

# Factors and Methods for Performance Evaluation of Human Resource in Construction Industry

Varun .V<sup>1</sup>, Linu T. Kuriakose<sup>2</sup>

<sup>1</sup>Post Graduate Student, Civil Engineering Department, Toc H Institute of Science and Technology, Kerala, India

<sup>2</sup>Assistant Professor, Civil Engineering Department, Toc H Institute of Science and Technology, Kerala, India

**Abstract:** *Construction industry is one of the labor intensive industries where human capital is considered as the greatest asset of the organization. Human resource management is thus required for 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.*

**Keywords:** Human Resource Management, Multi Criteria Decision Making Techniques, Performance Evaluation, Analytical Hierarchical Process, Analytical Network Process, Data Envelopment Analysis.

## 1. 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. Since Construction industry is having an extremely large work force, it is a tedious job to identify various facts that affect the human performance so this study aims at identifying the factors that affect the actual performance of human force and the various tools for evaluation.

## 2. Research Background and Hypothesis

Personal management was the initial step evolved before human resource management. Personal management aims at attracting, retaining and motivating workers. While human resource management aims at competitiveness, profitability, survival and work force flexibility. HRM is broad and team focused. (Armstrong, 1995)

HRM is a multidisciplinary organizational function that evolves various ideas from management, sociology and psychology. According to Storey (1995), HRM is a distinctive approach to employment management which seeks to achieve competitive advantage through strategic deployment of a highly committed and capable force, using an array of cultural, structural and personal techniques. Several human resource theories have been evolved which is summarized by Schuler (2000). According to Resource dependency theory employees are scarce resources, which should be carefully managed. Numerous factors and methods were investigated for formulating a uniform method and

factor for evaluation of human resource in construction industry Dianna et.al [1] identified the challenges and opportunities affecting the future of Human Resource (HR) with the changes in economy, globalization, domestic diversity and technology. Knowledge based economy and globalization was considered as a challenge for HR however it also provided opportunities for HR function to become a priority in organization. The article also discusses the effect of information technology and its profound effect on human resource management and predicts the influence of technology in future HR practices. Wayne et.al [2] discussed about the five broad areas of HRM system i.e., Staffing, retention development, adjustment and managing change. The factor identified was then used to develop HRM practices that benefit the organizational demands and employees welfare which in turn maximizes the productivity and efficiency of the organization.

According to Serder et.al [3] the three basic planning elements are time, cost and quality. The identification of fundamental elements was done by comparing labor productivity rates with the Unit Price Analyses (UPA). Amin et.al [4] studied the different aspects of working hours on performance with a reasonable degree of accuracy was done with the help of a hybrid SD<sub>1</sub>-DES model. And pointed out that improving the productivity ratio even by a few percent decreases the final project cost and can increase the profit of the organization. The effect of technology on HR process and its influence in attracting, motivating and retaining employees of an organization was reviewed by Dianna et.al [5]. It also identified the limitations of one way communication system which is impersonal and passive that creates an artificial distance between individuals and organizations. Feodor et.al [6] suggested that the efficiency of HRM with organizational structure and main tendencies that characterize the development of service of Human Resource Management with modern economic practice. Esra et.al [7] studied Multi Criteria Decision Making (MCDM) problems with interactions and stressed on the importance of considering the inter dependencies between criteria and alternatives which are effective in decision making process by considering both quantitative and qualitative data and also developed a hybrid model using Analytical network process(ANP) and Choquet integral to evaluate employees

performance. **Albert et.al** [8] identified different multi project management approaches in a structured way with available amount of resources. Approaches were classified into two dimensional classifications. One dimension classifies how the scheduling problem is approached relying on human insights and other based on the centralized or decentralized decision making. **Eugenijus et.al** [9] discusses the fact that to create efficient public service and to successfully pursue public administration reform it is necessary to improve human resource system through innovations. It mainly focused on the need of Human resource management in public administration as a result of globalization and inter regional society development. The study also highlights the need of better creativity, high morality, team work, skills, and adaptability to multicultural environment to be inculcated in public HRM system. **Alfredo et.al** [10] addresses the problems of risk management in construction projects using knowledge based approach, and proposes a methodology based on three-fold arrangement that includes the modeling of the risk management function, its evaluation, and the availability of the best practices model. This research will help owners and contractors to have a more systematic and formal approach to risk management and to make use of their own knowledge and experience as well as international practices.

