EFFECTIVENESS OF PROJECT TEAMS AND THEIR IMPACTS ON THE PERFORMANCE OF SAUDI CONSTRUCTION PROJECTS

BY

HAFIZ MUHAMMAD ADIL HAFEEZ MUGHAL

A Thesis Presented to the

DEANSHIP OF GRADUATE STUDIES

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DHAHRAN, SAUDI ARABIA

In Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE

In

CONSTRUCTION ENGINEERING & MANAGEMENT

NOVEMBER 2013

KING FAHD UNIVERSITY OF PETROLEUM &MINERALS

DHAHRAN- 31261, SAUDI ARABIA

DEANSHIP OF GRADUATE STUDIES

This thesis, written by **HAFIZ MUHAMMAD ADIL HAFEEZ MUGHAL** under the direction of his thesis advisor and approved by his thesis committee, has been presented and accepted by the Dean of Graduate Studies, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN CONSTRUCTION ENGINEERING AND MANAGEMENT.**

Thesis Committee:

16/12/13

Dr. Sadi Assaf (**Thesis Advisor**)

16/12/13

Dr. Ali A. Shash (**Member**)

M. Hassanain

Dr. Mohammad Hassanain (**Member**)

Dr. Khalaf Al-Ofi

Department Chairman

Dr. Salam A. Zummo

Dean of Graduate Studies

Date: 21/12/13

DEDICATION

To all members of my family, friends, relatives and professors who were continuously supporting and encouraging me throughout this research

ACKNOWLEDGEMENTS

I would like to start by thanking Allah SWT for giving me a strength and patience to complete this thesis. I also would like to thank for unconditional emotional, physical and moral support of all those people without the help of whom this thesis completion would have not been possible.

I would like to make special and humble thanks from the bottom of my heart to my thesis committee including Dr. Sadi Assaf, Dr. Ali Shash and Dr. Mohammad Hassanain for their guidance, patience and encouragement with positive feedback throughout this thesis otherwise I would have given up at some point of time.

I would like to make special thanks to all faculty members at the department of construction engineering and management who always stood behind me in difficult times of my master studies.

Finally I would like to thank all those people who have helped me directly or indirectly. First, my parents and rest of the members of my family for their unconditional cheering up of me and support and second are those who helped me in the attainment of required information and without which not even a single page of this thesis would have been possible.

May God bless all of them with long, happy, prosperous and peaceful lives (Aameen)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

TES	Team Effectiveness Survey
PSAQ	Project Success Assessment Questionnaire

ENGLISH ABSTRACT

NAME: HAFIZ MUHAMMAD ADIL HAFEEZ MUGHAL

TITLE OF STUDY: EFFECTIVENESS OF PROJECT TEAMS AND THEIR IMPACTS ON THE PERFORMANCE OF SAUDI CONSTRUCTION PROJECTS

MAJOR FIELD: CONSTRUCTION ENGINEERING AND MANAGEMENT

DATE: NOVEMBER 2013

There is a prioritization of team work in construction organizations to accomplish their projects in a prosperous manner. This is believed to be crucial on account of complexities and risks entangled with construction work which can be further aggravated in the absence of teamwork. Hence there exists an extreme need in construction organizations to work in teams to undertake challenges which necessitate intensified technical skills with appropriate planning. However, working in teams is just not sufficient as teams in construction firms exist for years but members are not acquainted with a way to build and work as an effective team. This is a basis for organizations to suffer losses in terms of profit, productivity and resources.

The study determined the relationship between attributes of effective teamwork with the performance of the high rise building construction project in Saudi construction environment. Literature review furnishes variety of constituents of effective teamwork and project success. The data was gathered from 13 different project teams by implementing two reliable existing surveys on teamwork effectiveness and project success.

The study substantiates convincing relationship between characteristics of effective teamwork and project success. As per level of agreement exhibited by respondents, three facets of teamwork that are team roles and responsibilities, team goals and objectives and team leadership were generously found to be strongly associated with project success.

The research conducted is most beneficial for project managers and team leaders in construction organizations to adjust their focus on key components of effective teamwork that lead to augment the possibilities of project success.

ARABIC ABSTRACT

ملخص الر سالة

الاسم الكامل: حافظ محمد عادل حفيظ مغل

عنوان الدراسة: تاثير فرق عمل المشاريع على اداء مشاريع انشاء المباني في السعودية

مجال التخصص: ادارة وهندسة انشاء المباني

التاريخ الدرجة العلمية: نوفمبر 2013

هناك اهمية قصوى لعمل الفريق في المؤسسات التي تعمل في انشاء المباني لانجاز مشاريعهم بطريقة ناجحة. يعتبر هذا الامر حيوي اذا اخذنا بالاعتبار التعقيدات والمخاطر التي تنضوي عليها مشاريع الانشاء وخاصة في غياب عمل الفريق.

وبالتالي فهناك حاجة ملحة في مشاريع الانشاء لعمل الفريق لمواجهة التحديات التي تقتضي مهارات عالية مع التخطيط الملائم. بالرغم من ذلك فعمل الفريق وحده لا يكفي حيث ان هناك الكثير من العاملين في فريق في الشركات ولكنهم غير متوافقين مع طريقة عمل الفريق الفعالة.

وقد حددت هذه الدراسة العلاقة بين عناصر عمل الفريق الفعال وبين اداء مشاريع الانشاء في المحيط السعودي. وقد غطى حصر المراجع كافة عناصر عمل الفريق الفعال ونجاح المشروع.

وقد تم جمع البيانات من 13 فريق مشروع بواسطة اجراء عدد 2 مسح فعال على فعالية عمل الفريق ونجاح المشروع. وقد قامت الدراسة بتاسيس علاقة قوية وراسخة بين مواصفات عمل الفريق الفعال ونجاح مشاريع

الانشاء. وبناء على ردود الذين اجري عليهم المسح فقد تم حصر ثلاثة عناصر لها تاثير كبير على نجاح اي مشروع وهي:

-مسؤوليات اعضاء الفريق واهداف الفريق وريادة الفريق.

ونحن نرى ان هذا البحث مفيد جدا لمدراء المشاريع ورؤساء الفريق في المؤسسات التي تشرف على مشاريع انشاء ليركزوا بشكل جيد على العناصر الرئيسية التي نسهم في فعالية عمل الفريق والذي يؤدي بدوره الى تامين فرص افضل لنجاح المشروع.

CHAPTER 1: INTRODUCTION

1.1 Overview

The situation of an economic environment nowadays is forcing business enterprises to center their attention more on efficiency, quality and reliability. In perfect competitive situations, objective is always to maximize profits and cut costs. There is not often use of quality and profitability interchangeably and this is only possible through implementation of teamwork (Conti & Kleiner, 1997).

Teamwork is prevalent in many businesses, industries, agencies and they are colligating good or bad performance with effective or ineffective teamwork respectively (Garrett, 2012). It is widely acknowledged that the role of employee teams is a crucial factor in contributing change to organization and continuous improvement (Munro-Fauer et al., 1998). Teamwork alleviates the process to accomplish solution to complex challenges through variety of ideas and knowledge from different perspectives and thus less time is outlaid in unneeded and non constructive conflicts (European Construction Institute, 1996). Series of UK government-funded papers from 1960s to the 1990s had powerfully advocated the construction industry to work better together so that productiveness and performance can be enhanced (Cornick & Mather, 1999).

The need to link teamwork with performance of the work has been rising intensely and effective teamwork has been considered as most vital part for making project success. Working independently has no longer been considered in organizations. People from diversified background must unite themselves in appropriate numbers with right skills and roles to obtain well defined and common goals (West, 2012).

1.2 Problem Statement

In contemporary society business establishments are utilizing a teamwork approach increasingly to carry out chores and solve problems (Drucker, 1992). Businesses demand workers experienced in working in teams. Nevertheless, workers are not getting in to the work force with training and acquirements they require to work in teams and therefore most projects are not able to achieve their desired objectives which are finishing on time, within the budgeted cost, and improved customer satisfaction through quality delivery. Gelbard and Carmeli (2009) stated that demand to keep the projects within stipulations like cost, time and quality is increasing as to escalate the satisfaction of owner and end user. The reason is the rate of failure of large number of projects at an alarming level despite the advancement of technologies. Major causes for project under performance or failures are unclear objectives and targets, poor organizational structure, deficient or inappropriate resources, poor team morale and poor interpersonal relations (Kerzner & Frank, 2011). To sum up, high level of projects or organizational failures is actually because lack of understanding of true sense of effective team work.

1.3 About the thesis

This research has conducted after the realization of the fact that construction firms still are not attuned with true apprehension of teamwork and its benefits to projects. Clear identification of critical components of effective teamwork and their relationship with the construction project success is helpful for team and organizational leaders to assure key factors in their working environment. This research has been carried through reviewing relevant literature on characteristics of effective teamwork and criteria for project success. An already existing and reliable survey instruments were used for the purpose of collecting data on team effectiveness and project success. For team effectiveness, Team Effectiveness Survey (TES) developed and used by Dr. Nurhidayah Azmy (2012) in her Phd dissertation and for project success, Project success assessment questionnaire (PSAQ), designed in 2001 by Shehnar, Divr, Levy, and Maltz were used. Team Effectiveness Survey constitutes of six components of teamwork which are team goals and objectives, team leadership, team roles and responsibility, team relationships, trust and values within the project team and team communications. Project success assessment questionnaire addressed the success of project from four dimensions which are project efficiency, impact on end user, success for business, and preparation for future. Questionnaires were sent either by mail e-mail or carried out to the participants. The questionnaires found out the satisfaction level of various professionals in construction field about teamwork in their project and success of the project. Finally, the collected data were analyzed and principal ways were suggested to increase the quality of project outcomes through effective teamwork that are beneficial to business and government

leaders, managers and supervisors, human resource and organizational development professionals, construction team leaders and team members, and trainers.

1.4 Research Objective

This research has aimed to succeed following principal objective

- Determine the nature and strength of relationships among different components of effective teamwork and overall project success in Saudi construction industry

1.5 Research Questions

The questions that were answered in this study based upon the statistical analysis of data collected are given as under:

1. Is there any relationship between *project team goals and objectives* as measured by TES with an overall success of project as measured by PSAQ? If yes, how intense is it?
2. Is there any relationship between *project team leadership* as measured by TES with success of project as measured by PSAQ? If yes, how intense is it?
3. Is there any relationship between *project team roles and responsibility* as measured by TES with success of project as measured by PSAQ? If yes, how intense is it?
4. Is there any relationship between *project team relationships* as measured by TES with success of project as measured by PSAQ? If yes, how intense is it?
5. Is there any relationship between *trust and values within the project team* as measured by TES with success of project as measured by PSAQ? If yes, how intense is it?

6. Is there any relationship between *project team communications* as measured by TES with success of project as measured by PSAQ? If yes, how intense is it?

1.6 Hypothesis

To address research questions, hypotheses were developed based on previous studies on effective teamwork and project success.

1.6.1 Project Team Goals and Objectives

Many writers have debated that success of project is mostly dependent on the clarity of goals and objectives. For example, Dinsomore and Cooke-Davies (2006) narrowed his thoughts that clarity of team goals makes it easy to evaluate if the project was success or failure. In addition, clear goals are major factors of project success. Rad and Levin (2006) indicated that team should concentrate more on project goals and objectives throughout project life cycle. Parker (2008) pointed that for team to function effectively, it should feature clear purpose, vision, and mission and complete understanding of the project that is going to be carried out. It can be resolved that scope of the work is brought off in a much better way when goals are apparently defined and substantially understood and thus prospects of project and team success is increased. In accordance with the studies presented above, this study proposed the following hypothesis:

H1: There is a positive relationship present between project team goals and objectives and overall project success.

1.6.2 Project Team Leadership

Leader guides others in the achievement of objectives. Many authors have identified the importance of leader role in the success of the project. For example, many authors have

reasoned strong leadership as one of the factor influencing the success of the project. Keller (1992) and Anantatmula (2010) pointed that prospering leadership convinces people of the need to change and how to induce it, provokes new ways of conceiving and problem solving, and then motivates them to work together with the objective of accomplishing project objectives in difficult work environments. Juli (2010) contended that knowledgeable leadership with potent skills of teamwork and project management contributes to success of project. Such findings entail a positive correlation among project team leadership and project success. The second hypothesis therefore is defined as follows:

H2: There is a positive relationship present between project team leadership and overall project success.

1.6.3 Project Team Roles and Responsibility

It is widely believed by many authors that clarity of roles and responsibilities is an adequate way of assuring success of the project. For example, Pratt (2010) pointed out that if roles and responsibilities assigned to team members are clearly defined and descriptive and are appropriate to their skills and expertise then they largely contributes to success of the project. Moreover, Emanuel Camilleri (2011) stated two important points. One, all team members must understand their roles and responsibilities as to operate effectively for the sake of ensuring project success. Second, roles and responsibilities must be well-defined adequately and assigned to members as per their knowledge and experience. Hacker (2012) and Biech (2008) further mentioned that in effective teams everyone is well aware of his/her duty through clear roles policy and the reason of being included in a team. Based on above studies, third hypothesis is:

H3: There is a positive relationship present between project team roles and responsibility and project success.

1.6.4 Project Team Relationship

Many authors believe that good professional and trustworthy relationships among team members are important to success of the project. According to Verzuh (2003), cooperative efforts are the distinctive characteristics of top performing teams. These teams manifest cooperative relationships not only among team members, but also across their organization. To sustain the most eminent potential functioning on a team, team members altogether should be accountable in building relationships. As per Aartsengel and Kuroglu (2013), individual team members must be capable of withstanding the problems arising because of day to day interactions, misapprehensions, and discrepancies. Establishing efficacious relationships by uprising mutual trust and agreement of the directions that individual members interact with one another is the foundation of teamwork. Effective team relationships render the climate required for high degree of collaboration and are classified in to, trust, respect, understanding, courtesy, and accountability. According to Gido and Clements (2009), a high degree of cooperation and collaboration, high level of trust, open, frank and timely communication, ethical behavior are important success factors for project success. Hence this relationship is hypothesized as:

H4: There is a positive relationship present between project team relationship and project success.

1.6.5 Trust and values within the project team

According to theories of Rad and Anantatmula (2010) that success of team in any project or task depends on the basis of the fact that how well team is capable of managing its

internal conflicts, communication gaps, reaching and agreeing on common goals, and setting up high level of trust among all members of team. In addition, positive team attitude must be present as to gain a wide spectrum of trust and cooperation as otherwise there will be no use of highly skilled and capable project team without the presence of project friendly infrastructure, and supportive organization's atmosphere. According to Kerzner and Saladis (2010), normally it takes a great deal of time to develop trust between individuals. However, there is a limited time in project and therefore people who are part of project teams must trust their colleagues as to take effective decisions and adopt the right method of working. According to Dalal (2012), it is impossible to see improved project results without establishing good trusting relationships. One way to establish lasting relationship is to respect team members' skills and expertise. Hence this lead to fifth hypothesis as:

H5: There is a positive relationship present between trust and values within the project team and project success.

1.6.6 Project team communication

Many authors favor effective communication roles in the success of the project. As according to Kerzner (2013) inadequate communication is a major enemy in the development of good teams as it induce low motivation levels, drops in team spirit. It frequently contributes to poorly stated targets and poor project control, coordination and flow of work. Rad and Levin (2003) mentioned that open communication is very important for the success of the project. They are supported by Williams (2002) who concluded that effective communication is very important for the successful delivery of the project. He further added that there should be no doubt in team members to convey

relevant and appropriate information to the righteous person at the right time. Team members should effort to overcome any barrier to effective communication. Moreover, Clutterbuck (2007), Hernon and Nancy (2007) contended that communication bond between members in effective team is very strong and intense and this is one of the reasons for project success. Based on these studies, the sixth hypothesis statement is as follows:

H6: There is a positive relationship present between project team communication and project success.

1.7 Limitations of research

Most research has restrictions, giving forth from influences such as preconception, variability, timing or even basic error. There are some inevitable imitations which required to be accentuated. First of all, this research was carried on to pertain the project success from an outlook of teamwork and team effectiveness in spite of the fact that there can be many political, governments, social and international agents that can affect the rating criteria for project success. Secondly, acceptability measures or rules and regulations for consenting project outcomes are not same for all. Nevertheless, in this research, the performance of the project is judged by way of most prominent factors prevalently reviewed in literature like cost, quality, time, and success of organizational objectives. Fourth, this study only meditates the strength of relation between distinctive aspects of teamwork and project success rather than debating its root and cause.

1.8 Significance of the research

Construction industry is an important sector in business areas and one of the factors for development of an economy. The interaction of construction industry with all other industries is noteworthy. Nevertheless, risks, complicated issues and uncertainties in this industry are alienating it for even most successful and inspirational project managers (Nguyen et al., 2004). On the basis of this fact, it is almost inconceivable to execute a construction project without the involvement of cooperative effort. This research foregrounds the advantages of effective teamwork in background of construction industry based on relevant literature review. The findings of this research will be worthful for business and government leaderships, managers and supervisors, team leaders and trainers and finally team members who desire particular advice on how to alter their organizations to gain the quality of teamwork and develop a culture that identifies a high values on team players. The research includes suggestions drawn from previous researches which will apprise them about proven teamwork practices and their benefits across the globe.

1.9 Organization of the thesis

Following introductory chapter, the thesis is arranged into five more chapters. Chapter two renders thorough description of team and team working and their affects on project success by applicable literature review. Chapter three talks over how the research has initiated practically based on the findings of literature review. Chapter four begins with the explanation of research approaches to address research questions. Chapter five comprises of data collection and analysis. Chapter six is devoted to make discussions on the results, opportunities for further research, recommendations, implications and

limitations, and conclusion. Appendices included at the end of thesis reveals more information about surveys used in this study.

