# Investigation On the Effectiveness of Performance Appraisal System in Construction Industry

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doi.org/10.64643/IJIRTV12I11-203616-459

***Abstract*—The formal performance appraisal has been identified as a critical management tool and control process in human resources allocation. Almost every organization, formally or informally, undergoes periodic performance appraisal rituals. This paper identifies and prioritizes the key factors affecting the performance appraisal system of construction industries. Fifty-three factors organized under ten groups were used for this study. Data were collected from three levels of management using a weighted scale of 1 to 4. The Relative Importance Index (RII) was employed to rank the factors. Results indicate that cost of materials and equipment, unavailability of resources, conformance to specification, site conditions, sequence of work as per schedule, leadership skill, employee motivation, accident rates, knowledge from experience, and climatic conditions are the highest-ranked factors in their respective groups. Identification and prioritization of these factors enables project management teams to effectively evaluate and improve performance appraisal systems through continuous monitoring of employee performance against predetermined standards.**

***Index Terms*—Performance Appraisal, Construction Industry, Relative Importance Index, Managerial Hierarchy, Key Performance Indicators.**

## I. INTRODUCTION

An organization's goals can be achieved only when people put in their best efforts. Construction industry plays a major role in the development and achievement of societal goals. Construction projects are complex in nature due to the involvement of large numbers of parties—clients, contractors, consultants, stakeholders, shareholders, and regulators—operating across different levels of management.

Performance appraisal may be defined as a structured formal interaction between a subordinate and supervisor, usually in the form of a periodic interview, in which the work performance of the subordinate is examined and discussed with a view to identifying weaknesses, suggesting improvements, and encouraging skills development. In many organizations, appraisal results are used, directly or indirectly, to determine reward outcomes—identifying better-performing employees who should receive merit pay increases, bonuses, and promotions [1].

The topic of performance appraisal is highly relevant to today's construction industry. Identifying whether a company is using the right performance appraisal methods and assisting it in making improvements in its system is of paramount importance. Performance appraisal evaluates cost, time, quality, productivity, client satisfaction, health and safety, innovation, learning, and environmental factors within the construction project lifecycle.

### *A. Objectives*

The objectives of this study are:

- To evaluate and compare the performance of different employees in a construction organization.
- To analyze the factors affecting the performance appraisal system.
- To identify areas of weakness of employees in order to improve performance.
- To make a valid database for personnel decisions such as promotion, pay, incentives, transfer, and training.
- To assess whether the current performance appraisal system motivates employees.
- To find out whether the performance appraisal

system identifies training needs and development requirements.
- To understand the impact of performance appraisal on career growth of employees.

*B. Statement of the Problem*

The project is titled "Investigation on the Effectiveness of Performance Appraisal System in Construction Industry." It aims to comprehensively understand the various departments, services and functions of construction industries to gain knowledge regarding performance evaluation. The study examines the meaning of performance appraisal, different methods used to evaluate employee performance, its effective implementation, and the benefits and drawbacks of traditional and modern methods. The study also analyses intelligence and emotional dimensions of employee performance [2].

## II. LITERATURE REVIEW

*A. Effectiveness of PMS in Indian Construction Sector*

Rai and Lele [1] conducted an exploratory study to understand performance management systems, their applicability and effectiveness in the Indian construction sector. A sample of 138 employees from three major Indian construction firms was studied using factor analysis and chi-square tests. Results showed fair understanding of PMS systems and their linkage to HR sub-systems including Training & Development and Pay & Rewards. The study highlighted that sophisticated performance practices are still nascent in this industry, which is neither organized in nature nor characterized by permanent employment.

*B. Performance Measurement Systems*

Takim, Akintoye, and Kelly [2] reviewed models for measuring construction performance developed in the UK, USA, France, India, Hong Kong, Saudi Arabia, and Malaysia. They proposed the use of an amalgamated-model of measurement that includes financial and non-financial indicators across project phases as a framework for measuring construction project performance. The study found that most existing systems focus more on product than on process and design.

