Enhancing Project Controls Effectiveness: The Role of Project Controls Team in Driving Project Success

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ABSTRACT: The study uses linear regression analysis and the results show a substantial difference when traditional project controls are implemented along with the project controls team. These results are supported by statistical analysis which shows that adding a project controls team significantly improved project performance (with significance value less than 0.05). This highlights how crucial project controls teams are in implementing project controls tools, techniques & procedures and for successful project completion. The study highlights the necessity of giving project controls teams top priority along with the integration of project controls tools & techniques (i.e. Change management control, risk management control, contracts management control, budgetary control, time control, communication control, key milestones control) within frameworks for project management to maximize results. Organizations will navigate through problems more efficiently, be able to reduce risks & implement risk mitigations, and achieve better project outcomes by deploying the project controls teams and by using their project management expertise.

Keywords: *Project Management; Project Controls; Project Controls Team; Regression analysis; Construction*

INTRODUCTION

The Infrastructure and Project Monitoring Division (IPMD) reported that in July 2023, 809 projects had delays, and 213 projects were behind schedule despite being given extensions. Further, a total of 388 projects also experienced cost overruns. The cumulative cost increase of the 809 projects that experienced delays amounted to around Rs 4.65 lakh crore. (Khan, 2023)

The major reason for the delays on the project as stated by various authors is no proper implementation of project controls. As stated by (Veera, 2017), major delay factors involve non-management of Change orders, Unilateral contract terms and lack of fairness in contract management, Inexperienced project team, Ineffective project planning and scheduling, Poor communication management, Insufficient project management support and so on. Further, as per (Whittaker, 1999) the most important takeaway for his research was that poor risk management was the leading cause of project failure. Failure to possess necessary team skills and an absence of control also played a role.

As highlighted by (Odeh & Battaineh, 2002) in their research, among the top ten most significant causes of delay according to the findings were owner interference, insufficient constructor expertise, financing and payments, labor productivity, sluggish decision-making, ineffective planning, and subcontractors.

Achieving the project's goals with minimal setbacks is the aim of project controls. It is based on keeping an eye out, systematically evaluating performance, finding variations, implementing actions to fix or prevent problems, and managing change. (Montes-Guerra, Gimena, Pérez-Ezcurdia, & Díez-Silva, 2014). Olawale &

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Sun (2010) explained the issue revolves around Project Controls and identified the most common tool is time and cost control supported by various software packages. The primary impediments to time and cost management in construction practice are the following five factors:

1. Inaccurate calculation of project duration.

2. Risks and uncertainties.

3. Design changes.

4. Non-performance of subcontractors

5. Complexity of works

Atout, (2018) highlights that effective project monitoring and controlling is the one of the most crucial project control tools that project managers should adopt to track, monitor the project and for taking remedial actions as and when required in response to schedule delays. Effective project management, encompassing schedule, cost, and quality control, is crucial for ensuring project success and requires the full support of the entire project team. Finding and analysing potential risks to a project's success is an effective control tool used in the software business to lower the rate of project failure, according to another study (Schmit, Lyytinen, Keil, & Cule, 2001)
The detailed work programme (DWP) is the foundation for effective time, budget, resource, and monitoring control in a project. It serves as a roadmap, outlining tasks and milestones for structured project execution. Time control involves comparing actual progress with scheduled milestones for timely completion. Budget control monitors actual expenditures against allocated budgets, preventing cost overruns. Resource control optimizes resource allocation, while monitoring control assesses project performance against benchmarks outlined in the DWP (Wilson, 2014). According to (Jaafari, 2001) focused on risk management, risk variables & their importance and argued that it should form a core function of project management. Identifying and controlling immediate risks to a project is crucial to completing it within budget, time, and perceived parameters (Datta & Mukherjee, 2001).

Al-Jibour, (2003) reports about the effectiveness of monitoring systems and discusses various monitoring techniques along with their use for project controls. Author states following five steps for project monitoring and control:

1. Prepare a plan.

2. Implement the plan.

3. Monitoring the actual progress.

4. Report the variances between planned and actual.

5. Take corrective action.

Gaur (2022) discussed various delay factors like insufficient project planning, Cost & Schedule underestimation, Poor communication plan, no risk management plan and so on. The author further discussed how deployment of Project Planner can increase the effectiveness of overall project planning and scheduling.

