

EVALUATION & MITIGATION OF FACTORS AFFECTING DIFFERENT MANAGEMENT PHASES IN RESIDENTIAL PROJECTS

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Abstract: With increasing demand for public housing Indian government decided to reduce the waiting time of future public housing owners, which requires these projects to be completed on time. A project can be said successful only when it is completed within the scheduled time and cost. In India, construction industry stands next to agriculture in the economic activity. Any problem in the economy of the construction industry would directly affect the country's economy. This study aims to identify the factors affecting project management phases. In order to eliminate this decline in countries economy, the factors influencing the construction industries decline is been studies. Five major groups of independent variables, namely project-related factors, project procedures, project management actions, human related factors, and external environment are identified as crucial to project phases. This study is also helpful to the different stakeholders like contractors, site engineers, owners etc.

Keywords: Buildings, Economy, Project management phases, Public housing

INTRODUCTION

In India, construction industry is the second largest employer in the country after agriculture. Infrastructure, especially construction, is vital for the growth of Indian economy and government also recognizes its importance. This is seen in the launch of mega and major projects by government departments to cover the historical gap between what is available and what is required. Over the next decade, India will continue to be among the fastest-growing countries in terms of construction output. Large infrastructure investments and growing urbanization will fuel this growth. Due to globalization, increasing competition and awareness of clients, there is a requirement to deliver projects successfully and build up organizations. This requires adoption of Project Management methodologies at the industry level.

Definition : Management is the science and art of planning, organizing, leading and controlling the work of organization members and of using all available organization resources to reach stated organizational goals.

Construction project management deals with economical consumption of the resources available in the least possible time for successful completion of construction project.

‘Men’, ‘materials’, ‘machinery’ and ‘money’ are termed as resources in construction Management.

Planning, scheduling is an important part of the construction project management. Planning and scheduling of construction activities helps engineers to complete the project in time and within the budget.

NEED OF THE STUDY

The study intends to analyze and promote a better understanding and recognition of the complexities of the performance of contractors as well as project managers in completing projects. This study will offer some practical ideas, based on actual construction experience, to assist project managers and contractors in developing realistic construction planning, schedules and controlling the work. It is intended to make the reader aware of certain aspects that frequently seem to be ignored and to alert owners to potential problems as well as possible courses of action to avert problems. The points outlined in the study will also assist owners in evaluating the qualifications of potential contractors who may propose on residential building development projects.

Objectives :

To achieve the aim, the main objectives of this study are outlined as follows:

- To identify factors that affects directly on the different management phases.
- To give ranking to the factors and identify most crucial factors amongst all factors which will be affecting.

Phases of Construction Project Management :

The phases of construction project management are: Planning, Scheduling, Organizing, Staffing, Directing, Controlling.

List of factors:

NO.		Factors	Description
A		Factors related to planning phase	
1	Man	Lack of knowledge	Have a lack of ideas and information about field.
2		Inexperience of planner	Not enough experience about the field.
3		Inappropriate planning	The planning is inappropriate in the sense the not applicable on site.
4		Lack of awareness	Lack of awareness about past, presence and future.
5		Inadequate follow-up	Follow up is not done when needed.
6	Project condition	Territory of the area	Different territory has different planning.
7		Weather condition of site	If weather differs then planning will differs.
8		Natural calamities	Natural problems affects the planning.
9	Design	Complex planning	Planning is complex enough to do the work.

B		Factors related to scheduling phase	
10	Man	Poor site management	Management is improper.
11		Coordination among parties	Improper coordination between the vendors and purchasers.
12		Preparation of schedule plan and updates	Scheduling is not well prepared and updating is not done timely.
13		Experience of contractors	Contractor's experience is less.
14		Frequent change orders	Work procedure has been changed frequently.
15		Considerable extra work	Extra works given to the workers.
16		Increase in scope of work	Whether work is more or less.
17		Labour shortage	Availability of labours.
18		Poor supervision	Supervision is inadequate.
19		Inaccuracy of material estimate	Deficiency in estimation of material.
20		Poor labour productivity	Labour productivity is low.
21		Lack of personnel training & management support	Insufficient training of labours and lack of support from management.
22		Planning and scheduling deficiencies	Not link among the planning and scheduling.
23		Organizational deficiencies	Things like i.e., material has not been provided at time.
24		Shortage of resources	Lack of availability of resources.
25	Construction method	Different method has different approaches to work.	
26	Man	Client initiated various method	Client looks to change method.
27		Political situation	Political enforcement during progress of construction work.
28		Experience of contractors	Lack of experience of contractor.
29		Experience of consultant	Consultant's experience matters.
30		Experience of owners	Owner's decision making power and experience.
31		Availability of staff to manage projects	Experience of staff members.
32		Inadequate planning	Planning is improper.
33	Conflicts	Conflicts between two parties.	
34	Time	Low speed of decision making	Process of decision making is slow.
35		Delays in design work	Late due architectural design
36		Waiting for information from clients	Delays from clients to give orders.
37		Delays in payments by owner	Payments to different stakeholder has been delayed.
38	Material	Material procurement	Procurement is done at right time or not.