CHAPTER 2: LITERATURE REVIEW

Teams are part of almost every system and their utilization has heightened in a dramatic manner. Teamwork may lead to a winning situation or may not be more than a fashion. Literature review will articulate the past and current research on teamwork as to substantiate factors in setting up connection between variables of teamwork effectiveness to success of the project. The literature for this study can be categorized into:

1. Theoretical perspectives of team and effective teamwork
2. Construction project teams
3. Theoretical perspectives of project
4. Success factors for construction project

Suitable literature has been examined and selected from refereed journals, books and using KFUPM main library electronic resources. The key words used for research were team, teamwork effectiveness, team work and performance of the project, project success measures, high performing teams, organizational and project management, project performance, project management and factors for project success.

Commercial enterprises nowadays require their workers to have a combining attributes that are useful for the business and make significant contributions to the success of the business (Johnson *et al.*, 2000). Profit generation is the key to measure the success of the

business not just in terms of cash but also an ability of its employees to maintain healthy professional relationships inside and outside organization.

It is well acknowledged for years that construction is a team process because of the fact that it necessitates specialize skills and knowledge from broadened areas to increase the potential for success. There is a wide spread believe within project managers that teamwork plays a substantial role for the success of their appointments and common interests of their organizations (Ross et al., 2008).

There is no doubt regarding the importance and severity of more and more effective teamwork with increasing intricacy and advancement of construction projects. This teamwork is mandatory in every part of the life cycle of the project (Chow et al., 2005).

At this stage, interpreting the difference between group and team is prominent to clear any misunderstanding. Team is more than a group as strength of connection between group members is not as robust as in teams. Group members have more preference in succeeding their personal goals in comparison to teams where engrossment is more on team mission, goals and objectives. Unlike group members, the communication bond between team members is very strong.

This chapter covered thorough review of literature on teams, teamwork, in general and specifically in construction sector. After that, different facets of effectiveness in teams have been examined. Eventually, there is a reviewing of different factors associated with assessment of construction project success.

2.1 Factors affecting team effectiveness

Many researches especially western research has found the team characteristics that affect or contribute to team effectiveness (Stevens & Campion, 1994).A cohesive team is linked

up with high performance (Bettenhusen, 1991; Yang & Tang, 2004). There must be an existence of an attraction that makes team members want to remain on a team (Cartwright & Zander, 1968; Burgoon and Ruffner, 1978). A clear structure and well defined roles promote the stability of coordination within a team (Choi, 2002; Molleman et al., 2004). When all team members are clear and accepting of goals, the team will perform at a high level (Hoegl and Parboteah, 2003). Team members can bring change in their behaviors only when they are committed, encouraged and motivated. There is less number of conflicts and high understanding when members of team openly communicate with each other (Ensley et al., 2000). Team performance improved when decisions are made unanimously (Bettenhausen, 1991; Jackson et al., 2003).

Culture is also an important element influencing the success of the project. Palmer (2002) remarked culture within the project team as a significant element by pointing that organizations may not be capable of achieving specific goals simply by getting key people to work together if culture of the project does not support the disciplines involved.

Team members should be selected based on the skills and expertise relevant to scope of work. According to Beale and Freeman (1991), the skills and expertise of key team members like client representative, leader of the designing team and the construction team leader are needed to be emphasized as to enhance team effectiveness.

Scarnati (2001) has remarked that by adopting proper structure of organization, enduring effective communication, making resources available, developing trust among team members, promoting respect for culture differences of the corporate and the conditions in which teamwork is conducted can lead to effective and high performing teams.

McGrath (1964) identified different level of factors that can influence team effectiveness. Demographics, experiences and skills are important factors at individual level. Whereas,

structure and composition of team are important factors at group level and finally situation of business, culture and physical conditions are major factors affecting team effectiveness.

Margerison and McCann (1992) have pointed the workplace setting as one of the significant agent that can affect the potency of team. In addition, Senge (1992) has explained the collective intelligence of a team as an important factor that can lead to improved team performance.

2.2 Factors affecting Project Success

Several efforts have been induced by different investigators to find out decisive factors influencing construction project. These are the factors that result in successful or failure delivery of the projects and plans. To put it differently, they demonstrate management the element that required to be handled effectively as for success of project management in project delivery (Morris, 2013).

Smith and Wyatt (1998) stated that the determinations constructed at early phases in the development of a project are crucial to its success or failure as they have immense impingement on cost, time and quality of project at later stages. Othman et al. (2004) expressed the same views by reasoning that decisions made at former stages of project are vital as they cannot be altered without leaving significant impact on the cost of the project. Some researchers, for instance Cho et al. (1999) and Dumon et al. (1997) even added that planning strategies at these early stages of project have larger effect on the project success than planning made at later stages.

Sayles and Chandler (1971) mentioned qualified project manager, scheduling and control accuracies, supervision and evaluation, and improving project situations on continuous

basis are important for the success of the project. From viewpoint of Martin (1976), clarity in goals, project organization's policies, proper leadership and adequate team for project are major influencing elements on the success of the project.

Camilleri (2011) hasdistinguished that personality and style of leader, management skills, employee commitement, participation and effective communication at all levels are the important factors for the successful outcomes of project. From an standpoint of team, composition and structure of team, great leadership skills of project managers, potentiality, competence, convincingposture, enthusiasam and motivation of team members are influencing factors on project success.

Cobb (2012) in his book have talked about a reason behind success of Canadian high rise construction firm that is making resources available when needed by project members. Chan and Tam (2000) extracted influential factors affecting performance of the project from quality point of view. They are effectiveness of design team leader, effectiveness of client's project manager, nature, scope and complexity of project, role of construction team leader, support from parent company, nature and competence of client, environment, client's emphasis on quality, time and cost, project management actions, procurement method and client size. Their study made an assertion that actions in project management, effectiveness of construction team leader and client's emphasis on quality and time have significant contributions towards the quality of project.

Powell and Buede (2009) stated that practical decisions making in project teams play a role for successful projects as project could possibly be survived outside sufficient resources but it has no chance of endurance if there are blemishes in decisions made.

According to Peter (2005), fluctuation of market prices for materials and labors, time and technical skills required for completing construction project are major constituents determining the success of the project.

According to Cleland & Ireland (2006) success of project is based on characteristics that team possess. But this relationship is not linear and many other elements can effect performance of the project like behavior of market, advancement in technologies, social and economical factors and government rules and regulations making it hard to conclude the extent to which team characteristics affect project success.

From viewpoint of many authors like Naoum (1991) and Nahapiet (1983), behaviour of client, clarity in project scope of work, defined roles with ability to brief and make effective decisions are other parameters that influence the success of the project from quality point of view. Bresnen et al.1990 in his studies also show agreement to aforementioned factors.

Study conducted by University of Manchester discloses nine critical success factors from contractor's point of view that can influence success of construction project. They are

1. Conformance to specifications and Safety Management
2. Past performance of contractor
3. Environmental conditions of a project
4. Technical and Managerial aspects of projects
5. Resource Management and availability
6. Structure of Organization
7. Experience of contractor
8. Size and kind of project previously executed by contractor
9. Finance (Acton, 2013)

Study conducted in Vietnam to understand the factors leading to successful outcome of construction project discloses the following elements:

1. Involvement of international companies in the project
2. Inspection of project by government authorities
3. Applying innovative techniques and methods under effective supervision

While element that lead to poor performance is the lack of availability of engineering data on ground conditions like situation of traffic, weather and soil (Acton, 2012)

Ten factors influencing success of project, suggested by Pinto and Slevin (1988) are mission of the project, support and facilitation from top management, project scheduling and planning, consultation and communication with owner, personnel involved in project, technical specifications of project, and acceptability by owner, assessment and feedback, diagnosing and communicating problems appropriately.

Baker et al. (1983) surveyed 650 professionals from aerospace and construction industry and found out factors influencing projects which are:

1. Goal clarity
2. Team commitment towards the attainment of project goals
3. Project Manager at site
4. Adequate budgeting for timely completion of project
5. Appropriate team competence
6. Precise estimation of cost at the start of project
7. Flexibility and easy start up of project
8. Good planning and control procedures
9. Task orientation
10. No involvement of political and government pressure

Based on above studies, usable research available on various factors affecting success of the project in general but there seems to be blunted research from looking success of the project in relation to team effectiveness. On the basis of this, it is difficult to substantiate the possibilities of attainment of benefits from these studies for teams in construction projects (Chow et al., 2005).

2.3 Synopsis of team – Theoretic Perspective

As previously posited 'team' is not a fresh idea. Since last 30 years, teamwork has espoused a new thinking in business enterprises and the effects are rewarding. Teams have become primary factors in accosting and elaborating complex problems and facilitating businesses to make productive move for future. A team would achieve better solutions than would individuals in situations necessitating a combination of multiple skills, expertness and judgments working out with specific job roles and responsibilities (Katzenbach, 1993).The new interpretation of a team would intimate that a group of people work unitedly to attain a common objective through a substantial allegiance, coordination, shared obligations along with individual accountability for the success or failure of the overall goal(Larson & LaFasto, 1989). Team members should adopt professionalism in handling their internal conflicts constructively (Scholtes et al., 2003). There is an essential dichotomy between groups and teams. Lencioni (2002) described group as people working simultaneously in the absence of essential constituents which are mutual trust, unanimous decisions, and shared responsibilities. Moreover, there should be a no constructive criticism and no one seems focus or obligated to goals of team.

The engagement of employees using teams is good to both the organizations and employees. Working in teams assists to meliorate productivity and contributes more

flexibility into a business (Castaka *et al.* 2001*)*. Some authors like Bacon and Blyton (2000) and Batt (2001) mentioned improved quality and Bens (1999), Goldin et al. (2001) and Gilbert (1999) stated reduced operating costs as other benefits of teamwork.

The ability of an organization to efficaciously react to environmental pressure like market forces, changing regulations, market requirements and any other affecting factor ameliorates through working in teams. Moreover, organizations treat internal problems with much better schemes by adapting team environment (Sashkin & Sashkin, 1994).

According to Kraut and Korman (1999), self managing work teams, management teams, cross functional teams, problem solving project teams and virtual teams are several types of teams that even though do not share a mutual structure inevitably but most of them have common characteristics (Mackin, 2007).Furthermore, teams are developed with different structure to attain clear-cut goals. Cross functional teams make up of members from two or more departments within an organization. These teams fundamentally planned for problem solving. Quality circles are free to choose challenges for research purposes in areas of quality and service. Teams that are gathered to formulate policies and philosophies of organizations are called corporation policy making teams. Teams similar to these include members from all phases of organizations. Eventually, self directed teams work unitedly on a day to day basis. They are enthusiastic to take first step in solving problems. They own a high awareness of obligations All key decisions like recruitment of manpower, planning budgets and self coordination of their schedules can be made by them (Mackin, 2007).

It is not free from problems in switching from traditionally integrated establishment to team working organization. Teams may face existing establishment structure a hassle for effective teamwork so an alteration in organizational structure is compulsory. Teams'

vision may be dimmed on account of individuality, control and governmental issues (Larson & LaFasto, 1989). The attention towards goals helps the teams to overcome individualism. Other problems that impede team affectivity are lack of support and commitment from top management, lack of training of team members and cultural barriers and poor communication. All these require to be addressed carefully to avoid side tracking of teamwork to group work.

It is not easy to improve performance of teamwork. Nevertheless, giving decision making authority to teams (Wellins et al., 1993), organization commitment towards promoting true concept of teamwork and team spirit, setting clear and well defined goals (Larson & LaFasto, 1989) are helpful approaches in enhancing and improving teamwork.

To sum up, there is no doubt nowadays on the importance of producing and enhancing the circumstances for efficient teamwork in the establishments. Teams extend greater involvement and beliefs of achievement. Organizations with teams will draw and hold the best individuals. This successively will make a high-performance organization that is effective and most especially profitable. Profitability is the attractive factor that will permit organizations to operate in a tough, global and competitive market successfully.

2.4 Construction Project Teams

The best example of teamwork is construction industry where construction projects are delivered by various professionals. According to Cornick and Mather (1999), man egressed from the caves and began constructing his shelters from raw materials on top of the land. Nowadays, the construction team is turning into enormously large and complex with different procurance placements and project management applications.

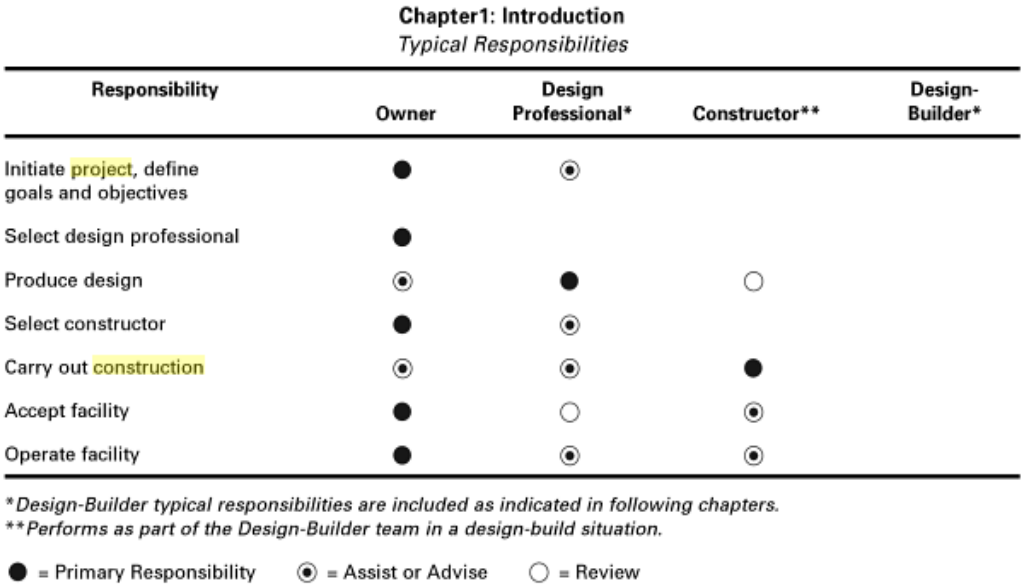
Construction project team has been defined in various ways in several researches. According to Chan and Tam (2000), a project team is a group of professionals with appropriate skills and expertise from one or more firms to meet designing, scoping and execution need of construction project. According to Chow *et.al* (2005), there are architects, constructors and suppliers in a project team who are held together through written agreements or contracts. Winch (2010) further delineates this team as the advisors, contractors, specialists and others who come together to design, supervise and build a product. Government planners and engineers may be other members of the team depending on the need of existing conditions(Spatz, 2000).It is tremendously essential to construct an effective team for successful acquisition of project objectives like aesthetics satisfaction, well-timed and within the budget completion due to the presence of adversarial relationships between various disciplines of construction professionals. According to Ancona and Caldwell (1992), project teams are set up into practice more commonly by firms due to increasing complexities of projects and competition. There is to be sure about high mutuality of project teams and team members must act together and with other non members in achieving tasks.

According to Klinger and Susong (2006), construction is more of an art than science theory. To explore more information about each step and process in each phase of construction, i.e., from owner's program and financial planning, through design and contractor selection stage, as well as construction project and handover to owner for final use is clearly demanding an art of coordination and effective management. This needs to be occurring at each stage of the construction project that is required to keep the construction project within timeline and cost. Based on this, there is no doubt that changing an idea into end products that is well designed, well structured is a tough

challenge and needs a fuel of teamwork. This needs highly coordinated teamwork project stages so project can be delivered to end user successfully and satisfactorily.

As per Albanese and Haggard (1993), construction project team is a group of people sharing a common goal that prompt them to work cooperatively and effectively with mutual respect, trust and constructive criticism. They have an intense comprehending of effective teamwork for recognizing complex problems and suggesting innovative and productive solutions.

Figure 2.1 clearly present the important roles and responsibilities of different team members over the life cycle of construction project as per American Society of Civil Engineers (2012). Streamlining of different skills and variety of knowledge areas for common goal which is project success makes teamwork a challenge in construction project. Based on this, participating members of the project teams need to believe that goals of the team are prior to their personal goals as otherwise the ultimate consequences will be suffered in terms of overscheduled, over budget and huge losses. For example, owner of the project plays an important role in achieving high quality of construction project as he is the one who has more need of it and initiated it and feels more concerned about its performance, goals, and real purpose (American Society of Civil Engineers, 2012). Project manager need to see him as a part of the team with common goals of project success and decision making authority. Designers also need to have well comprehension about their important roles as a designer of the team and the need of their effective participation in decision making process (Cornick & Mather, 1999).



Chapter1: Introduction
Typical Responsibilities

Responsibility	Owner	Design Professional*	Constructor**	Design-Builder*
Initiate project, define goals and objectives	●	◉		
Select design professional	●			
Produce design	◉	●	○	
Select constructor	●	◉		
Carry out construction	◉	◉	●	
Accept facility	●	○	◉	
Operate facility	●	◉	◉	

**Design-Builder typical responsibilities are included as indicated in following chapters.*
***Performs as part of the Design-Builder team in a design-build situation.*

● = Primary Responsibility ◉ = Assist or Advise ○ = Review

Fig 2. 1: Responsibilities in Construction Project
(Adapted from American Society of Civil Engineers, 2012)

Cornick and Mather (1999) also discussed definite duties and roles of key players at different stages of construction project. At the initiation stage, owner discussed the idea and need for project with project manager, designer and construction manager from an outlook of design, and construction strategies. Then in designing stage, there is a discussion on various designs proposed by designer in the presence of construction manager and specialist contractor. Afterwards, at specifying stages, there is a selection and approval of best design by client and project manager in the presence of designer, construction manager, and specialist contractor. At the estimation stage, project manager, designer, construction manager and specialist contractor plays significant role in setting final rate per unit of work. In construction stage, project manager plays a role of supervisor of construction work, designer in design supervision, construction manager arrange and organize construction processes along specialist contractor. Later on project

manager acts as a facility manager to run the constructed facility for its designated period with proper maintenance planning and procedures.

