

Strategies to Reduce Cost Overrun, Delays and Risk Involved in Construction Management

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Abstract: This study briefs about, how project management practitioners uses the strategies to reduce cost overrun, delays and risk involved in construction management by using some of the centralized themes. A construction project needs appropriate planning throughout the project lifecycle. All the construction projects have some or the other risks involved and there is a need to mitigate those risks. This case study was carried out to explore the strategies used by the practitioners to reduce cost overrun, schedule delays and risk involved in construction projects. The data was obtained from research and questionnaire which was given to the civil engineers from various departments of a contracting company who have successfully established their presence in real estate as well as infrastructure projects in India and also in other country. The questionnaire had centralized themes of master planning, managing design stage, process and procedures, procurement management, setting project cost and time, deciding clear scope, using proper software, risk management. Proper management of project components in the initial stage can reduce changes during construction, which may further control cost and time. Positive changes may include potential to maintain a cleaner earth by reducing the waste. Reduction in waste may further reduce the construction cost and provide affordable housing.

Keywords – Cost Overrun, Planning, Procurement, Procedures, Risk, schedule Delays, Themes.

I. INTRODUCTION

Cost Overrun, Delay and Risk are main features which contribute for a project's success or failure. Miscommunication between property owners, subcontractors, contractors and many other reasons causes construction delays in almost all projects. The main cause of construction delays is because of inaccurate estimate of project cost and time, which is provided at the initial stage to the project owners or clients. The cost overrun can be such a serious issue, which can result in exceeding 100% of the initially estimated schedule delays due to some or the other reasons, which may further cause project lagging resulting in a great loss. The magnitude of delays varies from project to project and country to country. The construction industry plays an important role for the growth of the country's economy, as it impacts the rate of GDP to a great extent. Many risks are involved throughout the projects life cycle which needs to be mitigated. For the smooth and proper working of any project, special care is to be taken, because of which everything can be kept in control. Monitoring the activities throughout the project life

cycle can be done to avoid cost overrun and delay, and mitigation of the risk should be done simultaneously. It is found that most of the projects experience client related rework, which increases the project cost and also cause delays. The cost overrun, delays and risk involved needs to be well planned or else there may be great loss in completion of the project.

II. LITERATURE REVIEW

Project management theory is a collection of demonstrated practices for managing projects with chaotic organizations. The main function of management started as planning, organizing, staffing, and controlling. Fayol, (1916) first introduced managerial thinking concepts based on his experience. Many researchers and practitioners started further developing the project management as a theory since 1960s. The standardization of project management tools and practices started only in the 1980s. Chen and Partington (2006) presented the project management competency in the United Kingdom in three hierarchical levels. The first level was for the planning and control tasks. The second level was organizing the project

activities, including coordinating stages and interfaces of the construction project. The third level was examining and managing problems. They concluded that the managers at third level are more competent than the managers at first level. They used various standards for assessment and development of the knowledge areas. Chen and Partington highlighted that, there is a need to train those managers who lack behind the attributes for any of the three hierarchical levels so that project management competence can be achieved effectively. Project management institute defined project management by analyzing management practices of successful projects in late 1960s. This institute distributed PMBOK which was developed by them which included the information of several management areas. A guide to the PMBOK was introduced by project management institute, with which project managers can apply the process groups which would further reduce cost overruns and schedule delays. The project management process included five groups which included initiation, planning, execution, monitoring-controlling and closing. The ten knowledge areas are introduced in PMBOK, were used as base for research work.

III. RESEARCH METHODOLOGY

The questionnaire survey method was chosen to aid in knowing cost overrun, schedule delay and risk involved in a well-known contracting company in Mumbai, India. For this survey 50 people were involved which included engineers, heads of departments as well as the contractors. This survey also required a numeric verification of the number of professionals who manage construction projects. The survey was to complement as well as to compare with the results from the research studies. In the research, the aim of the questionnaire survey was to find out the beliefs and attitudes of professionals with regard to the management of large and small projects. A convenient method is to get a sample of the population. The survey method is well placed to generate this type of information as the basic purpose. The rationale of the questionnaire survey was to generalize from a sample of a population so that inferences can be made on any characteristic or behavior of a population. The advantage is that due to anonymity in survey process, they encourage frankness which can be used to collect generalizable information from anyone. The disadvantage is that there may be possibility that data may be affected by the characteristics of the respondents in the process of questionnaire survey. So for the survey the individuals, at organization at the contracting company were provided with questionnaire. It was therefore decided that civil and structural engineers, quantity engineers, safety engineers, heads of all the departments and contractors are to be involved. The methodology also consists of the research study obtained from many research scholars. The questionnaire provided was as follows:

1. What is your experience of the projects that involved successful project managers?
2. What are the lessons did you learn from previous projects?
3. What measures should we take to reduce risk throughout the projects life?
4. What would be your strategies, for improving the delivery of large projects?
5. What difficulties did you face when developing and implementing these strategies?
6. What are the benefits of using management software to reduce cost overruns and schedule delays and risk involved?
7. Has risk mitigation helped in reducing cost and time overrun? If yes, then to what extent?
8. What are the principles of project management implemented in large construction projects?
9. What other relevant project management strategies and information would you like to share or recommend for reducing cost overruns and scheduling delays?

