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E-commerce Last-mile Supply Network Configuration and Logistics Capability

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Stanley Frederick W. T. Lim and Jagjit Singh Srai

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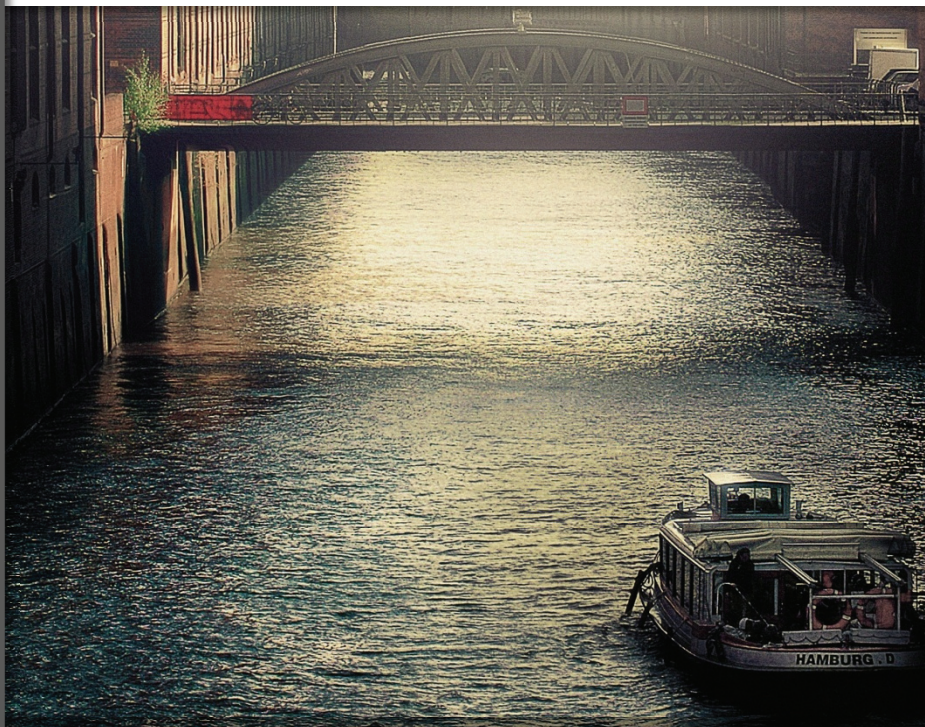

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E-commerce Last-mile Supply Network Configuration and Logistics Capability

Stanley Frederick W. T. Lim and Jagjit Singh Srai

The exact mechanism as to how last-mile supply network (LMSN) configuration influences performance has been relatively undeveloped, and with mixed results in the extant literature. This paper argues the difficulty in arriving to a convergent understanding because of a missing link that connects the relationship between configuration and performance. Specifically, it is posited that the missing link lies in the mediating role of logistics capability (comprising demand-management interface; supply-management interface; information management; and co-ordination) on the relationship between LMSN configuration and performance. Using the configurational approach, six configuration dimensions are identified: consumer portfolio; product portfolio; network structure; network flow; relationship and governance; and service architecture. By incorporating greater precision and additional theoretical considerations, this paper presents a conceptual framework through a set of propositions that provides greater depth of insight regarding the relationship between the influencing factors on LMSN configuration with logistics capability and performance.

Keywords: Last-Mile Supply Network, Configuration, Logistics Capability, E-Commerce

1 Introduction

The extant academic studies addressing issues related to e-commerce driven last-mile supply network (hereafter LMSN) and last-mile logistics (LML) have predominantly adopted a reductionist (or contingency) view (e.g., Esper, Jensen et al., 2003a, Punakivi, Yrjola et al., 2001). While such studies enhance the understanding of the causal relationships between select constructs, they are not able to capture the system dynamics and interrelationships between parts (Flynn, Huo et al., 2010), which are crucial in the dynamic LML context. Hence, a configurational approach adopting a holistic view can complement the contingency approach to enhance existing understanding and perhaps offer new insights. Since the seminar work of Singh Srai and Gregory (2008) and Neher (2005) represent early efforts to cross-fertilize configurational theory to the supply chain domain, the relationship between configuration and performance remains relatively undeveloped.

