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# A multi-criteria decision support model for evaluating the performance of partnerships

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ABSTRACT

Partnership is one of the strategies that could help companies increase their competiveness in a global market. Previous studies reported that a high percentage of partnerships fail to achieve their drivers of entering into partnership. The lack of a comprehensive partnership evaluation has been identified as one of the main reasons for partnership failure. In this paper, a multi-criteria decision support model is developed to evaluate the performance of an ongoing partnership in different periods based on the measures associated with the drivers for entering into the partnership. Interpretive Structural Modeling (ISM), Analytical Network Process (ANP) and Fuzzy Logic (FL) are used in order to address the interdependency, the importance of, and the uncertainty in performance measures, respectively. The outputs of the model are the importance of each performance measure and a single number for the overall partnership performance in each period, named as Partnership Performance Index (PPI) here. PPI is different from either mere financial or operational performance measures. PPI is a multi-dimensional measure which includes multiple performance measures associated with the partnership drivers and accounts for their importance and interdependencies. The model is applied to a partnership between a logging company and a sawmill in British Columbia, Canada. PPI is used to evaluate this partnership in three different periods. PPI values are compared to conventional measures for partnership evaluation and the managers confirmed that PPI values better represent the performance of their partnership. The sensitivity of the PPIs is investigated based on the changes in the importance as well as the value of the measures. The rankings from the model are compared to the ones estimated by the managers, and the results showed that the rankings are compatible. This model contributes to the literature by developing an index for partnership performance which captures partnership drivers and performance measures as well as their importance and interdependencies.

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## 1. Introduction

The new business environment is characterized by increased competition due to globalization, high customers' expectations, limited natural resources and rapid change in technologies and markets. One approach to remain competitive is through establishing a partnership. Partnership is an inter-firm relationship which is characterized by asset, information and risks/rewards sharing, and joint decision-making (Daugherty, 2011; Lambert, Emmelhainz, & Gardner, 1996; Webster, 1992).

There are different drivers for entering into a partnership. The most common drivers are cost reduction, customer service improvement, marketing advantage, product development, product diversification and joint investment (Cruijssen, Dullaert, & Fleuren, 2007; Ellram, 1995; Hoffmann & Schlosser, 2001; Lambert et al., 1996). There may be more than one driver for each partner with different importance. Partnerships require intensive time and effort, reduce autonomy, and can result in more complexity and opportunistic behavior because of information asymmetry (Kwon & Suh, 2005). A high percentage (about 40–70%) of partnerships fail to achieve their drivers (Das and Teng, 2000).

The Transaction Cost Economics (TCE) and the Resource-based View (RbV) are widely cited theoretical approaches for explaining the effects of partnership on performance (Combs & Ketchen, 1999; Geyskens, Steenkamp, & Kumar, 2006; Hoffmann & Schlosser, 2001; Markus, 2004). Based on these theories similarity (Brinkerhoff, 2002), compatibility (Maheshwari, Kumar, & Kumar, 2006), mutuality (Hoffmann & Schlosser, 2001), joint decision-making (Mohr & Spekman, 1994), information sharing (Hua & Cong, 2011), risk/reward sharing (Poppo & Zenger, 2002), trust and commitment (Morgan & Hunt, 1994) are identified as the major factors affecting partnership performance.

The partnership development process includes four main stages: (1) assessing the drivers/needs for partnership, (2) selecting a

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partner, (3) establishing the right level of partnership, and (4) maintaining/evaluating the ongoing partnership (Ellram, 1991; Hoffmann & Schlosser, 2001; Kim et al., 2010). Different criteria need to be considered to evaluate each stage of partnership. In the literature, few studies focused on evaluating the maintenance stage. Evaluating an ongoing partnership in the maintenance stage consists of both the evaluation of partnership performance (outcomes) and the factors affecting the performance (components). In this study, we focus on the evaluation of partnership performance in the maintenance stage.

Several studies (e.g. Glaister & Buckley, 1998; Hoffmann & Schlosser, 2001; Wilson, 1995) used a single criterion, which was managers' satisfaction and their perception on achieving the overall driver, to evaluate the partnership performance. This evaluation measure could be biased and hard to interpret (Carter, Kaufmann, & Michel, 2007). In addition, using one or even several criteria independently (e.g. Rezaei, Ortt, & Trott, 2015; Ryu, So, & Koo, 2009; Vereecke & Muylle, 2006) cannot capture the overall partnership performance because the importance and interdependencies of the measures are not considered. The lack of a systematic approach to evaluate partnership performance has been identified among the reasons for partnership failure (Hoffmann & Schlosser, 2001; Holmberg & Cummings, 2009).

In order to comprehensively evaluate partnership performance, the drivers, as well as their relevant measures and importance must be considered in the model. There are several difficulties in considering multiple criteria for evaluating an ongoing partnership. First, the importance of these criteria may not be the same for each partner. Second, some of the criteria may be interrelated. Third, some criteria may be hard to estimate quantitatively. Lambert (1997) and Simatupang and Sridharan (2005) developed a multi-dimensional index for the establishment and maintenance stages respectively, however, the importance and the interdependencies of the measures were not considered. Recently, Chen and Wu (2010) and Verdecho, Alfaro-Saiz, Rodriguez-Rodriguez, and Ortiz-Bas (2012) incorporated the importance and interdependences of the measures, however, they did not evaluate partnership in different periods and did not consider different drivers of entering into partnerships.

