

# Managing Talent in Human Resource: A Knowledge Discovery in Database (KDD) Approach

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## ABSTRACT

*In any organization, managing human talent is very important and need more attentions from Human Resource (HR) professionals. Nowadays, among the challenges of HR professionals is to manage an organization's talent, especially to ensure the right person is assigned to the right job at the right time. Knowledge Discovery in Database (KDD) is a data analysis approach that is commonly used for classification and prediction; and this approach has been widely used in many fields such as manufacturing, development, finance and etc. However, this approach has not attracted people in human resource especially for talent management. For this reason, this paper presents an overview of some talent management problems that can be solved by using KDD approach. In this study, we attempt to implement one of the talent management tasks i.e. identifying potential talent by predicting their performance. The employee's performance can be predicted based on the past experience knowledge which is discovered from existing databases. Finally, this paper proposes the suggested framework for talent management using KDD approach.*

**Keywords:** *Talent Management; Talent forecasting; Knowledge Discovery in Database (KDD)*

## **Introduction**

Nowadays, human capital is a crucial issue and need more attention from top management in all organizations. Human Resource Management (HRM) that deals with an organization's human capital aims to facilitate organizational competitiveness; enhance productivity and quality; promote individual growth and development; and complying with legal and social obligation (DeNisi & Griffin, 2005). Due to these reasons, an organization needs to struggle effectively in terms of cost, quality, service and innovation. In fact, all these depend on having enough right people, with the right skills, deployed in the appropriate locations at appropriate point of time. Recently, among the challenges for HR professionals is managing talent, especially to ensure the right person for the right job at the right time. These tasks involve a lot of managerial decisions, which are sometimes very uncertain and difficult. In reality, HR decision practices depends on various factors such as human experience, knowledge, preference and judgment. All these factors can cause inconsistent, inaccurate, inequality and unforeseen decisions. Thus, especially in promoting individual growth and development, this situation can often make people sense injustice as well can influence the productivity of an organization. In talent management, to identify the existing talent is one of the top challenges (A TP Track Research Report 2005). At present, most of the identification process uses human experience knowledge supported with evidence in order to justify the potential talent.

In the advancement of technology, there are many approaches that can be used to solve some of the talent management problems, and one of them is Knowledge Discovery in Database (KDD). KDD is one of the Artificial Intelligent (AI) technology that has been developed for exploration and analysis in large quantities of data to discover meaningful patterns and rules. Data in HR can provide a huge resource for knowledge discovery and decision support tools. However, the application using KDD approach has not attracted much attention in HRM field (Ranjan, 2008) compared to other fields such as marketing, financial, manufacturing, medical and others. As such, this study attempts to use this approach for managing talent *i.e.* to identify existing talents by predicting their performance using past experience knowledge. This study aims to suggest the potential framework for talent forecasting using KDD. This paper is organized as follows. The second section describes the related work on talent management. The third section discusses some of HR activities

that use KDD approach. The fourth section describes how talent management can be implemented using KDD and the suggested framework for talent management using KDD. Finally, the paper ends with Section five where the concluding remarks and future research directions are identified.

## **Talent Management**

In any organization, talent management has become an increasingly crucial method of approaching HR functions. Talent management in Human Resource (HR) is also known as Human Capital Management (HCM), HR Information System (HRIS) or HR Management System (HRMS). Besides that, talent management can be defined as an outcome to ensure the right person is in the right job; process to ensure leadership continuity in key positions and encourage individual advancement; and decision to manage supply, demand and flow of talent through human capital engine (Cubbingham, 2007). However, talent management is defined differently to different organizations. Some of it is about the management of the talented employee, and to others it are about how talent is managed with the assumption that everyone has talent which should be identified and liberated (Wikipedia, 2009). Talent for HR people is considered as any individual who has the capability to make a significant difference to the current and future performance of the organization (Lynne, 2005). In addition, managing talent involves human resource planning that regards processes for managing people in organization. In HRM field, talent management is very important and need attention from HR professionals (American Management Association, 2009; Hart, 2006; Hiltrop, 1999; Personneltoday, 2008; PricewaterhouseCoopers, 2008; SuccessFactors, 2007; Wilkins, 2008). Figure 1 showed some issues related to talent management and some top talent management challenges (A TP Track Research Report 2005), and one of them is identifying the existing talent. As such as in Figure 2 (Hamidah, Razak & Zulaiha, 2008) showed processes to identify the people in the organization who constitute its key talent using some common evaluation approaches (Cubbingham, 2007).

