HR Metrics & Analytics
MSB21T2001

GALGOTIAS UNIVERSITY

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Session 35 - Objectives

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

- Linear regression

- Discrete choice models

- Logistic regression

- Multinomial logistic regression

- Probit regression

- Neural network

- Decision tree

- Scenario analysis

Recap

- HR Analytics And Predictive Modelling- Talent Retention

- Strategic HR Metrics

- Understanding Predictive Models

- Contributors - HR Analytics

- HR Data Required For Predictive

- HR Data –Predictive Modelling - Decisions

- Data And Information For HR Predictive Analysis

- Possible Sources Of Information/Data For Use By Human Resources

- Software Solutions

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

- Predictive analytics extracts information from raw data and makes use of the same to predict the future pattern of behaviour or trends for getting better insights into HR decision-making. Broadly, predictive analytics tools are divided into regression techniques and machine learning.

- Regression analysis helps us in estimating relationships among different variables. For predictive analytics, the following types of regression analysis can be of use:

    - Linear regression.
    - Discrete choice models
    - Logistic regression
    - Multinomial logistic regression
    - Probit regression
    - Neural network
    - Decision tree
    - Scenario analysis

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

- Linear regression -This helps in modelling relationships between a dependent variable (Y) and one or more explanatory variable (X). Suppose an HR manager wants to assess the association between performance and pay.

- Here, performance is the dependent variable and pay is the independent or explanatory variable. In regression analysis, we denote the dependent variable as 'Y' and the independent variable as 'X'.

- Logistic regression. This type of regression helps us to predict the outcome of a categorical or dependent variable (e.g., employees' performance) based on one or more independent or predictor variables (such as pay, career development opportunities, promotion and so on).

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

Discrete choice models.

- Using these models, we can describe, explain and predict our choices between two or more discrete alternatives.

- Here, we limit our choices to those alternatives for analysis which we feel are critical for the problem or decision issue.

- This we can understand based on our previous knowledge, or through previous survey or qualitative research.

- Suppose as an HR manager you want to find out what matters more for employees' satisfaction: Should it be better deferred benefits for a secured future, some extra vacation plan or a better insurance coverage?

- We put before the employees various alternatives, so as to enable them to make their choice based on trade-offs between cash payout and deferred benefits, payment in monetary terms and extra vacation and so on.

- Responses from all employees are combined and then the best alternative that can increase the level of satisfaction for the employees and at the same time optimize the costs for the organization is identified by using the model.

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

Multinomial logistic regression.

- This regression model can generalize two outcome (dependent) variables with the linear combination of the predictor (independent) variables.

- For example, employees' career choice (outcome or dependent variable) can be studied in relation to his/her level of education or mother's influence (predictor or independent variables).

- Similarly, employees' choices of a training programme, either conceptual or skill specific, may be modelled against the performance score and the education level.

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

Probit regression.

- This regression model helps to study a problem when the outcome or dependent variable can only take two values, i.e., yes or no. Let us assume an employee may or may not get promotion.

- The predictor or independent variable in this case would be the performance score, age, number of years in same job position, leadership capabilities and so on.

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

Neural network.

- In predictive analytics, neural networks denote enhancing computer capabilities, configuring it with required hardware and software so that like human neurons in human brain it can solve complex signalling and pattern-recognition problems.

- For example, in employee recruitment if we want to predict how a particular applicant can achieve the best job performance, we require data on the application such as personal information, previous jobs, level of education, previous performance, social network data and so on.

- This requires neural networks or machine learning, rather than regression modelling discussed earlier.

- More appropriate use of neural networks in profiling a target hire is checking his/her background characteristics.

In some critical areas, such as handwriting recognition for cheque clearance, facial

recognition, speech analysis, text analysis and so on, neural networks can help.

It requires the use of multiple processors simultaneously to receive information

(like optic nerves of human beings).

The first-level processors receive raw input information.

After processing, the data pass on to the next level of processors and then get

transferred to the last level of processors to churn the results or the output.

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

Decision tree

- **A decision tree** is an important decision-making tool. Before taking decisions, HR managers can understand different choices, risks, gains and so on by using a decision tree.

- With multiple decision alternatives plotted on a decision tree, HR managers can critically assess each alternative and select the best one. A sample decision tree is illustrated.

