

TOWARDS AN INTEGRATED LOGISTICS CAPABILITIES MODEL OF SUPPLY CHAIN FLEXIBILITY: A SOCIAL EXCHANGE PERSPECTIVE

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Abstract:

Supply chain flexibility is a dominant capability in that it ensures sustenance of supply chain operations even in the face of growing uncertainties. However, the development of supply chain flexibility requires integration of logistics capabilities. As supply chains are network of inter-connected firms; the importance of relational attributes also cannot be undermined. The current study investigates the influence of various socio-exchange attributes viz. trust, commitment, power and reciprocity in the integration of logistics capabilities and consequently its impact on supply chain flexibility and supply chain performance. The collected data from 168 senior supply chain professionals using a cross-sectional survey was analyzed using Partial Least Squares. The analyzed data suggested trust, commitment, power and reciprocity to have a positive influence on integration of logistics capabilities. Further, integrated logistics capabilities were found to have a positive impact on supply chain flexibility which in turn exerts a positive influence on supply chain performance.

Keywords: supply chain flexibility, firm performance, social exchange theory, trust, commitment, integrated logistics capabilities.

JEL Classification: L10, M10.

1. Introduction

Increasing disruptions in recent times have led firms to devise on strategies that can enable them to have sufficient buffer in their planning and forecasting. This will enable the firms to respond better to environmental uncertainties (Wagner and Bode, 2008) and accordingly they can fight back disruptions effectively (Gligor et al., 2013). Strategically, this is as an essential supply chain capability termed as supply chain flexibility.

Recent supply chains disruptions are therefore are compelling factors for firms to devise risk mitigating capabilities. A supply chain disruption is an unexpected situation that can result in a negative outcome for a firm and its supply chain performance. Recent firms are facing an increase in the number of supply chain disruptions (Wagner and Bode, 2008; Gligor and Holcomb, 2012). This backdrop has compelled firms to devise adequate buffer in their routine to strategic operations so as to provide a proactive

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performance during disruptions. Supply chain flexibility accordingly was defined as the capability of supply chains to devise alternate configurations of operations (Skipper and Hanna, 2009). The current investigation takes a risk management perspective on supply chain flexibility and defined supply chain flexibility as the capability of supply chains to sustain and provide an optimal level of performance through quickly migrating to an alternate configuration. Extant literatures have investigated multi-facets of supply chain flexibility. For e.g. Yu (2013) conceptually explored the influence of several internal factors (e.g. knowledge and information systems, operations and control systems etc) and external factors (e.g.environmental uncertainties, relationship structure etc) on supply chain flexibility development and in turn, its effect on enterprise performance and supply chain performance. Jin et al. (2014) empirically established that IT-enabled sharing capability positively influences supply chain flexibility in a manufacturer's supply chain, which in turn affects the firm's competitive performance. Hence a firm should focus on flexibilities in the supply chain to improve its performance. IT-enabled sharing capability is an antecedent for improving these flexibilities. Using a sample of German manufacturing firms, Merschman and Thoneman (2011) established that in uncertain environments companies with highly flexible supply chains perform better than companies with less flexible supply chains while in certain environments the reverse holds good. However, a social exchange perspective was not adopted for exploring the development of supply chain flexibility and its influence on supply chain performance. A social exchange perspective is all the more important as supply chains are network of firms engaged in exchange relationships. Accordingly, the current investigation aims to fulfil this gap in the existing literature. The current study therefore answers the following questions:

- (1) What are the antecedents of integrated logistics capabilities and supply chain flexibility from a social exchange perspective?
- (2) What is the impact of integrated logistics capabilities on supply chain flexibility?
- (3) What is the impact of supply chain flexibility on supply chain performance?

The paper has been organized as follows. The next section draws on the theoretical tenets of social exchange perspective and formulates the research model. The corresponding section discusses relevant literature on logistics capabilities followed by review of literature on supply chain flexibility. Subsequent sections discuss hypotheses development and proceeds with data collection and empirical testing of the proposed model. Finally the study concludes with a discussion of managerial implications, limitations of the framework and scope for future research.