Katzenbach and Smith (1993) compared construction team with an ideal team and indicated that many lineaments of construction teams are like to the ideal teams. The construction team is consisted of a comparatively small number of central individuals made up of a various range of professionals, each with expertise in their respective disciplines. Hence each individual must possess necessary and mandatory skills as per assigned roles and responsibilities. Despite the fact that each member of the team has objectives to be achieved from business point of view, they also need to accomplish a common project objective, which is the reason of creating a team.

The above mentioned reasons developed an understanding that team in construction organizations are similar to ideal team. However, the lack of common responsibilities and the existence of different objectives (Cornick and Mather, 1999) can induce construction teams to aberrant from the definition of an ideal team. According to Walker (1996), construction teams can be delineated as inter-organizational teams and cross functional teams as well with multiple reporting relationships as they are outcome of various organizations rather than just single organization.

Cornick and Mather (1999) contended that any construction team is virtual in nature due to the fact that the members have to work together from lots of different locations over the life of the project as contradicted to other teams who work at the same place.

Even though this extant literature extends some apprehension of the structure of construction teams, precise research into identifying how construction project teams explicated into effective teams is deficient. Team development pertains to the degree of maturity and cohesion that a group accomplishes over time as members interact; learn

about one another and structured relationships and roles within the team (Sarker and Sahay, 2002). Furthermore, Gersick (1988) determines team development as the way that a group adapted over the lifetime for the attainment of major chores.

According to Tuckman (1965), there are four key stages that a team has to go through in order to emerge as an effective team. First stage is called forming, where there is a selection of team members possessing different set of skills, education and expertise. They are bring together to let them know each other. There is a constant addition and deletion of team members at this stage causing lack of stability in team structure and composition. Second stage which is considered as ruggedest and may be the most crucial stage is called storming where internal conflicts and competition among team members are at high level. Norming is the third stage of team development where members start recognizing themselves as a team. They are well aware of each other's role and have learnt the art of utilizing each other talents and skills towards the attainment of goals and objectives. In a performing stage, trust levels and flexibility among team members are high. They are all set and at this stage it is not easy to introduce new member. Hence team has matured as an effective team.

2.5 Characteristics of effective teams

Team effectiveness is defined as performance and employee satisfaction (Gladstein, 1984). In an explicit manner, Hackman (1990) delimitates it as the point to which a group's turn out conforms to requirements in terms of quantity, quality, and timeliness(performance); how well the experience and skills of the team members were yielded due to work in team and how much team members are satisfied. On top of that, it is also important to understand how much team members are willing to work in teams as a

result of their current group work experience. This definition of team can be regarded as a function of not just performance but also behavior and attitude.

Best practices are required to be followed for building and maintaining effective teams. West (2002) indicated components of effective teams. First, effective teams have no ambiguities about project tasks as they have clear apprehension of their objectives and performance as a team. Second, working environment should be stressed free and team members must be fit and healthy both mentally and physically. Third, team members should be highly capable of working as an effective team. Fourth, the significance of team creativity cannot be overstated as it helps to introduce and build on new ideas to progress for improvement. Fifth, it is very important for team to have positive and trustworthy relationships with other teams working for same cause or organization.

Adams (1997) explained that effective teams have a common goal and they are highly obligated to achieve the mission of the team. They possess high team spirit and morale. They effectively participate in discussions and always set the direction towards the objectives and goals of the project. Cooperation among team members is remarkable and they listen and respect each other despite of the fact that they are from various backgrounds.

According to Hoegl & Gemuenden (2001) effective teamwork produces a group of problem solvers. An effective team can function together in thinking out of the box and discovering solutions that an individual judgment may not be able to figure out. They are benefited from mutual brainstorming and conflating each other's know-how. Tasks are also completed firmer and quicker by effective teamwork. By creating synergism and exploiting their strengths a team can do more work together than separate individuals trying to do the same task on their own. After all, one person can ameliorate his/her

competency in one aspect while others are trying to excel in another aspect. Healthy competition is another characteristic of effective teamwork. Healthy competition propels team members to reach to a greater extent and stay incited. By vying with each other they can exceed beyond what can be anticipated than a single person working in isolation. Team members develop relationships with their colleagues by working in team which is good for members to feel encourages, energetic and motivated. As a result, team and organization are benefited from all these traits and it is no wonder that many companies encourage employees to form-up into teams instead of bluntly calling them groups.

According to Wellington (2012), effective teams are attentive of their liabilities and duties as team members. Goals of the team are patently outlined and time specific and as a result everyone is in absolute consciousness of job description and period of time. When a project is ascribed to an effective team for administration, they make all hardships to take full advantage of their skills and expertise as to deliver it in the timeframe at the lowest cost possible.

Keen (2003) suggested PERFORM Model to identify features of effective teams. Firstly, the effective team goes with a purpose (P) concerning the mission statement and agenda of the team and why it is an important organizational tool. They have collectively predesigned and well defined duties; aims and objectives to attain those goals. Secondly, teams have the competency to get through hurdles and recognize their plans which is nothing but Empowerment (E)**.** They understand each other duties and coordinate. Third, Relationship (R) and communication are vital ingredients. Due to open communication, the team members develop trust for one another; they share their ideas openly; there is great tendency towards conflict management and unity among members. Fourth, Flexibility (F) enables them to coordinate in the practical responsibilities, leading towards

easy change management. Fifth, optimal productivity (O) is achieved since the team members have an agreement on no compromise on quality. Such teams are more likely to learn and implement decision making and problem solving tactics. Sixth, Recognition (R) and appreciation give them a feeling of being honored within the team. And seven, Morale (M) reaches at its peak among team members.

Quick (1992) has highlighted various effective teams' features. The effective teams allow the easy and free flow of information up; down and sideways. People build relationships on the basis of trust; respect and coordination. Conflict is considered a healthy element and is focused on issues not persons. There is an air of participation among members and not of threats or competition. Through proper consensus; resource utilization and complete dedication, decisions measures are taken. Solution- orientation is determined on the principles of creativity. All the team members enjoy the power while collaborating with each other. This ensures greater chances of winning the game. Special emphasis is placed on motivation; goal setting dedication and members personal requirements. In accordance with every one's share, rewards and incentives are distributed.

According to Hacker (2012), there are 10 success factors for highly effective teams. In order to evaluate the performance of a team on the basis of quality and competence, these factors are considered as benchmarks. First, effective teams must have a strong; compatible and robust leadership. Leadership is a situational factor and is different for different scenarios. Every member of the team can act as a leader when the time demands so. Second, quality decision making approach needs to be followed which states that the decision must be exercised by the right person at the right time. When it comes to team decision making, it should be of high quality reflecting in the performance outcomes. Every team has its own way of seeking and circulating information. Team members are

responsible to circulate whatever information they have. Third, there are direct; clear and sincere interpersonal relationships among members. Measurable trust is a unique characteristic found in the team members. Members are encouraged to go for invention and innovation; take risks to create flexible relationships. Fourth, everyone is well aware of his/her duty through clear roles policy. Members are wise enough to coordinate and generate the required results expected from them. Whether it's a high or low skill job, individual efforts are visible. Rewards are shared according to achievements and skill sets going in the greater good of the entire team. Fifth, pursuit of results that explains team members have no ambiguity in minds about the relative purpose and are encouraged by their personal ideas, through which they identify their goals. They are well informed about the urgency factor required in achieving results for short and long term tasks. Sixth, creation of mindset, allows the members to make impossible as possible by turning risks into opportunities. Team members feel proud to own the entire team effort and have no inclination towards jealousy or enmity. They make an effective use of the problem solving techniques. They are competent enough to not only resolve the apparent issues but also create ways to go beyond those problematic factors. Seventh, resource strength which ensures every team members gets respected by the other, while the team goes for enhancing the contribution factor among members. Every member feels his duty to make the team and team members grow. Resource arrangement is made through expertise; enthusiasm and established performance. There is no room left for idle and uncreative attitudes. Eighth, every member has a pack vision where he/she looks at his/her vision or dream tied with that of the team. All the members have an idea about each other's expert areas to get the common objective in hand. A strong association stems out from self realization and not from exploitation. Ninth, engagement with environment which means

collaboration with other teams must not be neglected at any cost. The society is a blend of all customers; suppliers; up-line leadership and also competitors. Lastly, team assessment and renewal is carried out periodically to get improved results from the predefined objectives and to make realize the team vision. Fast response is required to avail and improve opportunities.

Biech (2008) presented 10 characteristics of effective teams as shown in Figure 2.2. He believes goals are the base of effective teams and need to be openly communicated to aware team players about their vision and purpose. Clear goals are a source of assistance for team members where the team is heading to. Through clear goals, a team can visualize its success by doing exactly the same what is required to gain an edge. The members in the effective teams are well informed about their duties. In other words, before setting up a team the members are explained about their job and inherent qualities. Besides clearly defined roles, theory guides them in comprehending the reasons for being included in a team. Effective teams always make sure that there is no communication barrier and allow the members to freely express their opinions and suggestion precisely and members utilize various methods to make a unanimous decision. The most preferred tool they adopt is consensus. However the team also exercises expert decision; authoritative decision based on discussion; majority method etc. Effective teams give every member an opportunity when it's duly required. They enjoy great dedication by engaging every single member. Team members are appreciated for their participations, creative thinking, proposing innovative and smart solutions on the basis of their skills, knowledge and expertise. Team members deal their internal disagreements constructively as to enhance productivity and to maintain transparent discussion and healthy atmosphere in a team. Every member of team makes effort to keep the environment of the team relaxed and comfortable with the

help of good interrelationships. Team leaders take huge responsibility to assist team members not only in making the environment of team working supportive but also in decision making process. Therefore an effective teams with clear understanding of the goals, objectives, limitations and scope of the project accompanied with appropriate skills and resources is mandatory for successful project execution.

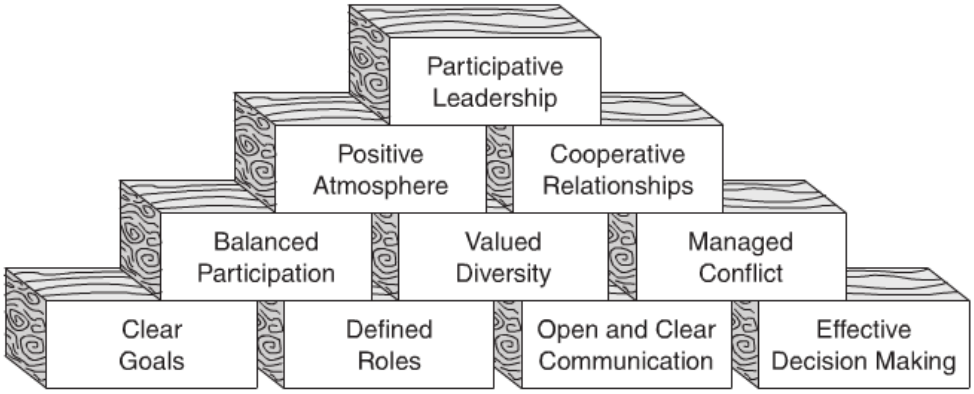


Fig 2. 2:Ten Characteristics of Effective Teams
(Adopted from Biech, 2008)

Literature has proposed many models to evaluate the effectiveness of team. These models suggest specific and mandatory features for teams to be effective. Adams *et al.* (2002) formulated a model to facilitate the evaluation of teams for their effectiveness. The conceptions proposed that need to be part of team working processes are as follows:

- Capability to manage conflicts productively: It pertains to processes and activities carried out when a difference of opinion happens that contribute to outcomes such as assisting the answer to the problem, with increased coherency among members of the team, exploring opportunities for different options with high level of team members involvement so that effective decisions can be made (Capozzoli, 1995).
- Professional communication: It pertains to activities in which members of the team are highly capable in sounding out their thoughts in an understandable and

specific way with justifications. They also listen to each other cautiously and respectfully and leave positive feedback when clarifications are required.

- Shared accountability and responsibility: It refers to emphasizing the need for team members to feel equally responsible in terms of quality and amount of wok they have been assigned.
- Well defined goals: The goals that are clear, specific, realistic and distinct made team members to decide on the set of statements and actions that lead them to successful attainment of these goals. All members of the team must understand what they have to do individually and mutually with high level of commitment. (Simon, 2001).
- Common aim: It refers to the principal target of the team. Common aim refers to team members' understanding and know-how of why and for what they are brought together to work in team.
- Clarity in roles and responsibility: Clear roles mean how well team members understand each other's expectations and authorities as to accomplish team effectiveness by using their skills with intense efforts (Salton, 2000).

In short, team effectiveness is a driver for project success or failure. The achievement of project cost, time and quality objectives is very important mission of teamwork as otherwise damage to project and organization' reputation will not have any remedy (Chow et al., 2005).

2.6 Synopsis of Project- Theoretic Perspective

Project can be defined as a specific set of tasks that are executed to produce unique goals and objectives within clearly specified duration, cost and technical specifications. Every

project is unique in characteristics and challenges. As a result, it does not have repetitive operations (Westland, 2006).According to Kanda (2011) purpose of the project is to incur a coveted goal or mission. This purpose may be economical, political, environmental or any other. Furthermore, all projects have initiation, middle and termination stages. Labor, material, machinery, finance, information, technology and energy are some of the key inputs to accomplish required need or services. Every project has some unique goals or objectives those need to be achieved as to evaluate the performance or success of the project at end.

2.7 Construction Project Success

The success or failure of a project is assessed differently now than in the past. According to Atkinson (1999), team development, benefit for company or organization, product success, and stakeholder satisfaction are all taken in account. Baccarini (1999) also expressed his agreement with views of Atkinson. Nevertheless, most of the researchers like Blaney (1989), Globerson and Zwikael (2002), Duncan (1987), Thomsett (2002) and Redmill (1997) have boiled down project success criteria to quality, budget and time.

According to Ahmad and Kangari (1995) when expectation of a project are met or exceeded, clients will be satisfied. The success of a project is reflected in the quality of the product and the management of the process that made it possible. In a report written by Lim and Mohammed (1999), the suggestion was made that success can be considered in two perspectives A macro perspective that encompasses stakeholders is one way to judge the success. The other is a micro perspective that takes only those directly involved in carrying out the project into account.

Shehnar et al., (2001) conducted a study that suggests the characteristics of a successful project are efficiency, benefits to the organization and customer, and future preparedness. Another study done by Takim and Akintoye (2002), outlines benchmarks of project success as completion of the project in a timely manner, staying within budget, and conforming to requirements. The report also includes end user usefulness, contractor's commercial success, and avoidance of legal issues for occupants.

Mentioned by Sanvido et al., (1992), success is indicated by the satisfied anticipation of a given participant. The report further states that construction industry project success is delineated by expectations and goals being met. Goals can be professional, educational, social, commercial and technical in nature.

In the report by Chua et al. (1999), quality, duration and finance are part of a successful hierarchical model of construction projects. Four principal aspects, cited in the report, that lead to a successful construction project are interaction, contract agreement, project stakeholders, and project attributes. Success is equated with the extent of achievement of these objectives. Haponava and Saad (2009) are in agreement. They see essential factors of the construction business as cost, quality of work, and duration. Recently, other indicators have been used to measure different aspects of business performance.

Cha and Kim (2011) came up with list of indicators to measure in order to find out the condition of business. They are duration, expenses, quality, safety and work condition.

Chan and Chan (2004) proposed objective and subjective measures (Figure 2.3) to evaluate if the project was success or failure.

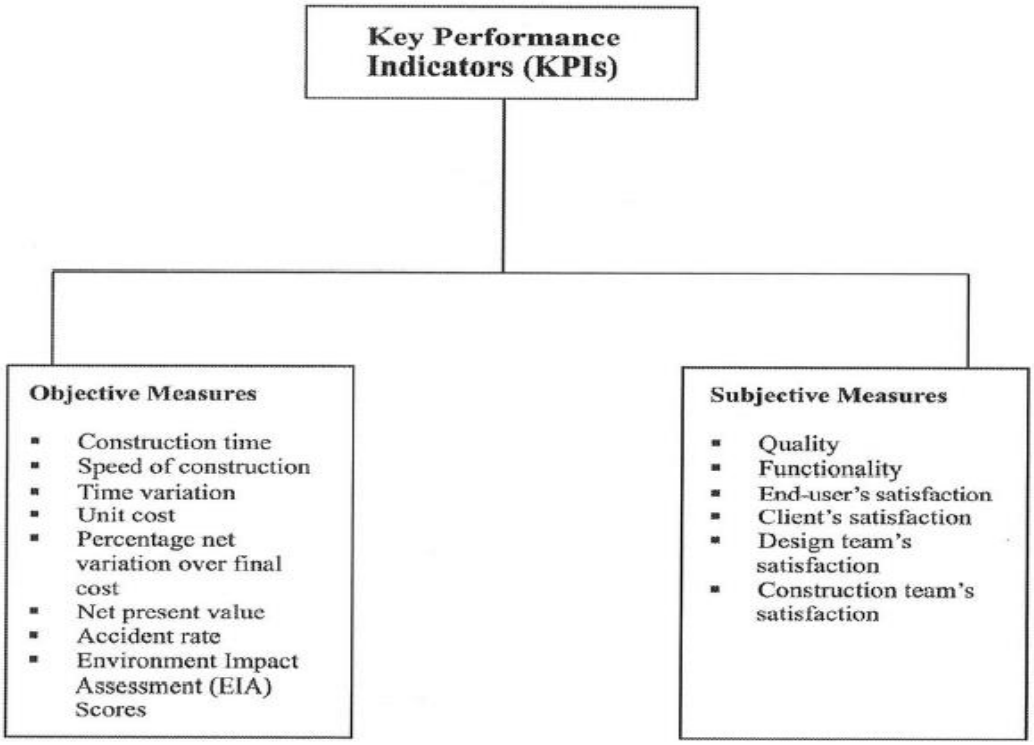


Fig 2. 3: Project Success Indicators
(Source: Chan & Chan, 2004)

In summary, the measure of success varies from person to person. After extensive review, some common threads have been denoted; they are quality, budget and time.

