

WORKFORCE ANALYTICS: INTEGRATION OF PREDICTIVE ANALYTICS FOR A ROBUST AND UNPREJUDICED PERFORMANCE APPRAISAL SYSTEM

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ABSTRACT

Workforce Analytics is a Game changer for HR and Predictive Analytics is divine for the organizational decision makers. The below paper is an encapsulation of the significance of Workforce Analytics and Predictive Analysis in performance appraisal system forenhancing the competence of HR department as a whole and also for the organizational effectiveness by making the process more resilient and employee-oriented. The paper identifies various drivers of employee performance and how these drivers can be metricised to quantify the results for predicting performance. The power of predictive analysis is decoded by decrypting the ways in which the predictions can be made to kick start the forecasting exercise at workplace. An unapparelled prediction potential of predictive analytics with the help of statistical tools is explained which can help organization identify its engaged and disengaged employees to a great extent. The paper presents a glimpse of how HR can become a strategic partner and can sit neck to neck with the other policy makers and prove its capabilities in the achievement of objectives by linking people with strategic goals of the organization.

I. INTRODUCTION TO ANALYTICS

Analytics is no more outlandish. It has been prevailing since the swearing in of mankind in different ways. It took different shapes and plots to meddle in different field in which it was implemented for an apt analysis of the data that has been consciously and deliberately gathered. Analytics is nothing but data quantification and computational analysis on the same. It makes use of machine learning, various statistical and mathematical tools to find patterns in the data and co-relations between them. It extracts required amount of information from silos of data to aid in decision making which is the basis of organizational effectiveness. The chances of departmental efficacy from the use of Analytics depends upon the quality of data that is extracted out of the humongous

amount of data that resides in every department of the organization. Therefore, the quality of data and extracting the right data and then applying analytics on it is a major prerequisite. Analytics can be used in any department of the organization viz Marketing Analytics, Financial Analytics, Human Resource Analytics etc. to align the departmental decisions to the strategic goals of the organization.

II. WHAT IS PERFORMANCE APPRAISAL?

Performance Appraisal is a unit under the umbrella of Performance Management, which encompasses shared understanding, evaluation and the transformation of individual contribution to monetary and non-monetary rewards. The tools and techniques that are fabricated to measure the productivity of workforce vis-a-vis the set benchmarks fall under performance appraisal. It is an ongoing process which is incomplete if used only by using one technique. Therefore, many techniques of PA are innovated and the combination of some of them are used to make performance appraisal process validated in every aspect. While doing an appraisal listening, observation, feedback and recognition all plays a vital role. It is done majorly keeping in mind two major objectives. Primarily it is done to reward the employees for the performance that he/she has showcased and secondly for keeping him motivated for performing the same in the future by giving him pay for performance compensation [1]. It is precisely a constructive analysis of an employee performance over a period of time for employee growth as well as the overall organizational effectiveness which aids in developing a greater sense of loyalty and commitment towards the organization and motivates the underperformers to perform.

III. WHAT IS 'WORKFORCE ANALYTICS'?

Big Data in HR, HR Analytics or Workforce Analytics is an upcoming trend which has empowered the organization to make better business decisions and to improve performance in the areas like making recruitment decisions, attracting top talent, accurately predicting future manpower needs and improving employee satisfaction. It does it by making use of past and present employees' data and finding correlations between them thereby making future decisions.

Analytics in HR helps in many ways. It constitutes of techniques that can forecast the workforce requirement and how best to fill the vacancies. It links the company's workforce to the strategic goals of the organization and also the financial goals which are ultimately the most sought for. It identifies the high value employees so that the organization takes ample measure to reduce high quality attrition. It aids in training need assessment and the techniques that is the most effective for the kind of workforce structure the organization has. Therefore, it can be said that the workforce analytics significantly works as a therapy for the HR department of an organization so that it can make the best of HR strategies which suits the organizational needs. Another advantage of HR analytics is that it showcases a positive image of HR, a discipline which was never associated with revenue generation, as a profit centre. It reflects HR as a team that can evaluate and mitigate risk and as the one that can now partner with the people at the executive/management level to make business decision and drive profits. It

also marvels in providing a comprehensive view of how much Return on Investment (ROI) the organization is able to drive as far as the workforce is concerned so that it can be worked upon accordingly and in advance.

IV. PREDICTIVE ANALYTICS-A MASTER STROKE

A wing of Analytics is Predictive Analytics. Predictive analytics is the maturity of Analytics from the time when all what HR did was static and iterative reporting of the past happenings. It then advanced to a stage where monitoring started taking place with the help of dash boards and scorecards to a stage where the analysis through predictive statistics was the new buzz. It finally landed to a stage of optimization through predictions. In short it is a succession from basic reporting and analysis which includes data collection and cleansing, making reports in standard format using Excel Sheets and OLAP's to predictive and prescriptive analytics. OLAP's stands for Online Analytical Processing which excels in performing multi-dimensional analysis for humongous business data in one go and also holds expertise in doing complex calculations and data modelling in no time. It excels in viewing data from different point of views and enables a user to selectively extract a kind of data from the silos with rapid execution speed.

