Linking service-dominant logic and healthcare supply chain

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Abstract
While Supply Chain Management (SCM) has proven effective in many industries, healthcare has found its adoption to be challenging. Underpinned by service-dominant logic (SDL), this paper examines value co-creation in healthcare; namely the translation of internal competencies into external capabilities, and develops a theoretical framework linking SDL and SCM.

Keywords: Healthcare supply chain, Value co-creation, Competencies.

Introduction
Healthcare costs are continuously spiraling up and hospitals are facing steep competition to provide high quality services (Dobrzykowski, 2012; HFMA, 2012, p.2). As such, supply chain performance and value creation activities with upstream and downstream actors have increased in importance for healthcare providers (Prahalad and Ramaswamy, 2004). Significant opportunities for better value creation approaches in healthcare exist in key areas linked to supply chain management (Schneller and Smeltzer, 2006).

While supply chain management has proven effective in other industries, healthcare has found its adoption to be challenging (McKone-Sweet et al., 2005; Meijboom et al., 2011). Supply chain networks in the healthcare sector are very complex – different from those of other sectors (Meijboom et al., 2011). Healthcare supply chains (HSC) involves numerous network partners working autonomously, based on often undefined incentive structure and supply driven self-interest. Such linkages are often sub-optimal, thereby lacking integration, cooperation and multidisciplinary collaborative approaches (van Raak et al., 2005; Billings and Leichsenring, 2005). In the HSC domain, major barriers exist in terms of communication, integration, information gathering and processing (Schneller and Smeltzer, 2006). This creates functional barriers and forms silos among the chain partners (Boyer and Pronovost, 2010).

Concomitantly, views on value creation are evolving to recognize a more networked and dynamic environment (Vargo and Lusch, 2004; Lusch and Vargo, 2006). There is a shift from the goods-centered view to the service-centered view which is based on identification and development of core competences for achieving competitive advantage through developing

relationships with key economic actors in the supply chain (e.g., customers and suppliers) (Lambert et al. 2006). Actors derive benefit when specialized competences are used in the value-creation processes, thereby becoming a co-producer of service and thus assuming an active role in 'relational exchanges and coproduction' (Vargo and Lusch, 2004).

These conditions are observable in the healthcare context where the purchasing function can benefit from collaborating with upstream suppliers of medical and surgical equipment as well as downstream physicians who use these products in the delivery of care (Schneller and Smeltzer, 2006). It is important to understand how value co-creation, namely the translation of internal competencies into external capabilities can be enabled by SCM practices (Zhang et al., 2002). This study develops a framework exploring procurement in healthcare (e.g. in the hospital supply chain). The role of SCM practices is examined to explain how they can be used to improve hospital supply purchasing processes. This study employs an SDL lens to examine *how SCM practices influence value co-creation (the translation of competencies into capabilities)?* In doing so, this study describes: 1) a contemporary view of value creation based on competencies and service-dominant logic (SDL), and 2) a theoretical framework that links SCM practices and value co-creation, capable of advancing the extant understanding of SCM in healthcare.

A contemporary view of value creation based on competencies and SDL

SDL explains the exchange protocol as a process through which supply chain actors use specific key specialized abilities or skills in sync for mutual benefit (Callaway and Dobrzykowski, 2009). It is when these benefits to an actor (including access to knowledge, skills, and abilities) exceed the perceived acquisition costs including money, effort, and time that value is created (Field, 2012). Because access to resources and capabilities from other actors are requisite in value creation, value is always inherently co-created (Vargo and Lusch, 2004). It follows then that co-creation is not the same as co-production which refers specifically to the labor contributed by actors in the co-creation of value or execution of a task (Field, 2012). Thus, a necessary ambience exists where the providers of services and the recipients of those services communicate and coordinate effectively to co-create value (Lusch and Vargo, 2006). Through an SDL lens, co-creation is not a temporally bound phenomenon, but rather can take place in a time-shifted or even place-shifted way. In other words, a customer (e.g., a physician) may apply operant knowledge to an operand resource (e.g., a robotic surgical device) provided by a supplier (e.g., medical manufacturer), that has been purchased by the focal firm (e.g., hospital), ultimately co-creating value in a non-temporally and physically disconnected fashion. Key here is the notion of value co-creation through the exchange of specialized knowledge and abilities (Lusch and Vargo, 2006). These specialized knowledge or abilities, that Callaway and Dobrzykowski (2009) discuss, are referred to as competences by Zhang et al. (2002).