2.8 Definition of success measures

Time: It relates to the amount of time period that was spent to complete the project (Chan and Chan, 2004). Some of the important factors that team of the project looks at in the interest of successful project are conformance to specifications, actual cost of the project and time period (Swan and Khalfan,2007).There is a rise in legal claims due to cost overruns and non conformance resulting from delays in construction (Al-Khalil and Al-Ghafly,1999). It was noticed by Odeh and Battaineh (2002) that almost all legal cases are connected to delays in delivering the project.

Cost: They are expenses that occur from the initiation to the accomplishment of a project.

Quality: According to Tukel and Rom (2001), project quality means meeting customer's needs fully for the end product, reducing the reworking of non-conforming tasks, keeping customers informed of the progress of the project, and changing the course of work to meet the customer's emerging requirements. Bubshait & Almohawis (1994) made same remarks. When quality improves there is reduction in the amount of required resources, low rate of rework and hence result is more profit for organization (Ling et al., 2009).The monetary value of correcting faulty work has been figured out to be 9.1% averagely of profits generated by a construction project (Thomas et al., 2002).

Profit: According to Norris (1990), profit is the amount of revenue that remains after cost. The key indicator of performance is found in profit (Beatham et al., 2004). Profit margins can be increased by savings and completing projects ahead of schedule (Soetanto et al., 2001).

Safety: It is how safety conditions were managed at workplace by placing safety measures in place to maintain safe working environment. That means work can be done without the threat of injury or accident (Bubshait and Almohawis, 1994). This will not save only time and cost but also reputation of a company (Chan and Chan, 2004).

User expectation and satisfaction: The core issue is to provide an environment that the people who use the facility can enjoy. Meeting the needs of people who spend a great deal of time in the constructed site is crucial.

Participants' satisfaction: A significant measure of success lies with owners and heads of construction and design teams. An indication of how good or bad a project is directly relates to the satisfaction of the aforementioned.

Environment: Public nuisance and waste management are environmental issues that can have a negative impact on a company (Shen et al., 2000).Much attention has been given to minimizing construction waste and restricting nuisances to the environment.(Wong and Chan, 2000). According to Tam et al. (2001), there is a trend in companies to place their money as to improve the protection of environment because of factors associated with cost. Shen and Tam (2002) again stressed the same point on companies making heavy investments for the protection environment. Yao et al. (2006) further added by exemplifying that energy efficient design investment pays off in terms of being environmental friendly and cost effective.

CHAPTER 3: POINT OF DEPARTURE

A detailed literature review examination conducted on effective teams and project success factors resulted in several findings. There were several factors discovered that are necessary to be constituents of effective teams. Table 3.1 lists the characteristics of effective team extracted as a result of literature review.

#	Characteristics	West (2002)	Adams (1997)	Hoegl & Gemuenden (2001)	Wellington (2012)	Keen (2003)	Thomas Quick (1992)	Hacker (2012)	Biech (2008)
1	Clarity of goals and objectives	X	X		X	X	X	X	X
2	Fit mentally and physically	X	X	X					
3	Competent	X	X	X		X		X	X
4	Creative and Innovative	X		X			X	X	X
5	Trust each other	X		X		X	X	X	
6	Maintain good relationships	X	X	X				X	
7	Maintain good communication		X			X			X
8	High level of cooperation		X	X		X	X	X	
9	Appropriate skills and expertise		X		X	X			
10	Respect and appreciate each others' opinion		X	X		X	X	X	
11	High team spirit and morale		X			X		X	
12	Problem solving skills			X			X		
13	Motivated			X			X	X	
14	Clarity of roles and responsibilities				X	X		X	X
15	Good conflict management						X		X
16	High level of participation						X	X	
17	Strong and Excellent Leadership							X	X
18	Effective Decision Making							X	X
19	High sense of responsibility								X
20	Well aware of each others' role and responsibilities							X	X

Table 3. 1: Literature review on characteristics of effective teams

Additionally, there were factors discovered that are the most common indicators for project success or failure used by industry professionals to decide the success or failure of project. Table 3.2 lists the most common indicators for project success extracted based on literature review.

#	Factors	Ahmad and Kangari (1995)	Baccarini (1999)	Lim and Mohamed (1999)	Takim and Akintoye (2002)	Sanvido et al. (1992)	Chua et al. (1999)	Haponava and Saad (2009)	Cha and Chan (2011)
1	Time		X		X	X	X	X	X
2	Cost		X		X	X	X	X	X
3	Quality	X	X		X	X	X	X	X
4	Profitability		X		X	X			
5	Health and Safety								X
6	User expectation and satisfaction			X	X				
7	Participants' satisfaction			X		X			

Table 3. 2: Literature review on factors for project success

Once these factors were identified, the next step was selection of questionnaires for the purpose of data collection and relationship analysis as to evaluate team and project success. According to Wael et al. (2007), a questionnaire is one of the most cost effective ways to collect and analyze a large number of responses from the involved parties in the construction industry in order to achieve better statistical analysis of the data.

For team effectiveness, Team Effectiveness Survey (TES) was selected that was designed by Dr. Nurhidayah Azmi (2012). It can be seen in Appendix C. The Team Effectiveness Survey was developed after intense literature review, pilot study and statistical analysis with strong reliability result. Survey is composed of six components that are team goals and objectives, team leadership, team roles and responsibilities, team communication, team relationship and trust and values within the project team that are relevant to findings of literature review found in table 3.1 that reveals the characteristics of effective teams which are goals and roles clarity, competency and adequacy of members in the presence

trust, respect, effective communication and decision making skills. It can be seen in Appendix C. Team goals and objectives assess how much team members are clear about their goals and objectives and if goals and objectives are realistic and achievable. Team leadership assesses the team members' comfort level with leadership, judgment and decision making processes. Leadership is an indispensable part of project management, impacting directly on project outcomes (Shenhar et al., 2002). Successful leadership convinces people of the need to change, stimulates new ways of thinking and problem solving, and then encourages them to work together in order to accomplish project objectives in difficult work environments (Anantatmula, 2010). Team roles and responsibilities assesses if team members are clear and satisfied with roles and responsibilities assigned to them. Team relationships assesses if members of team maintain positive and healthy atmosphere, make constructive criticism and handle conflicts in a suitable manner. Trust and values within the project team assesses how members treat each other personally, emotionally and professionally. Team communication assesses if team members are participative, well facilitated and are effective communicator.

For the purpose of assessing success of project, project success assessment questionnaire (PSAQ), a reliable survey instrument used by Shehnar et al. (2001) has been utilized. The reason for choosing this survey is because it represents the most needed and important information from project success point of view. For example, if we see the indicators in table 3.2 for project success, we found out that they are time, cost, quality, profitability, user and participants' satisfaction. When we look at PSAQ, we found out that it seeks information on cost, time, quality and profitability for business in terms of money and good will similar to findings of literature review. It can be seen in Appendix B. It is based

on four constructs or dimensions which are project efficiency, impact on customer/user, business and direct organizational success and preparation for the future. Project efficiency means how well the project has performed from budget and time wise. Impact on customer means how the project has satisfied the needs of the customers. Preparation for the future means how the executed project has assisted organization to prepare itself for future like new opportunities, identifying new market segments, and the development of new technology. Business Success means how well the executed project has made the organization successful from commercial point of view and leads the organization to profitability.

CHAPTER 4: RESEARCH METHODOLOGY

The focus of this chapter is to discuss the research methods that have been used to test the hypothesis that were presented in chapter 1. Moreover, reasons are provided to justify the selection of research method.

4.1 Research Technique

The research uses correlational technique to test the hypothesis used for evaluating and analyze the findings. Correlation analysis is a kind of statistical technique use when the objective is to find the relationship or dependence of two or more variables. Since this study seeks the level of correlation between difference components of team effectiveness and project success, this technique is considered most suitable. This dependence is denoted by r. If dependence exists between two variables, then it is concluded that both variables will experience increase in their values at the same time. The value of correlational coefficient is between +1 and -1. If the value of correlational coefficient is above .5 and near to 1, then it is concluded that there is a positive correlation meaning both variables increase simultaneously. In case value is less than 0.5 and close to -1, then it is concluded that increase in one value will result in decrease in other value. Even though many tools and functions are available for correlation coefficient but for this study

pearson's coefficient have been deployed. The reason is we want to correlate 2 variables at one time and pearson's coefficient is most suitable in these types of situations. In addition, this type of correlation is considered suitable in situations when variables are measured in intervals. Level of linear relationships between 2 variables (r) is computed by obtaining the ratio of 2 variables covariance to the products of their standard deviations.

$$r_{(X,Y)} = \frac{covariance\ of\ X\ and\ Y}{s_X s_Y}$$

Value of r to be zero is an indication of no relationships between two variables. There is one important point that need to be considered is that correlation coefficient is only intended to detect linear relationships between normally distributed variables. There are other important conditions in interpreting r which are the points in the scatter plot should tend to fall along a straight line. The magnitude of r shows the size or amount of variance that is considered for using a straight line.

The objective of the correlational analysis is to reveal the variation between two quantitative variables. It also shows intensity and direction of relationships between them. The strength of the relationship means the ability of one variable to make precise prediction about others. The direction of the relationships means whether there is an inverse or direct variation between two variables.

After the collection of data, it was analyzed using statistical software called statistical package for social sciences (SPSS). First, cornbach's alpha was analyzed as to evaluate the reliability and consistency of surveys. Evaluation of survey is very important as it sounds good when we came to know that our survey instrument will always yield credible and consistent responses even there is a replacement of questions with some other similar questions. When we generate a variable from such set of elements or queries that produce

stable responses, then we consider this variable as credible and reliable. So we can say that cornbach's alpha is a reliability index for our survey instrumentation. Value of cornbach'a alpha ranges between 0 and 1 and if its value is high then it means that scales are more reliable and well consistent internally. Reliability evaluations are very important in situations when variables that are derived are going to be used in predictive analysis. Then to quantify the relationships between various aspects of effective teamwork and project success, pearson's product moment correlation is applied. This statistical technique is considered as the most commonly used to compute the level of relationship between linear relevant variables. Important condition is that both variables must be distributed normally.

4.2 Instrument for Data Collection

Two questionnaires TES (as independent variable) and PSAQ (as dependent variable) were used to collect the data. Questionnaires were sent to respondents either by mail, e-mail or carried by hand. They were informed that completion time of these surveys could not be more than 20 minutes. The PSAQ sought important measures that indicate project success or failure. The performance measures were scored on a 5- point Likert scale varying from 1 to 5. Where in 1 in this case is strongly disagree and 5 is strongly agree. There are four parts of this survey 1) Project efficiency 2) Impact on customer/user 3) Business and organizational success 4) Preparation for future. The TES contains important factors of high performance teams. Each factor has many elements that were evaluated on a 5 point Likert scale that varies from 1 (strongly disagree) to 5 (strongly agree). The components of team effectiveness survey were project team goals and

objectives, project team leadership, project team roles and responsibility, project team leadership, trust and values within the project team and project team communication.

4.3 Explanation of survey components

This section provides explanation on constructs of team effectiveness and project success.

4.3.1 Team Effectiveness Survey

4.3.1.1 Team Goals and Objectives

The team should specify and accord together with goals and objectives of the project. Goals should be achievable with clear purpose drawing focus of team members. Team members should act in a direction that leads them towards acquiring these goals successfully (Azmy, 2012).

4.3.1.2 Team leadership

Team leader is accountable in leading the team to accomplish set goals of the project. A leader with appropriate skills and expertise ensure that members of his or her team are free of ambiguities about objectives of the project and are highly committed in attaining them. The leader must play a role in motivating members to perform at high level of their skills (Azmy, 2012).

4.3.1.3 Team Roles and Responsibility

Each member of the team must be assigned roles and responsibilities matching with his/her competence. Each member must buck for understanding his duties and obligations in a team before even the project start. This prevents problems that will occur in later

stages of the project when everyone knows why and for what he/she is in a team (Azmy, 2012).

4.3.1.4 Team Relationships

Developing professional and personal relationships within a team can lead team members trusting each other and this finally will contribute to successfully delivery of the project. Team members should strive to understand each other as much as possible (Azmy, 2012).

4.3.1.5 Trust and values within project team

It is very important for each team member to treat each other with respect. It is also important to trust each others' skills and roles in the construction process and comprehend various types of risks underlying with these roles to assure the success of the project (Azmy, 2012).

4.3.1.6 Team Communications

Team members should effectively communicate most needed and relevant information with each other throughout project life cycle. This communication should be maintained sincerely and honestly not just when working in teams but also outside teamwork (Azmy, 2012).

4.3.2 Project Success Assessment Questionnaire

4.3.2.1 Business success

Business success accosts the prompt affect of the project on the organization doing it. For example, did the project enhance the success of the organization commercially and

facilitated to heighten its profitability? This is an important measure as to evaluate the success of the project.

4.3.2.2 Impact on the customer/user

This factor assesses if the delivery of this project assisted in meeting the needs of the customers, solving their problem and comprehension about how much are they satisfied with it. The major reason is that customers are the one who cause project to initiate and without their satisfaction project is not a success at all.

4.3.2.3 Preparation for the future

This component of a survey covers the assessment of benefits that project deliver to firm in the long run. It also presents a notion about how substantially project can assist organization to develop its infrastructure from standpoint of future in the form technologies, opportunities and new customer base.

4.3.2.4 Project efficiency

Assessing the efficiency of the project is also an important measure to evaluate the success of the project in the short run. For example, was the project delivered within the set time and planned budget.

4.4 Data Collection and Sampling Technique

This research includes the measurement of project success taken as dependent variable and team effectiveness as independent variable. Data has been collected after approval from thesis committee using two reliable surveys Team effectiveness survey (TES) developed by Dr. Nurhidayah Azmy in 2012 as independent variable and Project success

assessment questionnaire (PSAQ) used by Shehnar et al. (2001) as dependent variable. TES quantifies team effectiveness whereas PSAQ quantifies project success.

The respondents of the survey are 13 project teams comprising of 94 members of high rise commercial buildings and they are project managers, project engineers, civil engineers, planning engineers, cost control engineers, architects, quality control engineers and purchasing engineers. The geographical area covered is Saudi Arabia. An invitation letter was sent to 25 project teams to participate. All project teams were from high rise commercial use building projects. Only 13 project teams comprising of 94 professionals responded completely. As a result, response rate is 52%. To avoid biasness, complicated questions were avoided. Questions with yes or no response were avoided and those questions were also avoided that may lead respondents to respond untruthfully.

4.5 Data Analysis

Statistical analysis was performed using SPSS for Window operating system. Alpha value was set to 5% which is the most common level of significance. This means that test has been conducted in way where the possibility of saying that existence of correlation was a chance is not more than 5 out of 100. The tests were two-tailed. The reason is that because there are no previous theories to suggest there is a strong or positive relationship between different aspects of teamwork and project success. Demographic responses will be summed up using the averages, deviations, and range for variables that are continuously scaled, and occurrence rate and percent for categorical scaled variables. Cronbach's alpha was used to quantify the persistence and credibility of the team effectiveness and project success scale scores.

All hypotheses statements for relating different aspects of team effectiveness with project success will be tested one by one using Pearson's correlation coefficient. The Pearson correlation coefficient was used to analyze the strength and behavior of connection between teamwork effectiveness and project success. In case of Pearson's correlation coefficient way above zero for a particular aspect of team effectiveness, then the null hypothesis will be rejected, and it will concluded that there is a positive correlation between that aspect of team effectiveness and project success. The strength of the relationship will be reported and interpreted.

Pearson correlation coefficient is the main and oftenly practiced parametric measure to find the correlation between two variables. Its representation is by r and value varies between positive one to negative one. In this study, it is covariance of two variables X (team effectiveness) and Y (project success) divided by product of their deviations.

$$Cov(X,Y) = \frac{E[(X-\mu_X)(Y-\mu_Y)]}{\sigma_X \sigma_Y}$$

μx = Averages of X (team effectiveness)

μy = Averages of Y (project success)

σx = Standard deviations of X (team effectiveness)

σy = Standard deviations of Y (project success)

4.6 Summary

This chapter has discussed the research methodology applied for this study. First the techniques to test hypothesis has been discussed and then later on type of statistical technique and its suitability for the research was explained. At last two sections, data

collection methodology, sampling procedure and contents of questionnaires were discussed. In the next chapter, results are discussed.

