

FACTORS CAN LEAD TO CREATING EFFECTIVE CONSTRUCTION PROJECT TEAMS

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Abstract: The success or otherwise of a construction project is a function of the team saddled with the responsibility of achieving such project and this is subject to the effectiveness or dysfunction of such team. The aim of this research is to assess the factors responsible for effective and ineffective team in the construction industry and its effect on cost and time performance of construction projects. Data for the study were obtained through well-structured questionnaires administered to professionals in the construction industry. The results indicate that trust and avoidance of accountability are the major factors responsible for effective and ineffective team in the construction industry. For effective and ineffective team, healthy conflict and fear of conflict among team members are the determinants of the time performance of construction works and the cost performance of construction work is determined mainly by accountability and avoidance of accountability in effective and ineffective teams respectively. Finally, the study recommends that healthy conflict and accountability should be imbibed by the construction team members so as to ensure successful project delivery.

Keywords: Construction Industry, Projects, Teams, Project leaders, Team Effectiveness etc.

1. INTRODUCTION

An evolution of teamwork and its concept started during the Industrial revolution, where most work organizations shifted to the hierarchical approach and used scientific management to design organizations and jobs. Scientific management methods call for optimizing the way tasks were performed by simplifying the jobs, so workers could be trained to perform Their specialized sequence of motions in the "best" way. This resulted in more simplified jobs and provided benefits to skilled workers. However, during the 1920s and 1930s, the scientific Management model was questioned, since it created issues with people's relationships to work, although the model functioned well. Workers became alienated and difficult to motivate. In Addition to no task flexibility, changes were difficult to implement Teamwork occurs where group of people works towards a common goal in an organized and Coordinated way and it require flexibility of Behavior in such a way that if one team members unable to do a task, it is passed on to another member who is free and capable of doing it, so that the work of the group can progress.

The process of execution of construction projects at any point Requires teamwork due to the nature of task involved and in particular, the fragmented nature of the industry as being responsible for the poor performance of the industry. Recent developments in teamwork and teams in organizations have heightened the need to determine better ways to utilize teams, especially in the construction sector. Teamwork is a characteristic of the construction industry where construction projects are delivered by various professionals as a team. These professionals include architects, contractors, material suppliers, specialists, and others like government planners and engineers.

2. SCOPE OF THE STUDY

This study is most helpful for project managers and team leaders in construction organizations to adjust their focus on key factors of effective teamwork that lead to increase the possibilities of project success. It is predicted this study will assist project managers and construction team leaders in understanding what factors contribute to create an effective project team.

Also, it is most helpful for construction project leaders and construction companies' top management to develop highly effective project teams through identified factors that contribute towards a construction project's success, by means of conducting a series of evaluations and assessments using the new team effectiveness assessment tool. This study also seeks to provide an understanding of what team effectiveness means to people in the construction business.

3. OBJECTIVES OF THE STUDY

The objectives of the study are as follows:-

- To study the teams effectiveness in construction Project.
- To identify the factor responsible for team effectiveness in construction Project.
- To examine the various team effectiveness models

4. LITERATURE REVIEW

The concept of team and teamwork has currently become a concern for management in all types of industries, including construction. Teamwork in construction and project management is nothing new (Albanese and Haggard 1993). Throughout history, people have worked together and collaborated as big groups on construction projects. Some of the earliest examples known to mankind are megaliths and the construction of the pyramids. During this particular time, teams, tasks, and individuals, some committed, some coerced, under leadership of one sort or another but mostly 'dictatorial', started to emerge very early in the evolution of civilized man in the context of the construction process (Cornick and Mather 1999).

However, teams developed during that era are small-scale teams. The Industrial Revolution in the 1700s saw changes in organizational structures and business models, which leads toward the beginning of scientific management. In the 1960s, organizations created functional teams, but the teams were still fragmented. After World War II, Japanese companies enhanced the team ethic, by making every worker, in every function, at every level, a part of the organization team. Many organizations experienced change by moving towards self-directed teams and team-based management processes starting in the 1980s. Later during this era, reengineering was prominent and led to something called a high performing organization. Both incorporated teams as part of their core approach. By the 1990s, organizations across the world, particularly in the United States, saw the team model replace the old organization structure.