Despite a lot of hue and cry being created around project management and the critical role played by project controls, there is still a significant research gap in completely understanding the complexities and delicacies of deploying the project controls team. While numerous studies have shown the importance of project controls in improving project performance, there has been little dedicated study into how the inclusion of a specialized project controls team affects the project outcomes and its efficacies in project management.

OBJECTIVES OF THE STUDY

The following research objectives are framed:

1) To identify the importance of the project controls team while implementing various project controls through literature review.

2) To establish that both Traditional Project Controls & Project Controls Team jointly affect the Project Performance.

LITERATURE REVIEW

Sahar, Ann, & Rashid (2022) study reveals that success with Project Control Systems (PCS) is important for achieving project goals, but it's especially important for staying within project cost budget. The most important of the six PCS factors for meeting project goals was found to be project governance. It turned out that not having standard methods was the biggest problem with good project governance. On the other hand, having skilled and experienced project team members was the biggest help with putting earned value into action. Further the research highlights following factors affect the PCS success:

A) a plan with clear goals and activities to be completed.

B) the project team's ability to keep track of planned tasks.

C) reliability of schedules.

D) lack of skills in planning and scheduling.

Abdullatif & Saud (2021) concluded that the pre-construction phase lacks a well-established framework in construction projects in the Kingdom of Saudi Arabia (KSA). The non-existence of a pre-construction team is a challenge to the management team and supervision consultant. There is an absence of a comprehensive set of management tools and the project management teams (PMT) are not sufficiently proactive. They exhibit a reactive approach, rather than proactive. The PMTs must be both stimulated and motivated, while also being subject to responsibility. Further, it is revealed that without a comprehensive project planning document that clearly outlines and organizes the necessary resources for the successful execution of a project, it is expected that the project will become unmanageable. Deficiencies of management in execution of knowledge management procedures, construction planning, risk management, monitoring and controlling of time, cost, and scope.

Ann & Sahar (2019) examined the elements that contributed to and hindered the installation of project control systems (PCS) on the projects in order to identify the key elements that worked. The study's three main takeaways are as follows: (1) a technically competent project controller; (2) well-defined roles and duties within the project team; and (3) a detailed work breakdown structure. Without consistent processes, ambiguous

contract deliverables, project goals, and deadlines, as well as an owner-contractor control system and an information-sharing gap, successful PCS implementation is highly unlikely. Rozenes, Vitner, & Spraggett (2004) says that Earned Value (EV) is one of the classical project control tools effective to monitor both time and cost at any given time of the project. Further, as per author Work Breakdown Structure (WBS) is another classic project control tool used at the planning stage. Finally, the author developed the Multidimensional Project Controls System (MPCS) which integrates all dimensions of project controls and will help project managers to identify the poor performance areas.

The achievement of project deliverables with the allocated time, cost-effective completion of its projects depends on a competent project management team. A crucial part of the project management team is establishing right project controls. These controls serve as a mechanism to monitor the project performance, ensuring achievement of predefined milestones and facilitating timely interventions by Sr. management to address change of scope in order to optimize the outcomes (Mithileni, 2022).

Ensuring the effective implementation of project controls necessitates the presence of a dedicated project controls team, alongside other essential project controls components. To improve the effectiveness and efficiency of project management processes is to have a dedicated Project Controls Team. This team helps in achieving budgetary control, schedule compliance, risk assessment, contracts management, change management and performance evaluation. The dedicated Project Controls Team is essential for having openness, accountability, and proactive management outlook throughout the project lifecycle. This ensures that projects are successfully completed within the assigned time and cost (Hindarto, 2023).

Project iron triangle i.e. cost, scope and time will be efficiently managed when organizations deploy specialized teams to implement & supervise project controls. To ensure that the decisions are based on actual site progress; insights into the project progress are provided in a timely manner; any deviations from the planned activities are identified and appropriate remedial actions are taken for that, a dedicated Project Controls Team is crucial (Merrow & Nandurdikar, 2018). Farhad, Ann, & Sahar (2018) aimed to determine what factors may facilitate or impede the successful implementation of PCS and rank them in order of importance. Data from Saudi chemical and petroleum firms was collected, evaluated, and analyzed using a multicriteria model. It identifies nine enablers and fifteen barriers critical to PCS implementation success. The study highlights the need for knowledgeable project team members and precise role descriptions as essential facilitators, whereas important obstacles include a lack of scheduling and controlling expertise, mistrust of the management system, and different control systems between owners and contractors. Further two challenges that have come to light are unclear contract deliverables and incompatible control systems between the contractor and owner. These results emphasize that for smooth PCS implementation below three things are necessary including assembling a competent team with clearly defined roles, developing a dependable and trustworthy framework for controls and getting the owner and contractor to agree on the same control systems and contract deliverables.