39		Lack of material in market	Shortage of different material in market near site.	
40	Money	Cash problem during construction	Money management during construction.	
41		Finance by contractor	Contractor not pays when needed.	
42	Machine	Shortage in equipment	Equipment not available at particular site or location.	
43		Selection of equipment	Type of equipment selected for work.	
44	Project condition	Bad weather	Whether condition is bad enough to do the work.	
45		Ground problems	The ground condition is important for work.	
46		Design complexity	Design is in the manner that work should not be completed at time.	
47		Foundation condition	Locality and ground water table condition of site.	
C		Factors related to controlling		
48	Man	Detailization problem	Improper detail given by controller.	
49		Managing innovation	Innovation technique has not known to all.	
50		Managing operation	Operation's activities are not managed.	
51		Development problem	Problem due to development.	
52		Culture problem	Different languages has not known.	
53		Leadership and review	Lack of experience of leader.	
54		Measurement identity problem	Low access to identify the problem.	
55		Lack of common understanding	Understanding of common thing of work is lacked.	
56		Man	Volume of information flows	Information about process of work .
57			Lack of experience of head	Inexperience of leader.
58	Non union thoughts		Thoughts of workers is non-unionized.	
59	Lack of constant supervision		Supervision during process of work has been lacked.	
60	Over controlled		Something over controlled in process.	
61		Communication problem	Communication between staff and management.	
62	Time	Due to not timely update	Updating of work has not been done time to time.	
63		Time limit for decision making	Decision making of leader in controlling.	
64	Money	Finance	Financial procurement towards the controlling staff members by organization.	
65		Cost of controlling & its efficiencies	Money spend towards controlling.	

METHODOLOGY

This chapter introduces the methodology which is applied in this research to achieve the research aim. Basically, this research work includes five different sections. First section of research covers the project title and identification of the objectives. Second section of research covers review of literatures. Third section of research includes overview of different project management phases. Fourth section includes factors affecting to different project management phases. In this section data analysis was done by SRCCM techniques to rank the factors. In this technique criticality index as a function of frequency index and impact index is calculated for each factors.

Data analysis approach

The collected data were analyzed through the following statistical techniques and indices:

Criticality Index as a Function of Impact and Frequency Indices

Bon-Gang Hwang (2013) used this same technique to rank the factors affecting schedule performance of housing projects in Singapore.

Impact Index: The impact index of each factor was computed using the following equation:

$$\text{Impact Index (I.I.)} = (5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1)/5N$$

where N is the total number of respondents; n₅ is the number of respondents answered “very high”; n₄ is the number of respondents answered “high”; n₃ is the number of respondents answered “mid”; n₂ is the number of respondents answered “low”; n₁ is the number of respondents answered “very low”. The II value ranged from 0 to 1 (0 not inclusive) and the higher value of II indicates the factor has higher-level impact on different phases of project performance.

Frequency Index: The frequency of each factor was derived from the following equation:

$$\text{Frequency Index (F.I.)} = (5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1)/5N$$

where N is the total number of respondents; n₅ is the number of respondents answered “always”; n₄ is the number of respondents answered “often”; n₃ is the number of respondents answered “sometimes”; n₂ is the number of respondents answered “rare”; n₁ is the number of respondents answered “never”. The FI value also ranged from 0 to 1 (0 not inclusive) and the higher FI value indicates the factor is more likely to occur and affect project phases.

Criticality Index: Based on the II and FI, the criticality index of each factor was calculated and the equation is:

$$\text{Criticality Index (C.I.)} = [\text{I.I.} * \text{F.I.}]$$

The top 5 factors of planning phase, scheduling phase as well as controlling phase

No.	Respondent	Questionnaire Distributed	Questionnaire Received	% of Response	% Total
1	Contractor	116	68	58.62	31.48
2	Developer	82	60	73.17	27.78
3	Site Engineer	88	53	60.23	24.54
4	Architect	64	35	54.69	16.20
TOTAL		350	216	61.71	100.00

according to the different stakeholders are as given as below:

Top 5 factors affecting to planning phase according to analysis:

- [1] Lack of knowledge
- [2] Inexperience of planner
- [3] Inappropriate planning
- [4] Lack of awareness
- [5] Territory of the area

Top 5 factors affecting to scheduling phase according to analysis:

- [1] Poor site management
- [2] Coordination among parties
- [3] Low speed of decision making
- [4] Availability of staff to manage projects
- [5] Preparation of schedule plan and updates

Top 5 factors affecting to controlling phase according to analysis:

- [1] Lack of experience of head
- [2] Leadership and review
- [3] Volume of information
- [4] Detalization problem
- [5] Due to not timely update

Remedies to mitigate most crucial factors:

Remedies for planning phase

[1] **Lack of knowledge:** The project manager should have vast knowledge about the field and should have practical thoughts. So for get rid of this factor hire the manager or planner of an activities who have sound knowledge about the field of construction.

