Evaluation of Construction Firms using Human Performance Factors

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Abstract- *Construction industry is one of the labor intensive industries where human capital is considered as the greatest asset of the organization. However it has been observed since long that human workforce in an organization represent the most complex resource to manage compared to any other resources that are required for satisfactory completion of a project. In general construction industry often experiences complexities in meeting project completion schedule and finance due to non-availability of sufficient number of skilled labors and staff to carry out the planned work. This kind of intricacy can be managed and it is efficiently possible to handle such issues with proper utilization of human resource management techniques to avoid shortage of labor. This research focuses on multiples site surveys based on human performance factors with different classes and experiences of construction firms. On collection of the data it is evaluated using AHP process.*

Keywords- Construction firm, human performance factor, Analytical hierarchy process

I. INTRODUCTION

Human resource is one of the most vital resources involved in the proper functioning of an organization. Human resource can also be referred to as human capital. The term capital denotes wealth, money, property owned by an individual or an organization. Human capital refers to overall skill and knowledge of the total workforce of an organization that can be utilized to achieve long term goals. An employee is a rare resource, immutable, non-substitutable and a valuable. There is a requirement for managing human resources according to the stage of growth in the organization. Thus effective management of human capital improves the productivity and overall wealth of an organization. In modern era the Human Resource Management plays an important role in motivating the labor force to work in a productive manner, [1].

The main queries that are addressed and evaluated in this study are:

- Human resource practices followed in the Indian construction industry.
- To study and identify the factors for human performance in construction industry.
- Evaluation of construction firms using human performance factors.

II. LITERATURE SURVEY

[1] Varun .V et.al. System discussed the effective management of this human capital to improve the productivity and wealth of organization as well as to maintain equilibrium between the workers and management. The study identifies the factors that can be used for evaluation of human capital in construction industry and various Multi Criteria Decision Making Techniques used for performance evaluation of Human Resource. Human resource management is an art of motivating the human force for achieving the organizational goals. However construction industry with its extremely large work force identification of the needs of the workers and its fulfillment is a tedious job. The study aimed at identifying the various factors that affects the actual performance of workforce in the construction industry and the various methods of analysis used for their evaluation.

[2] Antonio Aragon et. al., System explained an integrative model that examines strategic human resource practices as a catalytic mechanism influencing the effectiveness of knowledge management. The findings confirm that knowledge management strategies positively influence firm performance through certain high work performance practices selective staffing, intensive training, active participation, comprehensive performance appraisal, and performance-based compensation highlighting the mediating role of human resource management in this relationship and the need to align human resource practices with organizational strategies. This study provides empirical evidence to support the idea that a knowledge management strategy, acting as a coordinating mechanism, indicates the need for enterprise-level strategic human resource practices.

[3] V. Shahhosseini et. al. Author explained human resource management policies and practices, construction firms need to define competency requirements for project staff, and recruit the necessary team for completion of project assignments. Traditionally, potential candidates are interviewed and the most qualified are selected. Precise computing models, which could take various candidate competencies into consideration and then pinpoint the most qualified person with a high degree of accuracy, would be beneficial. This paper presents a fuzzy adaptive decision making model for selection of different types of competent personnel. For this purpose, human resources are classified into four types of main personnel: Project Manager, Engineer, Technician, and Laborer. Then the competency criteria model of each main personnel is developed. Decision making is performed in two stages: a fuzzy Analytic Hierarchy Process (AHP) for evaluating the competency criteria, and an Adaptive Neuro-Fuzzy Inference System (ANFIS) for establishing competency IF-THEN rules of the fuzzy inference system. Finally, a hybrid learning algorithm is used to train the system.