Saud & Abdullatif (2020) look into how bad management affects the success of Saudi Arabian construction projects. It brings up the fact that more than two-thirds of public building projects in the Kingdom are over budget and take more than twice the time as originally planned. Two case studies are used to look into why big delays and deviations from the planned works. Some of these reasons are bad construction management and taking too long to put ideas into action. According to the study, planning and management problems can be avoided by being strategic and setting up an early project management office. Additionally, it highlights that a proactive management team must be established early in the project process in order to ensure successful project performance. By avoiding mistakes in project planning and project management, this strategy seeks to increase the probability that a project will succeed.

Research Model

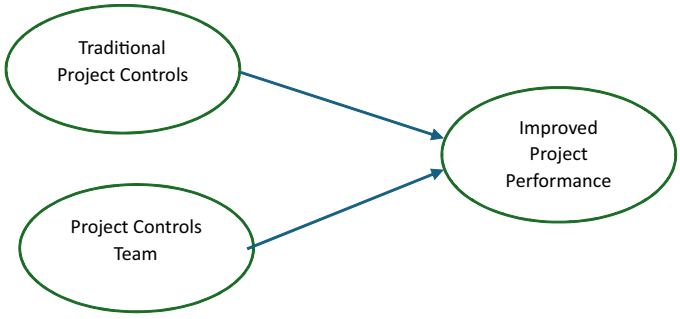

Figure 1: Research Model. Source: Author

RESEARCH METHODOLOGY

Research methodology refers to an analytical approach to research problems. It might be considered a study of scientific research methodologies. The study used a quantitative method. A quantitative analysis was conducted to determine the influence of project controls on project management effectiveness, with data collected via surveys or questionnaires issued to project managers and team members participating in various projects. This quantitative phase will enable statistical analysis to identify the influence and distinction between the presence and absence of a specialized project control team on project success measures. The complete approach gave a holistic knowledge of the function of project controls and its relevance in project management, specifically stressing the efficacy of a specialized project controls team. Responses were collected from industry experts comprising Engineers, Senior Engineers, Managers, Senior Managers, Project Managers, Project Directors, Planning Managers, and Document Controllers. They all have more than 10 years of experience working in the construction industry mainly in infrastructure projects and completed at least two projects.

Hypothesis:

The hypothesis is formulated based on the identified research gap and objectives:

H_0: All the independent variable (Traditional Project Controls & Project Controls Team) jointly does not affect the dependent variable (Project Performance)

H_1: All the independent variable (Traditional Project Controls & Project Controls Team) jointly affects the dependent variable (Project Performance)

Data Collection

Data was collected through a dual-phase method. In the first part, respondents requested to provide their basic information such as job title, total years of experience, and number of completed projects. In part two, participants were asked to respond about the project performance based on six criteria: 1) Risk Management Control; 2) Planning and Scheduling; 3) Contracts Management Control; 4) Project Communication Control; 5) Change Management Control; and 6) Key Deliverables Control. Participants' responses were collected using a seven-point Likert scale. The participants were carefully selected professionals who served in different roles such as project directors, project managers or project team members. This approach enabled a thorough

understanding of how project controls teams contribute to project performance by gathering input from experienced industry experts.

DATA ANALYSIS

The data is analysed using statistics that are both descriptive and inferential. Using SPSS, regression analysis was conducted to compare the mean effectiveness scores of Traditional project controls working without project controls team and along with project controls team. In addition, the reliability was examined using Cronbach's alpha to confirm internal consistency of the responses.