2. Theoretical foundation

2.1. Social Exchange Theory and Supply Chain Management

Social exchange theory originated from anthropology (Firth, 1951), sociology (Homans, 1958, 1961; Gouldner, 1960; Blau, 1964; Emerson, 1976), social psychology (Thibaut and Walker, 1978), behavioral psychology (Bandura, 1986), philosophy (Rawls, 1971) and economics (Ricardo, 1817). It argued that individuals interact with each other with hope for a reward in return (Emerson, 1976). Bandura(1986) underscored that expectation of a reward or punishment avoidance as the chief reason of interacting with

social beings as an individual or in groups. Further, the motivation for interaction resides on the rewards of the interaction minus cost of that interaction (Kale and Singh, 2009). When the other member in exchange does not receive the expected reward, the exchange member will intentionally avoid the action in future (Homans, 1961). There exist a set of basic principles of psychological and economic reinforcement that governs the way people interact with each other either as an individual or as a group. This includes a set of behaviors including trust, commitment, reciprocity, justice, relative dependence and power (Brock and Kim, 2002).

Studies have been using social exchange theory for examining supply chain relationships (Kwon & Suh, 2005; Wei et al., 2012; Wu et al., 2014). They underscored that reciprocal benefits offered by partners in a social exchange as the dominant reason for development of social relationship between supply chain partners. Griffith et al. (2006) argued utilized social exchange theory for investigating the consequences of procedural and distributive justice in supply chain relationships. They underscored that the more powerful partners in a supply chain build social credit of indebtedness that ensures other members to comply in the relationships. The attitudes and behaviors governing relational capital of supply chain members are therefore developed through perceived justice shown by the more powerful members. Griffith et al. (2006) underscored therefore the importance of two important components of social exchange theory in context of supply chain relationships viz. power and justice.

In an identical context, Narasimhan et al. (2009) utilized social exchange theory for understanding supply chain relationships between a buyer and a supplier under a lock-in situation through a case study of a multinational business example of a Danish business group. They used a game –theoretic model for examining the developed conjectures related to lock-in behaviors. The findings indicated that for a supplier the optimal strategy in context of pricing will be to lower the price with increasing demand. For a buyer, the investment intensity however decreases with increasing demand. From this theoretical backdrop, emerge two strong issues for this research: power and justice.

Yang et al. (2008) utilized social exchange theory for exploring the antecedents of relational stability in supply chain alliance and if the same affects alliance performance in manufacturing supply chains. They concluded that buyer and suppliers in a supply chain alliance develops respect for each other through relational commitment and also develops the common goal of competing with rivals. The authors further underscored that trust in this context will create a better environment for sustaining supply chain relationships, increasing reliability of contracts, reducing risks and uncertainty and providing incentive for cooperation. Hence, trust and commitment are important factors for maintaining relational stability in supply chain alliances. Further, Sambasivan et al. (2013) tried to integrate several theories e.g. resource dependence theory, resource based view, knowledge based view, contingency theory, game theory, transaction cost theory, social exchange theory and personal relationship theory in the context of developing strategic alliances in supply chain. They also underscored the importance of trust and commitment under social exchange theory for developing the component of relational governance in their proposed framework. Kwon & Suh (2005) investigated the chief factors for supply chain relationships and argued that commitment is a crucial

factor for the same. Further, they found trust as the root cause of fostering such commitment in supply chain relationships. Hallen et al. (1991) explored inter-firm adaptation process for developing inter-firm relationships under social exchange theory and found two critical factors for explaining such adaptation process: trust and power. While trust was found to be developed between the entities over time as each of them prove worthy to each other; power indicated the degree of relative dependence between parties in an exchange. They concluded that power is developed when a firm owns certain resources and controls the distribution of the same in making it accessible to others in need.

