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Knowledge management adoption and assessment for SMEs by a novel MCDM approach

Ying-Hsun Hung [a,b,*], Seng-Cho T. Chou [a], Gwo-Hshiung Tzeng [c]

[a] Department of Information Management, National Taiwan University, Taipei 106, Taiwan
[b] Department of Information Management, Hwa-Shia Institute of Technology, Taipei 235, Taiwan
[c] Institute of Management of Management, National Chiao Tung University, Hsinchu 300, Taiwan

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ABSTRACT

This paper aims to clarify the misunderstanding of high expenditure on knowledge management systems adoption, and provides a novel approach for the most emergent knowledge management components to catch up to the pace of their rivals for the late adopters of knowledge management systems. This paper adopts MCDM (Multiple Criteria Decision Making) approaches to solve this KM adoption problem, and ranks the gaps of the KM aspects in control items to achieve the aspired level of performance. The findings demonstrate that the knowledge management gaps within the service industry are higher than the gaps within the IC (Integrated Circuit) and banking industries. After normalization and computation, the knowledge management gap of the service industry is 0.4399(1), the knowledge management gap of the IC (Integrated Circuit) industry is 0.3651(2), and the knowledge management gap of the banking industry is 0.2820(3). The findings also show that the criteria for weighting in different industry sectors are quite different; and the adoption strategies for different industry sectors should be considered separately according to the SME industry sectors.

1. Introduction

Most SMEs (Small and Medium sized Enterprises) are suffering because of low profits caused by hyper competition and OEM (Original Equipment Manufacturer) dead-end. Moreover, since the middle of 2008, the financial tsunami has caused serious damage to the global economy. Since 80% of the enterprises fall into the category of "Small and Medium Enterprises", they lack the financial and systematic basis to introduce knowledge management practices and make innovations. Several researchers have explored the gaps in the knowledge management activities of enterprises. Their studies reveal that corporate performance is significantly influenced by those gaps. The researchers have stressed the need for further investigation of knowledge management gaps. To this end, we use Grounded Theory to study the gaps in knowledge management activities in enterprises. From our pilot survey, we have discovered that gaps indeed exist between the theory and practice of Knowledge Management; thus, further development and testing of models are necessary.

Our research aims to clarify the misunderstanding of high expenditure on knowledge management systems adoption, and provides a novel approach for the most emergent knowledge management components to catch up with the pace of their rivals for the late adopter of knowledge management systems. We adopt MCDM (Multiple Criteria Decision Making) approach to solve this KM (Knowledge Management) adoption problem (Fig. 1), in which this new method allows the decision maker to understand these gaps of the aspects and rank them to improve those large gaps in control items to achieve the aspired level.

There are certain concepts within the general domain of Knowledge Management that have not been fully explored. We will benefit from a more detailed look at various risks, gaps and strengths [25]. There are five management gaps in the implementation of KM (Knowledge Management) activities and these gaps exist in the links between KM activities and corporate performance. Corporate performance is significantly influenced by these knowledge management gaps. Lin and Tseng [19] explore the gaps of knowledge management activities for the enterprise to build a framework that analyze the corporate knowledge needs, and identify any inhibitors to the success of the implementation activities of the KM system. Their study is based on the literature review, expert interviews and questionnaires.

Recently much research has studied Knowledge Management Maturity Model (KMMM) to examine the knowledge management capability and maturity for organizations recently [7,14–16]. In this paper, we survey the gaps of KMMM (Knowledge Management Maturity Model) achievements, and provide an approach for the ranking of KM aspects by the most-urgent aspects to reach the next capability stage as soon as possible. Group decision-making, the

* Corresponding author. Postal address: Hwa-Shia Institute of Technology, 111 Gong Jhuan Rd., Chung Ho, Taipei, Taiwan. Tel.: +886 919 68598; fax: +886 2 29415730.
E-mail address: horninch@gmail.com (Y.-H. Hung).