Till now, HR relied only upon these basic reporting exercises and could only answer the questions like "What happened?" or "Why it happened?". Predictive analytics is the advancement to a point where HR can answer the questions like "What will happen?" and "What best could happen and how?". To answer these questions, predictive analytics makes use of various predictive models involving statistical tools, techniques and algorithms. By using these techniques, it analyses the current and historic data to predict the outcomes of events thereby helping the organization in making critical decisions on the future course of action.

V. TRANSFORMING PARAMETERS INTO PERFORMANCE METRICS

To effectively use the predictive techniques in performance appraisal systems, it becomes binding to go step by step, the first step being changing the various performance parameters into metrics. Some of the parameters and ways in which the performance can be metricised are as follows:

1. Employee Efficacy and efficiency: The employees who are efficiently getting their job done with maximum productivity and minimum mistakes. They meet both targeted benchmarks and deadlines. The number of errors and mistakes are rare. The employee efficiency can be measured in two ways. It can be measured by gauging the actual time taken to finish making one unit of product or service by an employee against the benchmarked time needed to complete it.

Secondly, it can be measured by conducting of team assessment in case of team oriented organizational structures. Team assessment will give an idea as to how far the team is able to fulfil the targets and identify the hiccups. Team includes those members an employee work with day in and out. Communicating with them can give an insight on employee's individual performance as well.

2. Training Investments: Measuring training investment is a two-step approach. The foot fall of the employees for attending a training program works as a measure to metricise the employee need for training and growing expectation from the Training Programme. Also, to be considered is the financial benefits that are achieved from the training programme against the total cost that is invested on it. This requires the identification of cost that is associated with developing, delivering and overall management of the program. Only when the benefit outweighs cost, is when the training programme can be called as effective. This is called as Return on Training Investment popularly known as ROTI which is measured to access the financial value of a Training programme [2]. The formula to measure ROTI is as follows:

$$\text{Benefits} - \text{Costs} / \text{Costs} \times 100 = \text{ROTI}\%$$

The main idea behind ROTI is the calculation, documentation and evaluation of the benefits of the training programme when a significant amount of finances is invested on these programmes and they are aligned to the strategic objectives of the organization.

3. Quality of the Job done: If there is something that can trump over quantity, it is the quality [3]. How much so ever deadlines are fulfilled, but if the quality is not maintained and if the product and the service is substandard, it invariably affects the productivity of the organization as a whole. Measuring quantity has many formulas to it but measurement of quality is a tedious and time taking task and also is subjective. It really depends upon the kind of sector the organization belong to. But a backward approach can be applied to it. Quantity of the errors can actually reflect the quality of the work done. The percentage of work output that is rejected gives a measure to the percentage of work output that is readily accepted. In case of non-quantifiable jobs, the percentage of job that needs to be redone out of the overall job done can be measured and can be converted into a metrics. In the same manner, number of corrections or number of bugs in the software codes can be considered as one of an effective measure of deciphering the quality. Precisely, number of errors, accidents, defects etc., therefore becomes an important measure since a single error can stop the entire system from working smoothly.

4. Absenteeism Rate: There are two constructs that are highly and inversely correlated. They are absenteeism and productivity. High absenteeism rate in the organization is an important indicator of the decreasing levels of organizational performance. Calculating absenteeism of an employee over a period of time can be fruitful in accessing his/her performance and engagement. Those employees who are highly motivated and perform outstandingly takes 37% lesser sick leaves in comparison to the employees who underperformers (As per a study done by Gallup). Therefore, more sick leaves mean higher disengagement, lesser motivation and productivity.

5. Employee Behaviour: Swiss Bank, UBS introduced "Employee behaviour" as one of the parameters in the performance review of their employees [4]. It consisted of 30% weightage in their performance score sheet and is

also is a criterion for shelling out employee bonus with some variations depending upon how much they score. It consists of parameters like ethics, team orientation, support to co-workers etc. Different sets of behaviour are required for different jobs. They are intangible but definitely vital in determining the effectiveness of the results that are tangible.

V Ravi, Vice-president & Head, L&D (RPMG,) Reliance Industries is of the view that employees must showcase 3 of the 30 behaviours which is discussed with their managers and should work towards it. This will also help in giving a measure to the employee's behaviour.