Research trend on configuration within the strategic management field on the other hand has taken a more active approach to studying the link (e.g., Ketchen, Combs et al., 1997, Leask and Parker, 2007, Short, Ketchen et al., 2007), as well as between capability and performance (e.g., Barney, 1991, Pavlou and El Sawy, 2011). While the link between capability and performance (Ferdows and De Meyer, 1990, Flynn and Flynn, 2004, Peng, Schroeder et al., 2008) appears to be well established, results linking configuration and performance have been mixed (e.g., Barney and Hoskisson, 1990, Ketchen, Combs et al., 1997, Thomas and Venkatraman, 1988). In the same light, several studies within the logistics domain have supported the link between logistics capability and performance (Cho, Ozment et al.,

2008, Lu and Yang, 2006, Zhao, Droge et al., 2001), while those between configuration and performance are scarce (e.g., Chow, Heaver et al., 1995). This paper attempts to explain the difficulty in arriving to a convergent understanding because of a missing link that connects the relationship between configuration and performance. Specifically, it is posited that LMSN configuration influences performance through logistics capability.

The purpose in this research is to provide a theory-based explanation to clarify the role of LMSN configuration and the configuration dimensions on logistics capability and propose a conceptual framework that explicates the relationship between the influencing factors on LMSN configuration, with logistics capability and performance. This is done by addressing the intrinsic capabilities derived from configurations that have been largely overlooked in prior research. The three research questions this paper aims to answer are: RQ1) what are the main dimensions of LMSN configuration; RQ2) how are the configuration dimensions link to logistics capability; and RQ3) what are the drivers of logistics capability?

This paper is organized as follows. Section 2 provides the theoretical background. Section 3 describes the conceptual framework. Section 4 presents the framework in detail and the propositions. Section 5 discusses the implications on research and practice, while conclusion is drawn in Section 6.

2 Theoretical Perspectives

Two well established theoretical perspectives that describe the effects of configuration on performance are summarized here: configurational theory and supply network configuration; and resourced-based theory. The

purpose is to highlight some of the limitations that arise from applying these perspectives to illustrate the need for additional insight.

2.1 Configurational Theory and Supply Network Configuration

Originated primarily from the strategic management field, Miller and Friesen (1984) define configurations as the "commonly occurring clusters of attributes or relationships [...] that are internally cohesive". Since configurations are composed of tight constellations of mutually supportive elements, they are considered predictively useful as the presence of certain elements can lead to the reliable prediction of the remaining elements (Miller, 1986). Several academics have since consented that configuration can generally be defined as the harmonic interaction of commonly occurring clusters of attributes of strategy, structure, process (or activities) and context (or environment) (e.g., Hambrick, 1984, Miller, 1990, Peter, Deborah et al., 1996).

Scholars who have adopted the configuration approach in the operations management domain include: Fisher (1997), Lee (2002), Neher (2005), and Singh Srai and Gregory (2008) in SCM; and Klaas (2003) in logistics who identified some logistically relevant variables grouped into context and design variables and highlighted that firms displaying a harmonic patterns of logistics configurations would be more efficiently organized and therefore more successful in their struggle for competitive advantage. Others have attempted to empirically show the linkage with performance as a result of better 'fit' among the configuration dimensions (e.g., Bowersox, Closs et al.,

1999, Chow, Heaver et al., 1995). The theory of configuration therefore suggests that because the attributes describing configurations are interdependent, limited varieties exist, and configurations that display harmonic patterns tend to result in better performance.

2.2 Resource-based Theory

Early literature on how firms create economic rents can be explained through two distinct causal mechanisms, resource-based view (selecting resource or resource picking) and the dynamic capabilities (deploying resource or capability building) (Makadok, 2001). The resource picking mechanism codified as resource-based view suggests resource ownership as the primary means to create economic rents and takes places before the acquisition (Conner, 1991, Makadok, 2001). The capability building mechanism codified as dynamic capability view suggests that firms' capabilities can only generate economic rents after resource acquisitions (Teece, Pisano et al., 1997). However, the idea of dynamic capability is actually better understood as the particular non-imitability capacity that a firm possesses to shape, reshape, configure and reconfigure its assets with the object of being responsive to changing technologies and market conditions (Teece, Pisano et al., 1997).