### 3. Factors for Evaluation of human performance

The factors of analysis for evaluating human performance vary for each industry. Construction industries being a labor intensive one should evaluate factors that can provide overall development of work force thereby achieving its strategic and management goals. Some of the factors that affect performance of human resource in construction industry were identified and are discussed below.

#### 3.1. Competency

Competency is the ability of an individual to do a job properly. Competency is the sum of all observable and measurable personal traits, professional skills, knowledge of an employee ;which he/she contribute to work and ultimately benefits the organization that employ them. Competency is a set of defined behaviors that provide a structured guide enabling the identification, evaluation and development of behavior in individual employees. Competency based assessments provide clarity in performance analysis. Competencies bridge the gap between performance management and employee development and are an integral component of personal development plans. Competencies close skill gaps within the organization. Competency data can be used for employee development, compensation, promotion, training and new hire selection decisions.

#### 3.2. Effective safety management

Effective safety management system is a term used to refer to comprehensive business management system designed to manage safety elements in the work place it provides a systematic way to identify hazards and control risk while maintaining assurance that these risk controls are effective. Workers who complain about workplace safety or health hazards are frequently the targets of reprisals by their

employers. In effective safety management factors like ability to identify possible work hazards, effectiveness in adopting preventive measures, safety management in reducing accident frequency, learning from past events, accident reporting are the factors analyzed.

#### 3.3. Attitude

Job attitude is a set of evaluations that constitute ones feelings, beliefs and attachment to job. There are two particular job attitudes namely job satisfaction and organizational commitment that influence ones behavior towards job. In professional jobs such as with engineers and researchers, there exist a stronger link between work attitudes and performance, as opposed to manual jobs such as assembly-line workers. Correlation between work attitudes and performance is important and has practical value. People who are organized, reliable, dependable, and achievement-oriented seem to outperform others.

#### 3.4. Quality

Quality is a measure of excellence or a state of being free from defects, deficiencies and significant variation. It is brought about by strict and consistent commitment to certain standards that achieve uniformity of a product in order to satisfy specific consumer or user requirements. Quality of work has a great impact in construction industry. Quality in construction industry refers to three things namely getting the job done on time, project completed based on client requirements, and completing the project within budget.

Quality of materials used in construction, efficiency of engineers, supervisors and other skilled and unskilled labors defines the success of a construction project. Compared to manufacturing and service industry, construction industry has poor quality standards mainly due to poor quality of exhibited by workers. Application of total quality management can improve the quality aspects of construction industry. A shift in the behavior and culture of the workforce especially senior management in the construction industry is necessary to improve its performance. Implementation of TQM in construction industry can be achieved only through cultural change.

#### 3.5. Productivity

Productivity is a measure of the efficiency of a person, machine, factory or system in converting inputs into useful outputs. Productivity is an average measure of efficiency of production it can be expressed as the ratio of output to input used in the production process.

The operational procedure of construction industry is complicated in nature. This industry consists of professionals involved in different phases of construction project like development, finance, concept development and review, detailed engineering, procurement, construction and startup. The clients, consultants, contractors, sub-contractors of a construction project all have to play their respective role to deliver a quality project. Another characteristic of construction industry is that the procedures lack standardization; this in turn leads to difficulties in quality assurances. As the processes continuously change with

changes in the plan during the course of construction also affect the productivity standards.

### 3.6. Risk

Risk is the measure of probability or threat of damage, injury liability loss or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action. The concept of risk in construction industry is multi-dimensional in nature. Risks involved in construction industry include project risk, financial risks, logistical risk, technical risks, environment and management related risk. Technical risk includes incomplete design, inadequate site investigation etc. Logistical risk comprises of availability of transportation facilities, resources such as construction equipment's spare parts, fuel, labor etc. Management related risk involves uncertain productivity of resources, industrial relation problems. Environment risk includes natural disasters and weather and seasonal implications. Financial risk involves delay in payments, local taxes, inflation etc. Application of project management techniques from the beginning of the project till its completion helps in mitigating the risks to a great extent. If the risks are not properly managed chances of cost overruns, delay in project completion and low quality which in turn leads to client dissatisfaction.

