Role of Project Manager from the Client's Side on the Performance of a Construction Project

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Abstract—: In the developing Country like India there are various small construction companies involved in building and real estate sector. In such company project management team plays a very important role in success of the project from Preformulation to the completion stage of the project. Such project management team mainly consists of project manager and project engineer or supervisor. As the project manager is the leader of this team, it is required by him to acquire all the skills required for the better performance of his role. In the present work, the correlation coefficient between delay in the work, project manager and contractor is determined. On the basis of value of the coefficient of correlation, required project manager skills and classification of skills are stated.

Index Terms— Coefficient, competency, Correlation, Project lifecycle.

I. INTRODUCTION

In India, many small construction industries are involved in building construction and real estate business. Such companies are having their small organization structure, in which project manager/ coordinator is a key person. He deals with the different internal and external departments of the company. Project manager team mainly consist of project engineer, supervisor. Project engineer follows all the direction given by project manager. As project manager manages the activities of the organization, in the success of business there is important role of project manager. In the present work, the correlation coefficient between delay in the work, project manager and contractor is determined. On the basis of value of coefficient of correlation, required project manager skills and classification of skills is stated.

II. CONSTRUCTION PHASES

A construction project begins with an idea, a perceived need, a desire to improve or add to productive capacity or the wish for more efficient provision of some public service. Whether the idea will be converted into a completed project will be decided during the planning and design phase.

Preformulation phase

Preformulation phase is a conceptual stage of project. It mainly consists of developing ideas and analyzing them by conducting feasibility studies.

Formulation phase

Formulation phase is related with analysis of feasibility report. It consists of gathering past experience from different persons and align the project as per requirement.

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Development phase

It deals with development of project by completing all formalities like preparation drawing, estimation and finance, scheduling, tendering and awarding contract, sanctioning from authorities, so that project is formally ready for execution.

Execution phase

Execution phase deals with execution of construction work, planning and scheduling, drawing and design by using different materials, equipment and labors by contractor.

Completion phase

Completion phase deals with handover of project from contractor to client by giving final payment to contractor as per contract.

Operation and Maintenance phase

This phase is the real test of performance based on the above phases.

III. CORRELATION COEFFICIENT

Correlation is a statistical technique that can show whether and how strongly pairs of variables are related. The main result of a correlation is called the correlation coefficient (or "r"). It ranges from -1.0 to +1.0. The closer r is to +1 or -1, the more closely the two variables are related. If r is close to 0, it means there is no relationship between the variables. If r is positive, it means that as one variable gets larger the other gets larger. If r is negative it means that as one gets larger, the other gets smaller (often called an "inverse" correlation).

1. Partial coefficients

If Y is affected by X1 and X2 simultaneously, then effect of only X1 on Y by keeping X2 constant and vice versa. The obtained value is a partial coefficient.

2. Multiple coefficients

If Y is affected by X1 and X2 simultaneously, then coefficient is established between Y and X1 & X2. The obtained value is a multiple coefficient.

IV. PROJECT MANAGER

The "ideal" project manager resembles a single person wearing multiple hats. He alone fills the role of the "missing" composite person with required managerial and technical skills in various disciplines and is linked to the role played by the "Orchestra Conductor". One must not only be able to guide, inspire, harmonize, co-ordinate and synchronize the entire team of musicians but at the same time also needs to know how each musician plays his music,

as expressed by Andrew A.L. Tan (1996)

Robbin (2001) stated that a Project manager needs to be a leader, as he must cope with change where they set the vision, the goal. How do we know who the leaders are? According to him, leaders are noticed by the way they participate in groups and usually challenge the way things are done or look for ways to achieve excellence. Leaders influence others and motivate people to achieve something beyond their expectations.

The leader should guide the team members by identifing their roles and responsibilties for the project. In addition , he should inspire the team members to sucessfully complete the project task in the interest of the project. The project manager is the catalyst , the initiator who lifts the entire project and puts it into motion

Project manager skills

Katz and Thamhain in 1983 (cited in Kerzner ~1989) listed ten specific essential skills for program managers: team building skill; leadership skill; conflict resolution skill; technical skill; planning skill; organization skill; entrepreneur skill; administrative skill; managerial support building skill; and allocation skill.

These skills may be described as follows.

