

# Choosing knowledge management strategies by using a combined ANP and DEMATEL approach

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## Abstract

Numerous companies are expecting their knowledge management (KM) to be performed effectively in order to leverage and transform the knowledge into competitive advantages. However, here raises a critical issue of how companies can better evaluate and select a favorable KM strategy prior to a successful KM implementation. The KM strategy selection is a kind of multiple criteria decision-making (MCDM) problem, which requires considering a large number of complex factors as multiple evaluation criteria. A robust MCDM method should consider the interactions among criteria. The analytic network process (ANP) is a relatively new MCDM method which can deal with all kinds of interactions systematically. Moreover, the Decision Making Trial and Evaluation Laboratory (DEMATEL) not only can convert the relations between cause and effect of criteria into a visual structural model, but also can be used as a way to handle the inner dependences within a set of criteria. Hence, this paper proposes an effective solution based on a combined ANP and DEMATEL approach to help companies that need to evaluate and select KM strategies. Additionally, an empirical study is presented to illustrate the application of the proposed method.

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## 1. Introduction

In the knowledge economy, a key source of sustainable competitive advantage relies on the way to create, share, and utilize knowledge (Desouza, 2003). For reacting to an increasingly rival business environment, many companies emphasize the importance of knowledge management (KM), and base the KM strategy on their unique resources and capabilities. According to Kamara, Anumba, and Carrillo (2002), KM is the organizational optimization of knowledge to achieve enhanced performance through the use of various methods and techniques. Also, KM is a systemic way to manage knowledge in the organizationally specified process of acquiring, organizing and communicating knowledge (Benbya, Passiante, & Belbaly, 2004). Today, KM and related strategy concepts are promoted

as important components for organizations to survive (Martensson, 2000).

More importantly, the effective KM largely begins with a proper KM strategy. Hence, in order to implement the KM successfully, there is a critical issue of how companies can better evaluate and select a favorable KM strategy. However, the KM strategy selection usually involves subjective and qualitative judgment. In particular, choosing KM strategies is a strategic issue (Bierly & Chakrabarti, 1996), which is restricted by resource needs, realistic support, time requirements, and conformity with expected outcomes or business purposes. In this sense, the treatment of KM strategy selection is required to handle several complex factors in a better sensible and logical manner. Thus, the KM strategy selection is a kind of multiple criteria decision-making (MCDM) problem, and requires MCDM methods to solve it appropriately.

Many traditional MCDM methods are based on the additive concept along with the independence assumption,

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but each individual criterion is not always completely independent (Leung, Hui, & Zheng, 2003; Shee, Tzeng, & Tang, 2003). For solving the interactions among elements, the analytic network process (ANP) as a relatively new MCDM method was proposed by Saaty (1996). The ANP is a mathematical theory that can deal with all kinds of dependence systematically (Saaty, 2004). The ANP has been successfully applied in many fields (Agarwal & Shankar, 2002; Chung, Lee, & Pearn, 2005; Coulter & Sarkis, 2005; Kahraman, Ertay, & Buyukozkan, 2006; Karsak, Sozer, & Alptekin, 2003; Lee & Kim, 2001; Meade & Presley, 2002; Niemira & Saaty, 2004; Partovi, 2001; Partovi & Corredoira, 2002; Partovi, 2006; Shang, Tjader, & Ding, 2004; Tesfamariam & Lindberg, 2005; Yurdakul, 2004). However, the treatments of inner dependences in those ANP works were not complete and perfect. Indeed, the Decision Making Trial and Evaluation Laboratory (DEMATEL) not only can convert the relations between cause and effect of criteria into a visual structural model (Gabus & Fontela, 1972, 1973; Fontela & Gabus, 1976; Hori & Shimizu, 1999), but also can be used as a wise way to handle the inner dependences within a set of criteria.

As the ANP and the DEMATEL have these advantages, this paper proposes an effective solution based on a combined ANP and DEMATEL approach to help companies that need to select a favorable KM strategy. Also, an empirical study is presented to illustrate the application of the proposed method. The rest of this paper is organized as follows. In Section 2, an evaluation framework is proposed. In Section 3, evaluation methods are presented. In Section 4, an empirical study is illustrated. Finally, according to the findings of this research, conclusions and suggestions are depicted.

## 2. Evaluation framework

The KM strategy selection is a kind of MCDM problem, which requires considering a large number of complex factors as multiple evaluation criteria. Consequently we need to employ MCDM methods to handle it appropriately. According to Opricovic and Tzeng (2004), solving MCDM problems is required to establish evaluation criteria, develop alternatives, evaluate alternatives in terms of criteria, apply a normative multi-criteria analysis method, and accept one alternative. Therefore, the evaluation framework of this study consists of four phases as shown in Fig. 1. The details of each step are described below.

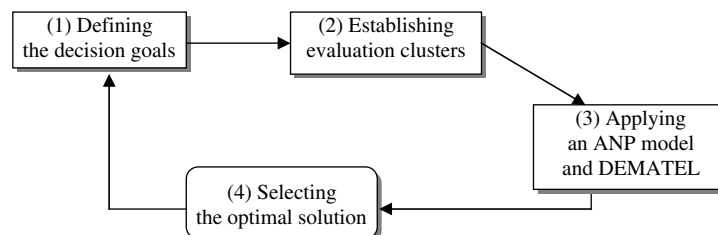


Fig. 1. Evaluation framework for the KM strategy selection.

Decision making is the process of defining the decision goals, gathering relevant criteria and possible alternatives, evaluating the alternatives for advantages and disadvantages, and selecting the optimal alternative (Hess & Siciliano, 1996). Hence, the first phase is defining the decision goal that here is to select a favorable KM strategy. In phase 2, it is required to determine and establish some evaluation clusters. In order to evaluate and select a favorable KM strategy, there are three kinds of evaluation clusters required to be considered, including: KM purposes, evaluation criteria of KM strategy, and alternatives of KM strategy.

The purposes of KM vary from organization to organization. For instance, KM is the way to improve an organization's performance, productivity and competitiveness, and to promote acquisition, sharing and usage of knowledge. According to Plessis (2005), there are many KM purposes such as: to initiate action based on knowledge; to support business strategy implementation; to become an intelligent enterprise; to increase competitive advantage; to create an innovative culture and environment; to entrench collaboration as a work practice; and to improve work efficiency. Referring to Martensson (2000), evaluation criteria of KM strategy can range from top management support, communication, creativity, culture and people, sharing knowledge, incentives, time, and evaluation. As to alternatives of KM strategy, Hansen, Nohria, and Tierney (1999) notes two types of KM strategies: the codification strategy (seeking to document and store knowledge in databases) and the personalization strategy (seeking to develop networks of people for communicating ideas).

In phase 3, it is necessary to apply an ANP model and the DEMATEL; the ANP model is used to calculate the weights of elements of evaluation clusters, and the DEMATEL is used to deal with the situation when inner dependences occur within an evaluation cluster. Finally, in phase 4, the optimal solution can be selected according to the overall priorities of the alternatives.

## 3. Evaluation methods

In this section, some essentials of the ANP and the DEMATEL are briefly described as follows.

### 3.1. The ANP

The KM strategy selection is a MCDM problem, so it is reasonable to employ MCDM methods to handle it

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