As developing integrated logistics capabilities argues for synchronizing operations of each partner firm; a social exchange perspective on integrated logistics capabilities is required. Thus, in view of the above discussion we explore several issues like trust, commitment, reciprocity, justice, power and relative dependence under social exchange theory in their impact on integrated logistics capabilities and developing supply chain agility. However, reciprocity and justice, power and relative dependence are both defined identically (Griffith et al., 2006; Narasimhan et al., 2009). Hence four key constructs can be identified: trust, commitment, reciprocity and power. In this study therefore, we explore the influence of trust, commitment, reciprocity and power in developing integrated logistics capabilities and supply chain flexibility.

2.2. Defining Logistics Capabilities

Morash et al. (1996) defined logistics capabilities as “those attributes, abilities, organizational processes, knowledge and skills that allow a firm to achieve superior performance and sustained competitive advantage over competitors”. Logistic capabilities determine the extent to which a firm can manage its operations efficiently and effectively (Gligor & Holcomb, 2012a) and are a potential source of competitive advantage for a firm (Bowersox et al., 1999; Zhao et al, 2001).

In the logistics literature, there exists several related and yet different classifications of logistics capabilities. Morash et al. (1996) through an extensive review of logistics capabilities classified the same into two broad themes or “value disciplines”. While the former value discipline, labeled “demand oriented” emphasizes interactions and interfaces with customer, fulfilment of allied goals and objectives, timeliness and being responsive to market needs; the latter, known as “supply oriented” stresses more on operational capabilities aimed at ensuring product availability, increasing convenience and minimizing total distribution cost. In contrast, Mentzer et al. (2004) classified logistics capabilities into: demand management interface capability (to manage and fulfil customer requirements; Zhao et al, 2001; Lynch et al, 2000; Bowersox et al, 1999), supply management interface capability (to efficiently manage inflow of raw materials; Morash et al, 1996, Lowson, 2003), information management capability (to effectively manage information flow both in and out of an organization; Zhao et al, 2001; Closs et al, 1997) and coordination capability (to align the interests of the participating members; Mentzer et al, 2004; Gligor & Holcomb, 2012).

Esper et al. (2007) explored the way a firm learns, develop and evolve its logistics capabilities and utilize the same for gaining sustainable competitive advantage. The authors argued that firms are leveraging their logistics capabilities to attain competitive

differentiation. Logistics leverage was defined as the attainment of distinctive logistics performance which when suitably appropriated with marketing strategy; creates enhanced customer value (Mentzer& Williams,2001).The study highlighted several derived benefits of logistics leverage for e.g. achieving customer satisfaction through improved inventory services and scheduled delivery of goods. However, logistics leverage may not be sustainable unless complemented with logistics learning over time. The authors classified logistics capabilities into five broad categories in line with other classifications (Zhao et al., 2001;Mentzer et al.,2004): (a)customer focus capability (also referred to as demand management capability) that aims to target a customer base and satisfy its requirements through differentiated products and services (b) supply management capability that aims to achieve total cost reduction in supply chain operations through efficient management of resources and wastes in addition to meeting demand profitably (c)integration capability that aims to unify the inter organizational efforts for overall gain (d)measurement capability that determines the degree to which a firm monitors its internal and external operations (e)information exchange capabilities that aims to collect, store, analyze and distribute routine and non-routine information for supporting firm operations.

Studies on logistics capabilities have also investigated the relationship between logistics capabilities and performance in online markets. Cho et al. (2008) empirically examined the relationship between firm's logistics capability, logistics outsourcing and its performance in an e-commerce market environment. The authors argued that e-commerce firms have a higher likelihood of creating a sustainable competitive advantage and improving performance if they have strong logistics capability. The authors' equated logistics outsourcing with 3PL.Third party logistics refers to using the services of an external supplier to perform some or all of a firm's logistics function. Results showed that (1) logistics capability positively affects firm performance (2) logistics outsourcing has a negative relationship with firm performance (3) a firm's use of logistics outsourcing is not associated with its logistic capability (relevant test statistics showed insignificant association) (4) logistics capability does not significantly mediate the relationship between logistics capability and firm performance. Therefore firms should not be worried about logistics outsourcing affecting performance and can safely invest for developing their logistics capabilities.

