An Intelligent Approach to Assess Tacit Knowledge Fitness in Networked Enterprises

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ABSTRACT

Many organizations attempt to form strategic networked enterprises, yet such strategies are difficult to implement because they are as likely to fail as to succeed. This failure is due to intangible differences and mismatches between partners in tacit knowledge (TK). Despite the various proposed partnership assessment models/tools in the literature, an immediate need exists for a new approach to measure the mismatch in TK across different organizations. This is due to the complex, vague, and uncertain nature of TK attributes. Hence, an instrument for measuring vagueness (imprecise), such as fuzzy linguistic variables, is needed. In this study, the author applies a neuro-fuzzy approach to assess TK fitness in networked enterprises. The results show how differences in TK between partners affect the networked enterprise’s performance. Furthermore, the assessment approach reveals the most significant values to adopt and the irrelevant values that must be abandoned to smooth the partnership formation. The proposed model can prevent unexpected conflicts between partners if managed properly.

Keywords: Networked Enterprises, Neuro-Fuzzy, Partners, Performance, Strategic Networked Enterprises, Tacit Knowledge (TK)

1. INTRODUCTION

Despite becoming a major source of challenges as well as opportunities for many industries, the globalization of the marketplace results Networked-Enterprises (NE) facing more and more global issues that are critical for their success, in particular tacit values conflicts and clashes. For example, the attempts to integrate European organizations to the global Japanese automotive organizations have resulted on pitfall conflicts because of the differences on tacit values between the western management and the Japanese management practices (Smagalla, 2004).

Therefore, assessing tacit values compatibility between partners is a critical and strategic success factor for NE. Nevertheless, current partnerships assessment attributes have included either quantitative indices, such as annual productivity and financial stability (Lorange et al., 1992), or qualitative indices, such as trademark reputation and communication openness (Talluri et al., 1999; Ip et al., 2003). Yet, sometimes evaluation attributes also include subjective indices, such shareholder’s
favourability, and objective indices, such as corporate image and geographic coverage (Donaldson, 1994; Choi & Hartley, 1996; Dacin et al., 1997; Mikhailov, 2002). However, these partnerships assessment models have mainly based on explicit knowledge (EK). EK is disseminated across organizations using physical objects like documents, standard operating procedures, and manual of best practices. This type of knowledge depends on facts, figures, data, and formulas to deliver its contents (Harison, 1987). EK can be information that are used during the negotiation, coordination and communication processes which are associated with selling price of an item, cost, order quantity, and other tangible data.

On the other hand, tacit knowledge (TK), can be a supplement source of knowledge to optimize partnership assessment process. TK is intangible knowledge that is hidden inside people and represents their individual experiences, culture, beliefs and values (Nonaka & Takeuchi, 1995). Therefore, TK is often learned independently of direct instructions, because this type of knowledge is difficult and sometime impossible to be documented, transferred and shared (Nonaka, 2007).

The main contribution of this research, therefore, is proposing a TK-based model to assess NE performance. The proposed model makes use of the Adaptive Network Based Fuzzy Inference System (ANFIS) that implements a Sugeno fuzzy inference system (Jang et al., 1997).

To construct and validate the model, I used a data set of three organizations from the petrochemical industry where organizations’ tacit values (i.e., risk and feedback) are used as inputs to the ANFIS model and the anticipated partnership performance is the output. Furthermore, I applied a resampling method to re-generate an adequate sample for training the proposed ANFIS model. To present this model the paper is divided into seven parts: Section 2 provides a background for the study and definition important terms, Section 3 depicts the instrument used to model TK in this study. Section 4 describes the design of the ANFIS model, Section 5 describes the data used in this study and explains the design of the experiments, Section 6 illustrate the results of the experiments conducted on a petrochemical SC, Section 7 concludes and summarizes the study.

2. BACKGROUND AND MOTIVATIONS

The recent advent on information technologies has overwhelmed decision makers with a large EK base. Consequently, all the incoming EK became a difficult, costly and time consuming task to the extent that decision makers complain of the absents of the right information availability (Feldman & March, 1981). Furthermore, NEs are no longer a simple source of discrete component manufactured based on manufacturer specifications, or a short service provider for a retailer. In contrast, partners are being more responsible for managing the entire network to satisfy the end customers and preserve long-term partnerships (Sako, 1998). Moreover, the use of EK to evaluate NE performance helps making a logical process for making decisions about managing the NE. However, such logical decisions are based on routine and structured information processing, yet the global and dynamics nature of today market expose decision makers to non-routine, unstructured and multiple expertise domain changes in business environment (Holsapple, 2003). This in turn enforces decision makers to depend upon sense-making capabilities for correcting the computational logic of the business and the data it processes. Hence, the same assemblage of data may evoke different responses from different organizations. Hence, partners ought to achieve a level of TK compatibility to decrease any future anticipated conflicts. Therefore, EK alone is inadequate source to evaluate NE performance.

TK can be understood to be knowledge that is embedded in an enterprise’s culture, values, and norms and it is difficult to share with other enterprises that are not compatible with that particular TK. Nonaka and Takeuchi
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