CHAPTER 5: DATA ANALYSIS

This research was conducted to examine the correlation between project success and team effectiveness based on the survey responses from project teams. Team effectiveness was built around project team goals and objectives, project team leadership, project team roles and responsibility, trust and values within the project team, project team communication as determined by Team Effectiveness Survey. The performance of the project was examined by considering four key aspects of which are efficiency of project, effects on end user, success of business and organization, and preparation for the future. The correlation between Team effectiveness, the independent variable, and project success, the dependent variable, were assessed by means of Pearson product-moment correlation coefficient.

5.1 Description of Sample

The respondents were from project teams that have worked on high rise building project. All projects were high rise building projects for commercial use. Invitation was sent to 25 different project teams out of which only 13 project teams participated in study. So response rate was 52%. Almost all of the professionals were from engineering background with good skills, knowledge and experience in construction sector.

5.2 Reliability test

The reliability of the data set concerning the data file of present research was 92.4%. That supports a variation between responses and the reliability of the data set. Minimum acceptable cronbach's Alpha statistic is 0.60 or 60%. So it was established that the data set for the current thesis qualifies the mandatory reliability statistics.

		N	%
Cases	Valid	94	100.0
	Excluded[a]	0	0
	Total	94	100.0

List wise deletion based on all variables in the procedure

Table 5. 1: Case Processing Summary

Cornbach's Alpha	Number of items
.924	59

Table 5. 2: Reliability Statistics

Achieving good reliability for summated scale is important in cases when the derived results are going to be used for the predictions. Poor reliability index may be an indication for the need to reexamine individual elements. This means that they need to be modified/change or completely eliminated.

5.3 Demographical Analysis

There were total of 25 project teams invited to participate in survey. Complete and detailed responses were received from only 13 project teams comprising of 94 members all together. Below is the histogram of respondents as per their designations.

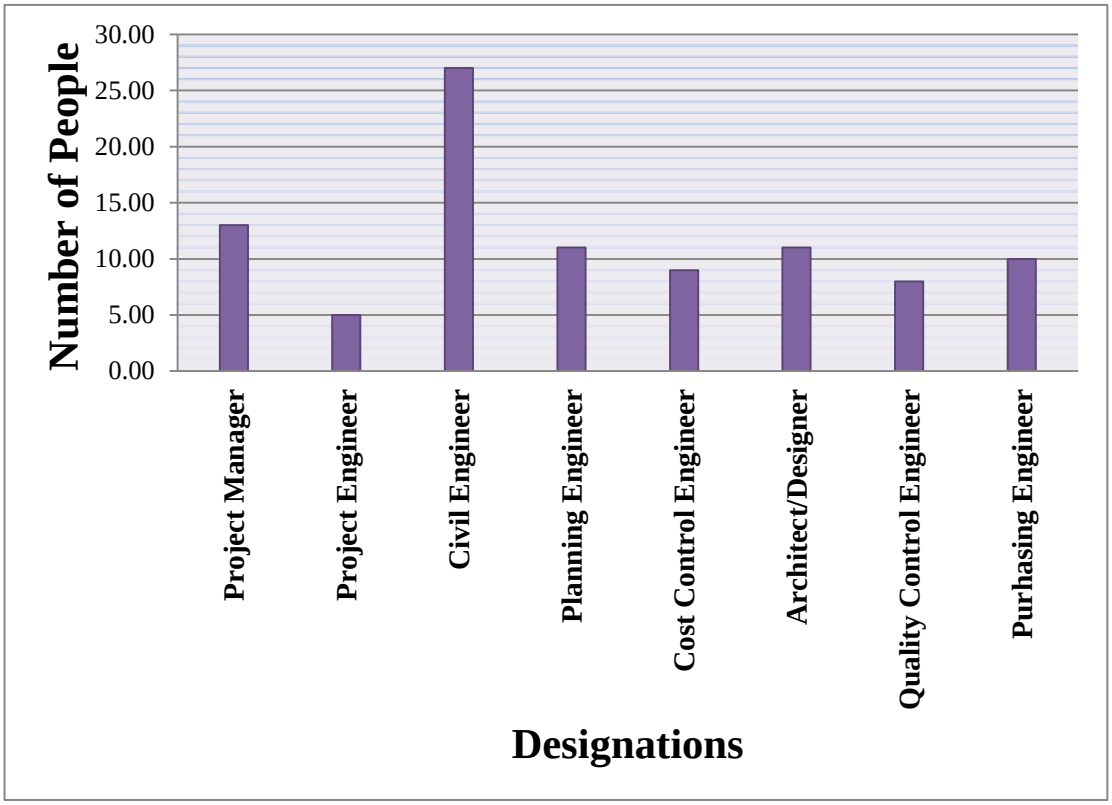


Fig 5. 1:Respondents' Histograms

Out of 94 respondents, 11 respondents were having experience between 0 and 5 years, 49 were having experience between 5 and 10 years, 25 were having experience between 10 to 15 years and 9 were having 15 plus years of professional experience. 9 out of 13 project teams were consisting of team members from 5 to 6 whereas 4 teams were having 7 to 10 team members.

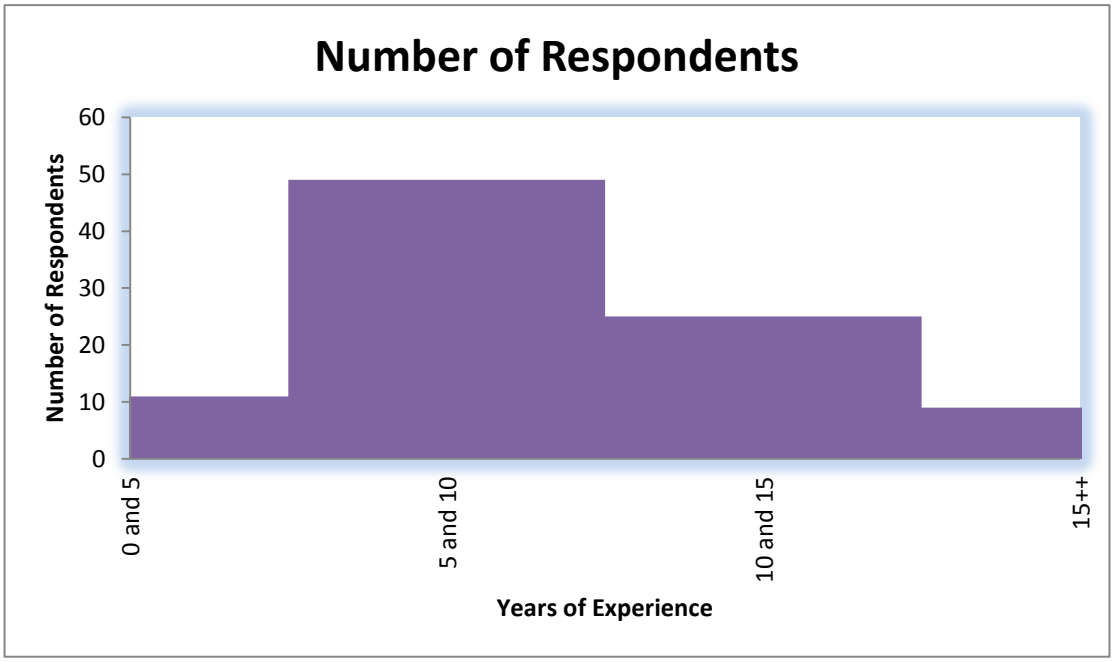


Fig 5. 2: Respondents' Experience

5.4 Results

Cornbach's alpha was between 0.79 and 0.96 as evidenced from table 5.2 for team effectiveness and project success. As a result, reliability for internal consistency is acceptable for independent and dependent variables. In addition, Table 5.3 presents the Pearson's correlation coefficient to more realize the relationship between project success (dependent variable) and components of team effectiveness (independent variables) which are project team goals and objective, project team leadership, project team roles and responsibilities, project team relationship, trust values within the project team and the project team communication.

Correlations							
	Project Team Goals and Objective	**Project Team Leadership**	**Project Team Roles and Responsibility**	**Project Team Relationship**	**Trust and Values within the Project Team**	**Project Tean Communication**	**Project success**
Project Team Goals and Objective	1	.788**	.843**	.743**	.632**	.741**	.869**
Project Team Leadership		1	.818**	.706**	.694**	.739**	.866**
Project Team Roles and Responsibility			1	.797**	.830**	.812**	.923**
Project Team Relationship				1	.757**	.684**	.837**
Trust and Values within the Project Team					1	.676**	.841**
Project Team Communication						1	.839**
Project success							1

** Significant at 1%

Table 5. 3:Results of Pearson Product Moment Correlation Coefficient

5.4.1 Research Question 1

Is there any relationship between project team goals and objectives as measured by TES with success of project as measured by PSAQ? If yes, what is it?

H1: There is a positive relationship present between project team goals and objectives and project success.

Figure 5.3 is the scatter plot that shows the relationship between the project success and project team goals and objectives. In addition, from Table 5.3, it can be observed statistically strong positive correlation between project success and project team goals and objectives, $r(94) = 0.869$, $p<0.01$. This conclusion is due to clustering and direction of dots linearly. Moreover, there are no observed or marked outliers. It can be observed that some dots are bold than others. It is due to the fact of same responses are being

overlapped. Coefficient of determination R^2 is approximately 75.5% which is not only high numerically but also relationship wise by considering possible positive influences of clear goals and objectives on success of project. Therefore the null hypothesis is rejected and conclusion is made that well defined goals and objectives will have positive impact on the success of the high rise building project.

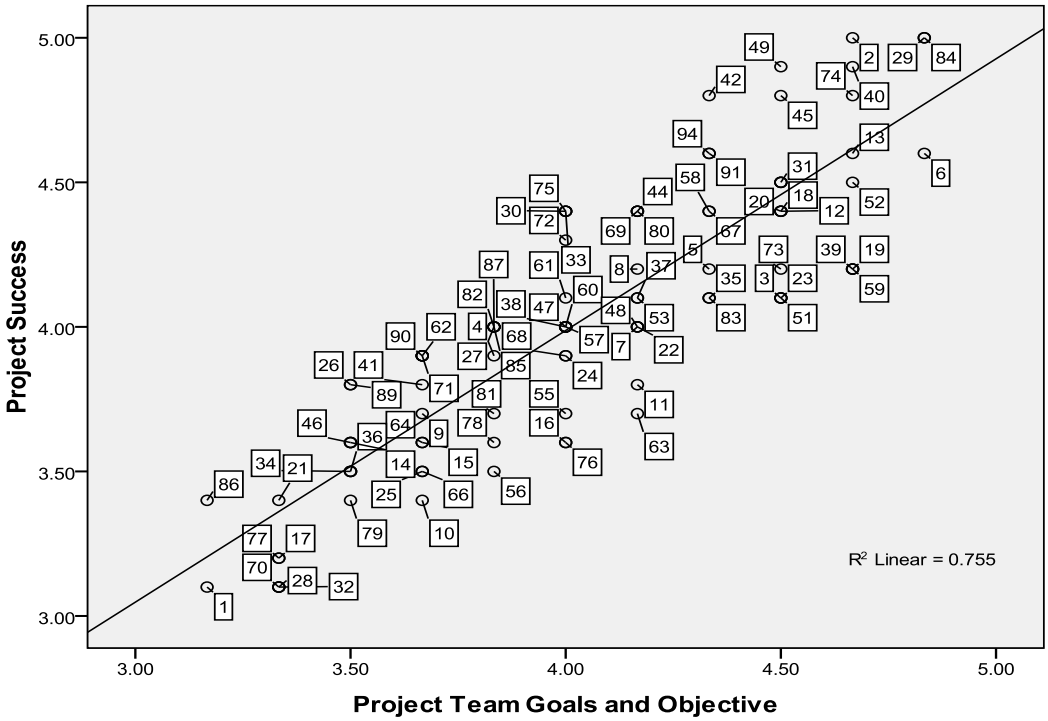


Fig 5. 3: Scatter Plot (Project Success and Project Team Goals & Objective)

5.4.2 Research Question 2

Is there any relationship between *project team leadership* as measured by TES with success of project as measured by PSAQ? If yes, what is it?

H2: There is a positive relationship present between project team leadership and project success.

Figure 5.4 shows the relationship between the project success and project team leadership. In addition, from Table 5.3 we can observe statistically strong positive correlation between project success and project team leadership, $r(94) = 0.866$, $p<0.01$. This conclusion is due to clustering and direction of dots linearly. Moreover, there are no observed or marked outliers. It can be observed that some dots are bold than others. It is due to the fact of same response are being overlapped. Coefficient of determination R^2 is 75% which is not only high numerically but also relationship wise by considering possible positive influences of strong and flexible leadership on success of project. Therefore the null hypothesis is rejected and conclusion is made that there is a strong positive correlation between project success and project team leadership in project teams who are involved in high rise building projects. This can also be concluded that there is a significant influence of project team leadership in prompting project success.

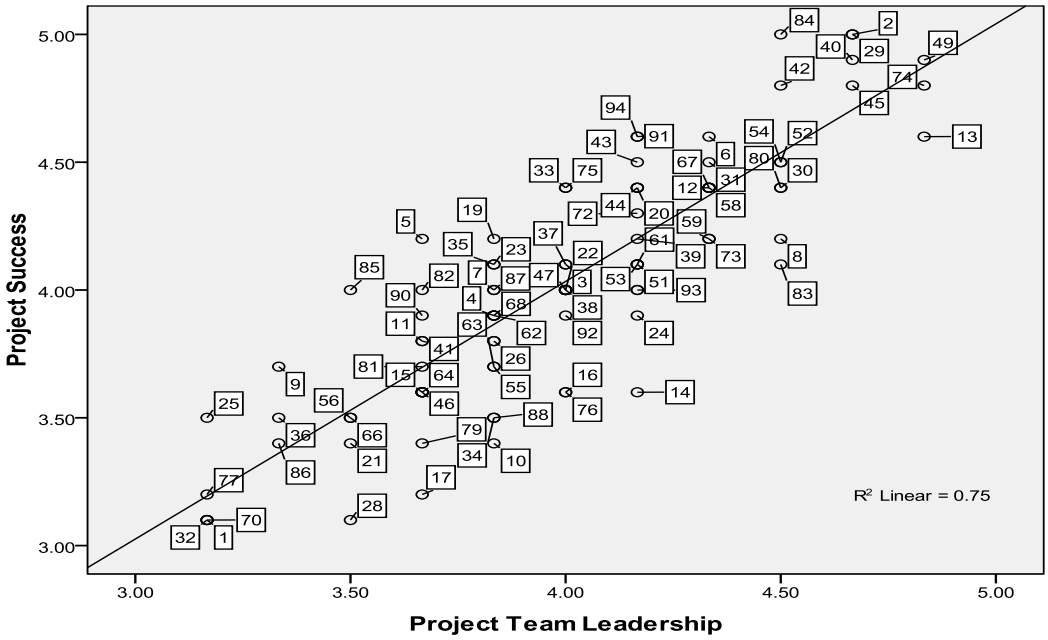


Fig 5. 4 : Scatter Plot (Project Success and Project Team Leadership)

5.4.3 Research Question 3

Is there any relationship between *project team roles and responsibility* as measured by TES with success of project as measured by PSAQ? If yes, what is it?

H3: There is a positive relationship present between project team roles and responsibility and project success.

Figure 5.5 shows the relationship between the project success and project team roles and responsibility. In addition, from Table 5.3 we can observe statistically strong positive correlation between project success and project team roles and responsibilities, $r(94) = 0.923$, $p<0.01$. This conclusion is due to clustering and direction of dots linearly. Moreover, there are no observed or marked outliers. It can be observed that some dots are bold than others. It is due to the fact of same response are being overlapped. Coefficient of determination R^2 is 85.2% which is not only high numerically but also relationship wise by considering possible positive influences of clarity in roles and responsibilities s on success of project. Therefore the null hypothesis is rejected and conclusion is made that there is a strong positive correlation between project success and project team roles and responsibilities among project teams who are involved in high rise building projects. This can also be concluded that teams with clear understanding of their roles and responsibilities would ultimately increase the project success.

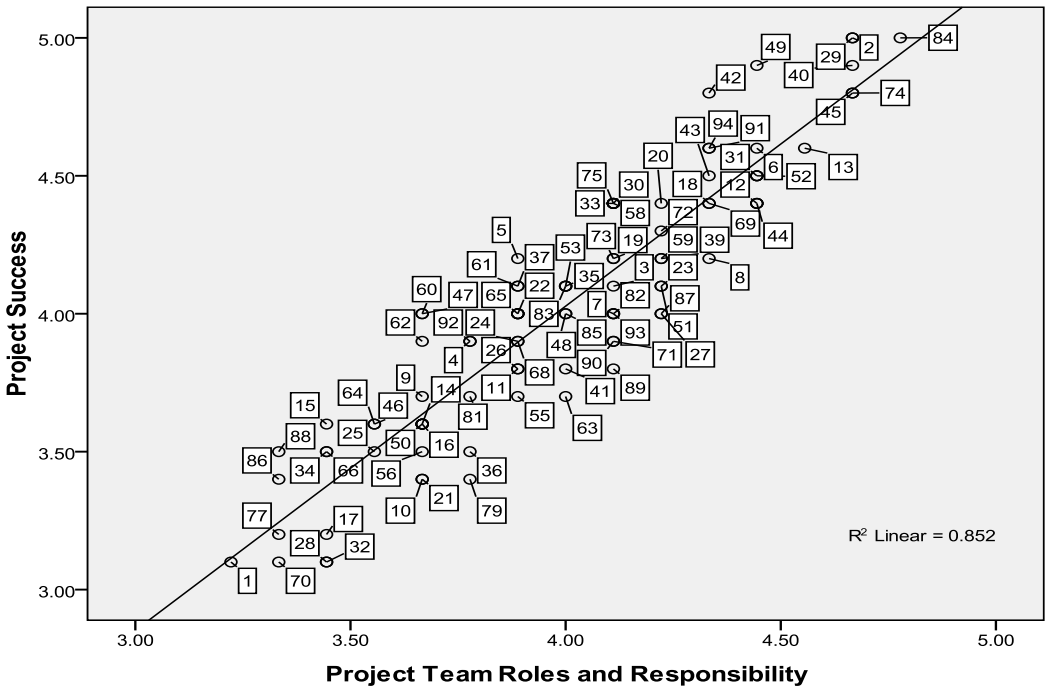


Fig 5. 5: Scatter Plot (Project Success and Project Team Roles & Responsibility)

5.4.4 Research Question 4

Is there any relationship between *project team relationships* as measured by TES with success of project as measured by PSAQ? If yes, what is it?