Resources are generally referred to the tangible and intangible assets owned by the firm that could be productively used (Grant, 1991), while routines are organizational processes that employ clusters of resources to achieve certain desired outcomes (Teece, Pisano et al., 1997). Capabilities are then described as high-level bundles of interrelated yet distinct routines (Amit and Schoemaker, 1993, Hult, Ketchen Jr. et al., 2003, Winter,

2003). As opposed to resources, routines and capabilities are generally "embedded in the dynamic interactions of multiple knowledge sources and are more firm-specific and less transferable, thus leading to competitive advantage" (Peng, Schroeder et al., 2008).

Some scholars highlighted that the concept of capability has been relatively abstract and high-level, and attempted to operationalize the concept (e.g., Pavlou and El Sawy, 2011, Peng, Schroeder et al., 2008). For example, Peng, Schroeder et al. (2008) argue that routines are a critical source of operation capabilities, and provided empirical evidences linking routines with operational performance.

2.3 Limitations of Configuration and Resource-based Theory

A configurational perspective of LMSN can facilitate a comprehensive analysis of LML system dynamics. The patterns of configuration might impact performance but current studies have either explored various configurations without an explicit link with performance, or have yet to provide further explanations to the mechanisms or how they impact performance.

Beyond the notion of routines that define capabilities, there is not yet a holistic view of the specific sources of capabilities where routines are embedded. This could be explained by the relatively abstract concept of capability and the fact that studies pertaining configuration and capabilities have largely been carried out in silos.

Since configuration comprises structures, processes, relationships, and service architecture, which are in fact sources of capabilities where routines are embedded, there is a significant potential to integrate knowledge

in these two domains to shed light on how configurations have intrinsic (or latent) capabilities that drive performance.

3 Conceptual Framework

Based on a synthesis of the information and insights from the extant theories and literature, six configuration dimensions are identified (Lim and Srai, 2015): 1) product portfolio; 2) consumer portfolio; 3) network structure; 4) network flow; 5) relationship and governance; and 6) service architecture. A model linking the influencing factors on LMSN configuration dimensions with logistics capability and performance is conceptualized (see Figure 1 and 2). Both product portfolio and consumer portfolio impact performance in an offline retail setting. Logistics capability modeled as a formative second-order model comprising network structure, network flow, relationship and governance, and service architecture as the sources (or drivers) of capability mediates the relationship between product and consumer portfolio, and performance prevalent in the online retail context. The relationship between the first-order and second-order constructs can either be reflective or formative (Edwards, 2000). A formative second-order model is more appropriate to represent logistics capability, as the four configuration dimensions are complementary to each other.

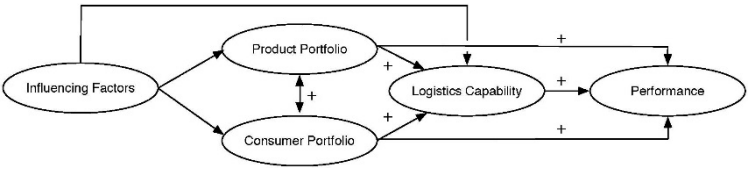

Figure 1 Conceptual Framework

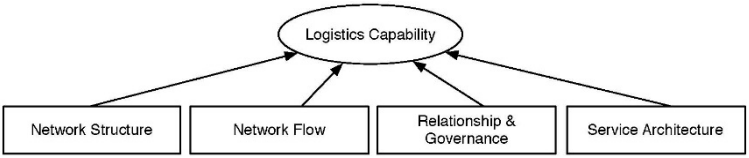

Figure 2 Drivers of Logistics Capability

Several studies have empirically tested the link between logistics capability and performance (e.g., Cho, Ozment et al., 2008, Zhao, Droge et al., 2001). This research adopts Cho, Ozment et al. (2008)'s measurement items to operationalize performance viz. profitability; sales growth; customer satisfaction; and overall performance. In addition, there is a set of external (Knudsen, 1995), and internal (Piotrowicz and Cuthbertson, 2014, Stock, Greis et al., 1998) factors influencing the configuration dimensions particularly, product and consumer portfolio mix, as well as the logistics capabilities required which in turn impact the drivers.

4 Framework Development

In this section, a model of propositions that address the causal means by which the configuration dimensions influence performance is developed. In the previous sections, several studies that support the positive association between logistics capability and performance have been highlighted, and thereby introduce the first proposition:

Proposition 1. Logistics capability is positively associated with the performance of a firm within the LMSN.