4.1. Overview of Team

The team is a word and concept well-known to everyone. Each person has his/her own definition of what a team means. Therefore, it is imperative to clarify what team means since it conveys different things to different people. Some people think any group working together can be called a team; some even think it is associated with sports; whereas, others perceive team as in its values, such as cooperating and helping each other. Regardless of what people perceive of teams, it exceeds individuals acting alone or in large organizational groupings, especially when performance requires numerous skills, judgments, and experiences. A team can be defined as:

“A small number of people with complementary skills, who are committed to a Common purpose, performance goals, and approach for which they hold themselves mutually accountable.”

4.2. Construction Project Teams

The construction industry is a project-based industry. Each project needs different people in accordance with their professionalism, knowledge, and experience, and requires them to work and coordinate with others from different companies. The construction industry has always dealt with the relationship between team, task, individual, and leadership. It is sufficient to say that teamwork is dominant in construction's cultural tradition and at the foundation of successful construction projects.

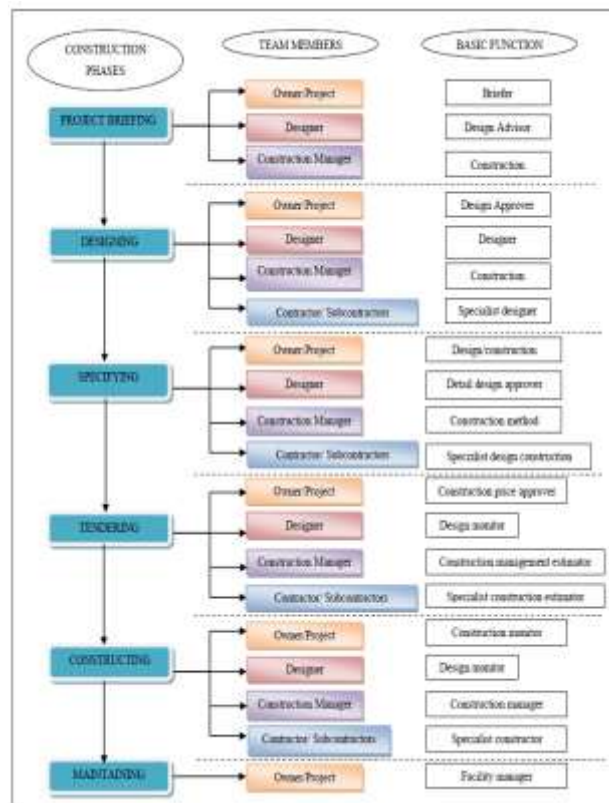
The participants of a typical construction project team as the following:[8]

- Client
- Project Manager
- Financier
- Legal Consultant
- Design Leader (Architect or Structural Engineer)
- Other Design Consultants
- Main Contractor
- Subcontractors
- Cost Consultant
- Other Consultants (depending on project needs)
- An end user of the completed project (where appropriate)

5. EFFECTIVE TEAMS IN CONSTRUCTION PROJECTS

It is significant to observe how the construction project team is setup and the characteristics it possesses. By nature, it is the most fluid in terms of people, where team members seldom train together, have unclear 'leadership', and come and go on a project-by-project basis. Therefore, it is sufficient to mention the construction project team has unique characteristics compared to other ordinary teams in various industries. Cornick and Mather listed how the construction project team differs from an ordinary team:

- Each team member has his/her own objectives and may or may not be the same as the project team's objectives unless shared goals are agreed and accepted.
- The team leader of a construction project team is unnoticed since the team leader may vary over the life of the project.
- The project manager does not play a part in the design or construction process. However, project manager understands both and supervises the overall project process from the beginning to the end.
- Construction project team usually trains together for a specific project due to the time, cost, and convention constraints. Team members will only understand and plan how their individual contributions can come together as a whole team effort in a very ad hoc manner as the project progresses.



6. METHODS OF DATA COLLECTION AND EVOLUTION

The project is said to be successful when it is completed in desired time and cost. Construction delays are common problems and occur frequently during the lifetime of the projects. Therefore understanding the concepts of Team effectiveness in construction projects and their impact on the project, a field study of construction projects is done in this study. Questionnaire survey method is used for collection data from two different construction sites.

