	Yes and the process is optimizing
		1	**2**	**3**	**4**	**5**
12	Do you need to communicate twice or the information is sufficient?	Not sufficient	Learning from mistakes	Mostly sufficient	Absolutely sufficient	Sufficient and the process is optimizing
		1	**2**	**3**	**4**	**5**
13	Do you have information about the references needed? (rules and regulations)	No	If I ask for it	Not regularly	Regularly	Yes and process is optimizing
		1	**2**	**3**	**4**	**5**
14	Dou you have knowledge about how to obtain the requested information?	No	If I ask for it	Not regularly	Regularly	Yes and process is optimizing
		1	**2**	**3**	**4**	**5**
15	How hierarchies effect the communication process?	Not important	To correct the mistakes	Used when needed	To have an open communicati on system	Process is obtimizing

		1	2	3	4	5
16	Does the procedures about the activity are used?	Not important	Not regularly	Used if the procedures are defined	Used regularly	Used regularly and the process is optimizing
		1	**2**	**3**	**4**	**5**
17	How is the level of Knowledge about the roles and responsibilities while communicating?	Not important	Only when there is a mistake	Defined but no regular distribtion of knowledge	Defined and regularly distributed knowledge	Process is optimizing
		1	**2**	**3**	**4**	**5**
18	How often technical conflicts are addressed and solved?	Never solved	Solved based on situation	Mostly solved	Always solved	Always solved and process is optimizing
		1	**2**	**3**	**4**	**5**
19	What do you think about transparency of decision making and involment of right people	Happens as it happens	Sort of clear and process is changed after a mistake	Mostly transparent	Always transparent	Always transparent and the process is optimizing
		1	**2**	**3**	**4**	**5**
20	Do you know and apply the corporate vision and values?	No	Known but no knowledge about how to apply	Knowledge is sufficient but no application	Knowledge is sufficient and applied	Yes and the process is optimizing
		1	**2**	**3**	**4**	**5**
21	Do you know and apply the common goals and objectives?	No	Known but no knowledge about how to apply	Knowledge is sufficient but no application	Knowledge is sufficient and applied	Yes and the process is optimizing
		1	**2**	**3**	**4**	**5**
22	What is the degree of interpersonal trust in the communication?	We don't think about it	We change the course of communication depending on the degree of trust	Mostly aware of it	Always aware of it	Always aware and process is optimizing
		1	**2**	**3**	**4**	**5**
23	Do you trust the accuracy of the information given?	We don't think about it	Depends on the personal communication	Trust if the information is defined	Always	Always and process is optimizing

		1	2	3	4	5
24	How often lessons learned are shared and communicated?	No capturing	Stored in our heads	Known but partly shared	Known and shared	Shared and the process is optimizing
		1	**2**	**3**	**4**	**5**
25	How is the level of collaboration in the organization?	No capturing	Collaboration if I ask	Collaboration if defined	Always	Always and process is optimizing
		1	**2**	**3**	**4**	**5**
26	How is the level of strenght of belonging to the team?	No	Belong to small teams	Belonging depends on the common benefits	Always there is strong belonging	Always and process is optimizing
		1	**2**	**3**	**4**	**5**
27	How is the level of Quantity and quality of formal and informal reviews?	No reviews	To correct the mistakes	Formal reviews to correct mistakes and planning future	There are always formal and informal reviews	Always and the process is optimizing
		1	**2**	**3**	**4**	**5**
28	How often best pratices are shared and communicated?	No capturing	Stored in our heads	Known but partly shared	Known and shared	Shared and the process is optimizing
		1	**2**	**3**	**4**	**5**
29	How is the information about work flow?	No	I can learn when I ask about it	Mostly I have knowledge	Always I have knowledge	Always have knowledge and process is optimizing
		1	**2**	**3**	**4**	**5**
30	Who are involved in what stages and why?	No thought of it	I can learn when I ask about it	Mostly I have knowledge	Always I have knowledge	Always have knowledge and process is optimizing
		1	**2**	**3**	**4**	**5**
31	How do you involve in information flow?	No thought of it	I can learn when I ask about it	Known in theory but not practice it	Known and practice it	Known, practicing and the process is optimzing
		1	**2**	**3**	**4**	**5**
32	What is your knowledge about organizational changes?	No thought of it	Learn after the changes	Not regularly distributed	Regularly distributed	Regularly distributed and process is optimizing