4.1 Influencing Factors

Influencing the configuration and logistics capabilities is a set of external (Knudsen, 1995), internal (Stock, Greis et al., 1998), and operational factors (Piotrowicz and Cuthbertson, 2014) that impact the product and consumer portfolio mix as well as the logistics capabilities required. The external factors are conceptualized in terms of competitive environment/dynamics (Hines, 2004); and internal factors in terms of strategy and competitive scope (Stock, Greis et al., 1998), and operational requirements in cross-channel visibility prevalent in the omni-channel retailing context (Piotrowicz and Cuthbertson, 2014).

The following propositions to capture the effects of the influencing factors on configuration are offered next:

Proposition 2a. External factors (in terms of competitive dynamics) influence product portfolio, consumer portfolio, and logistics capability.

Proposition 2b. Internal factors (in terms of strategy and competitive scope, and operational requirements in cross-channel visibility) influence product portfolio, consumer portfolio, and logistics capability.

4.2 Consumer Portfolio

Consumer portfolio is defined as the "collection of mutually exclusive customer groups that comprise a business' entire customer base". The ability of a firm to serve a wider array of different customer segments makes for a stronger business model and hence increases the potential of performance (Johnson and Selnes, 2005). While most firms would desire to serve as many segments as possible, resource limitation forces firms to only select

a handful to focus their efforts and resources to develop the relationships (Terho, 2009).

Consumer portfolio is a construct conceptualized with four key constituents (see Figure 3):

(1) Characteristics, determined by means of market segmentation comprising demographics, psychographics, geographic and behavioral (Buttle, 2009, Solomon, Bamossy et al., 2006);

(2) Strategic importance, determined by the volume or dollar value of purchases, potential and prestige of account, customer market leadership and the overall account desirability (Fiocca, 1982, Yorke and Droussiotis, 1994);

(3) Difficulty in managing each account, determined by product characteristics, account characteristics, and competition for the account (Fiocca, 1982, Yorke and Droussiotis, 1994); and

(4) Profitability, determined by gross revenue less costs incurred (Yorke and Droussiotis, 1994).

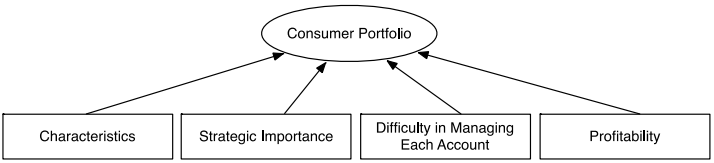

Figure 3 Proposed Model of Consumer Portfolio

Yorke and Droussiotis (1994) argue that the product mix purchased by consumers is critical to profitability. For instance, low profit margin products such as groceries can incur losses if ordered in small quantities and have to be delivered to consumers' homes. Hence, firms typically attempt to offer products of specific characteristics to particular consumer segments (Buttle, 2009, Solomon, Bamossy et al., 2006). It is therefore intuitive that characteristics of the consumer portfolio would influence a firm's product portfolio.

The prevalence of omni-channel retailing has resulted in the proliferation of channels, product formats and consumer profiles, and firms are increasingly challenged to offer a wider range of products and formats to serve their consumers' needs. Heterogeneity in consumer profiles necessitates firms to develop varying levels and types of logistics capabilities in pre- and post-sale customer service, flexibility, delivery speed and reliability.

Considered in all, firms that can manage a wider consumer portfolio in which to develop relationships would likely result in higher performance. This potential increases when the accounts are of strategic importance with lower difficulty of account management and higher profitability. This leads to the following proposition:

Proposition 3. Breadth (or variety) of consumer portfolio (in terms of distinct types of consumers that the firm can serve) characterised by strategic importance, management difficulty and profitability is positively associated with firm's performance.

Proposition 4a. Characteristics of consumer portfolio influence the characteristics of product portfolio.

4.3 Product Portfolio

A product portfolio represents the collection of products including stock keeping units (SKUs) and formats offered by a firm for the types of consumers it desires to develop relationships (Fixson, 2005).

In a study, Berger, Draganska et al. (2007) examine the impact of portfolio variety on consumer choice and show that larger numbers of product variants were associated with a perception of higher line quality. Hence it can be implied that increasing the breadth (or variety) of product portfolio through optimum selection has the potential to increase firm's performance by being able to meet consumer needs (Kaul and Rao, 1995). From another perspective, consumer needs influence a firm's product portfolio mix (Jiao and Zhang, 2005).