*C. Factors Affecting Performance Appraisal*

Enshassi, Mohamed, and Abushaban [3] studied construction projects in the Gaza Strip to identify factors affecting performance. A total of 120 questionnaires were distributed to three key groups: owners, consultants, and contractors. Survey findings indicated that the most important factors were: delays due to border/road closures, unavailability of resources, low level of project leadership skills, escalation of material prices, and poor quality of available equipment and raw materials.

*D. Performance Management Method Using BSC*

Kim, Park, Lee, and Roh [4] applied the Balanced Scorecard (BSC) concept to construction performance management. The paper focused on making a performance management process and defining each phase of it, considering financial, customer, internal process, innovation and learning perspectives. With developing performance processes in construction, companies were assisted in detecting deficiencies in current PMS and improving decision-making support [4].

*E. Performance Appraisal System in Construction Productivity*

Marawar [5] evaluated performance appraisal as a method of evaluating both quantitative and qualitative aspects of employee behavior in the workplace. The study proposed a model for individual and organizational performance, noting that appraisals serve organizational, administrative, individual, and control purposes. Technical methods studied included checklist, ranking, forced distribution, critical incidence, and essay appraisal methods [5].

*F. Performance Indicators for Construction*

Ali and Ibrahim [10] identified key performance indicators (KPIs) for large construction firms in Saudi Arabia. A survey of Grade 1 classified contractors was analyzed using the relative importance index. The study found that traditional financial measures alone are no longer sufficient; external customer satisfaction, safety, business efficiency, and effectiveness of planning are increasingly important performance indicators.

## III. METHODOLOGY

### A. General

Research methodology is a plan, structure, and strategy of the investigative process set out to obtain answers to the study. The main objective is to analyze the performance appraisal system of construction companies. This study adopts both percentage analysis and the Relative Importance Index (RII) as statistical tools.

### B. Data Collection

After studying common factors affecting performance appraisal through literature surveys and site observations, data were collected and organized under ten groups: cost factors, time factors, quality factors, regular and community factors, productivity factors, client satisfaction factors, people factors, health and safety factors, innovation and learning factors, and environmental factors. Fifty-three sub-factors were identified in total.

The respondents were classified into three management levels: top-level management (construction officers and senior engineers), middle-level management (project managers, quantity surveyors, structural engineers), and bottom-level management (skilled workers, foremen, site supervisors). Data were collected from 30 respondents across five active construction sites in Kerala and Tamil Nadu.

### C. Site Visits

Site visits were conducted at Nadthara -Moorkanikara - Kannara Road and Peechi - Vazhani Tourism Corridor 0/000 to 7/000, to ensure representative data collection across different construction typologies.

### D. Statistical Tools

Percentage Analysis: Percentage analysis was used to compute the proportion of respondents from each managerial level for each factor group, as follows:

*Percentage = (Number of Respondents / Total Respondents) × 100*

Relative Importance Index (RII): The RII was used for ranking factors according to their significance. The formula is:

$RII = \Sigma W / (A \times N)$

Where ΣW = sum of weightings given to each factor by respondents; A = highest weight (4); N = total number of respondents (30). RII ranges from 0 to 1; higher values indicate greater importance.

### E. Questionnaire Design

The questionnaire was divided into two parts. Part 1 collected general information: age, gender, qualification, experience, and job type of respondents. Part 2 consisted of the 53 performance appraisal factors grouped under the ten categories, rated on a 4-point scale: 1 = Low Importance, 2 = Medium Importance, 3 = High Importance, 4 = Very High Importance. The questionnaire was pilot-tested before full distribution.

## IV. RESULTS AND DISCUSSION

### A. Cost Factors

Materials and equipment cost (RII = 0.72) and cash flow of the project (RII = 0.71) ranked first and second among cost factors. Wages and incentives ranked lowest (RII = 0.51). The cost of materials and equipment significantly affects the liquidity of owners and the profit rate of contractors across all management levels.