H4: There is a positive relationship present between project team relationship and project success.

Figure 5.6 shows the relationship between the project success and project team relationship. In addition, from Table 5.3 we can observe statistically strong positive correlation between project success and project team relationship, $r(94) = 0.837$, $p<0.01$. This conclusion is due to clustering and direction of dots linearly. Moreover, there are no observed or marked outliers. It can be observed that some dots are bold than others. It is due to the fact of same response are being overlapped. Coefficient of determination R^2 is

70.1% which is not only high numerically but also relationship wise by considering possible positive influences of good professional and emotional relationships on success of project. Therefore the null hypothesis is rejected and conclusion is made that there is a strong positive correlation between project success and project team relationship in project teams who are involved in high rise building projects. This also indicates that good team's relationship will cause to increase the project success.

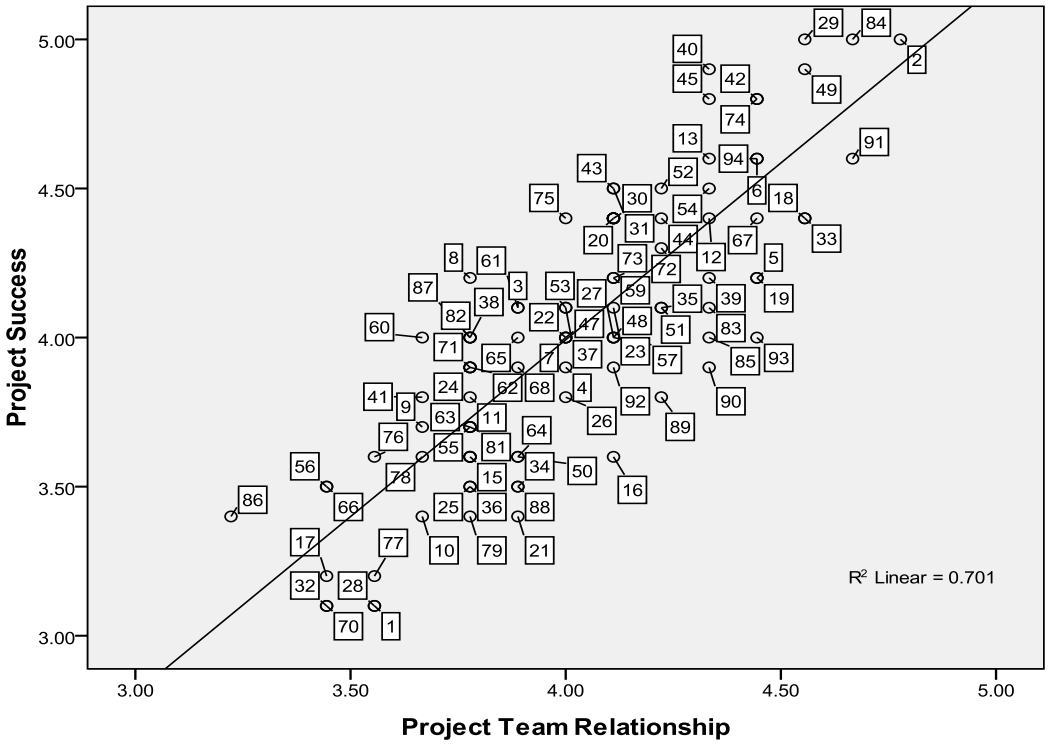


Fig 5. 6: Scatter Plot (Project Success and Project Team Relationship)

5.4.5 Research Question 5

Is there any relationship between *trust and values within the project team* as measured by TES with success of project as measured by PSAQ? If yes, what is it?

H5: There is a positive relationship present between project team's trust and values and project success.

Figure 5.7 shows the relationship between the project success and project trust and values within the project team. In addition, from Table 5.3 we can observe statistically strong positive correlation between project success and trust and values within the project team, $r(94) = 0.841$, $p<0.01$. Therefore the null hypothesis is rejected and conclusion is made that there is a strong positive correlation between project success and trust and values within the project team among project teams who are involved in high rise building projects. This also indicates that mutual respect of each other's experience; skills and knowledge enhance cooperation and confidence between team members and ultimately benefits the success of the project.

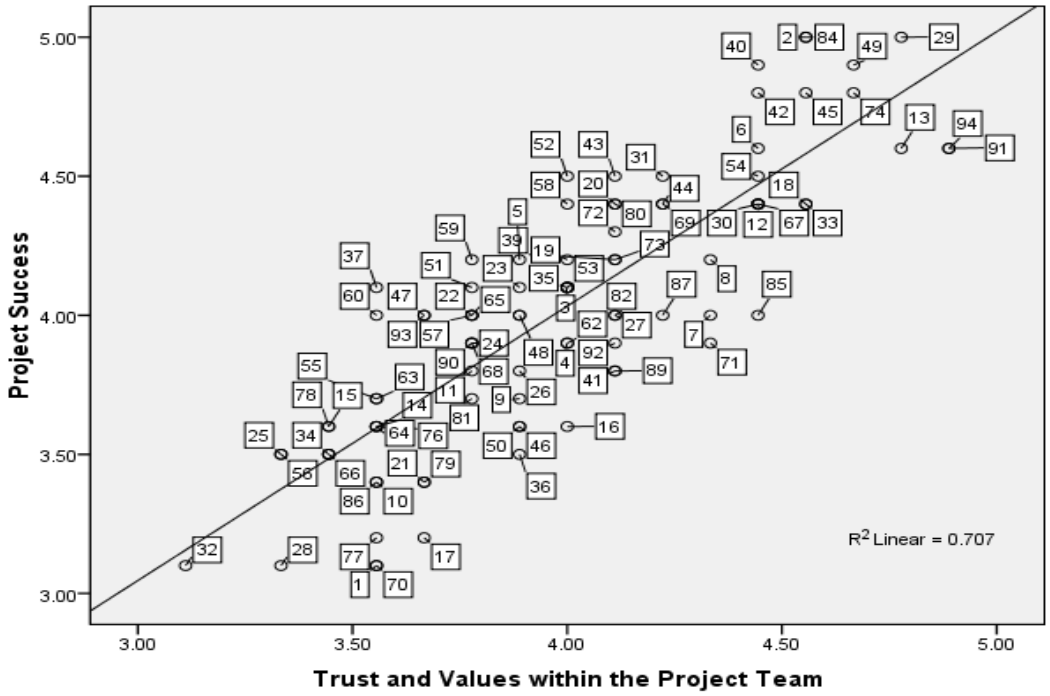


Fig 5. 7: Scatter Plot (Project Success and Trust & Values within Project Team)

5.4.6 Research Question 6

Is there any relationship between *project team communications* as measured by TES with success of project as measured by PSAQ? If yes, what is it?

H6: There is a positive relationship present between project team communication and project success.

Figure 5.8 shows the relationship between the project success and project team communication. In addition, from Table 5.3 we can observe statistically strong positive correlation between project success and project team communication, $r(94) = 0.839$, $p<0.01$. This conclusion is due to clustering and direction of dots linearly. Moreover, there are no observed or marked outliers. It can be observed that some dots are bold than others. It is due to the fact of same response are being overlapped. Coefficient of determination R^2 is 70.4% which is not only high numerically but also relationship wise by considering possible positive influences of open and trustworthy communication on success of project. Therefore the null hypothesis is rejected and conclusion is made that there is a strong positive correlation between project success and project team communication in project teams who are involved in high rise building projects. This also indicates that understandable communication would increase the project success.

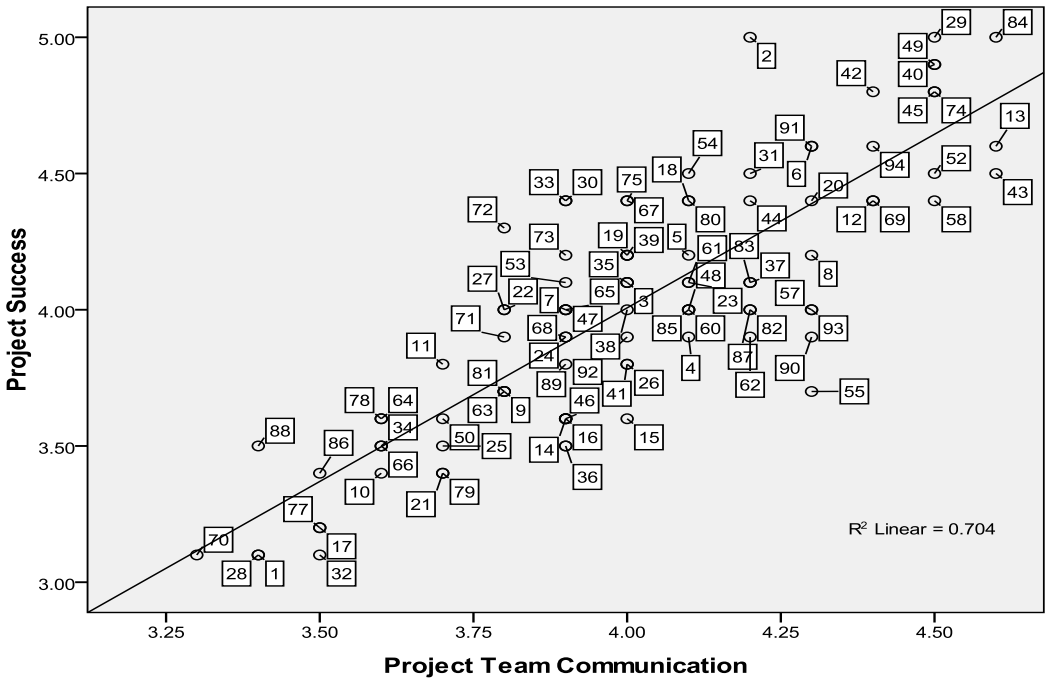


Fig 5. 8: Scatter Plot (Project success and Project Team Communication)

5.5 Summary

Correlation is the relation between two or more than two variables. Changes in one variable result in changes in other variables in same or opposite direction. This is possible to not to observe any cause and effect relation because of uncertainties. We can apply correlation between the variables if the variables are scale but in this research we can see that our dependent and independent variables are ordinals. We have chosen likert scale for data collection which are going from strongly disagrees to strongly agree. Dependent variables are (Project Efficiency, Impact on the customer/user, Business and Direct Organizational success and Preparing for the future) are ordinal variables and have been converted into new scale variable after getting average which is known as "Project success". Similarly independent variables (Project Team Goals and Objectives, Project Team leadership, Project team roles and responsibility, Project team relationship, Trust

and values within the project team and Project team communication) are in ordinal form and these variables have more than one question under one variable like project team goals and objectives has six questions and these questions have been converted into scale (take the average of six question under one variable) so that every independent variable can be converted into scale.

In graphical section we can see that points on scatter plot are less than the sample size because some dependent and independent variable has same value so that values are getting overlap. Correlation can be classified into different categories the first one Positive Correlation, second is Negative Correlation, Perfectly Positive Correlation, Perfectly Negative Correlation and last one is Zero Correlation. Here the entire scatter plot is moving in the same upward direction which shows the positive correlation between the dependent and independent variables. Project success and Project Team Goals and Objectives are moving in the same direction then this correlation between these two variables is said to be Positive Correlation. Increase or decrease in the value of project team goals and objective will result in increases or decrease of project success at the same rate. Similarly, other five independent variables will be discussed at same pattern because all scatter plots are moving in same direction.

CHAPTER 6: DISUSSIONS AND CONCLUSION

The present study deepens existing knowledge about the factors affecting the project success. While prior studies looked at various factors affecting project success, this research only focused on different constituents of effective teamwork in relation to success of the project. The reason was because relatively little is known in this area. A total of six hypotheses were developed to examine the relationship in the conceptual framework. Based on review of literature, it was expected that there will be significant positive relation between effective teamwork and project success.

In order to test the hypothesis, the study examined the relationships among different components of effective teamwork with the success of the project of 13 project sites in Saudi Arabia. All of the projects were commercial high rise buildings. The correlation results provided statistical evidence of positive and strong correlation of all constructs of effective teamwork with the project success.

Results not just revealed high correlations with score of r above 0.8 between constructs of team effectiveness and overall project success but also indicated these projects as successful. In spite of the fact that, all components of effective teamwork were found to be strongly and positively correlated with project success but three out of the six

components of effective team work were identified to be having very positive and strong correlation with the overall success of the project. They are listed as follows:

1. Project team roles and responsibility
2. Project team goals and objectives
3. Project team leadership

They are ranked based on the values of r as evident from table 5.3. Since project team roles and responsibility has the highest value of r, it can be predicted that it has very positive and strong correlation with project success.

Previous research indicates that high performing teams find that role clarity is critical (Burgoon and Ruffner, 1978). Members complement each other when they understand the duties and responsibilities specific to their contribution to the team. The team performance is cohesive and members are cooperating with one another (Bass, 1980). Quality performance results as members are also able to learn the roles of others and mold their own work accordingly. As a result, overall team performance is positively affected (Molleman et al., 2004).

Bernhold and AbouRizk (2010) mentioned that clarity of roles is one of the requirements for teams to be successful. Hoigaard et al (2006) and Stevens and Campion (1994) determined alike results for role clarity. According to Pfeiffer (1994) that when members of the team are competent to execute different roles, they lead to improved quality and productivity of team. All these past study determinations affirm the significance of clarity of roles and responsibilities towards the project success as reasoned from the empirical analysis of this research.

Next component which has second highest value of r is project team goals and objectives. It is indicated by many researchers that common team goals are the cause of team

motivation to attain these goals with less number of internal conflicts and issues (e.g, Larson and LaFasto, 1989; Locke and Latham, 1990). Goals that are agreeable by all team members (Pearson, 1987; Stevens and Campion, 1994) leads to having clearly defined goals and hence as a result team performance improved (Hoegl and Parbooteeah, 2003) in term of delivering a particular project or service (Guzo and Dickson, 1996). It has also been mentioned in previous researches that productivity of tasks significantly improved when everybody agreed with goals of the team (Bettenhausen, 1991). In addition, there is an important and positive relationship between team performance and commitment of members towards team goals (Evans & Dion, 1991). There are many other researchers in agreement that when everybody agree with team goals, it leaves positive impression on team performance (Guzzo & Dickson, 1996).

Third element which has obtained highest values of r was team leadership. Researches in the past have shown that problems in the project processes can easily be troubleshoot concisely and precisely when members of the team are highly involved and participative (Levine and Moreland, 1990; Stevens and Campion, 1994) and this is only possible if there is an effective and participative leadership where the leader encourage members of the team to participate in team discussions with honesty and openness (Samson & Daft, 2003). A good leader always strives to make the members of the team to work as a unit (Choi, 2002) through motivation and high team spirit (Osterloh and Frey, 2000). If members are strongly dependent upon each other, they will adapt different roles and responsibilities depending upon the requirement of time to yield more contributions as a team (Molleman et al., 2004). It was suggested by Katzenbach (1997) that when members in team undertake roles and responsibilities of leader at various points of time in various directions, they make team perform more effectively and as per Guzzo and Dickson

(1996) that when members are empowered to make decisions, there dependency on shared leadership is increased despite the presence of designated team leader (Hackman, 1992; Neubert, 1999) and all these findings has been confirmed by the results of this research.

6.1 Recommendations

Based on the findings and discussions of the study, it is recommended that having well defined and realistic goals, roles and responsibilities and appropriate leadership are very necessary for construction projects to be successful.

Literature review and interpretation results strongly recommend that working in teams effectively is not just beneficial for a corporation itself but it also brings benefits to individuals who are part of team like self-improvement, more responsibility and accountability, creativity, more involvement and feeling of being appreciated and recognized.

It is recommended that goals and objectives of should be made clear and set realistically and selection of team members must be based on their competence appropriate to goals and objectives. This has proven not just by the findings of this research but also by many other researches in the past.

Based on the results of the research, it is recommended that leadership of the team should be suitable and competent enough to assist team members in effective decision making, motivate them and input team whenever and wherever needed. This argument is also supported by Keller (1992) and Anantatmula (2010) that successful leadership convinces people of the need to change, stimulates new ways of thinking and problem solving, and then encourages them to work together in order to accomplish project objectives in

difficult work environments. Its benefits further stated by Shehnar et.al. (2002) that Leadership is an indispensable part of project management, impacting directly on project.

It is also recommended that roles and responsibilities should be well defined and assigned to members of team best matching their skills, expertise and satisfaction level. In a likewise manner, special care need to be taken when selecting team members as team members should be well capable in meeting the requirements through their skills, knowledge and expertise.