SDL argues that service is the true basis for understanding customer value co-creation as it is not tangible resources, but the services rendered by such resources emerging as competencies that act as primary inputs and in SDL terminology are addressed as operant resources (Penrose, 1959, pp 24-25; Vargo and Lusch , 2004; Lusch and Vargo, 2006). Operand resources are those which must be acted upon to create value (e.g., an MRI machine), while operant resources are those which act upon operand resources in value creation (e.g., knowledge of how to operate the MRI machine) (Callaway and Dobrzykowski, 2009). The basic underpinning of SDL centers on the understanding of a shifting focus from the traditional tangible aspects of skills, knowledge and information power towards more coherent intangible aspects involving interactivity, connectivity and building relationships with up and downstream

stakeholders (Vargo and Lusch, 2004). Thus, the SDL literature stream largely suggests the idea that supplier and customer are no more external to the system, but rather have integral role in the value creation process of the focal firm in the supply network through the sharing and application of each actor's competencies (Lo Nigro et al. 2006, Schmenner et al. 2009).

Competency exchanges and value co-creation

The competency literature is largely based on core competence theory (Prahalad and Hamel, 1990; Day, 1994), resource advantage theory (Conner and Prahalad, 1996; Srivastava et al., 2001) and the contrasting transformational viewpoints of the goods-centered and service-centered views (Vargo and Lusch, 2004). Competencies can be thought of as operand resources extant in the supply network. In other words, competencies must be acted upon in order to facilitate value creation (Vargo and Akaka, 2009). Capabilities, on the other hand, are outward facing resources that can be exploited by actors in the network for value creation (Zhang et al., 2002). In this way, capabilities can be thought of in an operant way as intangible resources capable of value creation (Vargo et al. 2008; Vargo et al., 2010). Value co-creation is defined as the extent to which network actors exchange specialized competencies to develop desirable capabilities (Zhang et al., 2002; Vargo and Lusch, 2004; Lusch and Vargo, 2006; Vargo and Akaka, 2009; Callaway and Dobrzykowski, 2009).

Value co-creation, or competency exchanges among supply chain actors, in essence facilitate the transformation process from internally facing competencies to outward facing capabilities necessary in value creation (Zhang et al., 2002; Vargo and Lusch, 2004; Lambert et al. 2006). This occurs through the exchange of actor competencies owing to the notion that value can only be created when value propositions are relevant to the actors involved in co-creation (Vargo and Akaka, 2009). This value co-creation process is illustrated in Figure 1. Thus, this study proposes:

Proposition 1: Inwardly facing competencies are transformed into outwardly facing capabilities during value co-creation.

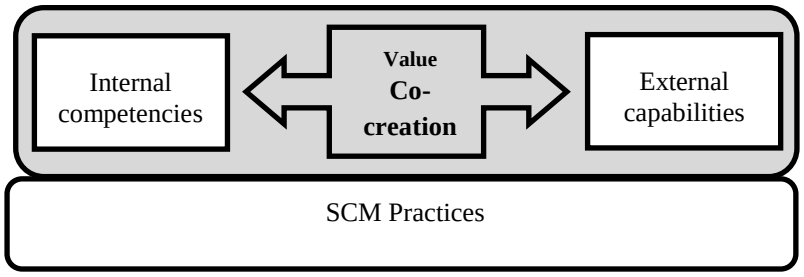

Figure 1 – Conceptual model of the competency – capability transformation which occurs during value co-creation in SCM practices.

A framework that links DART SCM practices and value co-creation

SDL asserts the advantages of integrative approaches to value co-creation in a way consistent with the SCM literature (Schmenner and Smeltzer, 2006). While most of the SDL literature remains in the conceptual stage of development, Zhang and Chen (2006) offer an early empirical examination of value co-creation which indicates that customer integration has positive influence on value co-creation system and also shows association development of new capabilities which support a firm's competitive advantage. Similarly integrative activities on the supplier side of the

chain also support superior performance (Lambert et al. 2006, Li et al. 2006b). For example hospitals in many cases give access into their procurement database to the key medical surgical suppliers which help in real-time information sharing, material tracking and inventory maintenance, thus both co-create a synergistic system which helps in avoiding costly inventory losses and critical stock-out situations (Chen, 2002; Lau Antonioetal., 2007). This provides a foundation suggesting a link between SCM practices and value co-creation exchanges; the competency – capability transformation. See Figure 1.