Studies have also explored the direct contribution of logistics capabilities to competitive advantage. Sandberg&Abrahamsson (2011) explored the link between operational and dynamic logistics capabilities and sustainable competitive advantage. The study used two Swedish retail companies for investigating the proposed links. The authors used resource based view as the theoretical backdrop for the aforesaid study. The authors argued that the success of these two Swedish companies was based on logistics operational and dynamic capabilities. Capabilities were defined as "complex bundles of individual skills, assets and accumulated knowledge exercised through organizational processes that enable firms to co-ordinate activities and make use of their resources" (Olavarrieta and Ellinger, 1997, p. 563). The case analysis revealed that the two companies have an integrated logistics processes and IT systems; that are valuable, rare, and inimitable as these have been developed in house for a long period of time.

From a resource based perspective; it was therefore the effective integration of logistics processes and IT systems that were the operational capabilities identified in these two retail firms. Further, the authors argued that these operational capabilities will be sustained i.e. renewed through certain dynamic capabilities (as found from two case analysis) viz. managerial knowledge and presence, cross-functional teamwork, control, learning and supply chain relationships.

Studies have also explored the interface of logistics capabilities and supply chain capabilities. As Mentzer et al. (2004) pointed logistics, as an integral of supply chain management; accordingly logistics capabilities must contribute for developing supply chain capabilities. Gligor&Holcomb (2012) conceptually explored the role of logistics capabilities in developing supply chain agility. The study did extensive literature review in logistics capabilities and supply chain agility areas and formulated a theoretical model. Finally, the authors proposed that logistics capabilities (e.g. demand management interface capabilities, supply management interface capabilities, information management capabilities of a firm) need to be integrated at its supply chain level for developing integrated supply chain logistics capabilities. These will in turn lead to supply chain agility. Further the level of integration will be moderated by cooperation and coordination capabilities as these were contingent upon the effective alignment of interest and actions of supply chain members. This study underscored the growing importance of logistics capabilities in developing supply chain capabilities. In fact, this study showed that integration of individual logistics capabilities of a firm and its partners are necessary to be integrated at its supply chain level for development of supply chain capabilities.

Further, Gligor&Holcomb (2014) investigated the influence of relational attributes like communication, cooperation and coordination on integrated logistics capabilities and in turn, the influence of integrated logistics capabilities on firm performance. The findings reveal a positive impact of each of the above relational resources on integrated logistics capabilities. The authors used relational view of firm (Dyer & Singh, 1998) for developing the proposed model. Therefore, we argue in line with Gligor and Holcomb (2012a) and Gligor&Holcomb (2014) that relational resources are required in a supply chain for integrating the logistics capabilities with a view to develop supply chain capabilities (e.g. agility in this study). This study therefore addresses the research call by Gligor and Holcomb (2014) to investigate other allied variables using identical theories for investigating integrated logistics capabilities.

2. Supply Chain Flexibility

Extant literature has viewed flexibility largely in manufacturing systems context (Beach et al., 2000; Vovurka and O'Leary-Kelly, 2000) although parallel research extended the same to supply chains too (Vickery et al., 1999; Rao and Wadhwa, 2002; Garavelli, 2003; Lummus et al., 2003; Pujawan, 2004; Lummus et al, 2005; Sanchez and Perez, 2005; Gong, 2008). Vickery et al. (1999) firstly extended the concept of total system flexibility to the supply chain. However studies have preferred to investigate it from several individual fragments for e.g. supplier affect (Scannell et al., 2000), information systems impact (White et al., 2005) etc. on focal firm flexibility and avoided the holistic view i.e. the system view. The literature on flexibility is highly diverse. Some