Research has also proved that organizations who prefer teamwork feel more of invested in what they are doing. A good argument for investing in teamwork is that it promotes self-organization. Employees learn to think outside the box and proactively take initiatives that go beyond a limited interpretation of their job description and participate in processes that are important for innovation. Following points would provide further recommendations in an area of teamwork.

Objectives and goals should be clearly defined at the onset of a project. Construction projects are not the only type projects that benefit from this organizational detail. Team members should take time to assimilate the nature and scope of the work. Study has shown that the chance of a project's success is in proportion to the clarity of objectives and goals.

Leadership is the key to a well functioning team. Qualities needed in good leaders include being confident in one's ability, having skills, knowledge and expertise needed for the project, and a strong desire to lead through coordination and integration. The project manager in Saudi Arabia is a leader. As leader, professional relationships must be formed with all team members. The more successfully a project is managed, the better the chance the project has of succeeding. It has been proven that teams comfortable with robust

leadership are more likely to succeed. This is certainly true when the project is high rise buildings.

Several types of roles and responsibilities among team members are mandatory for the successful has execution of the project. This research has concluded that team members should be selected based on the suitability of its skills and knowledge to the project. It has also been proved that selection of team members is very important when building a team. Each team member must be assigned roles and responsibilities that are within his capacity. Assigning roles and responsibilities in a wrong way could be fatal for the health of the project. Therefore each team member must be give roles and responsibilities appropriate with his skills, knowledge and professional experience. Team members should be very clear of their responsibilities and all these are very important for the success of the project.

For the success of the project, team should handle all its conflicts constructively and respectfully. Team members should appreciate and recognize good decisions regarding projects. This research has proved that in Saudi construction environment, team members with right attitude in handling issues related to project increase the chances of finding appropriate, creative and innovative solutions for them and thus increased the chances of the project. Therefore it is very important for all project teams to have conflict management phenomena as to significantly raise the project success.

Team members should treat and support each other honestly, sincerely and with respect. This research has proved that maintaining professional relationships encourages positivity towards project and hence increased the chances of project success.

Communication is also very important aspect of effective teamwork. Participating in team discussion and encouraging others to be interactive in communication is good for the success of the project.

6.2 Implications and Limitations

This research contributes to the body of knowledge by establishing a link between teamwork effectiveness and project success. Although this link has been acknowledged for years, the research team is unaware of any other efforts to quantify this relationship within Saudi Construction Projects. This study, in line with substantial research, shows that effective teamwork has a substantial effect on project success that are crucial for learning the competence to handle change. Critical team effectiveness variables have been identified and categorized while conducting this research. These results can be used to improve project team involvement and thus, the chances for the success. Carefully set goals that are well defined and realistic can give significant contribution in the success of the project. The finding of this study also has a limitation. Even though participants utilized were a good representative sample, utilizing only 94 participants is considered limited sample and results could have been better validated by using more participants representing different level of experience and responsibilities in a typical construction project.

6.3 Future Research

The true strength of the new methodology becomes available when the data of large number of project is used in the analysis. As this research was based on data collected from high rise commercial buildings in Saudi Arabia, future research should focus on data

collection from other types of project like residential, industrial etc. Utilizing these projects data to identify the relationship between effective teamwork and project success could be very valuable for management to learn from previous experiences and could be used as lesson learned for managers with less experience. Additionally, future research can also study how management decisions are made on projects.

6.4 Conclusion

Teamwork is increasingly applied in many organizations in an effort to improve performance, yet empirical evidence demonstrating the relationship between team effectiveness and project success is scarce. Consequently, this study has undertaken an empirical assessment of the linkages between team effectiveness and project success in Saudi construction industry.

This study has provided an insight into the various factors that affect teamwork and project success. Key conclusions of the study are as follows:

Clear objectives mean that the right projects are selected.

Clear processes and roles ensure that projects are done right.

Leadership competences correlate directly with project success

Without these factors, it is highly likely that an application of teamwork will be counterproductive. From results of questionnaires, it was broadly perceived among the sample that potential impacts of teamwork were significantly greater on the success of the project and that is why complex projects today utilize teams as part of the project management. This study suggests the need for further research in studying what makes team to be more effective in construction environment. In particular, teamwork for construction projects is an avenue of study that may be worthwhile to address.

APPENDIX A

Invitation Letter

Dear Respondent,

The Construction Engineering and Management Department of the College of Environmental Design at King Fahd University of Petroleum & Minerals is presently engaged in a study that will help to understand how the level of teamwork's effectiveness in construction project impacts the success of construction projects for high rise (large) buildings in Saudi Arabia.

The purpose of the study is to find the strength of relationship between different aspects of teamwork with project success for large buildings.

We are asking your project team for high rise building project to participate by providing needed information related to different aspects of project success and team effectiveness as per your experiences in high rise projects that are already completed. We know that there are numerous demands on your time. But your involvement is important in contributing to the study. The questionnaires will take less than 20 minutes of your valuable time.

The attached questionnaire consists of two sections. The first section seeks information about the success of your project. The second section is about different components of effective teamwork requiring your opinion to assess the level of teamwork effectiveness.

We shall therefore, highly appreciate your kindness towards us in rendering the information as per our needs. Your contribution in this regard is highly appreciated. It will be pleasure for us to share the results of this research with your team.

Your immediate action will be highly appreciated. Please return your completed questionnaire in enclosed self-addressed envelope as soon as possible.

Thank you in anticipation for your cooperation.

Sincerely yours,

Dr. Khalaf A. Al-Ofi
Department Chairman
Construction Engineering and Management

APPENDIX B

Project Success Assessment Questionnaire

Dear Participant,

This survey will only be used for a research purposes only. This study examines different factors associated with success of project (Efficiency, Impact on customer/user, Business and Direct Organizational Success, Impact on future) and to what extent these factors lead to create effective project teams.

This questionnaire should take about 5 minutes of your time to complete. The information collected will be kept confidential. This questionnaire can also be assessed online via this link:

https://docs.google.com/forms/d/1oxrJLEhmWa7MxlrPa_Aa-95pnB8vHcaCwRIbLnnqKfw/viewform

For questions or concerns, please contact Adil Mughal at hmamughal@kfupm.edu.saor Professor Sadi Assaf at assaf@kfupm.edu.sa

Thank you for your time.

---

1. Firm's Name:
2. Name of the Project:
3. What is your current job position?
    - Project Manager
    - Project Engineer

- Civil Engineer
- Planning Engineer
- Cost Control Engineer
- Architect/Designer
- Quality Control Manager
- Quality Control Engineer
- Purchasing Manager
- Purchasing Engineer
- Subcontractor
- Others, please specify_____

4. Years of experience in the construction industry

- 0-5 years
- 5-10 years
- 10-15 years
- More than 15 years

5. Please select the overall duration of the project (From contract starting date to ending date)?

- 0-6 months
- 6-12 months
- 12-18 months
- More than 24 months

No Code	Success Measures	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
S_1	**Project Efficiency** This section requests information about the performance of project in terms of time and cost. Please answer as per your opinion.					
S_{11}	The project was completed on time or earlier.	□	□	□	□	□
S_{12}	The project was completed within or below budget.	□	□	□	□	□
S_2	**Impact on the customer/user** This section requests information about if this project has met the requirements of the customer and customer is satisfied. Please answer as per your opinion.					
S_{21}	The customer was satisfied.	□	□	□	□	□
S_{22}	The product met the customer's requirements.	□	□	□	□	□
S_{23}	The customer is using the product.	□	□	□	□	□
S_3	**Business and Direct Organizational success** This section requests information about the impact of this large building project on your organization. For example, commercial success of your firm, increase profitability. Please answer as per your opinion.					
S_{31}	The project increased the organization's profitability.	□	□	□	□	□
S_{32}	The project contributed to the organization's direct performance.	□	□	□	□	□
S_{33}	The project was an economic business success.	□	□	□	□	□
S_4	**Preparing for the future** This sections requests information on benefits of this project in the long run. For example new opportunities for firm. Please answer as per your opinion.					
S_{41}	The project outcome will contribute to future project.	□	□	□	□	□
S_{42}	The project developed better	□	□	□	□	□

	managerial capabilities.					

APPENDIX C

Team Effectiveness Survey

Dear Participant,

This survey will only be used for a research purposes only. This study examines different factors associated with team effectiveness (Leadership, cohesion, Trust, Communication, and Interdependence) and to what extent these factors lead to create effective project teams.

This questionnaire should take about 10 – 15 minutes of your time to complete. The information collected will be kept confidential. This questionnaire can also be assessed online via this link:

https://docs.google.com/forms/d/10myb9KTteIXFq8Nd-YcTrH5Xq-GOOq88o9inQjukuEI/viewform

For questions or concerns, please contact Adil Mughal athmamughal@kfupm.edu.saor Professor Sadi Assaf at assaf@kfupm.edu.sa

Thank you for your time.

---

1. How many members are there in your team?
   - 2-4 people
   - 5-6 people
   - 7-10 people
   - More than 10 people

Project Team Goals and Objectives					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I understand team's goals and objectives.	□	□	□	□	□
b. My teammates understand team's goal and objectives.	□	□	□	□	□
c. Team agrees on team's goal and objectives.	□	□	□	□	□
d. Team goals and objectives are consistent with team members.	□	□	□	□	□
e. Team is committed to achieve team's goals and objectives.	□	□	□	□	□
f. Team achieves outlined team goals and objectives.	□	□	□	□	□
Project Team Leadership					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I feel comfortable with the concept of shared leadership.	□	□	□	□	□
b. I feel comfortable with the decision making process within the team.	□	□	□	□	□
c. I spend time with team members to clarify team's expectations.	□	□	□	□	□
d.Team exercises good judgement during decision making process.	□	□	□	□	□
e.Team members provide input/thoughts througout the Project.	□	□	□	□	□
f.I help my team whenever anyone has difficulties performing tasks.	□	□	□	□	□
Project team roles and responsibility					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. Team members are willing to take initiative for unassigned	□	□	□	□	□

tasks.					
b.I am willing to help with unforeseen problems that need immediate attention.	□	□	□	□	□
c. Team members are willing to help with unforeseen problems that need immediate attention.	□	□	□	□	□
d. I am clear on my individual roles in relations to the team as a whole.	□	□	□	□	□
e. Team members are clear on individual roles in relations to the team as a whole.	□	□	□	□	□
f. I agree with assigned roles and responsibilities.	□	□	□	□	□
g.Team members have the necessary expertise to perform the tasks.	□	□	□	□	□
h.I understand the responsibilities assigned to me.	□	□	□	□	□
i.Team understands the responsibilities assigned to them.	□	□	□	□	□
Project team relationship					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I manage to handle team conflict well.	□	□	□	□	□
b. Effective conflict management is exercised within the team.	□	□	□	□	□
c. Team works constructively on issues arise until they are resolved.	□	□	□	□	□
d. I care about the welfare of my teammates.	□	□	□	□	□
e. My teammates care about each others.	□	□	□	□	□
f. Good decisions are always made within the team regarding project matters.	□	□	□	□	□
g. Decisions are made with the involvement of all team members.	□	□	□	□	□
h. I carry my fair share of the work.	□	□	□	□	□

i. The team members always looking out for the team.	☐	☐	☐	☐	☐
Trust and values within the project team					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. As a member of the team, I am treated with respect.	☐	☐	☐	☐	☐
b. Other team members are treated with respect.	☐	☐	☐	☐	☐
c. I trust my teammates in making decisions for the team.	☐	☐	☐	☐	☐
d. The team members trust each other.	☐	☐	☐	☐	☐
e. The team members show appreciation towards one another.	☐	☐	☐	☐	☐
f. The team members support each other.	☐	☐	☐	☐	☐
g. My contributions for the team are recognized.	☐	☐	☐	☐	☐
h. I believe trust is an important component in teams.	☐	☐	☐	☐	☐
i. The team believes trust is an important component.	☐	☐	☐	☐	☐
Project team communication					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. Interactive communication is present within the team.	☐	☐	☐	☐	☐
b. Team members participate in team's discussion.	☐	☐	☐	☐	☐
c. I participate in team meetings.	☐	☐	☐	☐	☐
d. The team members trust each other.	☐	☐	☐	☐	☐
e. Team meetings are well-facilitated.	☐	☐	☐	☐	☐
f. Team meetings produce clear outcomes.	☐	☐	☐	☐	☐
g. There are disagreements during team meetings.	☐	☐	☐	☐	☐
h. Communications outside meetings are effective.	☐	☐	☐	☐	☐

i. I am honest with my teammates.	□	□	□	□	□
j. Team members are honest with each other.	□	□	□	□	□

Thank you for completing the questionnaire.

REFERENCES

Aartsengel, A.V., Kurotglu, S. (2013). A Guide to Continuous Improvement Transformation: Concepts, Processes, Implementation. New York: Springer.

Acton, A. (Ed.). (2012). *Issues in Engineering Research and Application: 2011 Edition.* Atlanta: Scholarly Editions.

Acton, A. (Ed.). (2013). *Issues in Innovation, Indicators, and Management in Technology.* Atlanta: Scholarly Editions.

Adams, J.R. (1997). Principles of Project Management (Collected Handbooks from the Project Management Institute). Project Management Institute.

Adams, S., Simon, L. and Ruiz, B. (2002). A pilot study of the performance of student teams in engineering education. Proceedings of the American Society for Engineering Education Annual Conference and Exposition, Montreal, June.

Ahmad, S.M., & Kangari, R. (1995). Analysis of client satisfaction drivers in construction industry. *Journal of Management Engineering*, 11(2), 36-44.

Albanese, R., & Haggard, R. (1993). *Team building: Improving Project Performance.* Austin: The Institute.

Al-Khalil, M.I., and Al-Ghafly, M.A. (1999). Delay in public utility projects in Saudi Arabia. *International Journal of Project Management*, 17(2), 101-106.

American Society of Civil Engineers (2012). *Quality in the Constructed Project: A guide for Owners, Designers, and Constructors.* Reston: American Society of Civil Engineers.

Anantatmula, V. (2010). Project manager leadership role in improving project performance. *Engineering Management Journal*, 22(1), 13-22.

Ancona, D.G., & Caldwell, D.F. (1992). Bridging the boundary: external activity and performance in organizational teams. *Administrative Science Quarterly*, 634-665.

Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. *International Journal of Project Management*, 17(6), 337-342.

Azmy, N. (2012). *The role of team effectiveness in construction project teams and project performance.* Phd Dissertation in Construction Engineering and Management, Iowa State University, Retrieved from ProQuest Central.

Baccarini, D. (1999). The logical framework method for determining critical success/failure factors in projects. *International Journal of Project Management*, 14(3), 141-151.

Bacon, N. and Blyton, P. (2000). High road and low road teamworking: perceptions of management rationales and organizational and human resource outcomes. *Human Relations*, 53(11), 1425-1458.

Baker, B.N., Murphy, D.C., and Fisher, D. (1983). *Project Management Handbook: Factors affecting project success.* New York: Van Nostrand Reinhold.

Bass, B.M. (1980). Team productivity and individual member competence. *Small Group Behaviour*, 11(4), 431-504.

Batt, R. (2001). The economies of teams among technicians. *British Journal of Industrial Relations, 39*(1), 1-24.

Beale, P. & Freeman, M. (1991). Successful project execution: a model. *Project management Journal*, 23-30.

Beatham, S., Anumba, C.J. and Thorpe, T. (2004). KPIs: a critical appraisal of their use in construction. *Benchmarking: An International Journal*, 11(1), 93-117.

Bens, I. (1999). Keeping your team out of trouble. *Journal for Quality and Participation*, 22(4), 45-47.

Bernhold, L.E., & AbouRizk, S.M. (2010). *Managing Performance in Construction.* New Jersey: John Wiley & Sons.

Bettenhausen, K.L. (1991). Five years of group research: What we have learned and what needs to be addressed. *Journal of Management*, 17, 345-381.

Biech, E. (Ed.). (2008). *The Pfeiffer Book of Successful Team Building Tools.* San Francisco: John Wiley & Sons.

Blaney, J. (1989). Managing software development projects. *Paper presented at the Project Management Seminar/Symposium*, Atlanta, GA.

Bresnen, M.J., Haslam, C.O., Beardsworth, A.D., Bryman, A.E. and Keil, E.T. (1990). Performance on site and the building client. *Occasional Paper No. 42*, Chartered Institute of Building, Ascot.

Bubshait, A.A. and Almohawis, S.A. (1994). Evaluating the general conditions of a construction contract. *International Journal of Project Management*, 12(3), 133-135.

Burgoon, M., & Ruffner, M. (1978). *Human Communications.* USA: Holt. Rinehart and Winson.

Camilleri, E. (2011). *Project Success: Critical Factors and Behaviours.* Surrey: Gower Publishing Limited.

Capozzoli, T.K. (1995). Resolving conflict within teams. *Journal for Quality & Participation*, 18(7), 28-31.

Cartwright, D., & Zander, A. (1968). *Group dynamics-research and theory.* England: Harper and Row.

Castak, P., Bamber, C.J., Sharp, J.M., & Belhoubek, P. (2001). Factors affecting successful implementation of high performance teams. *Team Performance Management, 123-134.*

Cha, H. S., & Kim, C. K. (2011), Quantitative Approach for Project Performance Measurement on Building Construction in South Korea, *Journal of Civil Engineering*, 1319-28.

Chan, A. P.C., & Chan A.P. L. (2004). Key performance indicators for measuring construction success. *Benchmarking: An International Journal,* 11(2), 203-221.

Chan, A. P.C., & Tam, C. M. (2000). Factors affecting the quality of building projects in Hong Kong. *International Journal of Quality and Reliability Management* , 423-441.

