Using the pairwise comparison method to assess competitive priorities within a supply chain

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ABSTRACT

The benefits of seamless integration and the pursuit of a shared strategy within a supply chain are widely recognized, creating, among other things, a hard to replicate competitive advantage. However, achieving this is a difficult task because of the limited means to assess a supply chain's strategic consistency. The purpose of this manuscript is to describe and illustrate how the pairwise comparison method can be used to reveal the consistency (or lack thereof) among supply chain members' perspectives with respect to the importance of different competitive priorities, such as cost versus flexibility. Illuminating where senior decision makers agree and disagree regarding the *current* versus *ideal* value creation processes within the supply chain has practical benefits. At a minimum decision makers within the supply chain should be aware of differences in opinions, although for optimal supply chain performance reconciling these differences is recommended.

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1. Introduction

The traditional view that competition takes place between firms or products is being superseded by the reality that competition occurs between different value creating supply chains (Ketchen & Hult, 2007; Lambert & Cooper, 2000; McCarter & Northcraft, 2007; Schnetzler, Sennheiser, & Schönsleben, 2007). Consequently, the idea of joint creation of value should apply to all contiguous relationships within the supply chain with an overall goal of optimally creating value for the end customer — a critically important issue to those embracing the marketing concept. Supply chains are difficult to replicate and can therefore provide a sustainable competitive advantage when operating well.

Viewing competition as something that occurs between supply chains increases the importance of strategic consistency among the members comprising a given chain. It is no longer appropriate to consider a firm's value creation capabilities in isolation without considering the other members involved in the value creation process. To maximize a supply chain's overall performance value should be created in a consistent manner throughout the entire chain (Johnson, Scholes, & Whittington, 2006). The greater the consistency between the strategies pursued by all members comprising the chain, the greater is the overall business performance (Andrews, 1971). Thus, for example, if cost leadership is the intended end-product positioning strategy, all

members within the chain should embrace that perspective. Conversely, markets characterized by technological dislocations may prefer chain members that initiate, or are prepared to respond quickly to, innovations up or down the chain. In this case, restraining costs may be viewed as less important than the ability to initiate or respond to innovations. Unfortunately, individual companies may be fixated on optimizing their own performance rather than the chain's overall performance. Pursuing what is best for the supply chain requires embracing a shared understanding of the competitive priorities that drive value creation within the chain.

Four decades ago Skinner (1969) highlighted the importance of making strategic choices among different competitive priorities, such as cost efficiency versus innovativeness, albeit his focus was intra-firm. Because companies cannot excel on every priority, he advocated the need for prioritizing a firm's available options. This study builds upon that philosophy, but applies it to the entire supply chain. Like individual companies, a supply chain cannot perform well on every competitive priority, hence prioritization is needed. Widely differing philosophies regarding what to emphasize (e.g., cost or innovativeness) is a potential source of friction among supply chain members and is likely to cause sub-optimal overall performance. Hence, identifying and isolating these conflicting perspectives has clear practical import. Unfortunately, there is a paucity of means to do so.

The purpose of this study is to demonstrate how the pairwise comparison method (PCM) can be used to assess the strategic consistency within a supply chain. PCM can be used to reveal areas of agreement and disagreement regarding the importance of various competitive priorities that drive value creation. A case study of a supply chain within the packaged food industry is presented for illustrative purposes. PCM was used to elicit opinions from senior management in

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each member of the supply chain about how value *is* created within the supply chain as well as how value *should be* created. These two perspectives, which need not be in agreement within or across firms, provide a basis for an in-depth analysis of the strategic consistency within the supply chain.

The overarching supposition is that the greater the difference between these two views (the current versus the ideal state), the less ideal is the current strategy being pursued; and the greater the differences in perspectives across organizations comprising the chain, the less there is consistency in strategy among chain members. As Swink, Narasimhan, and Kim (2005) note, practitioners and researchers do not have an adequate understanding of the role that consistency in value creation plays in achieving superior performance. To the authors' knowledge PCM has not been used to assess the strategic consistency within a supply chain. By working through a real-world example, the advantages and challenges of PCM are discussed.

2. PCM as a method to elicit managers' opinions

Managers could simply be asked to rank the relative importance of competitive priorities in the value creation process. Unfortunately, this straightforward approach has been criticized for being too abstract and resulting in inconsistencies (Zahedi, 1986). Importance weights could also be obtained by asking respondents to express their opinions using traditional five- or seven-point Likert scales (Christiansen, Berry, Bruun, & Ward, 2003; Morash, 2001). However, as Kim, Yoon, and Yun (2005) have suggested, respondents may evaluate many/most of the priorities as important, which would yield little strategic insight. Alternatively, asking respondents to distribute points (typically 100) across various attributes has also been used, but it can also result in little variance in perceived relative importance (Christiansen et al., 2003).

