**CHAPTER TWO**

**LITERATURE REVIEW**

**2.0 Introduction**

A performance appraisal (PA) or performance evaluation is a systematic and periodic process that assesses an individual employee’s job performance and productivity, in relation to certain pre-established criteria and organizational objectives. Other aspects of individual employees are considered as well, such as organizational citizenship behaviour, accomplishments, potential for future improvement, strengths, and weaknesses (Manasa & Reddy, 2009). A PA is typically conducted annually. However, the frequency of evaluation, and policies concerning them, varies widely from workplace to workplace. Sometimes an evaluation will be given to a new employee when a probationary period ends, after which they may be conducted on a regular basis (such as every year). Usually, the employee’s supervisor (and frequently, a more senior manager) is responsible for evaluating the employee, and he or she does so by scheduling a private conference to discuss the evaluation. The interview functions as a way of providing feedback to employees, counselling and developing employees, and conveying and discussing compensation, job status, or disciplinary decisions.

**2.1 History Of Performance Evaluation**

The history of performance Evaluation is relatively recent. (North, Intoduction To Performance Appraisal, 2010) Its can be traced to Taylor's pioneering Time and Motion studies. But this is not very helpful, for the same may be said about almost everything in the field of modern human resources management.

As a distinct and formal management procedure used in the evaluation of work performance, appraisal really dates from the time of the Second World War - not more than 60 years ago. Yet in a broader sense, the practice of appraisal is a very ancient art. In the scale of things historical, it might well lay claim to being the world's second-oldest profession! There is, says Dulewicz (Dulewicz, 1989)"... a basic human tendency to make judgements about those one is working with, as well as about oneself."

Appraisal, it seems, is both inevitable and universal. In the absence of a carefully structured system of appraisal, people will tend to judge the work performance of others, including subordinates, naturally, informally and arbitrarily. The human inclination to judge can create serious motivational, ethical and legal problems in the workplace. Without a structured appraisal system, there is little chance of ensuring that the judgements made will be lawful, fair, defensible and accurate. Performance appraisal systems began as simple methods of income justification. That is, an appraisal was used to decide whether or not the salary or wage of an individual employee was justified.

The process was firmly linked to material outcomes. If an employee's performance was found to be less than ideal, a cut in pay would follow.

On the other hand, if their performance was better than the supervisor expected, a pay rise was in order.

Little consideration, if any, was given to the developmental possibilities of the appraisal. It was felt that a cut in pay, or rise, should provide the only required impetus for an employee to either improve or continue to perform well. Sometimes this basic system succeeded in getting the results that were intended; but more often than not, it failed.

Institutionalization of performance appraisal started as far back as the industrial revolution when it was used as a means of measuring organizational efficiency (Fandray, 2001). (Wren, 1994) affirmed that Performance appraisal was incepted when Robert Owen used a wooden coloured block to measure the achievement of employees working in the cotton Mills in Scotland at the close of work hours. During that era, it was utilized as a disciplinary mechanism for punishing poor performance (Kennedy & Dresser, 2001). This resulted in the negative notation of the appraisal system which turned out to be despised by both the appraiser and the appraisee. As confirmed by (Robert & Pregitzer, 2007) “performance appraisal is a yearly rite of passage in organizations that triggers dread and apprehension in the most experienced, battle-hardened manager”. The above quote summarizes the extent to which the appraisal process is disliked by the evaluators. Subsequently, organizations tried to refine the methods linking it to other administrative matters including reward, promotion, training and so forth, arguing that employees achievements should not only be measured but evaluated and managed (Kennedy & Dresser, 2001). Despite the historical perspective, an appraisal is both inevitable and universal. There has been much analysis and wide criticisms of the effectiveness and use of performance appraisal within the organizational context but up to recent times, the issue is still being debated among scholars, academicians and professionals.