Table 2. Cost Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Material & equipment cost | 4 | 7 | 7 | 12 | 0.72 | 1 |
| Cash flow of project | 2 | 8 | 12 | 8 | 0.71 | 2 |
| Labour cost | 5 | 6 | 9 | 10 | 0.70 | 3 |

### B. Time Factors

Unavailability of resources (RII = 0.72) ranked first among time factors, followed by average delay in regular payments (RII = 0.71). Time needed to rectify defects ranked last (RII = 0.51). Delay and shortage of materials plays a leading role in time performance across all management levels.

Table 3. Time Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Unavailability of resources | 4 | 6 | 9 | 11 | 0.72 | 1 |
| Avg. delay in regular payments | 4 | 7 | 8 | 11 | 0.71 | 2 |
| Planned time for construction | 5 | 7 | 8 | 10 | 0.69 | 3 |

*C. Quality Factors*

Conformance to specification (RII = 0.71) ranked first among quality factors, with quality assessment systems in organization second (RII = 0.69). Top-level management is primarily responsible for ensuring conformance to specifications, as this is strongly related to client satisfaction.

Table 4. Quality Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Conformance to specification | 4 | 7 | 8 | 11 | 0.71 | 1 |
| Quality assessment system | 4 | 9 | 7 | 10 | 0.69 | 2 |
| Unavailability of competent staff | 5 | 6 | 11 | 8 | 0.68 | 3 |

*D. Regular and Community Factors*

Neighbours and site conditions (RII = 0.69) ranked first in this group, followed by cost of compliance to regulatory requirements (RII = 0.60). These factors are strongly related to client satisfaction and middle-level management performance.

Table 5. Regular and Community Factors

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Neighbours & site conditions | 4 | 7 | 11 | 8 | 0.69 | 1 |
| Cost of compliance to regulations | 6 | 11 | 7 | 6 | 0.60 | 2 |

*E. Productivity Factors*

Sequence of work according to schedule ranked first (RII = 0.70) among productivity factors. Management-labour relationship was second (RII = 0.66). Project complexity ranked last (RII = 0.60). Sequencing work according to schedule assists all management levels in completing projects on time.

Table 6. Productivity Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Sequence of work per schedule | 5 | 6 | 9 | 10 | 0.70 | 1 |
| Management-labour relationship | 6 | 5 | 12 | 7 | 0.66 | 2 |
| Absenteeism rate | 5 | 11 | 9 | 5 | 0.61 | 3 |

*F. Client Satisfaction Factors*

Leadership skill for project manager (RII = 0.69) ranked first among client satisfaction factors. Information coordination between owner and project parties (RII = 0.65) ranked second. Client satisfaction factors are critical across all management levels as they directly influence the degree of project performance.

Table 7. Client Satisfaction Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Leadership skill—project manager | 5 | 7 | 8 | 10 | 0.69 | 1 |
| Owner–project party coordination | 6 | 7 | 9 | 8 | 0.65 | 2 |
| Number of rework incidents | 7 | 10 | 6 | 7 | 0.60 | 3 |

*G. People Factors*

Employee motivation (RII = 0.72) ranked first among people factors, followed by requirement and competence development (RII = 0.66). Employee

attitudes ranked last (RII = 0.54). People factors affect productivity and performance across cost, quality, and time dimensions.

Table 8. People Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Employee motivation | 4 | 7 | 7 | 12 | 0.72 | 1 |
| Competence development | 6 | 5 | 12 | 7 | 0.66 | 2 |
| Employee attitudes | 12 | 6 | 7 | 5 | 0.54 | 3 |

*H. Health and Safety Factors*

Reportable accident rate (RII = 0.70) ranked first in this group, followed by project location safety (RII = 0.57). Application of health and safety procedures ranked last (RII = 0.51). Accident rates directly affect safety performance and client satisfaction.

