

Ci3 India Working paper on 'Study of Project time and cost '

Ci3 India - Action Team 2 – 10 Oct. 2016

1 INTRODUCTION

1.1 BACKGROUND and NEED FOR 'ACTION'

India has set an ambitious target of investing USD 1 trillion in infrastructure during the Twelfth Five Year Plan period. Given this factor, infrastructure development has been a key focus area in every Indian state more so in the recent past. At the centre as well, big budgets have been allocated for infrastructure development in every Five Year plan. The country has consistently fallen short of meeting such targets over the last few years. These performance of infrastructure projects especially in terms of time and cost have been affected (*PMI-KPMG, 2012*).

1.2 STUDY OBJECTIVES

- To identify factors that impact time and cost in construction projects.

- To recommend best practices, mitigation measures and appropriate policy recommendations to mitigate factors that impact time and cost.

- To identify stage wise targets to reduce time and cost in construction projects.

2. METHODOLOGY

Table 1 represents a summary of the steps followed for the study. The first step involved development of concept paper which was developed to brainstorm the action team members on the issues. PMI-KPMG and the study on time and cost by Iyer and Jha (2006) were summarized and sent to the participants. Next step on the study involved a conference call with the team members on the general discussion on issues that have an impact on time and cost. The following issues was discussed in the conference call

- The focus should be from the time when the land is bought to the time the facility is operational/sold to the end user.
- Getting approvals consume more time in a project
- It roughly estimated that in construction projects - 60% of time takes for approvals and conceptualization of planning, the rest 40% in real construction (inclusive of 10-15% snagging, redoing etc).
- In the past the practice was that since approvals consume a considerable amount of time, the owners start off the work in a weak front i.e. the work is started immediately after the approvals without even a basic set of drawings. This result in lack of quality, cost overruns etc.

- In recent times more emphasis is being placed on engineering and design to get good results.

- A owner said that an new strategy was adopted by their organization which involves the following conditions
 - All drawings should be GFC, there are no general drawings.
 - Anything that changes after GFC is fixed is a variation.
 - But the problem in the new strategy is that the contractors and architects are not used to this model and are used to changes in drawings.
- Parameters (on construction method, type-modular/precast etc) should be factored in during the design stage which could potentially save time
- The owner said that their organization is experimented different contracting strategies, including alliancing, design build etc.
- Alliance contracting was found to be very successful, particularly when working with international clients.

In order to have a focus the group suggested that the study needs to be done on three phases of the project

- I. Concept phase
- II. Planning and design phase
- III. Execution and monitoring phase

Action	Description	Way forward suggested
1. Regional Roundtables (Chennai & Mumbai)	<ul style="list-style-type: none"> •Time and cost reduction - priority issue • Discussed and concurred on reducing time and cost in projects by setting stage wise targets. 	<ul style="list-style-type: none"> •Action team formulated
2. Conference call -1	<ul style="list-style-type: none"> • Concept paper on time and cost overruns were summarized sent to the participants to set the context. 	<ul style="list-style-type: none"> • General discussion on issues that impact time and cost. • Factors to be studied based on project phases namely – Concept phase , Planning and Design phase, Execution and monitoring (general issues are elaborated in the following slides)
3. Conference call -2	<ul style="list-style-type: none"> • Issues were identified in each of the three phases from literature. •Members were asked to comment on relevance of issues and recommend additional issues. 	<ul style="list-style-type: none"> •A total of 52 issues identified as relevant •Recommended to validate the issues by sending to broader set of owners.
4. Questionnaire survey	<ul style="list-style-type: none"> • A questionnaire survey was designed to understand owners perspective on the impact of issues 	<ul style="list-style-type: none"> •Received 28 responses (sent to around 45 members)
5. Analysis of response	<ul style="list-style-type: none"> •The responses analyzed using Relative importance index 	<ul style="list-style-type: none"> • Important issues were identified in each phase.

Table 1 : Steps followed for the study

The definition for each phase is provided below (Source: Decoding the realty myth, KPMG)

1. Concept phase - It starts with identification of suitable land or site to be developed, followed by doing feasibility studies and arranging for funds. Validation of land title, market price, market demand, supply projections, selection of consultants etc. could lead to delays, litigation, disputes between stakeholders and even project failure

2. Planning and design phase - is the pre-development stage in which various activities, prior to start of the construction, are performed. The major activities include preparing preliminary design for securing approvals, detailed designing, project scheduling, budgeting and procurement, contracting, sales and marketing.

3. Execution and monitoring phase- After necessary inputs related to a project are fixed; the next stage is usually the execution and monitoring of the construction.

The third step involved a focus for the issues in each of the phases. KPMG study on the real estate value chain was referred to understand the generic issues in each of the project phases. A total of 52 issues were identified as relevant for the study Table 2 represents the breakup of the number of issues phase wise.