Product portfolio is a construct conceptualized with two key constituents:

(1) Product characteristics, determined by cost and frequency of purchase, value proposition (i.e., perishability), and the degree of differentiation (Peterson, Balasubramanian et al., 1997); and

(2) Demand variability, determined by the level of demand uncertainty (Lee, 2002).

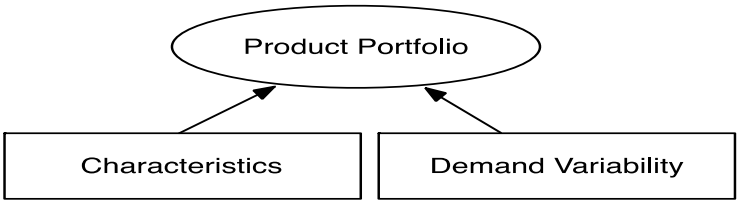

Figure 4 Proposed Model of Product Portfolio

Product portfolio can influence the types of logistics capabilities required. For instance, products of low demand variability drive efficient and low distribution cost capability while products of high demand variability drive the need for capability in flexibility.

Considered in all, firms that can manage a wider product portfolio would likely lead to greater potential for performance. This potential increases when the demand variability is low which allows firms to maximize the efficiency of the associated operating processes. Integrating these arguments lead to the following proposition:

Proposition 4b. Characteristics of product portfolio influence the characeristics of consumer portfolio.

Proposition 5. Breadth (or variety) of product portfolio (in terms of distinct types of product/SKU) characterised by demand variability is positively associated with a firm's performance.

4.4 Logistics Capability

Logistics capability is a construct conceptualized with four first-order variables: network structure; network flow; relationship and governance; and service architecture. These are in fact the identified configuration dimensions where we argue routines are embedded. Firm-level capability is typically associated with cost, quality, flexibility and dependability while at the operational level, capability is usually associated with performance measures (Ghosh, 2001).

The work of multiple papers that discussed logistics capabilities relevant to the e-commerce context have been synthesized, and subsequently categorized into four types: demand-management interface (i.e., flexibility, pre-

sale and post-sale customer service, delivery speed and reliability, and responsiveness to target market), supply-management interface (i.e., widespread distribution coverage, selective distribution coverage, and low total cost distribution), information management (i.e., information technology and sharing, connectivity, delivery information communication, and web-based order handling), and co-ordination capability (i.e., internal and external). Each capability can be evaluated based on the measurement items proposed by the respective authors (Morash, Droge et al., 1996, Zhao, Droge et al., 2001, Cho, Ozment et al., 2008, Mentzer, Min et al., 2004).

While product portfolio and consumer portfolio can directly impact firm's performance, their real impacts are only realized when the right product(s) can be delivered to the right consumer(s) at the right time and place in the e-commerce context. Hence, a partial mediation exists where logistics capability mediate the relationship. Due to the inherent characteristics of product portfolio, different product attributes suit different types of distribution schemes and thus capabilities to efficiently and effectively transport and deliver the product(s) from the fulfillment location to the consumers. Indeed, some authors state that firm performance is a function of the coherent alignment between product variety and supply chain structure (Childerhouse, Aitken et al., 2002, Randall and Ulrich, 2001).

Similarly, different types of consumers might prefer a particular distribution (or reception) scheme over others. For example, online grocery shoppers doing their main shopping mission would likely prefer direct home delivery service, while shoppers preforming 'top-up' purchases of specific items might prefer a "buy online pick-up in-store" (BOPS) service (IGD, 2014). Either would require different fulfillment and distribution structure,

and by extension different logistics capabilities. The preceding theoretical development and examples lead to the following two propositions:

Proposition 6a. Logistics capability mediates the relationship between consumer portfolio and performance of the firm within a LMSN.

Proposition 6b. Logistics capability mediates the relationship between product portfolio and performance of the firm within a LMSN.

4.4.1 Network Structure

Network structure is operationalized as a first-order variable described by the degree of: structural (de-) centralization; vertical and horizontal integration; and geographic dispersion (see Figure 5). A high degree of logistics infrastructure centralization permits firms to leverage on economies of scale both in transportation and warehousing (Cooper, 1983). Firms adopting this structure benefit from having lower inventory level through consolidation, and gain the ability to deal with demand variability. On the other hand, a de-centralized structure allows faster order to consumer cycle speed as facilities are located closer to the consumers (van Hoek, 1998). Therefore, a centralized structure would have an intrinsic capability of flexibility, while a de-centralized structure would have higher delivery speed, lower total cost distribution costs and higher responsiveness to target market.

