APPLYING MULTI-TRAIT MULTI-METHOD APPROACH IN SUPPLY CHAIN MANAGEMENT RESEARCH: AN EMPIRICAL ILLUSTRATION

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ABSTRACT

Supply Chain Integration (SCI) is considered as one of the important critical success factors for firms. One way to assess the impact of SCI is to assess the joint capabilities of buyer – supplier dyad. When we deal with empirical research involving multiple traits (capability factors) and multiple methods (in this case, buyer and supplier firms), Multi-Trait Multi-Method approach (MTMM approach) can be applied to validate the construct. We provide an empirical illustration in this study.

INTRODUCTION

The importance of Supply Chain Management (SCM) to compete effectively is now well established and widely accepted (Li et al., 2005). One of the new paradigms in SCM is Supply Chain Integration (Flynn et al., 2010). Researchers argue that firms that adopt SCI are likely to perform better in terms of less inventory, less stock outs, better customer service, lower cost, better product quality, shorter new product development time, better customer satisfaction, improved information and material flows, better operational performance, and ultimately superior financial results (Frohlich and Westbrook, 2001; Rosenzweig et al., 2003; Flynn et al., 2010). Many of these studies, however, examine the performance impact of SCI for the focal firms and not for both the buyer and the supplier firms.

Furthermore, there are questions concerning whether both buyer and supplier firms benefit equally from SCI. Some studies report that there is asymmetric distribution of benefits between buyer and supplier firms (Eg. Holmberg, 2000; Corsten and Kumar, 2005). Therefore, it is valuable to investigate the impact of SCI at the buyer – supplier dyadic level rather than at the focal buyer firm level. One way to assess the impact of SCI is to assess the 'capabilities of buyer – supplier dyad' because capabilities are direct antecedents to business performance (Rozensweig and Roth, 2004). We define capabilities of buyer – supplier dyad as joint capabilities of buyer and supplier units that constitute the dyad. Capabilities refer to the strengths experienced in the areas of cost capability, product quality, delivery reliability and process flexibility (adapted from Rosenzweig et al., 2003).

Assessment of 'capabilities of buyer – supplier dyad' calls for data collection of joint capabilities from the stand point of both the buyer and the supplier firms. CFA MTMM approach (Confirmatory Factor Analysis Multi-Trait Multi-Method approach) can be used in establishing the validity of constructs such as 'capabilities of buyer – supplier dyad' where it involves collection of perceptual data from the buyer and the supplier firms. The objective of this paper is to provide a methodological review of CFA MTMM approach and apply the approach to construct validation in SCM research. We then provide an empirical illustration by examining the construct 'capabilities of buyer – supplier dyad'. The remainder of the paper is organized as follows. In the next section, we review the construct validation assessment process followed by a review of MTMM approach. This is followed by methodological review of CFA MTMM approach. We then present an empirical illustration to show how this approach can be applied. The final sections discuss the contributions of this study to supply chain management research and directions for future research.

CONSTRUCT VALIDITY

Construct validity is defined by Schwab (1980) as "representing the correspondence between a construct (conceptual definition of a variable) and the operational procedure to measure or manipulate that construct (p.5). All data contain some degree of random error. Measures that

contain large amount of random error can modify statistical results and lead to false acceptance of null hypothesis (Nunnally, 1978).

Construct validity involves the assessment of the degree to which a measure correctly measures a targeted variable. Construct validation is a three step process (O'Leary-Kelly and Vokurka, 1998). The first step requires the identification of a group of measurement items (empirical indicators) which are thought to measure the construct. The second step establishes the degree to which the empirical indicators measure the construct (Schwab, 1980). This step requires a series of tests to measure the reliability, the convergent validity, discriminant validy and unidimensionality. Reliability refers to the consistency or stability of the measure and is inversely related to the degree to which a measure is contaminated by random error (Carmines and Zeller, 1979). The Cronbach's alpha coefficient is one of the most popular methods for assessing reliability. Convergent validity refers to the degree to which multiple methods of measuring a variable provide the same results. For example, if we measure joint capabilities using two methods (e.g. using data independently supplied by respondents from supplier firm and buyer firm), to what degree does data from two sources covary? The assumption is that if a measure is valid, it should yield the same results when utilized across different methods. Discriminant validity is the degree to which measures of different latent variables are unique. Unidimensionality measures the extent to which a set of indicators reflect a single underlying construct. It is assessed by fulfilling the following two conditions (Gerbing and Anderson, 1988; Hair et al., 1995). First, an item must be significantly associated with the empirical indicators of a construct and, second, it must be associated with one and only one construct. The final step in the validity assessment involves determination of the extent to which a construct relates to other constructs in a predictable manner. This is also referred to as nomological validity (Bagozzi, 1980) or substantive validity (Schwab, 1980) or criterion validity (Grover and Malhotra, 2003).

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