The objective of this study is to bridge the gap in the literature for evaluating an ongoing partnership in different periods in the maintenance stage using multi-criteria decision analysis methods, while considering the importance of partnership drivers and measures and their interdependencies as well as uncertainties in the estimation of some measures.

## 2. Literature review

The performance of a partnership has been investigated using both theoretical approaches and mathematical models. The Transaction Cost Economics theory suggests selecting an inter-firm relationship that minimizes the sum of fixed and continual transaction costs (Geyskens et al., 2006). Based on the TCE theory, partnership can significantly reduce the costs of selecting and monitoring a supplier in long-term transactions with high uncertainty, and low to medium asset specifity and frequency (Geyskens et al., 2006). Using the TCE theory, Heide and Stump (1995) studied 60 buyer-supplier relationships, and concluded that partnership had a positive impact on the overall performance of partners. In their study, performance was evaluated by a single Likert scale estimated by the managers. In the Resource-based View theory firms are defined as a bundle of tangible and intangible resources (Eisenhardt & Schoonhoven, 1996). From this perspective partnership is the best approach when a firm needs additional resources that cannot be acquired through market transaction and cannot be built within the firm. Considerable research attention has been given to define the specific processes through which sharing resources affect performance using the RbV theory (e.g. Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). Using the RbV theory and data from 149 companies, Bharadwaj (2000) found that partnership affects the profit and cost-based performance measures positively.

Previous empirical studies based on the TCE and RbV theories evaluated the partnership performance of surveyed companies using either a single subjective measure (e.g. Glaister & Buckley, 1998; Heide & Stump, 1995; Hoffmann & Schlosser, 2001; Johnston, McCutcheon, Stuart, & Kerwood, 2004; Wilson, 1995) or one/more individual financial and operational performance measures (e.g. Bharadwaj, 2000; Combs & Ketchen, 1999) because partnership drivers, their performance measures, and their importance would not be the same for all the surveyed companies and it would be hard to have a single multi-dimensional measure which would be suitable for all the surveyed/investigated companies. However, from an operational point of view, it is important to evaluate the performance of a partnership in different time periods considering multiple criteria.

To evaluate the performance of a partnership a variety of multi-criteria decision analysis (MCDA) models have been developed and each focused on a particular stage of partnership development using the criteria important in that stage. Uncertainties, volume and frequency of transactions are often evaluated in the need assessment stage to compare the partnership approach with other alternatives such as in-house or market approaches for achieving specific drivers (Geyskens et al., 2006; Jacobides & Billinger, 2006; Markus, 2004; Mudambi & Tallman, 2010; Water & Peet, 2006). Most decision support models have been developed for the selection stage and used criteria such as performance and compatibility to evaluate potential partners depending on the type and the drivers of the partnership (see the review studies: Chai, Liu, & Ngai, 2013; Ho, Xu, & Dey, 2010; Wu & Barnes, 2011). There are a few developed MCDA models related to the establishment stage, where different levels of partnerships are evaluated using multiple criteria. Lambert (1997) proposed an index using a simple arithmetic sum of multi-criteria to help managers in choosing the right level of partnership in the establishment stage. These criteria included the drivers of a partnership as well as the facilitators such as symmetry and compatibility. Simatupang and Sridharan (2005) developed a multi-dimensional index for the maintenance stage, named collaboration performance index, which is an arithmetic average of three dimensions of demand fulfilment, inventory, and responsiveness. In the proposed collaboration performance index, the measures were evaluated using a rating scale (between 0 and 5) by the managers in one period. The multi-dimensional indices developed by Lambert (1997) and Simatupang and Sridharan (2005) did not incorporate the importance and the interdependencies of the measures.

The interdependency and importance of criteria have been considered in several studies in the selection stage. Interpretive Structural Modeling (Chen & Wu, 2010) and the Decision Making Trial and Evaluation Laboratory (Chang, Chang, & Wu, 2011) were used to consider the interdependencies of criteria. Analytical Hierarchical Process (AHP) (see review study by Bruno, Esposito, Genovese, and Passaro (2012a)) and Analytical Network Process (ANP) (Bayazit, 2006; Gencer & Gurpinar, 2007) were used to estimate the importance of the criteria. However, the evaluation of each partner was done by rating or pairwise comparison by managers rather than using quantitative performance measures as they would not be available in the selection stage.

Compared to the selection stage, there are more data available in an ongoing partnership in the maintenance stage, although some measures may not be available or accurate. For example, it might not be possible to get the exact number for market share. Therefore, it is important to consider uncertainties in the estimation of the measures. Fuzzy Logic is widely used to quantify the measures with uncertainties (e.g. Chang et al., 2011; Chen, Lin, & Huang, 2006; Kahraman, Cebeci, & Ulukan, 2003; Kannan, Pokharel, & Sasi Kumar, 2009).

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