The supply chain cannot perform well on every competitive priority, hence trade-offs exist and therefore prioritization is needed. In that respect, the pairwise comparison method (PCM) as a method for eliciting managers' preferences is in balance with the idea of the trade-off concept as it forces respondents to reveal their preferences when priorities are compared against each other. Moreover, this is reminiscent of the everyday lives of managers who face choices between different priorities, such as whether to reduce costs by trimming R&D expenditures.

PCM is a suitable method for assessing strategic consistency. It not only returns a ranking for a set of priorities, but also shows how much more/less important managers consider a given priority, both within a firm as well as across firms comprising the supply chain. As such, PCM offers more information for evaluating and developing the strategic consistency of the supply chain relative to other approaches. Since its introduction, PCM has been widely used, most notably in the context of the Analytic Hierarchy Process (AHP) (Saaty, 1980, 1994; Saaty & Vargas, 2001).

3. Illustrating PCM: a case study of a food industry supply chain

To illustrate what can be learned from PCM, this method was applied to assess the strategic consistency of a supply chain operating in the packaged food industry. The supply chain consisted of four channel members: a package manufacturer (company A), raw material supplier (B), food manufacturer (C), and retailer (D). The supply chain studied produces a variety of different convenience foods, including ready-made meals, pizzas and casseroles. All the companies were among the top three performers in their respective industries measured by market share, and two of them were also internationally acknowledged market players.

Nine managers provided the pairwise comparisons: three managers from company A, one from company B, three from company C, and two managers from company D. All were senior decision makers with a direct connection to the strategic decision-making process within the firm.

3.1. Choosing an appropriate set of priorities

Choosing which priorities (e.g., cost? reliability? flexibility?) to emphasize is the first step in the analysis process and is of critical importance (Takala, Leskinen, Sivusuo, & Hirvelä, 2006). Existing literature is consistent, both theoretically and empirically, in advancing four competitive priorities: cost, reliability, speed, and flexibility (Swafford, Ghosh, & Murthy, 2006; Ward, McCreery, Ritzman, & Sharma, 1998). More recently, innovation and collaboration have emerged to extend the view of the value creation process; collaboration, in particular, has been widely recognized (Corsten & Kumar, 2005) and some argue will become increasingly important (Ogden, Petersen, Carter, & Monczka, 2005).

In addition to the literature review, three independent food industry experts were interviewed to gain their insight and feedback about the appropriateness of the proposed priorities in the case study context. The experts were interviewed separately and were asked to describe what they perceived as the critical drivers of value creation within the food industry. At this stage, the goal is to develop a valid, parsimonious list of competitive priorities. This list is likely to vary across industries.

To cross-validate the appropriateness of the chosen priorities, after providing the pairwise comparisons, discussed below, the senior managers of the companies comprising the supply chain were asked to describe the extent to which the chosen priorities actually represented the value creation process. The managers agreed on the chosen priorities, which validated the use of these six priorities. Table 1 summarizes the chosen priorities used in the case study as well as their definitions.

3.2. Data generation: collecting pairwise comparisons

Before eliciting the pairwise comparisons the study participants were given a presentation about the six priorities that were to be compared against each other. Definitions for each priority were given as well as a short discussion of what they meant in the given supply chain context. Participants — nine senior decision makers spread across the four firms comprising the chain — were encouraged to ask questions if something remained unclear.

These senior decision makers were then asked to rate the relative importance of one competitive priority over another on symmetric 1–9 interval scale (see Fig. 1). This interval scale has been shown to enjoy robust psychometric properties and has been widely used since its introduction in the context of AHP (Harker & Vargas, 1987; Saaty, 1980; Searcy, 2004).

The six competitive priorities resulted in 15 pairwise comparisons, each of which was rated twice. In the first round of comparisons respondents were asked to reach a consensus (at the firm level) on the competitive priorities with respect to the *current value creation* process within the supply chain. After providing these responses, they were then asked to reach a consensus on the two competitive priorities that were more important in an *ideal value creation* process within the supply chain. As a result, a general picture of the current value creation process as well as a vision of the ideal value creation process was achieved.

In each of the companies A, C and D more than one senior manager provided pairwise comparisons. Thus, before pairwise comparisons were elicited respondents were encouraged to share their opinions with the other members of the group. Many methods can be used to consolidate their judgements. For example, consensus, vote and geometric mean of the individuals' judgments can be used (Lai, Wong, & Cheung, 2002). The use of vote or geometric mean can yield a generalised view of the value creation process, but arguably one that lacks a clear picture of how the firm actually prioritizes competitive priorities. Voting, for example, would represent the majority opinion, but may be far from representing the minority opinion. In this study, respondents were asked to reach a consensus on each comparison. Reaching a consensus in itself has the potential to be a powerful