		1	**2**	**3**	**4**	**5**
33	How is innovative ideas supported and rewarded?	No thought of it	Reaction to the innovative ideas	There is a defined rewrding but not applicable	Always supported and rewarded	Supported, rewarded and process is optimizing
		1	**2**	**3**	**4**	**5**
34	How is training and education plans tailored and executed?	No training plans	Trainings are planed based on situation	Training plans are just on the paper	There are training plans and exeuted	Training plans are executed and process is optimizing
		1	**2**	**3**	**4**	**5**
35	How one's capabilities are realized and utilized?	İt is not thought of	It is important to get the job done	Just in special cases	Realized and utilized	Realized and the process is optimizing
		1	**2**	**3**	**4**	**5**
36	How is rewarding procedures?	Ödüllendirme yok	Bazen ödüllendirme oluyor fakat tanımlı değil	ödüllendirme sistemi var fakat her zaman uygulanmıyor	Ödüllendirme sistemi var ve uygulanıyor	Ödüllendirme sistemi uygulanıyor ve bu sistem geliştiriliyor
		1	**2**	**3**	**4**	**5**
37	Degree of understanding the representations (Drawings/Tables)	Every department has its own representation system	Understanding by asking	Departments can understand each other	Common defined representation system	Defined system and process is optimizing
		1	**2**	**3**	**4**	**5**
38	How is the level of understanding of terminology?	Every department has its own terminology	Understanding by asking	Departments can understand each other	Common defined terminology	Defined system and process is optimizing
		1	**2**	**3**	**4**	**5**
39	Does the media you use provides immediate answer?	No	Not always	Mostly	Always	Always and process is optimizing

		1	2	3	4	5
40	Is Channel capacity important for choosing media?	No	In some cases	Mosty important	Always important	Always important ans process is optimizing
		1	**2**	**3**	**4**	**5**
41	Is the media you use adaptabe?	No	Some of them are adaptabe	Mosty adaptabe	A of them are adaptabe	Adaptable and process is optimizing
		1	**2**	**3**	**4**	**5**
42	How is the level of saving and protecting the project or product?	Not important	Based on personal effort	Defined saving procedures but not always used	Always saved and protected	Always saved and protecting and process is optimizing

How often do you feel the listed moods when you are communicating?

		Never	Seldom	Sometimes	Often	Always
1	Interested					
2	Distressed					
3	Excited					
4	Upset					
5	Strong					
6	Guilty					
7	Scared					
8	Hostile					
9	Enthusiastic					
10	Proud					
11	Irritable					
12	Alert					
13	Ashamed					
14	Inspired					
15	Nervous					
16	Determined					
17	Attentive					
18	Jittery					
19	Active					
20	Afraid					

Answer the questions according to the behavior of your director while communicating

		Never	Seldom	Sometime	Often	Always
1	Do not postpone the problems					
2	In case of conflicts, they made decisions by considering the emotions of both sides					
3	Admit that the behaviors of the individuals depend on the conditions away from organization					
4	Do not let the personal habits to cause anxiety in the organization					
5	Trust the co-worker without high control and shows it					
6	Do not let occurences that cause emotional tensions in case of conflicts					
7	Make the individuals active for a n ethusiastic commitment based on collaboration					
8	Do not stres the individuals in the communication process					
9	Use an open communication system by not allowing emotional problems between individuals					
10	Support individuals for sharing their emotions					
11	Show a real concern while communicating and helping with the subordinates					
12	Show that they are happy for working with people					
13	Open and sensible to sensible feelings, emotions and beliefs					
14	Try to constitute a communication network that blocks the negative feelings					

VITA

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