ABSTRACT

One of the critical success factors in supply chain management is Internal Integration within the firms. In this study the authors have examined this construct in greater depth and have developed an improved measurement model grounded in systems and contingency theories. The authors have validated the model by conducting a large scale empirical study and by collecting data from 154 buyer-supplier dyads. The authors have established the construct validity by using refined Confirmatory Factor Analysis Multi-Trait Multi-Method Approach. The authors have used multiple perspectives from fields such as operations management, information systems management, and inter-organizational relationship management to present a richer construct.

Keywords: Confirmatory Factor Analysis (CFA) Multi-Trait Multi-Method Approach, Construct Validity, Empirical Research, Internal Integration, Supply Chain Management

INTRODUCTION

Supply Chain Integration (SCI) has received increasing attention among academicians and practitioners alike in recent years (Frohlich & Westbrook, 2001; Vickery et al., 2003; Rozenweig et al., 2003; Droge et al., 2004; Swink et al., 2007; Flynn et al., 2010; Lin et al., 2010; Zhao et al., 2011; Schoenherr & Swink, 2012). The literature broadly defines SCI as the extent to which a firm is strategically interconnected and aligned to its supply chain partners (Jayaram et al., 2010; Schoenherr & Swink, 2012). SCI consists of the integration of internal functions, as well as the integration with customers and suppliers (Zhao et al., 2011). Despite the increasing research interests in SCI, our understanding of the individual dimensions is very limited. While some studies focuses on dimensions such as customer and supplier integration (Cousins & Menguc, 2006; Homburg & Stock, 2004; Koufteros et al., 2007), others use omnibus...
definitions for SCI with single measurement item (Armistead & Mapes, 1993; Rosenzweig et al., 2003). As Flynn et al (2010) contend, many conceptualizations of SCI are incomplete and leave out central link of internal integration.

Internal integration is arguably the basis of SCI (Wong et al., 2011). It removes functional barriers (Flynn et al., 2010) and enables cooperation across internal functions (Morash & Clinton, 1998). Without Internal Integration, different functions work at cross-purposes. This leads to wastage of efforts and resources (Pagell, 2004). Investigation of the construct of Internal Integration is important for the following reasons: First, many prior studies have narrowly conceptualized Internal Integration. Second, some prior studies use a single measurement item to measure this construct. It is well established that psychometric properties of any construct will be substantially improved by use of appropriate multiple measurement items. Third, use of single item fails to account for the processes that need to be considered for strengthening internal integration. Fourth, granular understanding of the construct of Internal Integration is essential to improve our understanding of the mechanism of SCI. Finally, this study will help practitioners focus their limited resources on the important processes that constitute Internal Integration.

In this study, we develop an improved measurement model for Internal Integration by using multiple measurement items. Since buyers and suppliers perspectives on integration practices are different (Nyaga et al., 2010; Ambrose et al., 2010), we enhance the methodological rigor and quality of the measures by collecting data from the buyer and supplier firms that constitute the buyer – supplier dyad (Heide & John, 1990; Dong et al., 2001). In order to eliminate any potential methods effect and to bring cleaner factor structures, we use Confirmatory Factor Analysis Multi-Trait Multi-Method (CFAMTM) approach (Bryne, 1994). The remainder of the paper is organized as follows. In the next section, we review the theoretical background of Internal Integration. We then present an improved measurement model. We then validate the model using results from an empirical study. In the final sections, we discuss the contributions of this study and directions for future research.

**THEORETICAL BACKGROUND**

**Definition of Internal Integration**

The term “integration” is defined as “the unified control of a number of successive or similar economic or especially industrial processes formerly carried on independently” (Webster, 1966, p.1175). By adopting this concept, Internal Integration refers to the degree to which a firm can structure its organizational practices and procedures into collaborative and highly synchronized processes in order to fulfill customer requirements (Cespedes, 1996; Kahn & Mentzer, 1996; Chen & Paulraj, 2004; Flynn et al., 2010; Zhao et al., 2011). Effective use of enterprise resource planning systems (ERP) helps to strengthen information integration within organizations as well as across organizations in a supply chain (Leu et al., 2011). Internal integration involves coordinated activities in different functional areas such as product design, demand management, production planning and control, shop floor scheduling, order fulfillment (Radhakrishnan et al., 2007). Internal Integration also involves cross-functional cooperation, or working together across different functions in new product development. Internal integration recognizes that different functions within a firm should not act as functional silos, but instead work as part of an integrated process (Zhao et al., 2011). One of the critical enablers for integration is timely planning and information processing within and across organizations in a supply chain (Pathak & Vidyarthi, 2011). The goal is to achieve effective and efficient flows of products and services, information and money to provide maximum value to the end customer at low cost and high speed (Frohlich & Westbrook, 2001; Flynn et al., 2010). Internal Integration in essence refers to information sharing between internal functions, strategic cross-functional cooperation, and working together in processes such as demand management, production planning and control, shop floor scheduling, order...
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