VI. PREDICTIVE ANALYTICS FOR ANTICIPATING PERFORMANCE

Analytics is a tool that can help predict employee performance with the help of historical and real time data. It follows both retrospective and progressivist approach. Employees productivity and performance plunges if they are not satisfied with the results of performance appraisals. Therefore, all organizations want to be able to predict in advance, be it predictions regarding performance of the people or retaining the best talent by predicting the attrition. Predictive Analytics encapsulates many statistical techniques that ranges from predictive modelling, data mining and machine learning to study the history and predict the future. The companies can then use this insight for the talent management forte to become a consciously competent organization.

Predictive Analysis also works wonders in Performance Appraisals of the employees. Most organizations have concluded that the performance review methods that has been used traditionally are outdated and the cost and time associated with them outweighs the benefits they supply[5]. With this enlightenment, they now ponder over predictive analytics measures that can be used in addition to these age-old methods for adding robustness to the performance appraisal systems.

According to the Randstad India HR Game Changers 2016 Survey, there are 28% of HR leaders who sense that its high time that the existing employee performance methods implemented in Indian organizations requires a significant change in their orientation and must evolve into something more transparent and resilient. A PwC report 'Performance Management in India – A Change Beckons' reflects that 52% of Indian organizations are paving their way for bringing some innovations and inventiveness in the way employee appraisals are managed and conducted.

Predictive analysis can be applied to the workforce to identify the drivers of performance and the traits in the employees that account for their good or bad performance individually and in teams. Their core-competencies, capabilities and skills can be identified for predicting their future performance. This way any gaps that exists can also be taken care of by the help of training and support.

Following are some of the ways through which the predictive analytics makes use of traits and parameters in forecasting the performance of the employees:

1. Employee's Orientation towards Goals [6]

As per a study one of the fruitful methods of predicting performance is evaluating how much employees are oriented and focussed towards their respective/team goals. Achievement of goals along with sticking to set deadlines makes them a performer. The parameters that can predict employee's performance are as follows:

- a. **Oriented towards Learning:** It is when employees have an inner urge to acquire new skills and upgrade/improve the existing skills. This, he does, without any external pressure of getting assessed or under any other compulsion. He has an inner drive to brush his competencies time to time.
- b. **Proving Performance:** Here the employee makes use of an opportunity or a situation where he can showcase/prove his performance with the help of the skills that he has accumulated since long.
- c. **Avoiding Performance:** This is like a negative reinforcement. Here the employees perform just for the sake of performance to avoid the adverse consequences that could arise as a result of non-performance. The employees are not self-motivated, instead they perform under pressure.

A combination of predictor and mediating variables constructs a model that predicts the future performance of the employees. The predictor variables consist of behaviours like levels of target orientation and mediating variable consists of behaviours like proactiveness and emotional intelligence or control over emotions. These behaviours are vital for the employees in an organization and therefore incorporated in the predictive metrics for assessing the performance.

2. Competency modelling and Evaluation

Competency modelling [7] is to churn out critical knowledge skills and abilities that exists within the Organization or is sometimes acquired by the help of training. These traits are required by organization for getting a competitive edge over others. The identification, evaluation and development of these traits/behavioural patterns are a must for ensuring performance in the long run. These traits can be divided into two groups:

- a. **Resource Oriented Employee:** Employee having these traits tend to focus on the optimum utilization of resources that the organization is in custody of.
- b. **Problem solving Employee:** These traits are visible in those categories of employees who have the tendency of solving uncertain complex problems that turns up at any point in time. These employees are dependable and are often leaders. These traits are what leaders exists to do.
- c. **People Oriented Employee:** These employees are always interested in investing upon people and their growth. For getting a work done they would provide directions, implement plans and motivate people in every facet of their organizational life.

Evaluation of these above traits in employees prove to be successful predictors of short and long-term performance of the employees. Employees whose performance is predicted by incorporating these behaviours in a chosen predictive model have a greater possibility of getting assessed credibly.

3. Employee Individual Assessment

Along with the historical performance evaluation, the present assessment of the individual employee is an important factor for predicting the future performance of that employee [8].

A study done on the factors that can possibly and successfully predict performance shows that it can be divided into three key parameters:

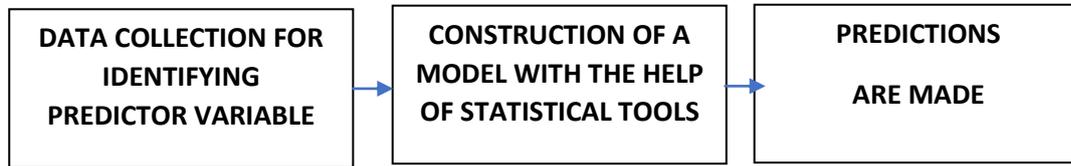
- a. **Information Input:** This captures psychometric assessment test which are the most powerful indicators of future performance of the employee for example Cognitive Ability Test or Situational Judgement Tests. These tests can be administered upon the employees at any point in time to predict their future performance.
- b. **Information Evaluation:** Once the tests have been administered, their results are then evaluated by comparing it with the standards or benchmarked results to predict the possibility of performance.
- c. **Information Output:** It is the decision making based upon the assessment done by the assessor after the results of the tests are live.