The employee evaluation in HR concern two major areas of measurement: performance and potential. The existing employee performance within a specific job is referred to as a standard evaluation measurement tool. Nevertheless, talent management also seeks to focus on an employee's potential, which represents employee's future

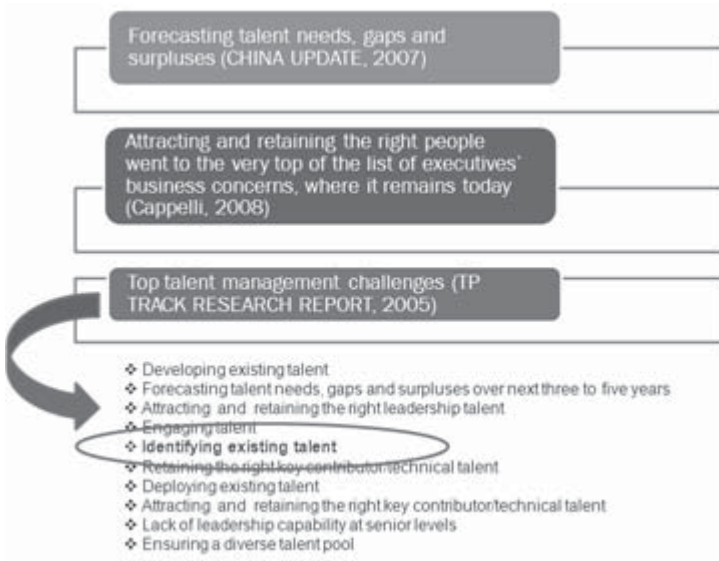


Figure 1: Talent Management Challenges

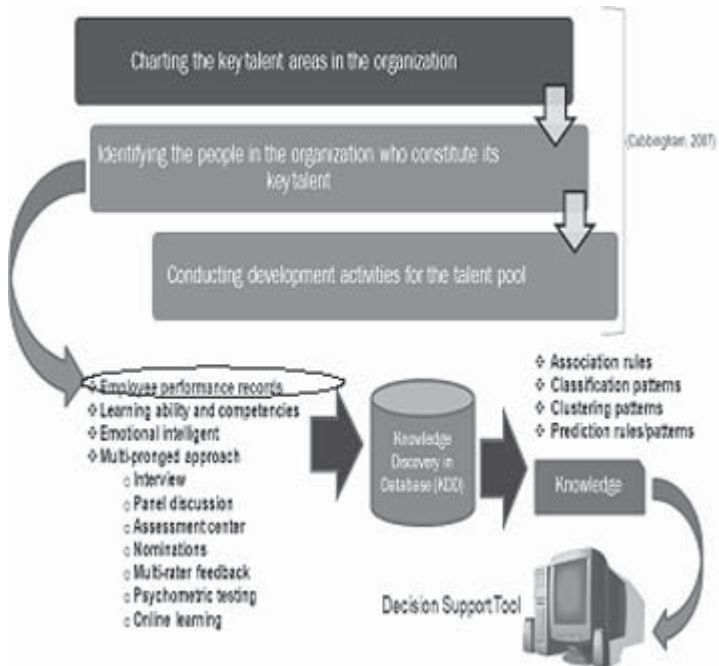


Figure 2: Talent Management and KDD

performance with the given proper development skills. Recently, a new way in dealing with talent management is by looking at the the supply chain processes in manufacturing, which forecast talent that is comparable to forecasting product demand (Cappelli, 2008). Talent forecasting needs to focus on the potential of employees which can be represented through employee's future performance. In this case, we can use any suitable approach to predict product demand to talent forecasting For this reason, in this study, we attempt to use KDD approach to identify the existing talent regarding to the key talent in an organization. Thus, employee performance records stored in the databases will be used to discover talent patterns and prediction model for employee in an organization.

## **KDD in Human Resource**

KDD and Data Mining (DM) are used interchangeably in this article. DM is a step to KDD and currently receive great attention and is being recognized as a newly emerging analysis tool (Tso & Yau, 2007). Recently, DM was given a great deal of concern and attention in the information industry and in society as a whole. This is due to the wide accessibility of enormous amounts of data and the important need for turning such data into useful information and knowledge (Han & Kamber, 2006). Computer application interfaces with DM tool can help executives to generate more informative and objective decisions. Besides that, it can help managers to retrieve, summarize and analyze decision related data to make wiser and more informed decisions. DM problems are generally categorized as clustering, association, classification and prediction (Chien & Chen, 2008; Ranjan, 2008). Over the years, the DM has involved various techniques including statistics, neural network, decision tree, genetic algorithm, and visualization techniques. DM has been applied in many fields such as finance, marketing, manufacturing, health care, customer relationship and etc. Nevertheless, its application in HRM is rare (Chien & Chen, 2008).