[4] Akiko Ueno, System found that there were six HRM practices, which are most crucial in supporting service quality. The purposes of this paper are, firstly, to clarity the individual relationships among the six HRM practices and to examine how those practices support reach other, and secondly, to develop a model which incorporates all of the inter-relationships among the six. HRM practices. Previously, each individual relationship has tended to be considered in isolation in the literature. Therefore, in this paper, the various inter-relationships were unified into a single model. In this new conceptual framework, the six HRM practices are inter-linked so that each of them may have a joint function in supporting service quality.

[5] Jason E. Barg et. al. fifty two published articles that addressed worker productivity in close context to construction. Twenty two of these works were not presented in this paper because they did not directly relate to construction worker motivation. The thirty articles that did address this topic were tabulated, categorized, and reviewed. Of these articles, nine addressed motivation models, five addressed worker environment/culture, nine addressed worker incentive and empowerment, and seven addressed worker management.

III. FACTORS CONSIDERED FOR STUDY

- Adaptability
- Job knowledge
- Judgment
- Productivity
- Motivation

IV. RESEARCH METHODOLOGY

- **Analytical Hierarchy Process**

The Analytical Hierarchical process is a systematic approach in decision making process where people deal with complex decisions rather than simple one .It was developed by Thomas L Saaty in 1970s based on mathematics and human psychology. It has been extensively studied and refined since then for prioritizing alternatives when multiple criteria must be considered and allows the decision maker to structure complex problems in the form of hierarchy or a set of integrated levels, [1].

The purpose of the AHP is to assist people in organizing their thoughts and judgments to make more effective decisions. The Analytic Hierarchy Process (AHP) provides the objective mathematics to process the inescapably subjective and personal preferences of an individual or group in making decisions. Fundamentally, the AHP works by developing priorities for alternatives and the criteria used to judge the alternatives. First priorities are derived for the criteria in terms of their importance to achieve the goal, then priorities are derived for the performance of the alternatives on each criterion. These priorities are derived based on pair-wise assessments using judgments, or ratios of measurements from a scale if one exists. Finally, a weighting and adding process is used to obtain overall priorities for the alternatives as to how they contribute to the goal, [6].

- **Data Collection**

The data was collected from different construction firms from owners, project engineers, managers through questionnaire survey. The questionnaire survey consisted of detailed information about the firm and human performance factors .Respondents were asked to rate factors of human performance on descriptive scale which was presented to them. The firms were classified according to their experience criteria in construction industry into 5 different classes. Classification of firms is as follows:-

Table 1. Classification of Firms base on classes

Sr. No.	Class	Experience
1	A	Up to 3 years
2	B	Ranging between 4 to 6 years
3	C	Ranging between 7 to 9 years
4	D	Ranging between 10 to 12 years
5	E	More than 12 years

V. RESULT

Table 2. Analysis of classes with respect to Human Performance factors

	Judgment	Adaptability	Motivation	Job Knowledge	Productivity	Score
P.V	0.026	0.045	0.116	0.295	0.516	0.998
Class D	0.032	0.592	0.030	0.465	0.033	0.185
Class A	0.056	0.197	0.045	0.266	0.057	0.123
Class B	0.142	0.106	0.120	0.180	0.171	0.166
Class C	0.261	0.059	0.305	0.057	0.224	0.177
Class E	0.506	0.044	0.498	0.029	0.513	0.346
Total	0.997	0.998	0.998	0.997	0.998	0.997

VI. CONCLUSION

Adaptability, Job Knowledge, Judgment, Motivation, Productivity are the human performance factors derived from the study. Job Knowledge is highly rated by all classes and proves to be the most important factor which firms consider in human performance among all other factors. Class A gave more importance to Job Knowledge and gave least importance to Motivation. Class B gave more importance to Productivity and gave least importance to Adaptability and Motivation. Classes which are highly experienced gave more importance to Job Knowledge, while Adaptability was given least importance. Class E emerges to be the best class as it scored the highest in analytical hierarchy process evaluation. It was followed by Class D, then Class C, then Class B and finally Class A. Thus experience plays a vital role in construction industry as firms which are highly experienced scored more compared to firms which possess less experience.

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