Table 9. Health and Safety Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Reportable accident rate | 5 | 6 | 8 | 11 | 0.70 | 1 |
| Project location safety | 10 | 8 | 5 | 7 | 0.57 | 2 |
| Health & safety application on site | 11 | 9 | 7 | 3 | 0.51 | 3 |

*I. Innovation and Learning Factors*

Learning from own experience and past history (RII = 0.69) ranked first in this group, followed by training of human resources (RII = 0.65). Group review of failures ranked last (RII = 0.51). Innovation and learning play a leading role in project execution and contractor/consultant performance improvement.

Table 10. Innovation and Learning Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V. High | RII | Rank |
|---|---|---|---|---|---|---|
| Learning from own experience | 5 | 7 | 8 | 10 | 0.69 | 1 |
| Training human resources | 6 | 8 | 7 | 9 | 0.65 | 2 |
| Learning from best practice | 10 | 8 | 5 | 7 | 0.57 | 3 |

*J. Environmental Factors*

Climatic conditions (RII = 0.76) ranked first among all environmental factors and also first overall among all 53 factors studied. Waste around site ranked second (RII = 0.71). Air quality ranked last (RII = 0.59). Climatic conditions significantly affect productivity and time performance of construction projects.

Table 11. Environmental Factors Affecting Performance Appraisal

| Factor | Low | Med | High | V.High | RII | Rank |
|---|---|---|---|---|---|---|
| Climatic conditions | 2 | 5 | 12 | 11 | 0.76 | 1 |
| Waste around the site | 4 | 7 | 8 | 11 | 0.71 | 2 |
| Noise level | 7 | 10 | 6 | 7 | 0.60 | 3 |
| Air quality | 8 | 10 | 5 | 7 | 0.59 | 4 |

## V. CONCLUSION

An effective performance appraisal system should be made mandatory in every construction project. Performance appraisal evaluates employee behavior and work progress against predetermined standards, providing the foundation for organizational improvement.

The results indicate that climatic conditions at site carry the highest rank (RII = 0.76) among all 53 factors, primarily affecting bottom-level management. Materials and equipment cost, unavailability of resources, and employee motivation are tied at second place (RII = 0.72). These findings emphasize the need for construction organizations to give equal importance to cost, time, quality, regularity, productivity, client satisfaction, human resource, health, innovation, and environmental factors.

Top-level management should facilitate timely payments to middle-level management to overcome delays, disputes, and claims. Middle-level management should adopt multi-criteria analysis for design cost optimization. Bottom-level management must account for political and environmental risks in cost estimation. Human resource development through continuous training programs is strongly recommended across all management levels.

## VI. RECOMMENDATIONS AND FUTURE SCOPE

For effective implementation of the performance appraisal system in construction, the following factors should receive prior attention at the planning stage: provision of proper communication, good quality material selection, cost-effective equipment selection, accurate plans and specifications, correct training, elimination of errors, and prevention of rework.

The present performance appraisal systems are primarily focused on evaluating individual employee performance. Future systems should also include evaluation of overall organizational performance through frequent external audits. Periodical performance appraisals should be made compulsory, especially in public sector firms. Timely feedback from concerned personnel must be ensured so that performance-related issues can be rectified before they escalate.

Future research can extend this study to include a broader geographic sample across India, incorporate digital performance tracking tools, and investigate the role of Building Information Modeling (BIM) integration in performance appraisal within smart construction environments.

## ACKNOWLEDGMENT

The author would like to thank Dr. T. R. Sethu Raman, Principal and Project Supervisor, and Mrs. Ajeera, Assistant Professor, Civil Engineering Department, Sivaji College of Engineering & Technology, for their guidance and support throughout this work. Sincere gratitude is also expressed to Dr. Sivaji Jaganathan, Chairman, for providing the opportunity to undertake this research.

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