Test of Normality

Skewness between -0.5 to +0.5 and Kurtosis between -2 and +2 makes the data symmetrical and acceptable and proves that the data is normal univariate distributed (Macgillivray, 2008).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TPControl	94	3.20	5.60	4.1234	.46105	.358	.249	.926	.493
PCTeams	94	3.20	5.60	4.3787	.57583	.181	.249	-.055	.493
PPerf	94	4.60	6.60	5.6106	.43638	.159	.249	-.041	.493
Valid N (listwise)	94								

Figure 2: Descriptive Statistics

Reliability Testing

A reliability test using Cronbach's alpha assesses the internal consistency of a scale or measure by analysing the correlations among its items. It measures how closely related a set of items are as a group, indicating the extent to which they consistently measure the same underlying construct or concept. This statistical method calculates a coefficient ranging from 0 to 1, with alpha value more than 0.70 shows reliable data (Hair, 2013).

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.735	.731	3

Figure 3: Cronbach's Alpha Reliability test

Model Testing

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.935[a]	.874	.871	.15670

a. Predictors: (Constant), PCTeams, TPControl

Figure 4: Model Summary

The adjusted R2 is 0.871 which shows that the model explains the 87.1% variance happening in the dependent variable.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.475	2	7.737	315.106	<.001[b]
	Residual	2.235	91	.025		
	Total	17.709	93			

a. Dependent Variable: PPerf

b. Predictors: (Constant), PCTeams, TPControl

Figure 5: Hypothesis testing using ANOVA test

Here, we can see that the p value is less than 0.05. Hence, we can reject the null hypothesis and accept the alternative hypothesis (Okoye, 2024).

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.853	.168		16.987	<.001		
	TPControl	-.107	.037	-.113	-2.875	.005	.904	1.106
	PCTeams	.730	.030	.964	24.603	<.001	.904	1.106

a. Dependent Variable: PPerf

Figure 6: Coefficient and Significance Value

Here, we can see that the p value is less than 0.05. Hence, we can say that all the independent variables individually affect the dependent variable (Pal, 2019).

FINDINGS

The above study suggests that the presence of a project controls team has a substantial impact (i.e. 0.730) on project performance. The p-value, also known as the significance value, is less than 0.05, demonstrating a notable disparity in the efficacy of project controls when implemented alongside the project controls team, indicating that the presence of a project controls team leads to a substantial enhancement. The alternative hypothesis is accepted, while the null hypothesis is rejected.

CONCLUSION

Project controls are essential for effective project management since they establish the procedures for overseeing, assessing, and modifying project performance. This study emphasizes the significance of a project controls team in accomplishing the desired results from project controls within the established timelines and within the allocated project cost. A skilled project control team lets project managers quickly spot risks and issues, so they can take the right steps to reduce the risks and keep the project moving forward as planned.

The objective of this study is to highlight the importance of the Project Controls team in effectively implementing project controls for positive project outcome. However, it is crucial to recognize the constraints of the study such as potential biases in sample selection or the specific research setting, which could mean that the results can't be used in other projects. Conducting additional study which includes larger samples, various organizations and several industries would give a more comprehensive understanding of how a dedicated project controls team function and its effect on project controls & project performance.

IMPLICATIONS OF THE STUDY AND FUTURE SCOPE OF STUDY

Through deploying a skilled project management team and adopting effective project controls, organizations may reduce project risks, maximize resource utilization and improve project performance. The importance of a Project Controls Team in achieving project success is emphasized. By assigning a specialist project controls team collaboration across different functions increases, enhances openness and promises alignment among all parties involved. This collaborative method enables well informed decision making through timely interventions by senior management, proactive risk management by preparing risk registers, thus improving project performance and reinforcing that the project will complete within assigned time and cost.

Project management and project controls now have started receiving significant attention but still there is a significant research gap in completely understanding the complexities and nuances of project controls teams, as well as their precise impact on project management. Although several studies have emphasized the significance of project controls in improving project performance, there has been limited research specifically focused on the influence of integrating a specialized project controls team on this usefulness.

The study indicates that there is a favourable correlation between the presence of a specialist project controls team and the effectiveness of project controls. However, there is a lack of empirical data that specifically analyses the impacts and intricacies of these teams on project performance indicators. By addressing this gap, we can gain a better understanding of the diverse benefits and difficulties related to implementing dedicated project controls teams on projects. This will offer significant updates to the existing body of knowledge for project management. Continuous investigation into this research area has potential for deeper understanding of project controls, project control teams and its impact on optimizing project management methods in actual project settings.

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