Phase	Number of issues identified
Concept	9
Planning and design	28
Execution and monitoring	20

Table 2: Number of issues identified phase wise

The issues were sent to the team members and were asked to their opinion on the relevance. 52 issues were identified as relevant by them team members. The team suggested that the issues need to be sent to a broader set of audience for their inputs on the impact of time and cost in construction projects. Appendix -1 lists the issues that were identified as relevant and ratified by the team members

The questionnaire survey details are provided below:

- Objective:
 - The objective of the survey was to gather feedback from the Owners on issue that impact cost & time.
- Methodology
- A total of 52 issues were ratified and identified as relevant by the team members. 9 issues in concept phase, 23 issues in planning and design phase, 20 issues in execution phase. <issues list to be embedded here>
- A 5 point likert scale was used to record the responses for the impact of these issues identified on both time and cost (scale weight: 5 – High impact, 4- No impact).
- The questionnaire was sent to 45 odd people from owners side and were asked to rate.
- 28 responses received with a response rate of 62%.
- Analysis of responses were done by Relative importance index (RII) for both time and cost impact (phase wise and overall).
- The relative importance index is calculated by the formula

$$RII = \frac{\sum W}{A * N}$$

where, W—weighting given to each statement by the respondents and ranges from 1 to 5; A—Higher response integer (5); and N —total number of respondents.

Respondent details

Respondents designation categories
Managers -General, administration, MEP and other divisions
Top management – Vice presidents
Heads – Projects& portfolio MEP, Planning and coordination
Planning & coordination, Budgeting & estimation AGM's

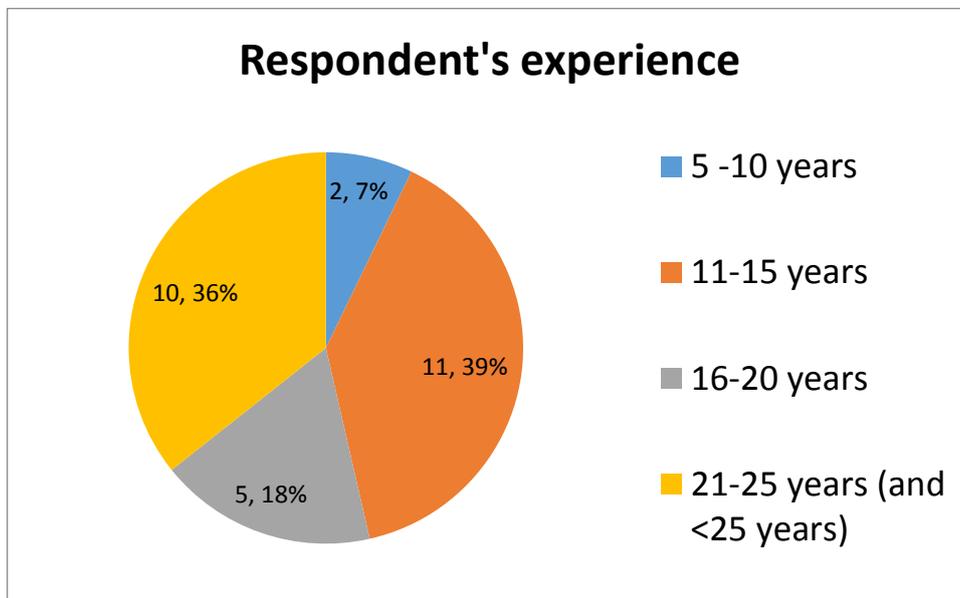


Figure 1: Respondents experience

3. RESULTS and DISCUSSION

These are being consolidated so that overall findings and outcomes will be detailed in the forthcoming White Paper.

The top 3 significant factors based on Relative importance index (RII) on each phase are shown in the graphs below