[2] **Inexperience of planner:** Sometimes inexperience of planner leads to failure of project because he has not that abilities to mitigate or solve such kind of problems which are unknown to him. So it is very important characteristics of the manager that he should have proper knowledge and experience about the field of the construction project management.

[3] **Inappropriate planning:** The planning of an activities should be such that the work process during the construction should be as cream as possible so that the work carried out one by one and step by step. The planning should not be such inappropriate that the work process chain breaks in between the construction phase. So while planning phase special concentration need to provide on the appropriate planning.

[4] **Lack of awareness:** The awareness is necessary while planning. The present and future criteria should be kept in mind . If you are not aware to that future and present problems the planning might fail in the future.

[5] **Territory of the area:** This is the criteria that can fail your planning if not given proper concentration to it. Different territory has different planning so while planning one must kept in mind.

• **Remedies for scheduling phase**

[1] **Poor site management:** The site management is very important part of the any construction in the world. Better utilization of the resources leads to project success and poor utilization of such leads to failure of project. So the site management should be such needs to improve all the time with present techniques and by that utilization of the resources at its optimum level.

[2] **Coordination among parties:** It is extremely important that link between the parties or different stakeholders should be kept in good relationship mode because it tends to fail while such thing is not happened. The proper work as per schedule will not be carried out if the coordination among parties is inappropriate.

[3] **Low speed of decision making:** The decision making is very tuff task when such unfortunate problem occurs during the construction work. Low speed of decision making by the owner or developers or project manager leads to delays the construction work process and might chance of delay the schedule. So in such cases the owner needs to pay attention to problem quickly and give the decision quickly.

[4] **Availability of staff to manage projects:** Staff is the ultimate success key to the any organization. If they have been provided good benefits and facilities their moral towards doing work goes very high and for long time they work with such organization. So one needs to create such environment to avail such kind of staff to manage the project.

[5] **Preparation of schedule plan and updates:** The project manager should have such experience to prepare a better schedule and not the one which is unrealistic. It should prepare such that it can be implement better on site.

- **Remedies for controlling phase**

[1] **Lack of experience of head:** It is very important that the controlling head have enough experience to control the work process. Controlling the activities and the resources is very elaborated thing in nature. So hire that kind of person who have lots of experience about the field.

[2] **Leadership and review:** Leadership is as important as the experience, it should in such manner that it creates the environment of good working condition. While supervising at the site one should have appreciate the workers and review their work and give them the easy path to do the work.

[3] **Volume of information:** The information provided to the workers such that it should easy to learn things about work and proper work will carried out. The training session should be carried out and give information to all workers about how to do their work.

[4] **Detalization problem:** The detail provided to the workers are not much complex and easy to learn.

[5] **Due to not timely update:** Timely updating is required for controlling any process if not done properly then it might create the problem to carry out work in time.

CONCLUSION

Every construction project involve with a lot of activities which need to be plan properly and schedule properly to ensure the completion of the project. In order to make project successful the controlling phase is as important as other phases. Therefore the study on different management phases must be conduct to provide knowledge on this topic to implement construction project with a proper planning, scheduling and controlling. On site they are not aware or not practised the project management phases as a result cost overruns and time overrun occurs. By implementing such phases during construction period the complexity of projects can be reduced.

This phase gives importance of factors related to different project management phases such as planning, scheduling and controlling. The study examines and evaluated the salient factors that affect the effectiveness of each phase in the management of construction projects

in South Gujarat region. Comprehensive literature review has been conducted to gather the information on the factors affecting the different project management phases followed by structured questionnaire distribution as a main tool to gain data to establish the importance of these factors. From the analysis highlighted, there were sixty eight (68) factors where these factors were divided into four (3) main categories which were panning, scheduling and controlling and they were also divided into related to Man, Project condition, Design, Time, Material, Money, Machine etc. As per population of stakeholder in south Gujarat region total 352 numbers of respondents were required. All 352 questionnaires to stakeholders were distributed. This study received 216 responses. So, the response rate is 61.38%. The collected data was analyzed through Spearman's Rank Correlation Coefficient Method(SRCCM). From the survey analysis, the crucial factors for different project management phases were carried out. As per analysis most important factors are described below.

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