**2.2 Traditional Methods of Performance Appraisal**

**2.2.1 Rating Scales Method**

Rating Scales Method is a commonly used method for assessing the performance of the employees and well-known traditional method of performance appraisal of employees (Archer, 2000). Many corporations and companies example in the country India, telecommunications company likely airtel and US IT companies like Dell Corporation are using this method for evaluating the employees and subsequently take decisions on the concerned employee.

Depending upon the job of an employee under this method of appraisal traits like attitude, performance, regularity, accountability, and sincerity, etc, are rated with the scale from 1 to 10. 1 indicates negative feedback and 10 indicates positive feedback as shown below.

The attitude of the employee towards his superiors, colleagues, and customers

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Extremely Excellent poor

Regularity in the job

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Extremely                                                                                    Excellent

poor

Under this method of performance appraisal, an employee may be assessed by his superiors, colleagues, subordinates or sometimes by his customers which all depends on nature of the company or job which is added where the employee. An appraiser is a person who appraises employee will give a rating for every trait given by marking or choosing a number based on his observation and satisfaction. ultimately all numbers chosen or marked will be added to determine the highest score gained by an employee. An employee who scored more points will be treated as a top performer following  descending scored employees will be treated as a low performer and the least scored employee will be treated as non-performers

**2.2.2 Essay Appraisal Method**

This traditional form of appraisal, also known as “Free Form method” involves a description of the performance of an employee by his superior. The description is an evaluation of the performance of any individual based on the facts and often includes examples and shreds of evidence to support the information. A major drawback of the method is the inseparability of the bias of the evaluator.   
  
Under this method, the rater is asked to express the strong as well as weak points of the employee’s behaviour. This technique is normally used with a combination of the graphics rating scale because the rater can elaborately present the scale by substantiating an explanation for his rating. While preparing the essay on the employee, the rater considers the following factors: 

1. Job knowledge and potential of the employee;
2. Employee’s understanding of the company’s programmes, policies, objectives, etc.;
3. The employee’s relations with co-workers and superiors.

How is technology helping transform performance appraisal and management?  
The most common cliché is “performance appraisal is dead“. What it means is the annual performance appraisal is dead and most organizations today are adopting regular, real-time, anecdotal and casual feedback. Just as young people do not write e-mails anymore they WhatsApp similarly we don't have to write a long performance appraisal at the end of the year. Companies are moving to real-time performance appraisal and that is why in our system everything is shareable and real-time. And technology plays the most crucial role in providing the platform to have fast and quick and informal communication.

1. The employee’s general planning, organizing and controlling ability;
2. The attitudes and perceptions of the employee, in general.

Essay evaluation is a non-quantitative technique. This method is advantageous in at least one sense, i.e., the essay provides a good deal of information about the employee and also reveals more about the evaluator. The essay evaluation method, however, suffers from the following limitations:

1. It is highly subjective; the supervisor may write a biased essay. The employees who are sycophants will be evaluated more favourably than other employees.
2. Some evaluators may be poor in writing essays on employee performance. Others may be superficial in explanation and use flowery language which may not reflect the actual performance of the employee. It is very difficult to find effective writers nowadays.

The appraiser is required to find time to prepare the essay. A busy appraiser may write the essay hurriedly without properly assessing the actual performance of the worker. On the other hand, the appraiser takes a long time, this becomes uneconomical from the viewpoint of the firm, because the time of the evaluator (supervisor) is costly.

**2.2.3 Ranking Method**

Under the ranking method, the manager compares an employee to other similar employees, rather than to a standard measurement. An offshoot of ranking is the forced distribution method, which is similar to grading on a curve. Predetermined percentages of employees are placed in various performance categories, for example, excellent, above average, average, below average, and poor, The employees ranked in the top group usually get the rewards (raise, bonus, promotion), those not at the top tend to have the reward withheld, and those at the bottom sometimes get punished.

**2.2.3.1 Why Ranking Method**

Managers have to make evaluative decisions, such as who is the employee of the month, who gets a raise or promotion, and who gets laid off. So when we have to make evaluative decisions, we generally have to use ranking. However, our ranking can, and when possible should be based on other methods and forms. Ranking can also be used for developmental purposes by letting employees know where they stand in comparison to their peers—they can be motivated to improve performance (Archer, 2000).