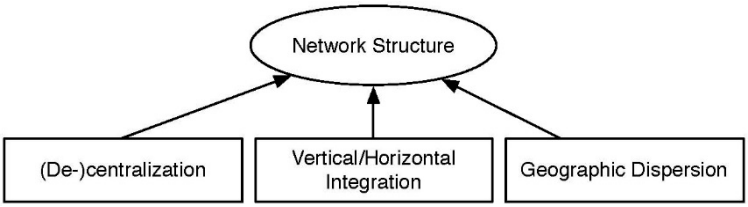

Figure 5 Proposed Model of Network Structure

Vertical integration relates to the extent in which a firm owns the various stages of the upstream to downstream supply chain (Stock, Greis et al., 1998), while horizontal integration relates to the level of multiplicity of the same stage/function (Klaas, 2003). A low vertical and high horizontal integration allows firms to be more flexible in reconfiguring their distribution networks to adapt to market dynamics (Gunasekaran, Patel et al., 2004), while a high vertical and low horizontal integration reduces co-ordination complexity and increase control over service quality to maintain brand reputation (Esper, Jensen et al., 2003b).

A high degree of horizontal integration would gives firms the capability of resilience and the ability to cope with disruptions through alternate nodes that provide similar capabilities. Therefore, a network structure characterized by the degree of vertical integration relates to the intrinsic capabilities of information sharing, delivery information communication and internal co-ordination while the degree of horizontal integration relates to capabilities of flexibility, and responsiveness to target market in terms of the ability to handle frequent small orders.

Geographic dispersion refers to the extent in which facilities and operations in the distribution network are dispersed geographically (Stock, Greis et al., 1998). Low geographic dispersion exhibits a high proportion of facilities and operation concentration in a specific region. Typically, this means the ability to provide high level of delivery service within a localized region. Hence, a low geographic dispersion structure has intrinsic capabilities of delivery speed, ease of co-ordination, and higher pre- and post-sale cus-

tomer service due to proximity, while a high geographic dispersion structure would have capabilities of widespread distribution coverage, and the ability to select distribution coverage.

4.4.2 Network Flow

Network flow is operationalized as a first-order variable described by the degree of: flow integration; and flow co-ordination (see Figure 6).

Co-ordination and integration mechanisms are the key dimensions characterizing distribution network flow and dynamics (Cooke, 1997, Lee and Ng, 1997, Stock, Greis et al., 1998). Rai, Patnayakuni et al. (2006) highlight that enabling intra- and inter-firm process integration and co-ordination would result in the development of higher-order capabilities, such as streamlined material, and information flows across the supply chains.

Co-ordination can be defined as a pattern of decision-making and communication among a set of actors who perform tasks to achieve goals (Malone, 1987). Lee and Ng (1997) highlight that gains from increased efficiency of supply networks can be achieved through the coordination of multiple flows in a supply network.

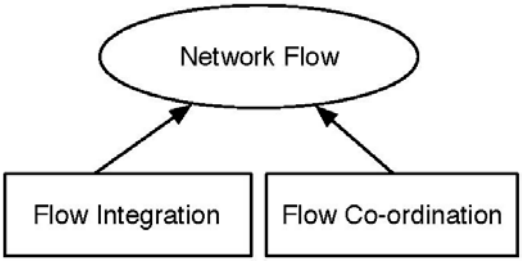

Figure 6 Proposed Model of Network Flow

Network flow dynamics characterized by the degree of flow co-ordination would allow firms to achieve varying levels of internal and external co-ordination capability, as well as information management capability (in terms of information sharing, connectivity, delivery information communication and web-based order handling).

The concept of integration as a mechanism to support supply chain and logistics processes is closely linked to the effort required to overcome intra- and inter-organizational boundaries, and to achieve a shift from local to system optimization (Romano, 2003). However more often than not, the major obstacles to fully integrate the entities in the value network lie in the inadequacy of internal management systems, high level of fragmentation in information flows, and lack of integration among different information systems (Forza, Romano et al., 2000, Simchi-Levi, Kaminsky et al., 2000). Cross-channel integration is critically important to enable omni-channel retail. The consequences of high integration are: significant cost reductions, the simplification or elimination of activities and the synchronization of all the production and distribution operating systems (e.g., Hammer, 2001, Rosenzweig, Roth Adela et al., 2003).