### 3.7. Ethics

Ethics is the system of moral principles based on which human actions are judged as right or wrong. They affect how people make decisions and lead their lives. Ethics is concerned with what is good for individuals and society and is also described as moral philosophy. Ethics can be both business ethics and personal ethics, both are inter related. Business ethics emphasizes on the basic rules to be followed by a business organization with regard to the society they operate in. Professional ethics refers to the responsibilities and procedures to be followed by a group of people involved in a profession with regard to the organization they work and the public at large. Professionals are not exempt from common ethical behaviors like obligations, duties and responsibilities-that are binding on ordinary people and are usually bound by a set of principles, attitudes or types of character dispositions that control the way the profession is practiced. Professional ethics in construction industry is very much dependent on the implementation and policing of the ethical guidelines and polices of both professional bodies and private organizations together with the leadership of public sector procurement agencies. As long as the lack of professionalism and ethics remains, even the ethically good will have difficulty to adhere to moral code of conduct.

### 3.8. Cost and Benefit Evaluation

Cost Benefit evaluation is a systematic approach to estimate the strength and weakness of alternatives that satisfy transaction activities or functional requirements of a business. It is a technique that is used to determine options that provide best approach for the adoption and practice in terms of benefits in labor, time and cost savings. As far as the construction industry is concerned cost benefit evaluation is relevant because chances of financial risks like inflation, delay in payments, local taxes, labor cost fluctuations etc.

always linger around a construction project from the beginning till the end. So if effective project management practices are not in place then cost overrun can occur. Cost benefit evaluation is necessary to identify the feasibility of a project. Cost benefit evaluation helps to set an appropriate budget.

## 4. Methods used for evaluation human performance in industries

There exist a number of methods for evaluating the human performance in various organizations however choosing the right method of evaluation is the key to maintain the equilibrium between the management and work force. The various methods used are as follows.

### 4.1. Psychological Methods

Psychological method is one of the traditional techniques used to evaluate the employee of an organization. This method includes in-depth interviews, psychological tests, and discussion with supervisors etc. Using the data obtained employee's intellectual and emotional quotient is analyzed. However this method is costly and effectiveness of the evaluation is largely dependent on the skill of the psychologist. But this method helps to understand the extent of motivation and dedication the employee has to his organization.

### 4.2. Reward system

Reward system is a modified version of the traditional carrot and stick approach where the employees are rewarded for achieving organizational goals within the stipulated time period and available resources. The reward system is a highly motivational technique which increases the productivity and professional approach of the employee. It includes reward measures like bonuses, increased pay, overtime payment, additional time off, Holiday packages etc. .

### 4.3. 360 Degree Evaluation

It is a method by which an employee is evaluated based on the performance data collected from the Team leaders, Human Resource manager, co-workers and all those who can provide useful information about the employees. This technique is widely used since multiple rating helps in giving accurate information. The 360 degree evaluation also helps in the all-round development of the employee to the needs of the organization and achieving its strategic goals.

### 4.4. AHP- Analytical Hierarchical 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. This method is widely used to evaluate large amount of data hence it considered superior to the traditional techniques.

#### 4.5. ANP-Analytical Network Process

The Analytical Network Process is a more general form of AHP used in Multi criteria Decision Making process analysis. AHP structures decision problem into a hierarchy with a goal, decision criteria and alternative while ANP structures it as a network. Both then use the system of pair wise comparison to measure the weight of the components of the structure and finally to rank alternatives in the decision process. In many real world cases there is interdependence among the items and alternatives. However ANP does not require interdependence among elements so it can be used as an effective tool in these cases. ANP method is an improved method in comparison to AHP for data evaluation and serves as a foundation for much management software.

#### 4.6. DEA-Data Envelopment Analysis

DEA is a non-parametric method in operations research and economics for the estimation of production frontiers. It is used to empirically measure productive efficiency of decision making units. It is linear programming methodology to measure the efficiency of multiple decision making units when the production process presents a structure of multiple inputs and outputs. Using the DEA sources of inefficiency can be analyzed and quantified. Hence this method is widely preferred over traditional methods where quantification of data is insufficient.