**2.2.4 Paired Comparison**

A better technique of comparison than the straight ranking method, this method compares each employee with all others in the group, one at a time. After all the comparisons on the basis of the overall comparisons, the employees are given the final rankings.

**2.2.5 Critical Incidents Location**

This technique of performance appraisal was developed by Flanagan and Burns (Flanagan, 1954). The manager prepares lists of statements of very effective and ineffective behaviour of an employee. These critical incidents or events represent the outstanding or poor behaviour of employees on the job. The manager maintains logs on each employee, whereby he periodically records critical incidents of the workers' behaviour. At the end of the rating period, these recorded critical incidents are used in the evaluation of the workers’ performance.

**2.2.6 Checklist Method**The rater is given a checklist of the descriptions of the behaviour of the employees on the job. The checklist contains a list of statements on the basis of which the rater describes the on the job performance of the employees.

1. Another simple type of individual evaluation method is the checklist. A checklist represents, in its simplest form, a set of objectives or descriptive statements about the employee and his behaviour. If the rater believes strongly that the employee possesses a particular listed trait, he checks the item; otherwise, he leaves the item blank. A more recent variation of the checklist method is the weighted list. Under this, the value of each question may be weighted equally or certain questions may be weighted more heavily than others. The following are some of the sample questions in the checklist.
2. Is the employee really interested in the task assigned?
3. Is he/she respected by his colleagues (co-workers)
4. Does he/she give respect to his superiors?
5. Does he/she follow instructions properly?
6. Does he/she make mistakes frequently?

**2.3 Modern Method Of Appraisal**

With time and technology, workplaces have evolved drastically and needed better appraisal methods than the traditional methods of performance appraisal. It’s been observed that traditional methods lay more emphasis on rating individual’s personality traits, whereas the modern methods of performance appraisal lay more emphasis on the evaluation of job achievements, which is more objective and worthwhile.

**2.3.1 Assessment Centres**

An assessment centre is a place to evaluate an individual potentiality and performance, so as to position he/she in the core functional areas in an organisation. normally, organisations outsource assessment centres instead of making them on their own.

This method of performance appraisal is being opted by the RBI (Reserve Bank of India) for assessment of its officers (Saumya, 2019).

An assessment centre typically involves the use of methods like social/informal events, tests and exercises, assignments being given to a group of employees to assess their competencies to take higher responsibilities in the future. Generally, employees are given an assignment similar to the job they would be expected to perform if promoted. The trained evaluators observe and evaluate employees as they perform the assigned jobs and are evaluated on job-related characteristics.   
  
The major competencies that are judged in assessment centres are interpersonal skills, intellectual capability, planning and organizing capabilities, motivation, career orientation etc. assessment centres are also an effective way to determine the training and development needs of the targeted employees.   
  
Nearly 30% of companies seek assessment centre services while moving an employee from an executive position to a managerial position. 20% of companies said they use the centre's services when seeking a position on senior management level (North, 2000).

**2.3.2 Behaviorally Anchored Rating Scales**  
  
Behaviorally Anchored Rating Scales (BARS) is a relatively new technique which combines the graphic rating scale and critical incidents method. It consists of predetermined critical areas of job performance or sets of behavioural statements describing important job performance qualities as good or bad (for example the qualities like inter-personal relationships, adaptability and reliability, job knowledge etc). These statements are developed from critical incidents.   
  
In this method, an employee’s actual job behaviour is judged against the desired behaviour by recording and comparing the behaviour with BARS. Developing and practising BARS requires expert knowledge.  
  
A behaviorally anchored rating scale is an employee appraisal system where raters distinguish between successful and unsuccessful job performance by collecting and listing critical job factors. These critical behaviours are categorized and appointed a numerical value which is used as the basis for rating performance.