consider it as a subset of agility. Agility was frequently defined as “the ability of an organization to thrive in a continuously changing, unpredictable business environment” (Lummus et al., 2005). Prater et al. (2001) extended the concept of agility to supply chain agility and identified its essential components as speed and flexibility. Although supply chain flexibility is an emerging field (Sanchez and Perez, 2005) yet it has its initial roots in manufacturing flexibility. Manufacturing flexibility is often treated as a response to environmental uncertainty. However, later many researchers conceived in different ways. Later, Prater et al. (2001) extended it to logistics by indicating it as adjustable time dimensions for a firm to ship or receive goods. This early notion of manufacturing flexibility has shaped the concept of supply chain flexibility and consequently with Vickery et al. (1999); researchers have understood to adopt a total system perspective while considering flexibility in supply chains. Consequently, supply chain flexibility has been defined in multiple ways for e.g.:

- the abilities directly impacting a firm’s customer (Vickery et al., 1999)
- Supply chain’s promptness and degree for adjusting its speed, destination and volume to respond to dynamic environments (Lummus et al., 2003; Duclos et al., 2003).
- elasticity of buyer-supplier relationship under dynamic conditions (Das and Malek, 2003)
- extent to which supply chain linkages are able to adapt to changing business conditions (Gosain et al., 2004)
- Ability to restructure supply chain operations quickly and economically (Kumar et al., 2006; Wadhwa et al., 2008) to meet and respond to customer requirements (Gunasekaran et al., 2008).

However, a more comprehensive definition was given by More and Subashbabu (2008):

“the inherent ability, or characteristics of the supply chain and its parameters to be sensitive to the minor or major disturbances in business environment, assess correctly the real situation, respond quickly by the way of adjustments and adaptation with little time, effort and cost and control effectively the organization with stable performance”.

There also exist different types of supply chain flexibility e.g. operations system flexibility, market flexibility, logistics flexibility, supply flexibility, organizational flexibility, information systems flexibility (Duclos et al., 2003) etc. For a detailed discussion the reader is referred to Vickery et al. (1999), Lummus et al. (2003), Lummus et al. (2005), Duclos et al. (2003), Kumar et al. (2006) Gong (2008), More and Subashbabu (2008:2009) and Malhotra and Mackelprang (2012).

The current study adopts the definition of supply chain flexibility given by Skipper & Hanna (2009). They argued supply chain flexibility as an essential supply chain capability of devising alternate states or configurations. The current investigation approaches supply chain flexibility from a risk mitigation perspective in supply chains and hence defined it as a supply chain capability that enables a supply chain to quickly switch to one of the previously devised alternate configurations so as to sustain an

optimal level of performance. Recent literature on supply chain flexibility has explored it from multiple perspectives.

Gosling et al. (2012) developed a four step framework using a construction supply chain network of 12 suppliers. Their framework was developed with a view to develop appropriate flexibilities for uncertainty mitigation. The four steps were classifying the supply chain, identify and analyze uncertainties, optimize pipelines and develop strategic flexibility. Soon&Udin (2014) conducted a comparative analysis across several manufacturing firms in the electrical and electronic industry with a purpose of exploring the business drivers and response effect of a flexible value chain. The study underscored that the core flexibility of the value chain can be defined from operational, supply and logistics perspectives where different levels of integration and implementation strategies offer different levels of flexibility response to volume and product mix. Thome et al. (2014) underscored that supply chain flexibility must be investigated using a multi-tier network as the unit of analysis. Their study investigated (using a multiple case study) the relationships between supply chain contextual constraints and flexibility types. The study took place in three representative supply chains of the Brazilian automotive industry and sought mainly to identify and compare supply chain contextual constraints that hinder product delivery to end-customers. Constraints such as suppliers' capacity, diversity of suppliers, suppliers' cooperation, trust and commitment, tariffs, exchange rates and inventory were identified in different supplier tiers of the OEMs as the main factors influencing the observed volume and mix flexibilities. Additionally, supply chain flexibility types such as sourcing, relational, delivery, postponement, new product and responsiveness influenced the supply chain flexibility provided to the end-customers. In this backdrop, therefore an urge was felt to adopt a social exchange perspective on development of supply chain flexibility. The next section develops the linkages between the antecedents of integrated logistics capabilities with supply chain flexibility and supply chain performance.