#### 4.7. ELECTRE- Elimination and Choice Expressing Reality

Usually ELECTRE methods are used to discard some alternatives to the problem after that we can use another of Multi-Criteria Decision Analysis to select the suitable alternative. It is based on the concept of ranking by paired comparisons between alternatives on the appropriate criteria. The advantage of using the ELECTRE methods is that we can apply another MCDA with a restricted set of alternatives saving much time. Bernard Roy is widely recognized as the father of ELECTRE method. It is usually classified as an outranking method of decision making.

### 5. Conclusion

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 affect the actual performance of workforce in the construction industry and the various methods of analysis used for their evaluation. The review suggests that use of Multi criteria decision making techniques like Analytical hierarchical process, Analytical network process and TOPSIS methods are more superior in evaluating human performance than traditional techniques like reward system, psychological methods and 360 evaluation techniques. Since both qualitative and quantitative data can be analyzed by using the MCDM techniques.

### References

- [1] Abbas Al-Refaie, "Effects of human resource management on hotel performance using structural equation modelling", *Computers in Human Behaviour* 43, 293-303, 2015.
- [2] Ahmet Ecirli, Edith Mihaela Dobre, Emilian Dobresu, Loana Danetiu "Human Resources in European Market in the Past Decade-A sociological overview", *Procedia-Social and Behavioural Sciences*, 150, 320-329, 2014.
- [3] Albert Ponsteen, Rob J. Kusters "Classification of Human and Automated Resource Allocation Approaches in Multi-project management", *Procedia-social and behavioral science*, 194, 165-173, 2014.
- [4] Alfredo Federico Serpella, Ximena Ferrada Rodolfo Howard, Larissa Rubio, "Risk management in construction projects: a knowledge-based approach", *Procedia-Social and Behavioural Sciences*, 119, 653-662, 2014.
- [5] Ali Gorener, "Comparing AHP and ANP: An Application of Strategic Decisions Making in a Manufacturing Company", *International Journal of Business and Social Science*, 3, 194-208, 2012.
- [6] Amin Alvanchi, SangHyun Lee, Simaan Abourizk, "Dynamics of Working Hours in Construction", *Journal of construction engineering and management (ASCE-2012)*, 138, 66-77, 2012.
- [7] Andra Badea, Gabreila Prosteian, Gilles Gonsalves, Hamid Allaoui, "Assessing risk factors in collaborative supply chain with the analytic hierarchy process", *Procedia-Social and Behavioral Sciences*, 124, 114-123, 2014.
- [8] Dianna L. Stone, Diana L., Deadrick, "Challenges and opportunities affecting the future of human resource management", *Human Resource Management review*, 2015.
- [9] Dianna L. Stone, Diana L. Deadrick, Kimberly M. Lukaszewki, Richard Johnson, "The Influence of Technology on the Future of Human Resource Management", *Human resource management review*, 2015.
- [10] Esra Albayrak, Tuncay Gurbuz, "An Engineering approach to human resource performance evaluation: Hybrid MCDM application with interactions", *Applied soft computing*, 21, 365-375, 2014.
- [11] Eugenijus Chlivickas, "International cooperation and innovation for developing human resources system", *Procedia-social and Behavioral sciences*, 110, 276-283, 2014.
- [12] Feodor Mikhaylov, Kolesnikova Julia, Salpkhov Eldar, "Current tendencies of the development of service of human resources management", *Procedia-Social and Behavioral sciences*, 150, 330-335, 2014.
- [13] Serder Ulubeyli, Aynur Kazaz, Bayram Er, "Planning Engineers Estimates on Labor productivity: Theory and Practice", *Procedia-Social and Behavioral sciences*, 119, 12-19, 2014.
- [14] Shuai Shao, Lili Yang, "Natural resource dependence, human capital accumulation, and economic growth: A combination explanation for the resource curse and the resource blessing", *Energy Policy*, 74, 632-642, 2014.
- [15] Thomas L. Saaty, "Decision making with the analytic hierarchy process", *International journal Services and science*, vol-1, 2008.
- [16] Wayne F. Cascio, "Human Resource Management, Psychology of", *International encyclopaedia of the social and Behavioral sciences*, 1, 348-352, 2015.