**2.3.3 Human Resource Accounting Method**  
  
Human Resource Accounting is a method to measure the effectiveness of personnel management activities and the use of people in an organization.HRA is the process of Assigning, budgeting, and reporting the cost of human resources incurred in an organization, including wages and salaries and training expenses.  
  
Human resources are valuable assets for every organization. Human resource accounting method tries to find the relative worth of these assets in terms of money. In this method, the Performance appraisal of the employees is judged in terms of the cost and contribution of the employees. The cost of employees include all the expenses incurred on them like their compensation, recruitment and selection costs, induction and training costs etc whereas their contribution includes the total value added (in monetary terms). The difference between the cost and the contribution will be the performance of the employees. Ideally, the contribution of the employees should be greater than the cost incurred on them.

**2.3.4 Customer Feedback Method**

This method is truly one of the modern methods of the performance appraisal system. Customer feedback method is used, especially for sales staff who deal with sales activity in the organisation. Under this method of appraisal system, customer feedback is directly linked with employee performance. This method of assessment could be unbiased and reliable since customers who are outsiders may give correct judgement about employee performance than the insiders who are superiors.  
  
Companies like Cognizant and Wipro software solutions (North, 2000) are using customer feedback method to assess the performance of their sales staff in order to hike salaries.

Some industry experts say placing a higher weightage on customer feedback may fail to motivate employees because customer feedback may vary from customer to customer. Depending on the current state of mind, psychology and perception of the customers may give different feedback for the same degree of sales service.

### 2.4 Performance Evaluation Criticism

An issue with performance appraisals is that differentiating individual and organizational performance can be difficult. And if the evaluation's construction doesn't reflect the culture of a company or organization, it can be detrimental. Employees report general dissatisfaction with their performance appraisal processes (Gary Roberts, 2007). Other potential issues include:

1. Distrust of the appraisal can lead to issues between subordinates and supervisors or a situation in which employees merely tailor their input to please their employer.
2. Performance appraisals can lead to the adoption of unreasonable goals that demoralize workers or incentivize them to engage in unethical practices.
3. Some labour experts believe that the use of performance appraisals has led to lower use of merit- and performance-based compensation (Chen, 2018).
4. Performance appraisals may lead to unfair evaluations in which employees are judged not by their accomplishments but by their likeability. They can also lead to managers giving underperforming staff a good evaluation to avoid souring their relationship.
5. Unreliable raters can introduce a number of biases that skew appraisal results toward preferred characteristics or ones that reflect the rater's preferences.
6. Performance appraisals that work well in one culture or job function may not be useful in another.

**2.5 Decision Support System**

decision support system (DSS) is an information system that supports business or organizational decision-making activities. DSSs serve the management, operations and planning levels of an organization (usually mid and higher management) and help people make decisions about problems that may be rapidly changing and not easily specified in advance—i.e. unstructured and semi-structured decision problems. Decision support systems can be either fully computerized or human-powered or a combination of both.

While academics have perceived DSS as a tool to support decision-making processes, DSS users see DSS as a tool to facilitate organizational processes (Keen & Peter G, 1980). Some authors have extended the definition of DSS to include any system that might support decision making and some DSS include a decision-making software component; (Ralph H. Sprague, 1908) Ralph H. Sprague defines a properly termed DSS as follows:

1. DSS tends to be aimed at the less well structured, underspecified problem that upper-level managers typically face;
2. DSS attempts to combine the use of models or analytic techniques with traditional data access and retrieval functions;
3. DSS specifically focuses on features which make them easy to use by non-computer-proficient people in an interactive mode; and
4. DSS emphasizes flexibility and adaptability to accommodate changes in the environment and the decision making approach of the user.

**2.6 Fuzzy Logic**

Fuzzy logic is a form of many-valued logic in which the truth values of variables may be any real number between 0 and 1 inclusive. It is employed to handle the concept of partial truth, where the truth value may range between completely true and completely false (Novák, Perfilieva, & Močkoř, 1999). By contrast, in Boolean logic, the truth values of variables may only be the integer values 0 or 1.