In order to conceptualize a set of SCM practices that may be useful in value co-creation, we turn to the work of Prahalad and Ramaswamy (2004). These authors indicate that across the sectors, there has been an emergence of '*connected, informed, empowered, and active….*' network partners challenging the traditional perspective and participating into increased value co-creation. Prahalad and Ramaswamy (2004) used the term 'consumers' to indicate the buyers in the market who increasingly expressed interest of interacting with the supplying firm and thereby co-creating value in course of their transactions; thereby redefining the very nature of the buyer-supplier interaction and redefining the new cult of value 'co-creation' instead of mere 'creation' and processes associated with it. They proposed a framework referred to as the DART framework (D-A-R-T is the acronym for dialogue, access, transparency, and understanding of risk-benefits) which enables the co-creation and co-extraction of value (Callaway and Dobrzykowski, 2009). See Figure 2.

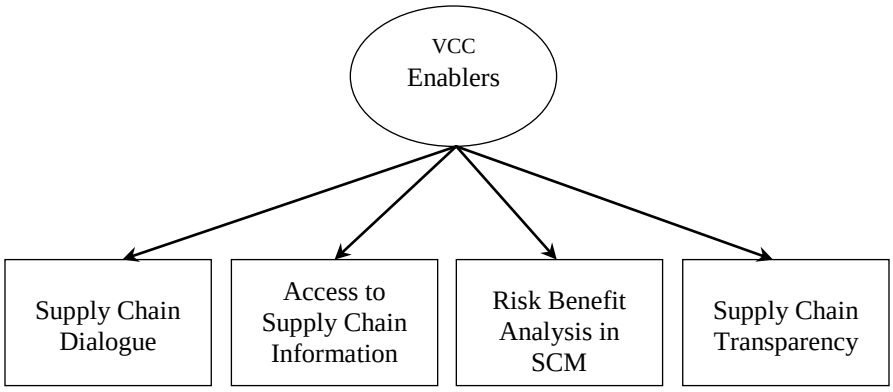

Figure 2 – Supply Chain enablers of Value Co-Creation.

Supply Chain Dialogue and Value Co-Creation

The first dimension of DART stands for the dialogue which is very important for any exchange to be successful and subsequent relationships to flourish. A study by Levine et al. (2001) conceptualized the network environment (i.e. the market) as 'sets of conversation' between the buyer and the supplier. This conceptualization also holds well for B-2-B scenario between a buying firm and its suppliers. The conceptualization of dialogue forms the basis of interaction and engagement. It contributes towards building a platform based on ability and willingness from both the sides (i.e. the buying firm as well as the suppliers), thereby providing a convenient environment for mutual benefit and development of a business scenario, which favors co-creation principles (Prahalad and Ramaswamy, 2004).

The conceptual understanding behind dialogue can be viewed from the perspective of *communication practices* necessary for creating a collaborative environment along the supply chain and understanding the needs and expectations of the actors in the network. The DART framework also drives its conceptual base from the same VCC principles and roots that is at the

center of S-D logic focusing on value creation process. The 'dialogue' parameter of DART indicates and carries the same understanding of 'communication' as in the S-D logic literature. S-D logic argues for communication based on the conceptualization of communication consisting of 'conversation and dialogue' in which the network partners (i.e. the customers are communicated with); be it the customers of the supplying firm i.e. the suppliers to buying firms in B-2-B setup or the customers of the focal firm in B-2-C. Therefore, this study defines Supply Chain Dialogue as *the extent to which network actors demonstrate a manifested willingness to communicate* (Prahalad and Ramaswamy, 2004; VanVactor, 2011). See Table 1.

In the perspective of healthcare sector, such communication practices have been indicated to be very effective and important for the smooth continuation of the supply activities among the networks. VanVactor (2011) highlighted that such communication practices (referred to as collaborative communication) has been successful in not only creating a collaborative network environment and enhanced healthcare supply chain operations, but also had potential cost savings and higher efficiency in achieving enhanced synergy between network organizations, multi-stakeholders working together. Given this, the 'dialogue' dimension of the DART framework can be conceptualized as a supply chain practice centered on communication that enables value co-creation. Thus, this study proposes:

Proposition 2: Supply Chain Dialogue among actors will support value co-creation.