The study from which the above model was constructed, was of this view that combination of present psychometric tests administered on employees and the evaluation of the historical performance can prove to be an effective predictor of the future performance of the employees.

VII. PREDICTIVE ANALYTICS- TOOLS AND TECHNIQUES

Predictive tools are used to discover meaningful trends and patterns in data. A predictive model uses predictors. Predictors are those variables pertaining to employees that influence the results and future outcomes. These predictor variables could be gender, location, salary structure, number of years of experience or educational qualification. There are number of statistical tools that can be used in doing predictive analytics in anticipating performance on the data that is gathered. These tools are used for knowing the correlation between different sets of data and for getting actionable insights from the data. However, advance tools and techniques are used differs for various applications but there are some fundamental tools and mathematical algorithm which is common in most cases while doing predictive modelling.

The following flowchart depicts the course of development from identifying predictors to getting results:



The basic statistical tools that are used commonly in any of the predictive analytics model are as follows:

- a. **Correlation Analysis:** Correlation Analysis depicts the degree or the strength of relationship between different variables and also deciphers how close that relationship is. It is most useful when the manager has an idea that there definitely exists a correlation between variables and he/she intend to test the assumption. There can be many related variables in performance management that can be tested through correlation analysis for example is there a relationship that exists between number of years of experience vs. levels of performance or degree of job satisfaction vs. levels of performance etc.
- b. **Scenario Analysis:** Scenario Analysis is a decision-making tool for analysing possible future course of events. It describes the possible outcomes of a problem thereby allowing the manager to analyse variety of possible future events. It is also called as Horizon Analysis or Total Return Analysis because it works by estimating the total expected return of a selected course of action in financial or any other terms. Managers use this technique when they have to decide on which course of action to pursue out of many alternatives.
- c. **Monte Carlo Technique:** If a manager wants to understand the implications of a particular course of action and risk involved in taking a particular decision, Monte Carlo Technique is useful. It is a risk assessment and a mathematical problem-solving tool that uses computerized simulation and algorithms.
- d. **Time Series Analysis:** Time series Analysis is the forecasting techniques that is based on the analyses of the past data trends. The two main goals of time series analysis are i) the observation of the sequence of phenomenon over time ii) Forecasting the future values in the time series variable. An example can be the performance of an individual over a period of time and prediction of the future performance based on the past performance of that employee.
- e. **Regression Analysis:** Regression Analysis depicts the form of relation that exists between two random variables. One variable being dependent and others being independent variables. Regression Analysis tests how the value of dependent variable changes when any of the independent variables are varied and when all other existing independent variables are fixed. Where Correlation analysis portrays the presence of a relationship, regression analysis describes the kind of relationship that exists.

- f. **Sentiment Analysis:** Sentiment Analysis is also known as Opinion Mining. The opinions of the employees are extracted from the text, video or audio data available over internal portals or social media to know the sentiments of the employees to contemplate their future behaviour. Sentiment Analysis is done to know the overall attitude of an employee towards a particular topic and to know their future behavioural patterns.

Abovementioned are some of the statistical tools that are used in constructing a predictive model and getting actionable insights from the data that is gathered over a period of time. There are some other techniques like Cluster Analysis, Linear Programming, Neural Network Analysis, Meta-Analysis etc. that are also commonly used for effectively predicting the future performance of an employee. Their effectiveness in making accurate predictions across variety of business functions like HR, Finance, Marketing etc are highly commendable.

VIII. CONCLUSION

Many academic researches and real-life cases from the industry brag of the success of using predictive analytics as a technique to anticipate the future employee performance. This aids in formulating a robust performance appraisal system and guarantees for more validated results which keeps the employees motivated and satisfied. Incorporating predictive analytics makes the performance appraisal system transparent as it is known for its objectivity in the analysis of the performance. It is very thrilling to know the actual results of the performance appraisal and analyse it vis-s-vis the predicted results. This also helps in making continuous improvement in the techniques by inducing certain other variable which can possibly predict performance in a better manner. As a stem of Workforce Analytics, Predictive Analytics gives astonishing results not only in the areas of Performance appraisals and management but also in the streams like managing attrition, recruitment, training effectiveness etc. in the organizations. Various people centric organizations like Google, Facebook, Best Buy etc are continuously striving to find and add new variables (and some of them really out of the box) to add to their predictive model so as to make the predictions more validated and reliable. This assists in identifying those people who are most likely to become highly toxic for the organization and also those who can induce a healthy and motivated blood in the organizational veins. Workforce Analytics is unquestionably and indubitably a proven game changer for any Organization's HR department.

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