Choi, J.N. (2002). External activities and team effectiveness: Review and Theoretical Development. *Small Group Research*, 33(2), 181-208.

Chow, L.J., Then, D., & Skitmore, M. (2005). Characteristics of teamwork in Singapore Construction projects. *Journal of Construction Research* , 15-46.

Chua, D. K. H., Kog, Y. C., and Loh, P. K. (1999). Critical success factors for different project construction projects. *Journal of Construction Engineering and Management*, 118(1), 94 – 111.

Cleland, D., & Ireland, L. (2006). *Project Management: Strategic Design and Implementation.* McGraw-Hill Professional.

Clutterbuck, D.(2007). *Coaching the Team at Work.* London: Nicholas Brealey International.

Cobb, A. T. (2012). Leading Project Teams: The Basics of Project Management and Team Leadership. Sage Publications.

Conti, B., & Kleiner, B. H. (1997). How to increase teamwork in organizations. *Training for Quality* , 26-29.

Cornick, T., & Mather, J. (1999). *Construction Project Teams: Making Them Work Profitably*. London: Thomas Telford Publishing.

Dalal, A.F. (2012). The 12 Pillars of Project Excellence: A Lean Approach to Improving Project Results. Florida: CRC Press.

Dinsomore, P., & Cooke-Davies, T. (2006). The Right Projects Done Right: From Business Strategy to Successful Project Implementation. San Francisco: Jossey-Bass.

Drucker, P.F. (1992). *Managing for future: The 1990s and beyond.* New York: Truman Talley.

Duncan, W. (1987). "Get out from under", *Computerworld*, 89-93.

Ensley, M.D., Pearson, A.W., & Amason, A.C. (2000). Understanding the dynamics of new venture top management teams: cohesion, conflict, and new venture performance. *Journal of Business Venturing*, 17(4), 365-486.

European Construction Institute. (1996). *Implementing TQ in the Construction Industry: A Practical Guide*. London: Thomas Telford.

Evans, C.R., & Dion, K.L. (1991). Group cohesion and performance: a meta-analysis. *Small Group Research,* 22(2), 175-186.

Garrett, D. (Ed.). (2012). Project Pain Reliever: A Just-in-time Handbook for Anyone Managing Projects. USA: J.Ross Publishing.

Gelbard, R., & Carmeli, A. (2009). The interactive effect of team dynamics and organization support on ICT project success. .*International Journal of Project Management,* 464-470.

Gersick, C.J.G. (1988). Time and Transition in Work Teams: Toward a New Model of Group Development. *Academy of Management Journal,* 9-41.

Gido, J, & Clements, J. P. (2009).Successful Project Management. New York: American Management Association.

Gilbert, T. (1999). Great Teamwork pays off for Xerox. *Journal for Quality & Participation.* 22(4), 48-51.

Gladstein D.L. (1984). Groups in context: A model of task group effectiveness. *Administrative Science Quarterly,* 29(4),499-517.

Globerson, S. and Zwikael, O. (2002). The impact of the project manager on project management planning processes. *Project Management Journal,* 33(3), 58-64.

Goldin, D.S., Venneri, S.L., & Noor, A.K. (2001). Fresh air, wide-open space. *Mechanical Engineering,* 123(11), 48-55.

Gransberg, D. D., Villarreal B.M.E. (2002). Construction Project Performance Metrics. .*AACE International Transactions,* CSC.02, 1-5

Gudienė, N., Banaitis, A., & Banaitienė, N. (2013). Evaluation of critical success factors for construction projects -- an empirical study in Lithuania. *International Journal of Strategic Property Management* , 21-31.

Guzzo, R.A., and Dickson, M.W. (1996). Teams in Organizations: Recent Research on Performance and Effectiveness. *Annual Review Psychology*, 308-344.

Hacker, S. K. (2012). How to Coach Individuals, Teams, and Organizations to Master Transformational Change. Vermont: Business Expert Press.

Hackman, J. R. (1990). *Groups that work (and those that don't): creating conditions for effective teamwork*. San Francisco, CA: Jossey-Bass.

Hackman, J.R. (1992). *Group influences on individuals in organizations*. Handbook of industrial and organizational psychology.

Haponava, T., & Saad A.J. (2009). Identifying key performance indicators for use in control of pre-project stage process in construction. *International Journal of Productivity and Performance Management*, 160-73.

Heinmann, G. D., & Antonette M. Z. (2002).Team performance in health care assessment and development. New York: Kluwer.

Hernon, P., & Nancy R. (Eds.). (2007). *Making a Difference: Leadership and Academic Libraries.* USA: Libraries Unlimited.

Hoegl, M., & Parboteeah, K.M. (2003). Goal setting and team performance in innovative projects: on the moderating role of teamwork quality. *Small Group Research*, 34(1), 3-19.

Hoegl, M., and Gemuenden, H.G. (2001). Teamwork quality and the success of innovative projects: a theoretical concept and empirical evidence. *Organizational Science*, 12(4), 435-449.

Hoigaard, R., Safvebom, R., & Tonnessen, F.E. (2006). Perceived Social loafing in soccer team. *Small Group Research*, 37(3), 217-232.

Jackson, S.E., Joshi, A., & Erhardt, J.L. (2003). Recent research on team and organizational diversity: SWOT analysis and implementation. *Journal of Management*, 29(6), 801-830.

Johnson, P.R., Heinmann, V.L., & O'Neill, K. (2000). The wolf pack: team dynamics for the21st century. *Journal of workplace learning: Employee counseling today*, 159- 164.

Juli, T. (2010). Leadership Principles for Project Success. New York: CRC Press.

Katzenbach, J. R. (1993). *The Wisdom of Teams: Creating the High-performance Organization*. New York: McKinsey & Company.

Katzenbach, J.R. (1997). The myth of top management team. *Harvard Business Review*, 83-91.

Katzenbach, J.R., & Smith, D.K. (1993). *The wisdom of teams: creating the high-performance organization.* Boston: Harvard Business School Press.

Keen, T. R. (2003). *Creating Effective and Successful Teams.* USA: Purdue University Press.

Keller, R. (1992). Transformational leadership and the performance of research and development project groups. *Journal of Management*, 18(3), 489-501.

Kerzner, H., & Frank P. S. (2011). *Value Driven Project Management.* New Jersey: John Wiley & Sons.

Kerzner, H., & Saladis, F.P. (2010). *Project Management Workbook and PMP / CAPM Exam Study Guide.* New Jersey: John Wiley & Sons.

Kerzner, H.R. (2013). Project Management: A Systems Approach to Planning, Scheduling, and Controlling. New Jersay: John Wiley & Sons.

Klinger, M., & Susong, M.(Eds.). (2006). *The Construction Project: Phases, People, Terms, Paperwork, Processes.* Chicago: American Bar Association.

Kraut, A.I., & Korman, A.K. (1999). Evolving Practices in Human Resource Management; Responses to a Changing World of Work. San Francisco: Jossey-Bass Publishers.

Larson, C. E., & LaFasto, F. M. (1989). *Teamwork: What Must Go Right/What Can Go Worng* . California: Sage Publications.

Lencioni, P. (2002). *The Five Dysfunction of a Team.* San Fransico: Jossey-Bass.

Levine, J.M. & Moreland, R.L. (1990). Progress in Small Group Research. *Annual Revision Psychology*, 585-634.

Lim, C.S. and Mohammed, Z. (1999), Criteria of project success: an exploratory re-examination. *International Journal of Project Management*, 17(4), 243-248.

Ling, F. Y. Y., Low, S. P., Wang, S. Q. and Lim, H. H. (2009).Key Project Management Practices Affecting Singaporean Firms' Project Performance in China. *International Journal of Project Management*, 27(1), 59–71.

Locke, E.A. & Latham, G.P. (1990). *A theory of goal setting and task performance.* NJ: Prentice- Hall.

Mackin, D. (2007). The Team Building Tool Kit: Tips and Tactics for Effective Workplace Teams. New York: American Management Association.

Margerison, C., & McCann, D. (1992). Measures which help you work together as a team. *Executive Development, 6-9.*

McGrath, J.E. (1964). *Social Psychology: A Brief Introduction.* New York: Holt, Rinehart & Winston.

Molleman, E., Nauta, A., and Jehn, K.A. (2004). Person-job fit applied to teamwork. A multilevel approach. *Small Group Research*, 35(5), 515-539.

Morris, P. (2013). *Reconstructing Project Management.* UK: John Wiley & Sons.

Munro-Faure, L.; Teare, R.; Scheving, E. (1998). *Quality Improvement Teamwork Solutions from the UK and North America. London:* Cassell.

Nahapiet, J. (1983). The management of construction projects. Case studies from the USA and UK, CIOB, Ascot.

Naoum, S.G. (1991). Procurement and project performance. *Occasional Paper No. 45,* The Chartered Institute of Building, Ascot.

Neubert, M.J. (1999). Too much of a good thing or the more the merrier? Exploring the dispersion and gender composition of informal leadership in manufacturing teams. *Small Group Research,* 30(5), 635-646.

Nguyen, L. D., Ogunlana, S. O., & Lan, X.D. T. (2004). A study on project success factors in large construction projects in Vietnam. *Engineering Construction and Architectural Management,* 404-13.

Norris, W.E. (1990). Margin of profit: teamwork. *Journal of Management in Engineering*, 6(1), 20–28.

Odeh, A. M., and Battaineh, H. T. (2002). Causes of construction delay: Traditional contracts. *International Journal of Project Management*, 20(1), 67-73.

Osterloh, M., and Frey, B.S. (2000). Motivation, knowledge transfer, and organization forms. *Organization Science.*

Palmer, M. (2002). How an effective peojct culture can help to achieve business success. *Industrial and Commercial Training* , 101-105.

Parker, G. M.(2008). Team Players and Teamwork: New Strategies for Developing Successful Collaboration. San Francisco: Jossey-Bass.

Pearson, C.A.L. (1987). Participative goal setting as a strategy for improving performance and job satisfaction: A longitudinal evaluation with railway track maintenance gangs. *Human Relations,* 471-488.

Peter, F. (2005).Construction project management: An integrated approach. New York: Routledge.

Pfeiffer, W.J. (1994). *Theories and Models in Applied Behavioral Science.* Pfeiffer and Company Library, Group Member Roles, 109-112.

Pinto, J.K., & Slevin, D.P. (1988). Critical Success factors across the project life cycle. *Project Management Journal,* 19(3), 67-75.

Powell, R. A., & Buede, D. M. (2009). *The Project Manager's Guide to Making Successful Decisions.* Vienna: Management Concepts.

Pratt, D. (2010). Pragmatic Project Management: Five Scalable Steps to Success. Vienna: Management Concepts.

Quick, T. L. (1992). Successful Team Building. New York: American Management Association.

Rad, P.F. & Levin, G. (2003). *Achieving Project Management Success Using Virtual Teams.*USA: J. Ross Publishing.

Rad, P.F., & Anantatmula,V.S. (2010). *Successful Project Management Practices.* UK: Emerald Group Publishing Limited.

Rad, P.F., & Levin, G. (2006). *Metrics for Project Management: Formalized Approaches.*VA: Management Concepts.

Redmill, F. (1997). *Software Projects: Evolutionary vs Big-bang Delivery*. Chichester: Wiley.

Ross, T. M., Jones, E. C., & Adams, S.G. (2008). Can team effectiveness be predicted?. *Team Performance Management*, 248-68.

Rwelamila, P.D., & Hall, K.A. (1995). Total systems intervention: an integrated approach to time, cost and quality management. *Construction Management and Economics*, 235-241.

Salton, G.J. (2000). Getting a grip on group behavior. *Industrial Management*, 26-33.

Samson, D., and Daft, R.L. (2003). Management. Australia: Nelson.

Sanvido, V., Grobler, F., Pariff, K., Guvents, M., and Coyle, M. (1992). Critical success factors for construction projects. *Journal of Construction Engineering and Management*,118(1), 94 –111.

Sarker, S., and Sahay, S. (2002). Understanding virtual team development: An interpretive study. *Journal of the Association for Information Systems*, 3(3), 247–285.

Sashkin, M. G., & Sashkin, M. G. (1994). *The New Teamwork: Developing and Using Cross Functional Teams.* New York: American Management Association.

Scarnati, J.T. (2001). On becoming a team player. *Team Performance Management: An International Journal*, 5-10.

Scholtes, P. R., Joiner, B.L., & Streibel B. J. (2003). *The Team Handbook.* Madison: Oriel Incorporated.

Senge, P.M. (1992). The Fifth Discipline: The Art & Practice of the Learning Organization. New South Wales: Random House.

Shen, L.Y. and Tam, W.Y. (2002) Implementation of environmental management in the Hong Kong construction industry. *International Journal of Project Management*, 20(7), 535–543.

Shen, L.Y., Bao, Q. and Yip, S.L. (2000). Implementing innovative functions in construction project management towards the mission of sustainable environment. *Proceedings of the Millennium Conference on Construction Project Management—Recent Developments and the Way Forward*, Hong Kong, 24 October, 77–84.

Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. (2001). Project success: A multidimensional strategic concept. *Long Range Planning*, 34(2), 699-725.

Shenhar, A.J., Tishler, A., Dvir, D., Lipovetsky, S. and Lechler, T. (2002). Refining the search for project success factors: a multivariate typological approach. *R&D Management*, 32(2), 111-126.

Simon, L.C. (2001). *Study of the performance of student teams in engineering education*. unpublished master's thesis, University of Nebraska, Lincoln, NB.

Smith, J., and Wyatt, R. (1998). Criteria for strategic decision making at the pre-briefing stage. In Hughes, W. (Ed.). *Association of Research in Construction Management (ARCOM), Proc. of 14th Annual Conference., 9-11 September Reading University, UK, 300-309.*

Soetanto, R., Proverbs, D.G. and Holt, G.D. (2001). Achieving quality construction projects based on harmonious working relationships—clients' and architects' perceptions of contractor performance. *International Journal of Quality & Reliability Management*, 18(5), 528–548.

Spatz, D. M. (2000). Team-Building in Construction. *Practice Periodical on Structural Design and Construction*, 93-105.

Stevens, M.J., & Campion, M.A. (1994). The knowledge, skills ability requirement for teamwork: implications for Human Resource Management. *Journal of Management*, 20(2), 503-530.

Swan, W., and Khalfan, M.A. (2007). Mutual objectives setting for partnering projects in the public sector. *Engineering, Construction and Architectural Management*, 14(2), 119–30.

Tam, V., Bao, Q. and Wu, D. (2001). Experience gained in implementing ISO 14000 in Hong Kong construction industry. *Proceedings of 2001 CRIOCM International Research Symposium on Development of Construction Management*, Shenzhen, China, 17–18 November, 99–113.

Thomas, R., Marosszeky, M., Karim, K., Davis, S. and McGeorge, D. (2002). The importance of project cultures in achieving quality outcomes in construction. Proceedings of the 10th Conference of the International Group for Lean Construction, Federal University of Rio Grande do Sul, Brazil, August.

Thomsett, R. (2002). *Radical Project Management.* NJ: Prentice Hall.

Tuckman, B. W. (1965). Developmental sequences in small groups. *Psychological Bulletin*, 384-399.

Tukel, O.I., and Rom, W.O. (2001). An empirical investigation of project evaluationcriteria. *International Journal of Operations and Production Management, 21(3), 400-416.*

Verzuh, E. (Ed.). (2003). *The Portable MBA in Project Management.* New Jersey: John Wiley & Sons.

Wa'el, A., Mohd, R.A., Kadir, A.S. and Ernawati, D. (2007). The significant factors causing delay of building construction projects in Malaysia. *Engineering, Construction and Architectural Management*, 14(2), 192-206.

Walker, D.H.T. (1996). The contribution of the construction management team to good construction time performance – an Australian experience. *Journal of Construction Procurement*, 2(2), 4-18.

Wellington, P. (2012). *Managing Successful Teams*. London: Kogan Page.

Wellins, R. S., Byham, W. C., & Wilson, J. M. (1993). Empowered Teams: Creating Self-Directed Work Groups That Improve Quality, Productivity, and Participation. San Franccisco: Jossey-Bass.

West, M. A. (2012). Effective Teamwork: Practical Lessons from Organizational Research. West Sussex: BPS Blackwell.

Westland, J. (2006). The Project Management Life Cycle: A complete step-by-step methodology for initiating, planning, executing & closing a project successfully. London: Kogan Page Limited.

Williams, J. (2002). Team Development for High0tech Project Managers. Artech House.

Winch, G. (2010). *Managing Construction Projects*. Blackwell Publishing Ltd.

Wong, W.S. and Chan, E.H.W. (2000). *Building Hong Kong: Environmental Considerations. Hong Kong:* The Hong Kong University Press.

Yang, L.H., & Tang, J.H. (2004). Team structure and team performance in IS development: a social network perspective. *Information and Management*, 41, 335-349.

Yao, H., Ou, X. and Shen, L.Y. (2006). Review on environmental management performance in construction business, in Shen, L.Y. (ed.) *Key Issues of Sustainable*

Performance for Construction Projects, SDP Research Group, Department of Building & Real Estate, The Hong Kong Polytechnic University, Hong Kong, pp. 55–72.

VITAE

- Name: Hafiz Muhammad Adil Hafeez Mughal
- Nationality: Pakistan
- Date of Birth: Oct. 7 1982
- Email: engr.hafizadil@gmail.com
- Education: Master of Science in Construction Engineering and Management (2013-KFUPM), Bachelor of Science in Industrial and Systems Engineering (2008 - KFUPM)
- Present Address: King Fahd University of Petroleum and Minerals, P.O Box 1936, Dhahran 31261, Saudi Arabia