Supply Chain Information Access and Value Co-Creation

The 'access' dimension of DART represents a simplistic yet critically important supply chain practice. Access refers to availability and reach of information and knowledge existing in the network and the related transactions between the network actors that achieve better understanding of the associated risk and benefits of actor exchange decisions (Prahalad and Ramaswamy, 2004). In this study, supply chain information access is defined as *an approach towards provision of timely, accurate and relevant information, more precisely having inclusions of the previously hidden or unavailable information to be used by the organizational decision makers* (Davenport and Glaser, 2002). Prahalad and Ramaswamy's (2004) conceptualization of 'access' centered primarily on a downstream perspective (with the customer base), however, the SCM literature prescribes that access is also an important dimension in upstream practices (Ford and Scanlon, 2007).

Information sharing have been shown to as a means of information access, evident in the plethora of SC information sharing literature (Strader et al. 1999, Lee et al. 2000, Zhao et al. 2002, Sezen, 2008). While Strader et al. (1999) endorsed the idea regarding sharing of supply and demand information with up and downstream SC partners for both financial and operational gain in terms of cost and time savings respectively, Lee et al.(2000) highlighted that such information sharing practices between network partners enhances the responsiveness of the network environment and benefitted the focal firm. For critical industry sectors such as healthcare, where responsiveness and agility to respond to sudden demand variability are vital attributes, this SC practice has a particular significance (Shah et al., 2008). Sezen (2008) findings endorse the relevance of the practice in influencing another operational performance attribute (flexibility), especially in variable uncertain delivery and demand environments. Many other studies indicate that cooperative information sharing among SC members enhances the effectiveness and competitiveness of the SC, by enabling actors to incorporate necessary

information into their work (Berry and Naim, 1996; Zhao et al., 2002; Sahin and Robinson, 2005; Li et al., 2006a).

Studies indicated that coordinated sharing of supply and demand information with SC partners reduced cost and shortened order cycle time (Strader et al. 1999), increase in information sharing amidst volatile demand environment led to better SC responsiveness (Lee et al. 2000) and enhanced operation, product and delivery flexibility (Sezen, 2008). Other studies showcase the relevance of information sharing along the SC among the related partners and advocated its influence in enhancing competitiveness and effectiveness (Berry and Naim, 1996; Zhao et al. 2002; Sahin and Robinson, 2005; Li et al. 2006a).

Superior performance has been attributed to joint decision making activities (Arshinder and Deshmukh, 2007), joint inventory management between network partners (Holweg et al. 2005) and ordering coordination (Zhao et al. 2002); all leading to enhanced total supply chain cost savings as high as 60%. These phenomena when considered through a SDL lens can be explained as the resultant gain out of VCC activities and can be attributed to information sharing or access. Information sharing among network actors from the beginning of the decision-making process is very vital in healthcare sector so as to not only develop consensus about the purchasing decision, but also garner buy-in and commitment, thereby avoiding helping in anticipation and avoidance of many potential problems (HFMA, Dec 2012, p6). The physician, who represents the patients' needs, is a vital stakeholder on the consumer side. Thus, regular dialogues between the managers and physicians to update each other's needs and purchasing options become important. This concept might hold well in both up and downstream situations (i.e., not just with physicians but also with upstream suppliers). Thus, this study proposes:

Proposition 3: Supply Chain Information Access among actors will support value co-creation.

Supply Chain Risk-Benefit Analysis and Value Co-Creation

We conceptualizes the third DART parameter – analysis of risk and benefit – as *the extent to which network actors possess the information necessary to adequately assess the consequences of their decisions to interact* (Prahalad and Ramswamy, 2004; Tummala and Schoenherr, 2011). This interaction decision might also include their decision to participate in any group purchasing alliance and most importantly the type of relationship practices to involve with and implement with the upstream supply partners and downstream customers (Hu et al., 2012). Also hospitals often engage in outsourcing practices. Such decisions, the associated interactions and shared information also pose concerns for the managers. Thus, the understanding and ability to conduct risk-benefit analysis becomes not only important for the SC / procurement managers but also for the operations managers engaged in hospitals.

The group purchasing phenomena in healthcare illustrates a more collaborative approach to value co-creation, but brings with it a degree of risk that ought to be assessed in hospital purchasing decisions. The literature is quite rich and varied offering both support for and identifying the risks of group purchasing practices. The literature indicates that group purchasing alliances are very effective in reducing cost, as high as 20% of procurement cost (Rozemeijer, 2000). This savings is achieved through reduced procurement pricing, reduction in administrative cost and asset utilization cost. Also studies in hospital perspective on group purchasing indicate such practice to enhance hospital revenues besides providing more negotiating power to the buying firms than individually could be gained (Burns and Lee, 2008). Thus from the procurement perspective of a SC manager, associating with a formal purchasing

group or being a member of group purchasing organization is often lucrative and supposed to be value creating, where the similar actors (suppose the buying firms) of the network come together to negotiate favorable supply and price with single or many supply partners.