The answers obtained from the survey were assisted on the scale of various themes such as master planning, processes, project brief, methodology, design, procurement management, software, value engineering, cost and time, time allowed for tender scope, cost cutting, risk management, team responsibility, upscaling marketplace, train clients consultants and contractors, monitoring.

IV. RESULTS AND DISCUSSION

A. *Having a Master Program/Plan.*

The first preference of every participant is planning and developing a project master program. Planning a project at the initial stage is an effective success factor for any project. There should be a right planning team to make an accurate project plan, having less probability of including incorrect data. The master program should consist of a breakdown of the project plan for all stages of projects life. Exercising the planning process is an important strategy to reduce cost overrun and schedule delays.

B. *Implementing Correct Processes and Procedures.*

A systematic process and procedure should be implemented and it should be followed strictly. There is a need for systematic work by implementing detailed processes and procedures for each stage. Setting formal processes and procedures is essential for project cost and time control. Including systematic process reduces the project risks, improves the team performance, and enhances the satisfaction of the stakeholders. Poor application causes design revisions and construction reworks, which contribute to cost overruns and schedule delays.

C. *Completing and Managing Design Stage Prior Construction.*

Most of the professionals believe that design management is very essential to ensure the completion of project within the specified budget. With the help of different design gateways the different design stages can be managed. According to project management book of knowledge the three gateways are concept design, schematic design, and detailed design. If thorough study is done, the mistakes in designing can be avoided and the transfer of drawings and specifications in tender documents can be without error.

D. Procurement Management.

Procurement planning, procurement execution, procurement control and procurement closeout are the stages for proper management. In procurement management the manager should collect the procurement requirements and gets it confirmed by management, finds alternative traders, decide the final seller, and formalize agreements terms and condition. There is a need to set a clear tendering procurement plan through all stages of the project lifecycle and make the right consultants and contractors selection criteria. Selecting the lowest bid can affects the decision of the cost estimator who may underestimate the cost at tender stage and act accordingly.

E. Using Appropriate Software.

The participants emphasized more on using appropriate software. There is a need to apply management software's and some other management soft kits to standardize process and procedures and to provide solutions in construction projects. The participants suggested use of BIM for reducing cost overrun, schedule delays and mitigate the risk involved in project, and also providing a coordinated design with discrepancies and detecting features in the software. The project management software is beneficial to construction industry because it provides better design coordination and enhances the communication which further enhances project success.

F. Setting Project Cost and Time.

All the participants stated that setting project cost and time is very much important for proper working of the project. The cost and time should be decided at the early stage before starting the execution. Logical project budget is schedule is expected to avoid underestimation. Firstly the market study is to be done and the realistic cost of materials is to be obtained. Many of the construction industry consider the early stage cost estimation as critical phase in projects life. For big projects, the estimators may forecast underestimated budget because they may exclude factors such as inflation and other cost related issues. Poor estimation can be hazardous.

G. Setting Clear Scope.

Setting clear scope is very essential according to the data collected from the participants. The project manager obtains the information from the stakeholders, and then

defines the work scope, divide it into elements, and control the scope changes to avoid cost overrun and schedule delays and risk involved. In every phase there is a need to define scope for proper working. The unclear scope in the contracts may lead to project failure and a great loss. A cost benefit analysis is must to be conducted before deciding on, scope changes to avoid any unforeseen problems.

H. Risk Management Plan.

A risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. Risk is inherent with any project, and there is a need to assess risk continually and develop plans to address them. The risk management plan should contain an analysis of likely risks with both high and low impact, as well as mitigation strategies to help the project avoid being derailed, further reducing common problem from arising. Risk management plans should be periodically reviewed by the project team to avoid having the analysis become stale and not reflective of actual potential project risks. There are four potential responses to risk which are avoid, control, accept, transfer. In this entire process which will be adopted in order to identify, analyze, evaluate, and mitigate risk throughout the project lifecycle. Strategies involved in risk management are to be transferred to WBS so that mitigation of risk can be done effectively.

V. CONCLUSION

The purpose of this qualitative multiple case study was to explore the strategies to reduce cost overruns and schedule delays. The study has meaningful values for managers in construction. Reducing cost overruns and schedule delays is a helpful approach to improve the performance of construction project businesses and enhance the lives of people. Cost and time control is a project performance indicator. Identifying and assessing the causes to cost and time overruns enable senior construction leaders to solve and control the problem to maintain business sustainability in the short and long terms. Managers could improve their business sustainability by adhering to latest strategies published in the literature and findings of this study. The study findings included various themes. Eight themes are major centralized themes whereas the others were minor. The central themes were (a) planning, (b) processes and procedures, (c) managing design stage, (d) procurement management, (e) use of software, (f) setting project cost and time, (g) deciding clear scope, and (h) risk management. The findings of the study aligned with the literature, the current studies, and the conceptual framework. The leaders need to improve the awareness of their management team at all levels to have a common shared vision, values, and strategy in adopting the industry best practices. Engaging the management teams in project management related courses might contribute to improving awareness and skills. Periodical business performance assessment is helpful to

monitor and control systematic approach to applying the identified strategies.

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