1. Team building skills: The ability to integrate people from many disciplines into an effective team,
2. Leadership skill: The program manager's ability to lead the team within a relatively unstructured environment; the ability to integrate individual demands, requirements, and limitations into decisions that will affect overall project performance,
3. Conflict resolution skills: The program manager's ability to understand the determinants of conflicts and to deal with it effectively,
4. Technical skills: The capacity to manage the technological innovation and integration of solutions for the success of the project,
5. Planning skills: This involves the preparation of a project summary plan before the project starts and requires communication and information pressing skills.
6. Organizational skills: The program manager must understand how the organization works and how to work with the organization. It requires defining and reporting relationships, responsibilities, lines of control, and information needs,
7. Entrepreneurial skill: This is the program manager's ability to identify and pursue some important goals that are critical to the success of the program. Some of these goals are customer satisfaction, future growth, and cultivation of related market activities,
8. Administrative skills: Involve planning, staffing, budgeting, scheduling, and other control techniques,
9. Management support building skill: The program manager's ability to build favorable relationships with senior management, and
10. Resource allocation skill: The program manager needs to work out specific agreements with all key contributors and their superiors on the tasks to be performed and the associated budgets and schedules.

V. RELATED WORK

National skill development council has done their study on mapping of human resource skill gaps in India till 2022, NSDC report (2010). In this report they have given overall scenario of construction industry in India, various skill required, skill gaps present in the various human resources. This report serves as a guideline for designing of training and development programmes for HR development in construction industry.

Eddie W. L. Cheng and Heng Li (2006) have done their research on improving and sustaining job performance. It involves well planned employee evaluation criteria to assess employee performance. It is suggested that construction companies should pay more attention to the importance of job performance evaluation, which can be done in a more thoughtful manner.

Sadi A. Assaf[1], et. all (1995): They have done a survey of contractor, owner, and A/Es on the causes of delay factors in large building projects in Saudi Arabia. The survey showed that all three groups generally agree on the ranking of individual delay factors. The most important delay factors according to contractors were preparation of drawings, and design changes by owners. The most important delay according to A/Es were cash problems during construction, the relation between different subcontractor's schedules in the execution of the project and slowness of the owner's decision –making process. The most important delay factors according to owner were excessive bureaucracy in project owner organization, labor shortage and inadequate labor skill.

VI. DATA COLLECTION AND ANALYSIS

For the present study, data is collected in the following way.

1. Skill requirements and skill gaps in the Indian construction sector by National Skill Development Council, India.
2. Data related to the human resources and their relation with delay of project is collected from major construction Projects situated in the Pune city.

A. Correlation Coefficient

In the present work independent correlation between project delay and project manager, delay and contractor & project manager and contractor is calculated in the following way.

Total hundred points are distributed to the project manager and contractor as per their responsibility for delay in project. More points indicate larger responsibility of the particular person in causing the delay.

Point distribution is given in theTable1 which is as follow:

Table1- Point distribution between project manager and contractor

Reason for delay	Delay in days(X)	Points awarded to	
		Project manager (Y1)	Contractor (Y2)
Planning	80	100	0
Change in design	60	90	10
Getting approval	60	90	10
Lack of manpower during excavation	40	50	50
Unavailability of equipments	15	40	60
Monotony in the work	35	50	50
No full time supervision	20	50	50
Redesign of water tank	25	80	10
Shortage of portable water	20	75	25
Unskilled labor during water proofing	4	30	70
Irregular payment of worker	10	50	50
Strike of labor for cleanliness	3	60	40
Shifting of steel yard	3	50	50
Total	375	815	475

From the above table, it is observed that more points are awarded to project manager of client side than the contractor. Maximum delay is occurred during initial stage of the construction project (200 days), which consists of planning, change in design, getting approval from different agencies. Planning stage activities are depends on client or project manager from client side. Decision of design change for increasing floor area is taken by client, so for the delay project manager from client side is responsible. Getting approval from the different agencies is the responsibility of client, so the more points are awarded to project manager. The remaining delay (175 days) is occurred during construction phase. As a project manager from client side to make control on construction activities by, regular monitoring, taking decision with contractor, checking daily/ quarterly reports. Thus, there is measurable responsibility of project manager in that phase also. So the total points awarded to project manager from client side is more (815) than contractor side (475).