However other studies in the group purchasing literature provide evidence against such claims and argues that Group Purchasing Organizations (GPOs) increase the distance between the network partners and acts as an extra link (Young, 1989). A section of literature suggests that the claim regarding the advantages of group purchasing practices and is of opinion that prices negotiated through GPOs are not always lower as claimed (Fenstermacher and Zeng, 2000). Moreover studies have expressed concerns regarding the risk associated with the sharing of procurement information with such alliances apprehending loss of confidentiality with competing firms as well as proportion of gain perceived by different size of the firms at different stages of the purchasing group (Essig, 2000). Thus arises the necessity of risk-benefit assessment for the focal buying firms (actors) and their understanding regarding their possession of the necessary information so as to adequately assess the decision consequences.

The rationale behind the concept of the SC risk-benefit assessment has been the notion that while participating in different decision activities, network actors may not possess the necessary information to accurately assess outcomes and the associated risk. It is only when actors can accurately assess and understand the risks and benefits of participation in the network that they will engage (Prahalad and Ramswamy, 2004; Callaway and Dobrzykowski, 2009). Thus, this study proposes:

Proposition 4: Supply Chain Risk–Benefit analysis will support value co-creation.

Supply Chain Transparency and Value Co-Creation

Transparency is the final parameter of the DART framework (Prahalad and Ramaswamy, 2004). However the understanding of transparency has not been clear. A primary aim of the procurement function is inter-actor transparency which is the extent to which network actors exhibit trust, and reveal their true motivations, goals, and agenda are gaining importance and this has been the basis of the conceptualization of SC transparency (Handfield and Bechtel, 2002; Fawcett et al. 2004; Sahay, 2003; Lamming, 1993; Lamming et al. 2001; Lamming et al. 2004).

The principle impediments to transparency are: lack in connectedness, trust, alignment of agenda and co-ordination (Hill and Scudder, 2002). Marquez et al. (2004) mentioned that SC integration indicates a level of connectedness in which the key activities at various levels of the SC and the SC partners are connected. Literature supports the positive influence of SC integrative practices in creating a synchronous conducive environment and in maintaining trust and connectedness, through goal alignment along the value chain and enhancing performance, both upstream and downstream with suppliers and customers respectively (Frohlich and Westbrook, 2001; Drickhamer, 2002; Rosenweig et al. 2003; Droge et al.2004). Kim and Narasimhan (2002) supports such claims about SC integration and indicate that it enhances the linkage between the focal firm and network actors through integration of the relationships, activities, processes and strategies, which in other words from the viewpoint of DART can be said to represent SC transparency reflected through alignment goals.

SDL suggests the creation of a purchasing platform where clarity is present and the goals of all the actors are aligned (Dobrzykowski et al., 2012). This helps to achieve a globally optimized SC and network-wide trust among the actors. Thus, the role of e-business and associated technologies for data synchronization, interchange and system-wide connectivity to

maintain clarity in transactions appears inevitable (McKone-Sweet et al. 2005). Process integration and the complementarity of network assets and IT infrastructure in healthcare delivery integration for maintaining the system-wide transaction clarity have improved (Murillo, 2001). The healthcare sector is often characterized as having high service criticality and demand variation (Schneller and Smeltzer, 2006). However Bhakoo and Chan (2011) indicated the gap that exists in the healthcare sector, in terms of e-business's role in supporting vital SC functions like procurement, distribution and inventory management. Without explicitly mentioning the term 'Supply Chain Transparency', Brennan (1998) and Kim (2005) largely supported similar lines of thought through their studies concerning integration in the context of healthcare sector where they highlighted similar concepts as enablers of integration and playing commendable role in orienting the customer-organization-supplier relationships and alignment of actor goals. Attaran and Attaran (2007) indicated that in a transparent environment companies might be in a position to dramatically enhance their supply chain effectiveness through collaborative planning, forecasting and replenishment of their needed inventory, thereby building a one-to-one relationship. Such conditions enable competency exchanges in support of value co-creation (Dobrzykowski et al., 2012). Thus, this study proposes:

Proposition 5: Supply Chain Transparency will support value co-creation.

Conclusion and future research:

This paper based on academic and practitioners' literature support put forward five vital propositions. The detailed conclusion and future scope will be presented at the conference.

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