In all, network flow dynamics characterized by the degree of flow integration would result in varying levels of information management capabilities in terms of information technology, delivery information communication and information sharing.

4.4.3 Relationship and Governance

Relationship and governance is operationalized as a first-order variable described by: the degree of interdependence; and networked governance structure (see Figure 7).

Some scholars highlight that the key factor in gaining competitive advantage in supply chain is the formation of interdependence (Lejeune and Yakova, 2005, O'Keeffe, 1998) and is a necessary condition for obtaining the desired outcomes (Mentzer, Min et al., 2000). Interdependence refers to the degree in which the success of each firm in a relationship depends on the actions of the other firms (Stock, Greis et al., 1998).

The descriptors adopted for interdependence follow the work developed by Lejeune and Yakova (2005) in which they characterized interdependence as form and depth with each operationalized via two attributes: trust and decision-making for form; and information sharing and goal congruence for depth.

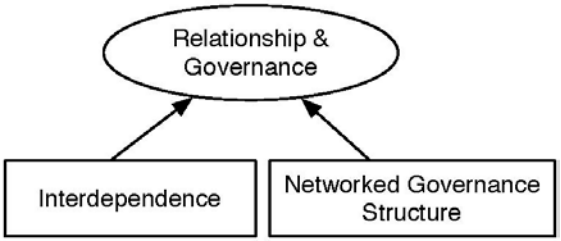

Figure 7 Proposed Model of Relationship and Governance

At one end of the continuum is a relationship builds upon goodwill trust, 'dyadic' parity-based decision-making process, supply-chain-wide information sharing and true goal congruence. Such relationships are typically long-term where firms are interdependent and minimum transaction costs are incurred due to the high level of trust that neither party would exhibit opportunistic behavior. In addition, due to the high level of information sharing, such relationship structures have intrinsic capabilities in external co-ordination and information management giving firms the ability to respond to demand variability and supply disruptions. At the other end, a relationship builds upon deterrence-based trust, 'myopic' decision-making process, nearest-neighbor information sharing, and absence of goal congruence represents a weak relationship that is typically short-term characterized by sporadic information flow, and high transaction costs incurred to govern opportunistic behavior(s).

Networked governance structures (NGS) can be defined as the "economic forms of organization that are built on reciprocal exchange patterns, enabling firms to obtain resources and services through dyadic relationships with other organizations, as well as through broader relational links where these relationships exist" (Rabinovich, Knemeyer et al., 2007).

NGS is characterized by the governance mechanism (Barney, 1999) and the strength of NGS (Rabinovich, Knemeyer et al., 2007). The types of mechanisms can generally be grouped into three categories: market governance; intermediate governance; and hierarchical governance (Barney, 1999).

On strength of NGS, firms typically attempt to increase the strength when the associated transaction costs are higher than what could be obtained

outside the firms' boundaries, and the key determinants include level of asset specificity and uncertainty faced by firms (Rabinovich, Knemeyer et al., 2007). Rabinovich, Knemeyer et al. (2007) argue that the development of stronger networked structure becomes more viable when asset specificity decreases as the cost of safeguarding (or policing) incurred by the focal firm decreases. This allows firms to access to greater externalities in terms of access to users and capabilities, and complementariness (Katz and Shapiro, 1994). Similarly lower uncertainty motivates firms to leverage on the capabilities of network partners as resources required to manage relationships reduces.

In all, the degree of interdependence and networked governance structure would give firms varying levels of access to demand-management interface and supply-management interface capabilities.

4.4.4 Service Architecture

Service architecture is operationalized as a first-order variable described by the degree of: architecture decomposition; and service modularity (see Figure 8).

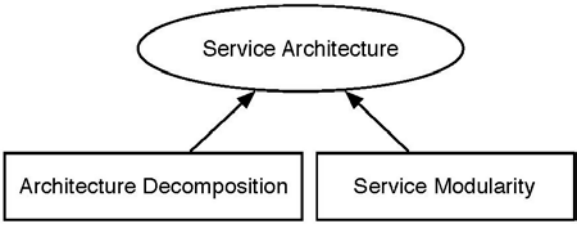

Figure 8 Proposed Model of Service Architecture

Voss and Hsuan (2009) define service architecture as "the way the functionalities of the service system are decomposed into individual functional elements/modules to provide the overall services delivered by the system". Essentially, the process of decomposition allows firm to gain deeper insights into the modules (or parts) that form the service system, identify the ratio of unique to standard service nodes that gives an indication of the degree of competitive advantage, and at the various levels of decomposition to identify sources of logistics capabilities or the lack of them. Several scholars have recognized that having modular architectures vis-à-vis integral architectures enable greater mass customization capability in terms of service variety and flexibility to respond to consumer needs (e.g., Pekkarinen and Ulkuniemi, 2008, Voss and Hsuan, 2009).