The term fuzzy logic was introduced with the 1965 proposal of fuzzy set theory by Lotfi Zadeh (Petr, Christian, Fermüller, & Carles, 2006). Fuzzy logic had however been studied since the 1920s, as infinite-valued logic—notably by Łukasiewicz and Tarski (Pelletier & Francis, 2000).

It is based on the observation that people make decisions based on imprecise and non-numerical information, fuzzy models or sets are mathematical means of representing vagueness and imprecise information, hence the term fuzzy. These models have the capability of recognising, representing, manipulating, interpreting, and utilising data and information that are vague and lack certainty (About fuzzy logic, 2018).

**2.6.1 Fuzzy System**

The fuzzy system generally involves three phases of fuzzification, fuzzy inference and defuzzification.

**2.6.1.1 Fuzzy Inference**

Fuzzy inference engine resembles human reasoning in its use of approximate information and uncertainty to generate decisions. It consists of rules, facts and conclusions. The fuzzy production rules connect premises with conclusions, condition with action. In this inference, expert's knowledge and experience was acquired and formulate accordingly to develop the appropriate rule to perform the system. The fuzzy inference can be implemented using the if-then statements. The if-then implementation is the same as that executed in expert systems except that it involves the linguistic variables.

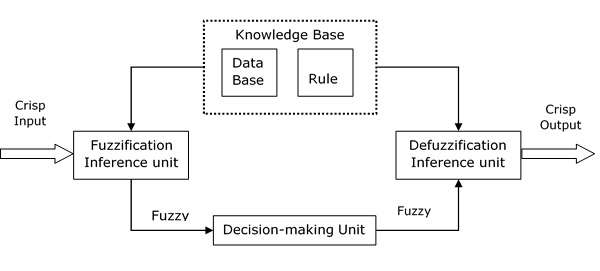


Figure 2.1 Fuzzy Logic Inference System.

**2.6.1.2 Fuzzification**

Fuzzification is the process of assigning the numerical input of a system to fuzzy sets with some degree of membership. This degree of membership may be anywhere within the interval [0,1]. If it is 0 then the value does not belong to the given fuzzy set, and if it is 1 then the value completely belongs within the fuzzy set. Any value between 0 and 1 represents the degree of uncertainty that the value belongs in the set. These fuzzy sets are typically described by words, and so by assigning the system input to fuzzy sets, we can reason with it in a linguistically natural manner.

**2.6.1.3 Defuzzification**

Defuzzificationor decomposition involves finding a value that best represents the information contained in the fuzzy set. The implementation of defuzzification is important in order to transform the linguistic terms back into the crisp interpretation. The Defuzzification process yields the expected value of the variable for a particular execution of a fuzzy model.

**2.6.2 Early Applications Of Fuzzy Logic**

Many of the early successful applications of fuzzy logic were implemented in Japan. The first notable application was on the subway train in Sendai, in which fuzzy logic was able to improve the economy, comfort, and precision of the ride (Kosko, 1994). It has also been used in recognition of hand-written symbols in Sony pocket computers, flight aid for helicopters, controlling of subway systems in order to improve driving comfort, precision of halting, and power economy, improved fuel consumption for automobiles, single-button control for washing machines, automatic motor control for vacuum cleaners with recognition of surface condition and degree of soiling, and prediction systems for early recognition of earthquakes through the Institute of Seismology Bureau of Meteorology, Japan (Bansod, Kulkarni, & Patil, 2005).