Instead of literature review, interviews with practical site personals or management team such as project manager, site engineers, contractors, consultant etc having a different position in a construction project is done to get the practical information about the construction site. A series of question-related to construction Effective teams were set for conducting a survey to obtain feedback and response from the construction project. Then analysis of the collected data is done for each company and effect of Teams is found out.

6.1 Team Effectiveness Models

Several studies identified sets of variables or constructs used to determine team effectiveness. Therefore, it is relevant for this study to examine various team effectiveness models to determine team effectiveness factors that can be use to develop assessment tools for this study. Normative models of team effectiveness emerged in the late 1980s and Emphasized points of leverage that practitioners and researchers could employ to influence [9] team effectiveness. According to, input-process-output (IPO) theory was fundamental in the early development of team effectiveness models. IPO theory predicts input factors, such as team and individual characteristics, function through mediators or moderators to influence outputs, such as team satisfaction and performance (Salas et al. 2009). This section describes several important team effectiveness models in chronological order. They are listed below

- Driskell model
- Salas Model
- Tannenbaum model
- Canon-Bowers model
- Klimoski and Jones model
- Raskar model
- Blended model

6.1.1. Driskell Model

The team effectiveness model developed by Driskell depicts the IPO framework. On the input factors side, there are three levels of factors—namely Individual level factors, group level factors, and environmental level factors. All three Input Factors are considered as potential to the team's productivity, but do not guarantee team effectiveness.

Driskell et al. Team Performance Model

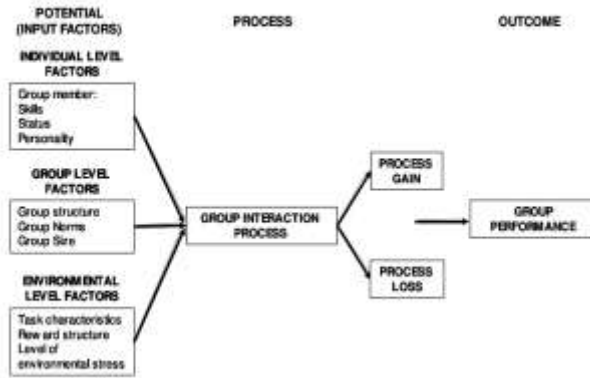


Fig. 6.1.1 Team effectiveness model by Driskell

6.1.1. Salas Model

The team effectiveness model by Salas in Figure 1.2 suggests organizational Context and team design affect the team’s communication process, which, in the end, affects the quality of the team’s performance. Team synergy helps develop the process criteria of effectiveness, namely through interactions among team members, knowledge, and skills the team members apply to task work and the strategies used for task performance.