Pekkarinen and Ulkuniemi (2008) define service modularity as the "usage of reusable process steps that can be combined ("mixed and matched") to accomplish flexibility and customization for different customers or situations in service implementation". Modularizing services facilitate the division of tasks within the network (Leseure, Bask et al., 2010) that yields economies of scale and scope, and provides the foundation for customization through structuring services and/or processes to facilitate outsourcing (Voss and Hsuan, 2009). Higher degree of modularity enables firms to easily make in-sourcing and outsourcing decisions due to the higher level of specification and standardization (Mikkola, 2007). Hence, service architecture characterized by the degree of decomposition and modularity appears to have intrinsic capability in flexibility and customization, and the process of decomposition helps to establish this analysis in terms of modularity and integrality of the service modules and elements.

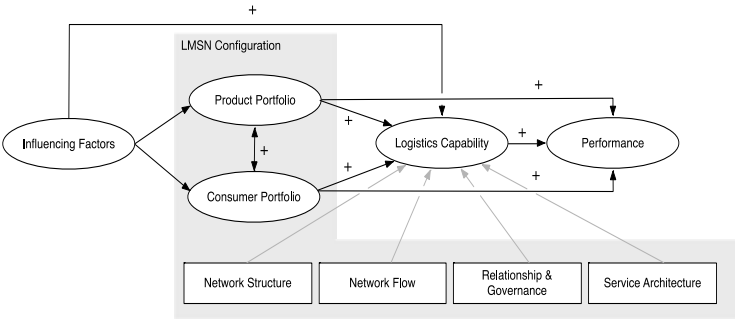

Figure 9 Detailed Conceptual Framework

Integrating the presented evidences and studies from the six configuration dimensions lead to the final proposition (see Figure 9):

Proposition 7. LMSN configuration influences performance through logistics capability.

The above proposition is derived based on the arguments that both the product portfolio and consumer portfolio drives the types of logistics capabilities required, while network structure, network flow, relationship and governance, and service architecture have intrinsic (or latent) logistics capabilities that influence performance.

5 Implications for Research and Practice

In this paper, configurational theory is combined with resource-based theory to offer new theoretical insights that link configuration with capability and performance. This paper creates the foundation for empirical work to test and refine the relationships expounded. The potential contribution of

this line of research is the identification of emerging patterns of LMSN configurations, as well as understanding how the configuration dimensions drive logistics capabilities, and the propensity to develop dynamic capabilities.

The identification of a comprehensive yet limited number of dimensions would allow managers to focus on the specific areas of importance that actually influence performance. Through the elements that operationalized each dimension, the framework provides guidance on what exactly can be reconfigured to offer new configuration mix that impact capability. This is important since capabilities developed can be lost very quickly through replications by competitors (Teece, Pisano et al., 1997). The drivers (or sources) of logistics capabilities determine the propensity to develop dynamic capabilities.

6 Limitation and Conclusion

By incorporating greater precision and additional theoretical considerations, this paper provides greater depth of insight regarding the relationship between the influencing factors on configuration, with logistics capability and performance; specifically highlighting the intrinsic capabilities embedded in configuration. The framework conceptualises six configuration dimensions: product portfolio; consumer portfolio; network structure; network flow; relationship and governance; and service architecture with the latter four being the drivers of logistics capability.

This paper assumes the established positive relationship between logistics capability and performance to focus the discussion on configuration and

capability. Future research could explicitly ascertain the triad relationship. The discussions have hitherto limited to the LMSN considering portfolios of consumers and products. However, it is not difficult to foresee that the arguments would apply to the consumer and product level as well if greater granularity is required. The variables conceptualized within consumer and product portfolio can easily be applied to the unit level. External influencing factors are also limited to competitive dynamics. Future research could also consider the impact of distribution infrastructure and freight regulations on LMSN configuration.

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