**2.6.3 Why Fuzzy Logic**

The major advantages of the fuzzy logic system over other decision support logic are:

1. Similar to human reasoning
2. Based on the linguistic model
3. Using simple mathematics for nonlinear, integrated and complex systems
4. High precision
5. The ease of implementation
6. Able to manage troubles associated with inaccurate data

**2.6.4 Drawbacks OF Fuzzy Logic**

1. For more accuracy, you need more fuzzy grades, which results in an exponential increase in the rule.
2. Usually lacks real-time responds.
3. A restricted number of usage of input variables

**2.7 Related Works**

Jayanthi et al (Jayanthi, Goyal, & Ahson, 2008) presented the role of data mining in Human Resource Management Systems (HRMS). A deep understanding of the knowledge hidden in Human Resource (HR) data is vital to a firm's competitive position and organizational decision making. Analyzing the patterns and relationships in HR data is quite rare. The HR data is usually treated to answer queries. Because HR data primarily concerns transactional processing (getting data into the system, recording it for reporting purposes) it is necessary for HRMS to become more concerned with the quantifiable data. They show how data mining discovers and extracts useful patterns from this large data set to find observable patterns in HR. The paper demonstrates the ability of data mining in improving the quality of the decision-making process in HRMS and gives propositions regarding whether data-mining capabilities should lead to increased performance to sustain competitive advantage.

Hamidah et al (Hamidah, AbdulRazak, & O, 2009), in their work, described the background of data mining, data mining in human resource application and an overview of talent management. Their literature study reveals that most researchers have discussed HR applications from a different type of application. However, there should be more HR applications and Data Mining techniques applied to different problem domains in HRM field research in order to broaden our horizon of academic and practice work on HR applications using Data Mining techniques. Due to these reasons, they proposed the suitable Data Mining techniques for performance prediction based on an initial experiment. They suggested for future work that the data in HR can be tested using other Data Mining techniques to find out the best accuracy of the techniques, especially for talent management data. Besides that, the relevance of attributes should be considered as a factor to the accuracy of the classifier. It was also suggested that in future experiment, attribute reduction experiment should take place in order to choose the relevant attributes for each of the factor. Once the relevant attributes are attained, the next modelling steps can be established to recommend. Finally, the ability to continuously change and obtain new understanding is the power of HR application, and this can be the HR applications of future work.

Nagadevara et al (Nagadevara, Srinivasan, & Valk, 2008), explored the relationship of withdrawal behaviours like lateness and absenteeism, job content, tenure and demographics on employee turnover in a rapidly growing sector like the Indian software industry. The unique aspect of this research was the use of five predictive data mining techniques (artificial neural networks, logistic regression, classification and regression trees, classification trees (C5.0), and discriminant analysis) on a sample data of 150 employees in a large software organization. The results of the study clearly show a relationship between withdrawal behaviours and employee turnover. This study raised several issues for future research. First, further research could explicitly collect data on demographic variables across a large sample of organizations to examine the relationship between demographic variables and turnover. Second, large scale data on variables in the past academic research which have a relationship with turnover can be collected longitudinally.

Such a data set will allow for more rigorous analysis and also a refined prediction model. Third, the context-specific variables of employee turnover which emerged from this study would warrant a deeper understanding of the phenomena. There is a need for more empirical research and in particular, longitudinal research using data within corporations to refine the model. Last, more research needs to be conducted on various samples to confirm the validation of the theoretical model and the prediction model proposed in the study.

Wei-Chiang and Ruey-Ming (Wie-Chiang & Ruey-Ming, 2007), in their work explored the feasibility of applying the *Logit* and *Probit* (Moore, 2007)models, which have been successfully applied to solve nonlinear classification and regression problems, to employee voluntary turnover predictions. A numerical example involving voluntary turnover data of 150 professional employees drawn from a motor marketing enterprise in central Taiwan was used with a usable sample size of 132. The data set was divided into two parts, the modelling dataset and the testing data set. The modelling data set was used to test the *logit* and *probit* models. The testing data set was not used for either model building or selection and was used for estimating model performance when applied to future data. The empirical results of their investigation revealed that the proposed models have high prediction capabilities and that the two (*logit* and *probit) models* also provide a promising alternative for predicting employee turnover in human resource management. The authors suggested that turnover research should move in new directions based on new assumptions and methodologies, which would raise new issues and problems (such as the use of neural networks and support vector machines to conduct classification problem for detecting stayer or leaver).