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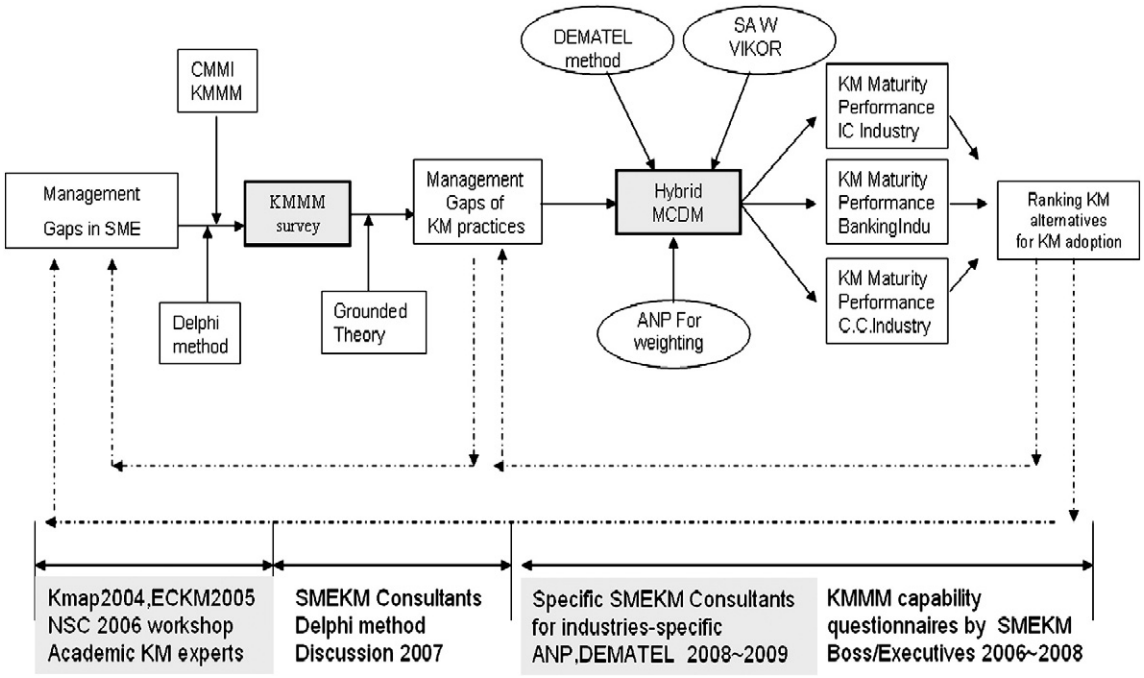

Fig. 1. The hybrid procedures of MCDM (Multiple Criteria Decision Making) for KM adoption [26].

essence of KM, lets us consider multi-dimensional problems for the decision-maker, sets priorities for each decision factor, and assesses rankings for all alternatives.

The remainder of this paper is organized as follows. Section 2 describes the related works to knowledge management capabilities and Knowledge Management Maturity Model. Section 3 describes the Multiple Criteria Decision Making approaches. Section 4 describes the research methods used in this study. Section 5 proposes a novel MCDM approach for SME (Small and Medium sized Enterprises) knowledge management adoption, and Section 6 presents data collected and represented in this study. Finally, in Section 7, we present our conclusions and suggest some directions for future research.

2. Related works

In this knowledge-based economy, knowledge has become an important asset to an organization and, consequently, Knowledge Management has emerged as an issue managers have to deal with. Numerous works on knowledge management capabilities are reported in literature [1,3,8,17,18,33]. In this section, we will discuss the related works in knowledge management capability, Knowledge Management Maturity Model, and knowledge management gaps.

2.1. Knowledge management capability

Knowledge management capability (KMC) is the source for organizations to gain a sustainable competitive advantage. KMC evaluation is a required work with strategic significance [8,18]. Previous KM research has developed integrated management frameworks for building organizational capabilities of Knowledge Management. Based on these frameworks, they propose stage models of organizational knowledge management encompassing the KM process stages [17].

Gold et al. [10] examine the issue of effective Knowledge Management from the perspective of organizational capabilities. They suggest that a knowledge infrastructure consisting of technology, structure, and culture along with knowledge processes architecture of acquisition, conversion, application, and protection is essential for the organizational capabilities of effective Knowledge Management.

2.2. Knowledge Management Maturity Model

Knowledge Management Maturity Modeling (KMMM) has been a major topic of research in recent years [7,14–16]. In practice, a few KMM models [16] have been proposed by consulting firms as well. However, a common KMM model that both academics and practitioners agree on has yet to materialize and moreover, details are often missing from models in practice.

Most KMM models inherit the spirit of the Capability Maturity Model (CMM) [5] of SEI with its five levels of maturity — initial, repeated, defined, managed, and optimizing. Capability, another important attribute of CMM, can be translated into the enabling factors or infrastructure of KM. While most KMM models treat KM as a holistic activity, we view it as a process and divide it into four KM sub-processes, namely knowledge creation, knowledge storage, knowledge sharing, and knowledge application. The added dimension allows us to gain better insight into how KM practices are supported at each maturity level and reflects our emphasis on the need for continuous process improvement.

2.3. Knowledge management gaps

Several researchers have explored the gaps in knowledge management activities of enterprises and identified the links between these activities and corporate performance. Their results reveal that corporate performance is significantly influenced by these management gaps.

Previous research has demonstrated that making a more detailed observation of risks, gaps and strengths is beneficial [25]. According to the findings of Lin and Tseng [19], there are five management gaps in implementation of KM activities and these gaps exist in the links between KM activities and corporate performance [19]. Their study explores the gaps of knowledge management activities for the enterprise to build a framework that analyzes the corporate knowledge needs, and identifies any inhibitors to the success of the implementation activities of the KM system. It shows that corporate performance is significantly influenced by these knowledge management gaps.