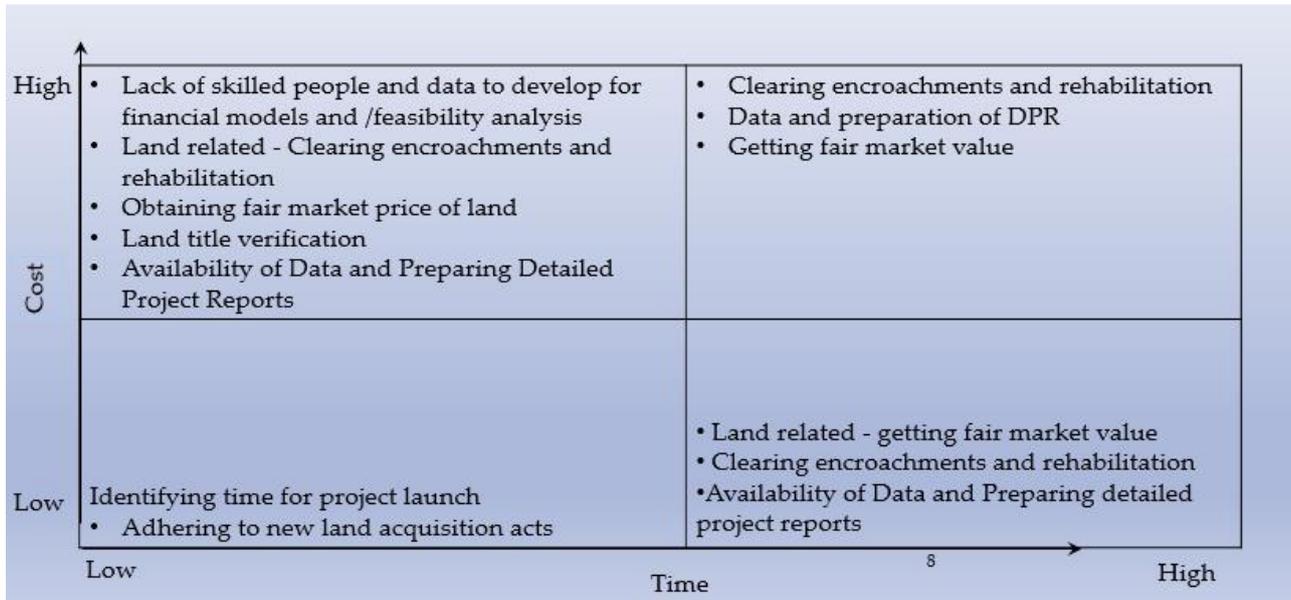


Figure 2: Significant factors affecting time and cost in the concept phase



Figure 3: Significant factors affecting time and cost in the design phase

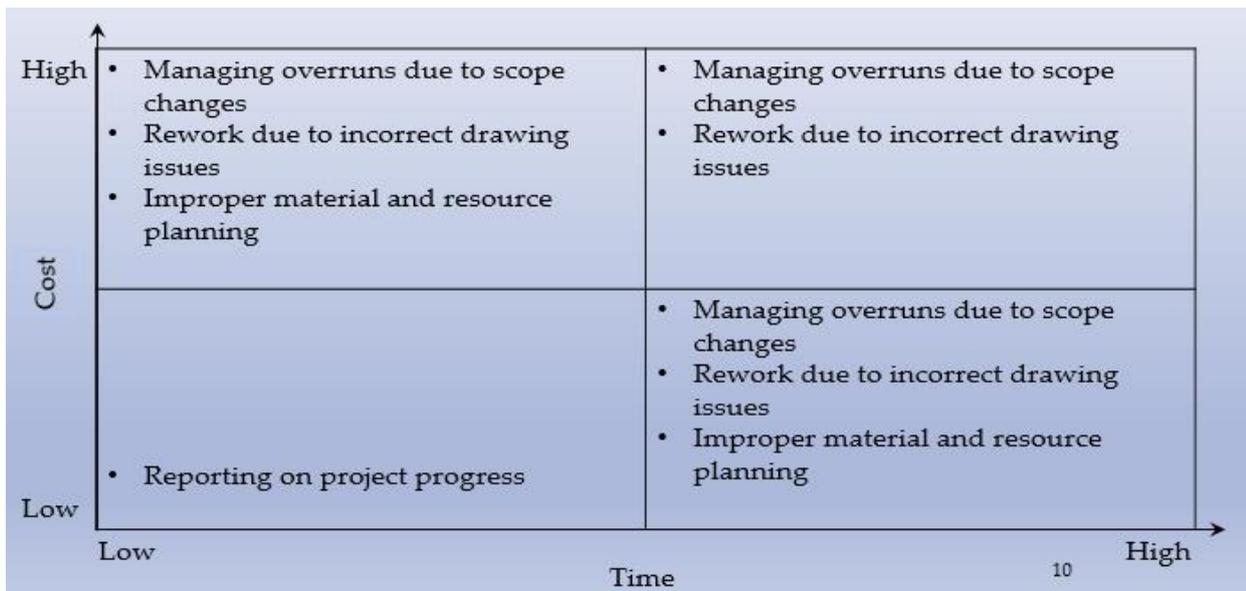


Figure 4: Significant factors affecting time and cost in the execution and monitoring phase

4. CONCLUSIONS AND WAY FORWARD

The next step towards taking this team suggested in the following to be done in the following steps

- Benchmark construction projects with real time data on time and cost impact
- Collect actual information (time & cost) on original baseline vs actual on time and cost for each of the three phases
- Compare the quantitative data with qualitative analysis (i.e. results from the survey)
- Recommend targets for reduction
- Recommend potential intervention strategies

The Conclusions and Recommendations can be best finalised after receiving inputs from other Ci3 India members at the two Roundtables in October 2016. Meanwhile, the significance of this area and of the interim outputs would be evidenced in the above sections. The limitations in collecting, sharing and making sense of the data are not to be belittled.