These days, there are some interests on solving HRM problems using DM approach (Ranjan, 2008). From the literature study, Table 1 lists some HR activities uses DM approach as a tool to solve their problems, even though it has very limited domain, but it uses quite advanced techniques such as in project assignment research (Table 1). Moreover, there are very few studies related to prediction application in HR using this approach; but is viable in some HR personnel selection problems.

Table 1 : Human Resource Activities Using Data Mining

Activity in HRM	Data Mining Techniques
Project Assignment (Huang, Tsou & Lee, 2006)	<i>Fuzzy Data Mining and Fuzzy Artificial Neural Network</i>
Personnel selection (Chien & Chen, 2008)	
Job attitudes classification (Tung, Huang, Chen & Shih, 2005)	<i>Decision tree</i>
Performance Evaluation (Xin, 2008)	
Training (Chen, Chen, Wu & Lee, 2007)	<i>Association rule mining</i>
Personnel Selection – Recruit and Retain Talents (Chien & Chen, 2007)	<i>Rough Set Theory</i>
Personnel Selection (Tai & Hsu, 2005)	<i>Fuzzy Data Mining</i>

## Talent Management Using Data Mining

Most of the DM studies in HR problems focus on personnel selection and very few discussions in other activities such as planning, training, talent management and etc (Table 1). Recently, with the new demands and increased visibility of HR management, HRM seeks a strategic role by turning to DM methods (Ranjan, 2008). This can be done by identifying generated patterns from the existing data in HR databases to useful knowledge. In this study, we focus on identifying the patterns relate to talent. The patterns can be generated by using some major DM techniques and it is shown in Figure 3. The matching of DM problems and talent management needs are very important, in a way to determine the suitable DM techniques. In this paper, we propose talent management framework using KDD approach and we attempt to hybrid the suitable DM technique and knowledge-based system (KBS) approach in system development phase. This integration can allow users to interact with the system and obtain the forecasting results and explanations about the decision made by the system. The decision is made by the knowledge discovery from the existing HR databases and it shown in Figure 4. The proposed talent management framework contains three main modules:

- a. *Knowledge Discovery in Database (KDD) Module* is used to develop predictive model and possible talent pattern and rules from the existing database system. In this case, we will use HR databases

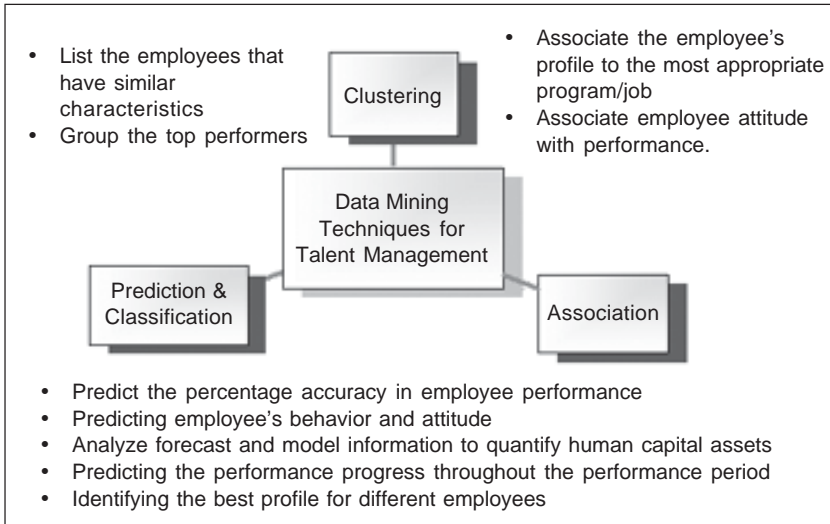


Figure 3: Data Mining Tasks for Talent Management

related to talent performance such as personnel information, performance evaluation data and other related databases. The relevant data will be transformed into useful knowledge as predictive model through talent predictive modeling, generated rules by talent pattern discovery and extracted patterns to find unusual data elements by forensic analysis. All these discovered knowledge are useful for talent management tasks.

