Assessing Knowledge Management: Refining and Cross Validating the Knowledge Management Index Using Structural Equation Modeling Techniques

Derek Ajesam Asoh, SIU Carbondale, USA & University of Yaounde I, Cameroon
Salvatore Belardo, University at Albany, USA
Jakov (Yasha) Crnkovic, University at Albany, USA

ABSTRACT

With growing interest in knowledge management (KM)-related assessments and calls for rigorous assessment tools, the objective of this study was to apply structural equation modeling (SEM) techniques to refine and cross validate the KM index (KMI), a metric to assess the degree to which organizations are engaged in KM. Unlike previous KM metrics research that has focused on scales, we modeled the KMI as a formative latent variable, thereby extending knowledge on formative measures and index creation from other fields into the KM field. The refined KMI metric was tested in a nomological network and found to be robust and stable when cross validated; thereby demonstrating consistent prediction results across independent data sets. The study also verified the hypothesis that the KMI is positively correlated with organizational performance (OP). Research contributions, managerial implications, limitations of the study, and direction for further research are discussed.

Keywords: Belardo’s matrix; critical success factors; cross validation; data analysis; empirical study; knowledge management index; knowledge management processes; organizational knowledge; partial least squares; structural equation model

INTRODUCTION

The knowledge-based view of the firm (Grant, 1996) and the resource-based view of knowledge (Barney, 1991, 2001) have contributed to an understanding and recognition of knowledge as a unique resource that enables organizations to attain and maintain sustainable competitive advantage. The recognition of the value of knowledge has propelled many organizations to become more committed to managing their knowledge assets. As a result, KM has evolved to become a prevalent if not mandatory practice in such organizations; where expectations are high, of KM to positively and significantly contribute to bottom-line results and consequently overall OP. Yet, despite massive investment in KM per se, many organizations are still struggling to assess and tie KM to such outcomes as improved performance (Chan & Chau, 2005).
KM benefits are intangible in nature and assessing the performance impact of KM may be one of the greatest challenges confronting organizations that have embarked on KM. But the results of the assessment are quite invaluable to be ignored even if organizations have to face various challenges or other deterring factors to the assessment process. For example, assessing KM permits organizations to identify and possibly eliminate gaps in knowledge preparedness, set realistic expectations of KM benefits, and appreciate how such benefits relate with OP.

As organizations approach KM as a means to improve their performance, being able to assess the degree of engagement in KM remains an important task that must be conducted with a reasonable degree of accuracy if they hope to use the results for better management decision making regarding the allocation and deployment of resources to meet performance goals through KM. The KMI has been proposed as a metric to measure the degree to which an organization is engaged in KM (Asoh, Belardo, & Crnkovic, 2002). Although the usefulness of the KMI as a proxy for KM and predictor of OP has been reported in previous studies (Asoh, Belardo, & Crnkovic, 2004; Crnkovic, Belardo, & Asoh, 2004), the KMI has a number of limitations which this study addresses in order to enhance its usefulness.

First, in its current form with 32 items measuring one construct, the KMI instrument may be perceived as being lengthy and as such would be of limited usefulness (Comer, Machleit, & Lagace, 1989). Second, the KMI is conceptualized and measured as a mean score of responses to questionnaire items. Although summing item responses (Spector, 1992) or creating item parcels (Little, Cunningham, Shashar, & Widaman, 2002), is acceptable practice, some researchers have stressed the necessity of first establishing that the items summed or used in the parcel are unidimensional (Gerbing & Anderson, 1988; Kim & Haghtvet, 2003). The unidimensionality of the KMI has not been investigated. Third, we believe that the KMI is multi-dimensional because KM itself is a multifaceted organizational phenomenon. Without establishing the unidimensionality of the KMI items, attempts at validating the KMI where groups of items are simply summed and used in regression equations as in the recent study (Asoh, Belardo, & Crnkovic, 2005) may produce results that are not stable. Fourth, the KMI model has not been cross validated. Researchers have been urged to validate empirical research as a means of maintaining rigor in the field (Straub, Boudreau, & Gefen, 2004). However, cross validation is often ignored. Cross validation, which involves the use of a second sample to test a theory/model that has been developed using a first sample, avoids circular reasoning in research when the theory/model is developed and tested using only one sample as is often the case in validation-only studies. Furthermore, cross validation is essential to evaluating the accuracy of a model and is important because it demonstrates the model can “generate consistent results, and will thus be of practical value in making predictions among members of the reference population upon which the model is based” (Sheskin, 2004, p. 1002).

Given the interest in KM-related assessments (Anantatmula, 2005; Kankanhalli & Tan, 2005), the relevance of the KMI as a potential KM assessment metric (Asoh et al., 2004; Crnkovic et al., 2004), and the calls for rigorous assessment tools (Straub et al., 2004), the purpose and objectives of this study were to (1) refine and reduce the number of items of the KMI instrument; (2) conceptualize and investigate the KMI model as a multi-dimensional formative latent variable (LV) construct; (3) investigate the performance impact of KM via the KMI; and (4) investigate the stability of the refined KMI model across two independent datasets of the same population through cross validation: developing a KMI nomological network model using a first sample (calibration) and testing it using a second sample (holdback/validation).

The rest of this paper is organized as follows. The second section presents the theoretical background, including the rationale for KM assessment, and highlight of current work on KM metrics, scope of the KMI, definition of the elements of the KMI model, as well as...
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