5. REFERENCES

Iyer, K.C. & Jha, K.N., (2006). Critical Factors Affecting Schedule Performance: Evidence from Indian Construction Projects. *Journal of Construction Engineering and Management* [Online] August 2006, Vol. 132, No. 8:pp. 871-88. Available from: [http://ascelibrary.org/doi/pdf/10.1061/\(ASCE\)0733-9364\(2006\)132:8\(871\).](http://ascelibrary.org/doi/pdf/10.1061/(ASCE)0733-9364(2006)132:8(871).) (Accessed 13 June 2016).

KPMG (2012), Decoding the realty challenges, https://www.kpmg.com/IN/en/IssuesAndInsights/ArticlesPublications/Documents/Real-Estate-Decoding-the-realty-challenge_For-Secured.pdf accessed 09 Oct. 2016

PMI-KPMG (2012) Study on time and cost overruns in India construction projects, India, <https://www.kpmg.com/IN/en/IssuesAndInsights/ArticlesPublications/Documents/PMI-KPMG-2013.pdf>, accessed 08 March 2016

Appendix -1

List of issues identified (Phase wise) and their Relative importance index (RII) that impact time and cost in projects

	Issue	Time RII	Cost RII
Concept phase	Verification of title of land	0.72	0.61
	Obtaining a fair market price	0.77	0.65
	Preventing and dealing with encroachments or land grab	0.76	0.73
	Obtaining change of land use	0.75	0.66
	Understanding and adhering to the new land acquisition acts	0.63	0.62
	Lack of skilled people and data to develop for financial /feasibility analysis	0.69	0.74
		0.85	0.67
	Identifying suitable time for project launch	0.59	0.58
	Lack of data availability to develop detailed project reports	0.63	0.68
Planning and design phase	Inadequate knowledge of the approval process	0.89	0.72
	Difficulty in estimating timelines and cost impact of approvals	0.79	0.74
	Dealing with multiple authorities	0.81	0.72
	Lack of clarity of required approvals	0.80	0.68
	Preparing design conforming to bye laws	0.67	0.70
	Obtaining customer feedback and understanding their requirements.	0.63	0.68
	Ambiguity in design brief communication between architect and owner leading to lack of clarity with respect to cost efficiency of design, design specifications or requirements	0.73	0.75
	Inability to assess constructability in design	0.75	0.73
	Effective coordination among multiple design partners	0.73	0.57
	Managing the changes during design development phase	0.72	0.69
	Difficulty in assessing quantum of works and drafting suitable construction methodology	0.70	0.70
	Planning adequate and accurate budgetary provisions	0.64	0.70
	Establishing accurate timelines for different stages in project life-cycle	0.68	0.62
	Selecting vendors who are suitable to meet the time and cost expectations of the project	0.74	0.63
	Assessing the supplier and contractor's credentials, their capability and payment mechanism.	0.70	0.69
	Identifying and planning for long- lead supply items or imported items	0.73	0.65
	Managing overruns due to poor internal and external controls (scope, estimates, costs etc.)	0.60	0.73
	Inadequate strategy for sales and marketing	0.68	0.69
	Selecting the right medium for sales and marketing	0.62	0.63
	Following up with customers for payments	0.58	0.60
Inequat sales strategy, developing and maintaining sales agents and selecting the right medium	0.56	0.55	
	0.54	0.55	

	Obtaining update of inventory status	0.57	0.52
Execution and monitoring phase	Preparing a detailed project schedule	0.72	0.66
	Timely mobilization of skilled manpower on site	0.70	0.69
	Preventing theft and corruption at site	0.56	0.64
	Rework due to quality issues	0.69	0.71
	Managing project and cost overruns due to change in scope/design	0.78	0.76
	Rework due to incorrect drawing issues	0.76	0.71
	Implementing adequate quality management systems	0.62	0.62
	Work stoppage due to safety approvals /practices	0.64	0.61
	Issues in monitoring vendor performance	0.62	0.57
	Issues related to project compliance	0.64	0.60
	Improper material and resource planning	0.76	0.75
	Accessing information on project progress partners	0.60	0.59
	Managing project procurement, both client issue and vendor supplied	0.67	0.64
	Coordination of front and drawings across vendors	0.69	0.59
	Reporting on progress, daily, weekly, and monthly	0.61	0.50
	Preparing and approving RA bills	0.64	0.56
	Project close out - getting NOC	0.64	0.58
	Project close out- Fire certificate	0.69	0.53
	Project close out - occupancy certificate,	0.73	0.58
	Project close out - punch lists	0.75	0.59