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Decision Tree on Incentive
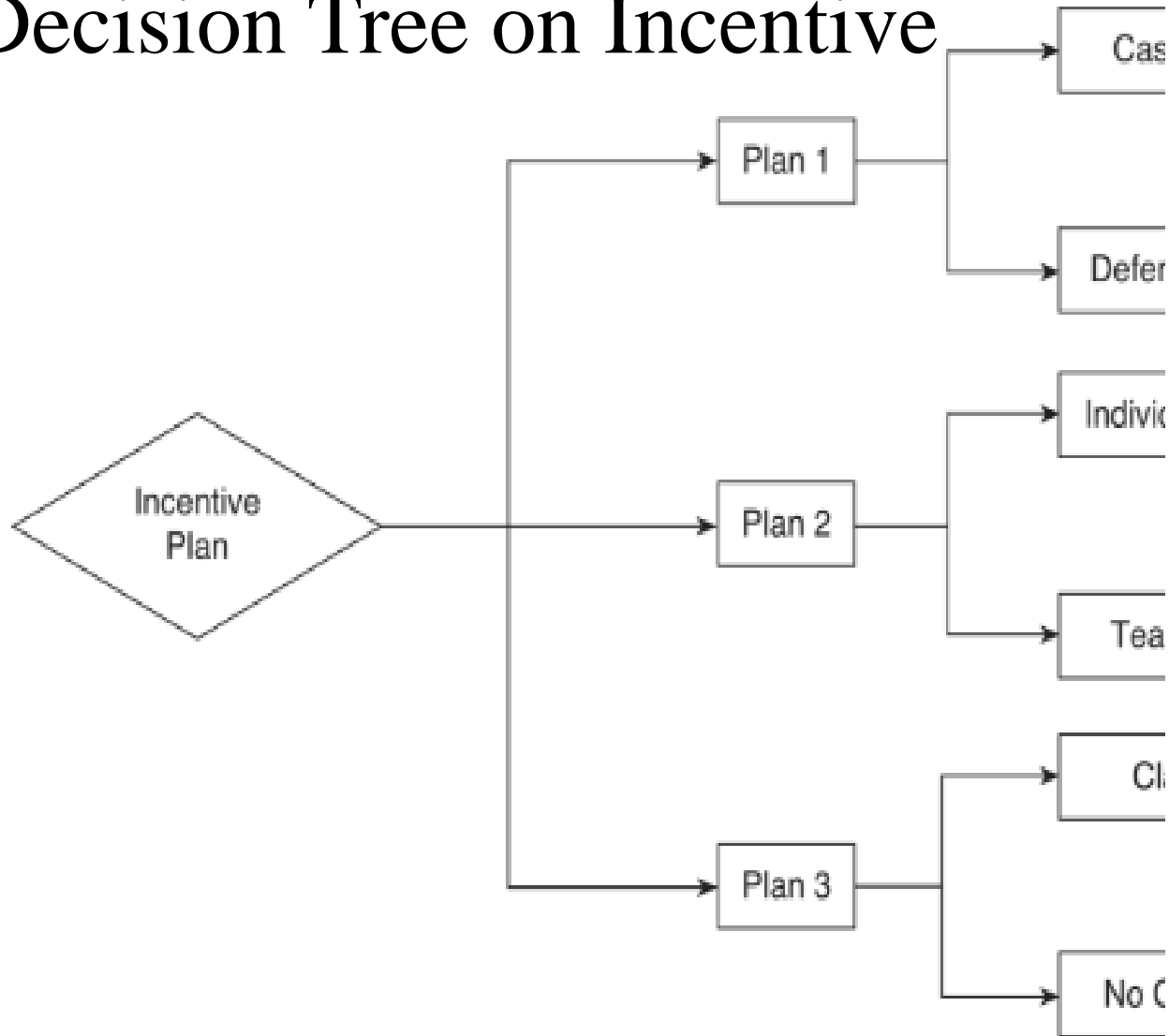
Nodes and branches indicate a host of choices available for decisions.

The model combines different choices (actions) with detailing of different possible events when a articular choice is selected for the decisions.

PREDICTIVE ANALYTICS TOOLS AND TECHNIQUES

Scenario analysis -helps us to understand the expected outcome of a decision in different situations.

- Like simulation, this analysis considers two extremes of a scenario or a base case. Both best and worst possible outcomes of a decision can be ascertained and accordingly decisions are taken.

- Although its usage is more appropriate in financial decision-making, we can also use it in human resources.

- HR managers need to perform scenario planning from time to time for assessing uncertain shifts in the environment of an organization and accordingly calibrate the decisions.

- In human resources, scenario analysis can help us in integrating organization-wide HRM activities with business scorecards, thereby helping in strategic decision-making.

- The analysis follows the system dynamics approach to model complex systems with computer-aided simulation.

- Systems dynamics methodology can encapsulate complex HR factors like performance management in understanding which factors contribute to specific performance outcomes, linking HR metrics, competencies and organizational business scorecards.

- Such causal relationships once understood with scenario analysis can be used as the basis for HR decisions.

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In case, you find any difficulty in understanding the concepts of lecture, please feel free to contact.

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Thanks