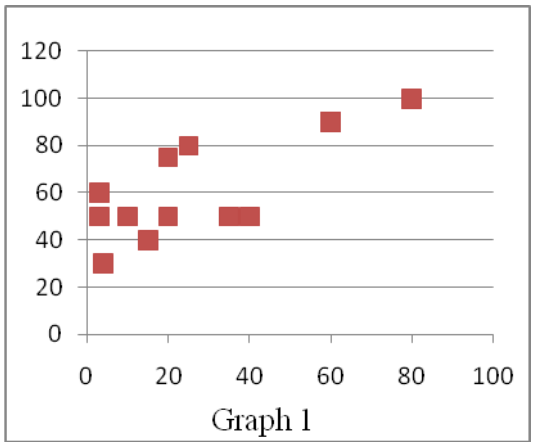
1. Based on the above data, values of the correlation coefficient are determined as follow:
2. Independent correlation between delay and points awarded to project manager = 0.8
3. Independent correlation between delay and points awarded to contractor = - 0.75
4. Independent correlation between points awarded to project manager and points awarded to contractor = 0.99

Graphical representation of correlation coefficient is given in the following way.

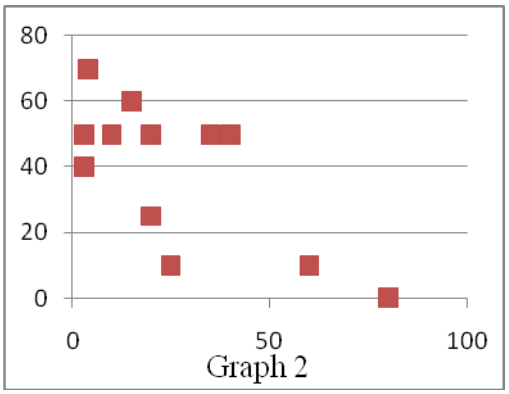
Graph1- shows relation between project manager responsibility and delay in work (X and Y1)

Graph2- shows relation between contractor responsibility and delay in work (X and Y2)

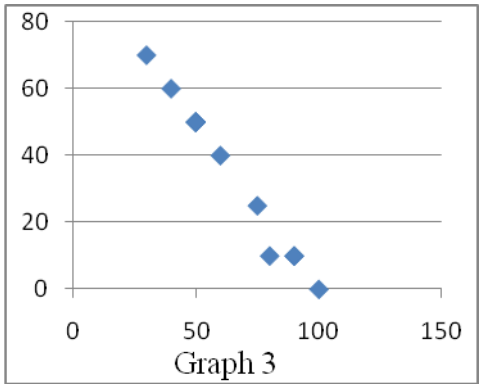
Graph1- shows relation between project manager and contractor (Y1 and Y2)



Graph1- shows relation between project manager responsibility and delay in work (X and Y1



Graph2- shows relation between contractor responsibility and delay in work (X and Y2)



Graph1- shows relation between project manager and contractor (Y1 and Y2)

The positive value of correlation coefficient between delay and points awarded to project manager from client side (0.8) indicates that project manager from the client side is the most significant cause for the delay as compared to the contractor's responsibility.

B. **Classification of competencies required by project manager:**

In order to avoid delay's the project manager from the client side should be a very competent person; hence these competencies are classified below.

The classification of project manager competencies into following categories is suggested:

1. Management skill
2. Technical skill
3. Interpersonal skill
4. Human skill

The further classification is given in Table 2

Table2- Classification of Project management skills

Management skill	Time management
	Quality management
	Contract management
	Inventory management
	Resource management
	Safety management
	Finance management
	Stress management
Technical skill	Awareness of technology and techniques
	Ability to understand technical drawing and project design
	Basic knowledge of construction equipments
	Basic computer skill
	Advance knowledge of PM tools like PERT, CPM
Internal personal skill	Issue resolution
	Ability to maintain site document
	Strong networking and liasoning skill
	Ability to articulate project objectives to team members, coordinators and motivate the site team
	Communication skill
	Self realization
	Equity
Human skill	Strong task orientation
	Issue resolution
	High integrity
	High energy level
	Knowledge of local language
	Adaptability (sacrifice)
	Tranquility (general moods)

VII. CONCLUSION

The positive value of correlation coefficient between delay and points awarded to project manager from client side (0.8) indicates that project manager from the client side is the most significant cause for the delay as compared to the contractor's responsibility. So it is required by him to develop and update his knowledge for the better performance.

Classification of project manager competencies gives guideline to project manager for upgrading his knowledge and performance.

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