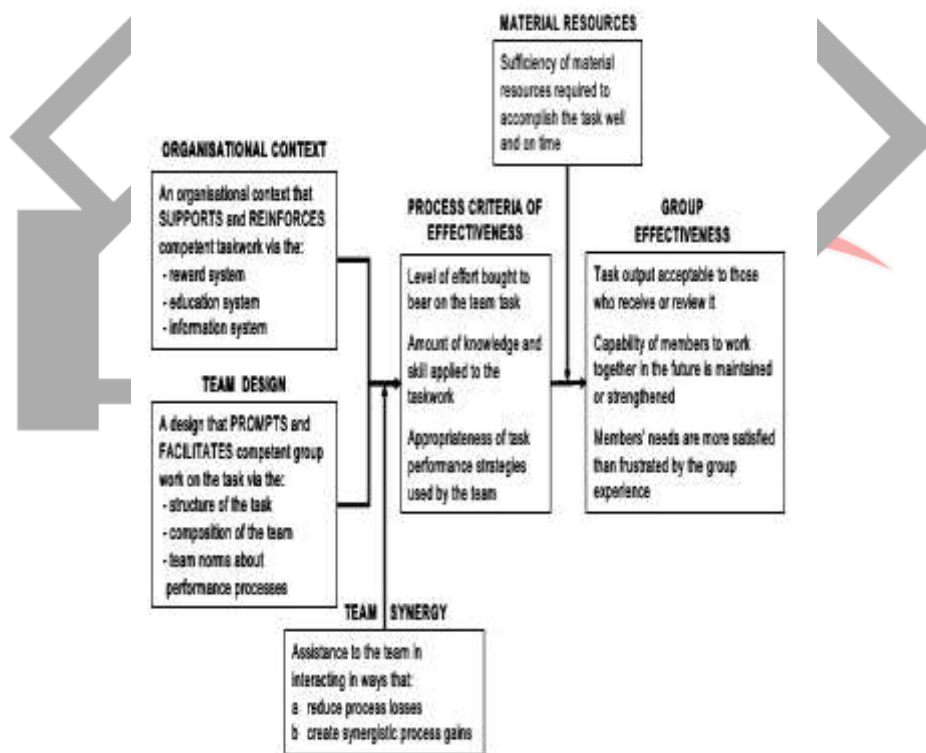


Fig 6.1.2. Team effectiveness model by Salas

6.1.3. Tannenbaum Model

The team effectiveness model by Tannenbaum adopts the IPO Structure, while acknowledging the significance of the organizational and situational context throughout the entire process, as well as incorporating feedback loops. The input consists of four variables—task characteristics, work structure, individual characteristics, and team Characteristics. According to Gladstein and Tannenbaum a team that performs better has better individual task proficiency, abilities, and skills. This process Incorporates both team interventions and input variables—the end influence is the overall Team’s performance. Changes within the team and individual changes will occur as a result of the team’s processes. Once the team’s performance is assessed, it will serve as feedback on Team

members' characteristics, work structure, or other team inputs and processes. Besides, an ongoing evaluation of team performance may affect team processes and team Performance.

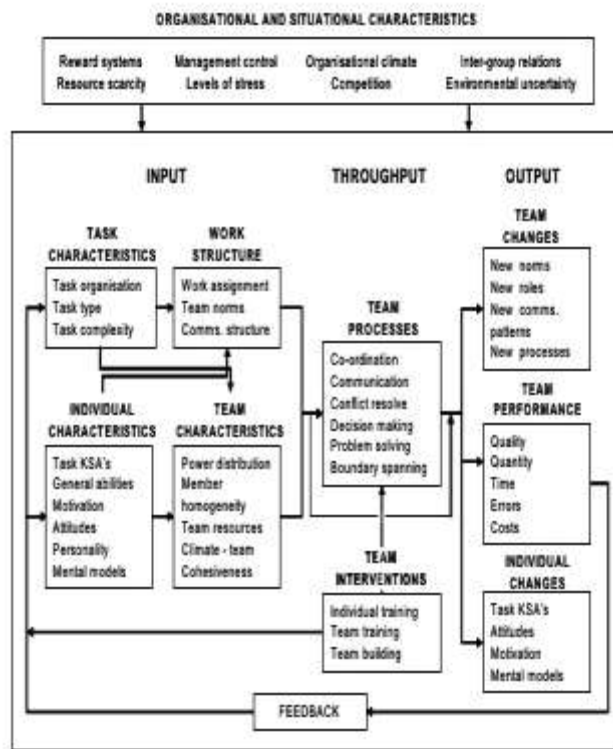


Fig.6.1.3. Model of team effectiveness from Tannenbaum

7. DATA COLLECTION AND EVALUATION

It contains following steps:

1. Development of questionnaire to get information about the delays in construction site.
 2. Conducting questionnaire survey through personal interviewers on site.
 3. Analyzing of feedback from questionnaire survey of each site to identify the critical delays and there serious effect on construction projects.
- Data is collected from following two live construction project.

SITE DETAILS	PROJECT I	PROJECT II
Project Name and address	Sales tax Administrative Building, Yerwada, Pune.411006	Construction of Hostel Building for 1000 students at Survey No. 104-105 Yerwada, Pune – 411006
Name of the Client	MSRDC, Pune	Public Works (Buildings) Division, Pune -3
Building Type	Administrative	Hostel
Number Of Floors	Two Basements with (G+ 4)	G+5
Construction start Date	19th October, 2017	6th January 2017
Date Of Completion	18 th April, 2019	5 th January 2019
Estimated Duration	18 Months	24 Months
Estimated Cost	205000000	223500000

Table 7.1 Details of Project

The team effectiveness is divided into six categories -

1. Team goals and objectives,
2. Team leadership,
3. Roles and responsibility,
4. Trust and values within the project team,
5. Team relationship,
6. Communications.