- b. *Model and Knowledge Based Module.* This module is used to store constructed model, existing simulation model and related models can be used in appropriate decision making process. In fact, before using talent performance predictive model, the model must be evaluated and tested in model analysis and evaluation process. The Knowledge Base System (KBS) contains a set of facts and rules. In the suggested framework, KBS will contain information about talent patterns, association rules related to the potential talent in future and any related facts and rules. The rules and pattern will be evaluated and interpreted by the HR domain experts.
- c. *Advisory System Module* is as inference engine in this application that supervises the interactions among the various parts of application. Basically, the component will react as interface between user and the system itself, especially to display the prediction results, justify and explain the decision and sometimes if needed it can instruct KBS

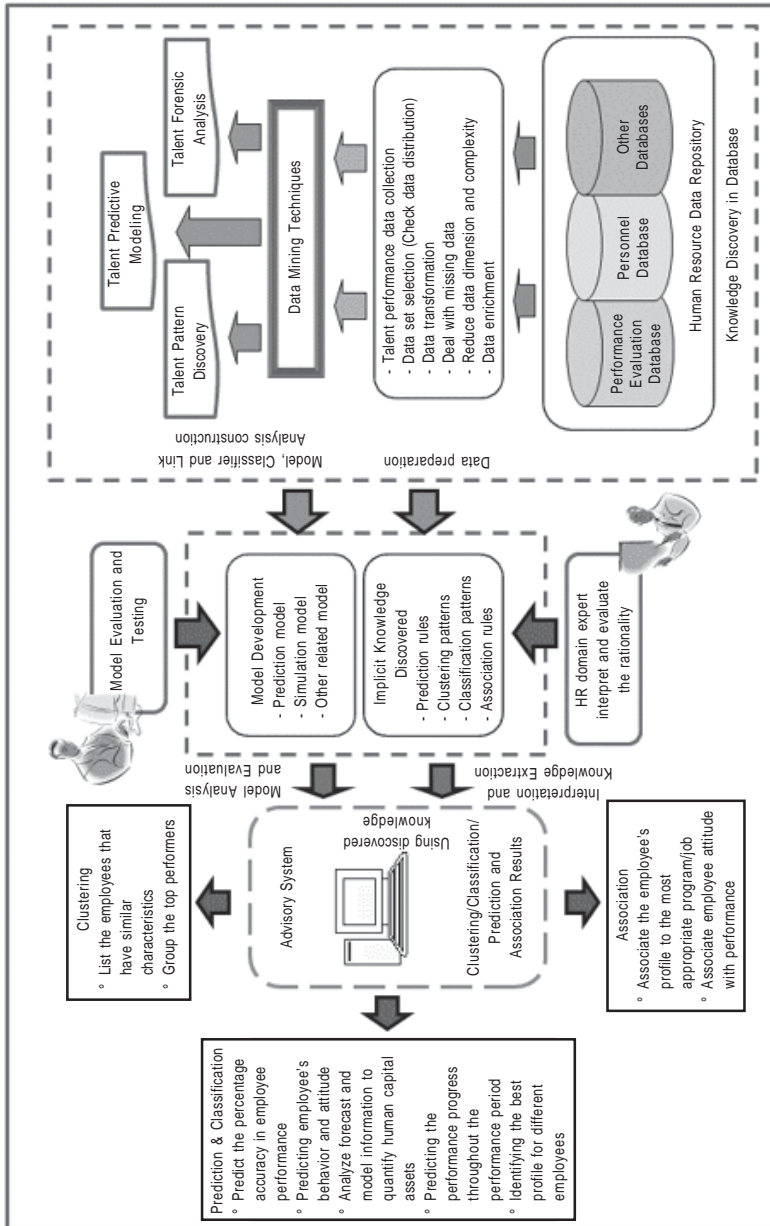


Figure 4: Talent Management Framework Using KDD Approach



to update the existing knowledge. In this study, the advisory system will display the potential talent with some reasons, and suggest the possible tasks for them.

In this paper, the suggested framework focuses on talent management purposes which are used to identify the potential talents and to analyze some of the talent management needs. In addition, this framework also can be applied to other DM tasks such as association, classification and clustering for solving some of talent management problems.

## **Conclusion**

This paper has described the significance of the study, issues in talent management and KDD approach in HR application. As a result, we propose the talent management framework using KDD approach to identify potential talent in an organization. From the literature study, most researchers have discussed HR applications using KDD from different types of application (Hamidah, Abdul Razak & Zulaiha, 2009). However, there should be more HR applications and KDD techniques applied to different problem domains in HRM field in order to broaden our horizon of academic and practice work on HR applications using KDD approach. For future studies, some experiments could be conducted to identify the most suitable Data mining techniques. The association rules, clustering pattern and predictive model will be generated through the selected technique. The generated rules, pattern and model would be embedded to the application; this application can act as a decision support tool, in decision making process. Finally, the ability to continuously change and obtain new insights is the power of HR application, and this can be the HR applications for future studies.

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