Table 7.2 Representation of independent variables used in Team Effectiveness Survey

Sr. No	Variable name	Measurement in survey	Conceptual definition	Characteristics
1	Team leadership (TLEAD)	Overall team Leadership and Welfare	The degree and type of Inter-dependence in work Groups includes the differentiation of roles, the distribution of skills and resources and the Manner in which goals are defined and achieved, and the Manner in which Performance is rewarded and feedback is given.	Shared Leadership, Decision making Process, work Performance and Effort to Improve
2	Team Relationship (TREL)	Relationships Among team Members	A dynamic process Which is reflected in the Tendency for a group to Stick together and remain united in the pursuit of Goals and objectives. It Can be described based on team type, structure, affinity and bonds, as Well as how well the Team manages conflict.	Conflict management, team unity, team welfare

3	Trust Values and (TV)	Trust values and Placed within Teams	Trust is depicted as a Psychological state, Involving expectations and feelings that lead to judgments about the trustworthiness of others and as either rational or relational choice behavior that puts these expectations and feelings into observable action. Team values developed will help to shape the overall culture of a team.	Treatment and respect among team members, trust issues within teams
4	Team Communication (COMM)	Team Communication Processes	Sharing of information between two or more individuals or groups to reach a common Understanding. It is important that the information or ideas conveyed must be understood.	Communication in and out of meetings, honesty and level of interaction among team Members.
5	Team Goal and Objectives (TGO)	Goals and Objectives of the Team and the Entire project	The degree and type of interdependence in work groups stems from several sources including the differentiation of roles, the distribution of skills and resources, and the manner in which goals are defined and achieved.	Level of achievement for project goals, team commitment and understanding of the project goal's and Objectives.

6	Team Roles and Responsibility (TRR)	The roles and responsibilities outlined by the team for each members		Helping each other can carry fair share of work, helping team members on performing task, understanding the rights and responsibility as a team
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7.1 Relative Index analysis (RI)

In average index analysis, the result will be further summarized to obtain the overall level of importance and evaluation of construction Projects. Respondent is requested to rate each factors on five point scale 1 to 5. The relative index analysis for each variable is calculated by using:

$$\text{Relative Index} = \frac{\sum 1X1+2X2+3X3+4X4+5X5}{5 \sum X1+X2+X3+X4+X5}$$

Where, X1 = number of respondent for not important,
 X2 = number of respondent for less important,
 X3 = number of respondent for average,
 X4 = number of respondent for important,
 X5 = number of respondent for very important.

8 DISCUSSIONS

The main purpose of this study is to present factors responsible for team effectiveness of construction project and that leads to project performance.

1. The team effectiveness factors obtained from the two case studies and literature reviews are Team Goals and Objectives, Team Leadership, Team Relationship, Team Roles and Responsibilities, Team Communication, and Trust and Values. These factors are utilized to develop a Team Effectiveness Survey geared towards team members in a construction Project.
2. For Project-I, the respondents are clearly agree on the Project leadership within Project Teams also have an impact on the team performance. So there is should take care if this factor. Here they should maintain the relationship between the team member and develop communication to avoid misunderstandings.
3. Similarly for Project-II, the respondents are clearly agree on the Trust & values within the Project teams also have impact on team performance. Here for they should increase their communication.

CONCLUSIONS

From the above study we can present the conclusions developed from the research of team effectiveness factors.

1. Firstly, it is important for team members to be committed to achieve the project goals. They should understand clearly the project’s goals, and ensure these goals and values of the team are aligned and consistent. The project delivery depends on

team goals and objectives in construction team members. Project team's communication has the greatest variation between the project teams

2. Team Leadership is determined the most significant predictor in Project Change Management. Team Leadership is determined the most significant predictor in Project Change Management. Team leaders should promote shared leadership throughout the project and consult team members on matters concerning them.
3. Prior to the construction process, roles and responsibilities for each team member must be clarified to ensure no confusion arises.

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