3. Hypotheses Development

3.1. Trust and Integrated logistics capabilities

Trust is largely defined as “the firm’s belief that another company will perform actions that will result in positive actions for the firm, as well as not take unexpected actions for the firm, that would result in negative outcomes for the firm” (Anderson and Narus, 1990, p. 45). Different types of trust exists viz. contractual trust, competence trust and goodwill trust (Fynes *et al.*, 2005). Zaheer *et al.* (1998) further distinguished between interpersonal trust and inter-organizational trust. Moorman *et al.* (1993) refers to trust as the willingness to rely on an exchange partner in whom one has confidence. Morgan and Hunt (1994) referred to trust as “a firm’s belief in its partner’s trustworthiness and integrity”. Pruitt (1981) defines trust as the belief that a party’s word is reliable and that a party will fulfil its obligation in an exchange. This definition indicates a firm’s willingness to collaborate. Zand (1972) argues that absence of trust will prohibit information exchange and will hamper supply chain relationships. From a social exchange perspective, presence of trust ensures sustainability of contracts, increases reliability between entities, provides incentives for cooperation and develops the ground

for synchronizing and integration logistics activities for individual firms within a supply chain (Yang et al., 2008; Gligor&Holcomb, 2012b). Accordingly we hypothesize that:

H1: Trust positively influences integrated logistics capabilities.

3.2. Trust and Commitment

While some studies examining the link between trust and commitment concluded that trust precedes commitment (Tan & Lim, 2009), other studies implied that it is commitment (or feelings of loyalty to the organization) that in fact enhances the likelihood of trust (Wong&Sohal, 2002). Others simply imply that trust and commitment both impact other organizational outcomes and as such have different antecedents (Tang & Fuller, 1995; Iverson et al, 1996).However, the current study holds that it is trust among supply chain entities that is the root of commitment in supply chain relationships (Kwon & Suh, 2005). Hence we posit that:

H1a: Trust positively influences commitment.

3.3. Commitment and Integrated logistics capabilities

The willingness of trading partners to apply effort due to the relationship is referred to as commitment (Porter et al.,1974).Quite frequently it indicates a firm's attempt to build a relationship that can be sustained in times of problems and contingencies (Gundlach et al.,1995) High levels of commitment develops the platform in which both parties to exchange can realize joint goals without any opportunistic behavior (Cummings, 1984).Committed parties are willing to invest in transaction-specific assets, demonstrating that they can be relied upon to perform essential functions in the future(Anderson and Weitz, 1992)This investments help in arriving in stabilizing supply chain relationships and eliminate the uncertainty of continually searching and forming new relationships. There has been a positive relationship between commitment and relationship success (Mohr and Spekman, 1994). Hence from a social exchange perspective, commitment is a crucial success factor for supply chain relationships (Kwon & Suh, 2005) and determines the effectiveness of synchronization of logistics activities. Without commitment of each individual party in a supply chain for integrating their capabilities, supply chain capabilities cannot develop (Gligor& Holcomb, 2014). Accordingly, we propose that:

H2: Commitment positively influences integrated logistics capabilities

3.4. Reciprocity and integrated logistics capabilities

Under social exchange perspective, members in supply chain enter into contracts or maintain healthy relationships with the expectation of reciprocal benefits (Lawler et al., 2000).This forms the basis of collaborative relationships among supply chain partners that urge each other to reciprocate their actions accordingly to expectations (Narasimhan et al., 2009) and help each other in achieving mutual objectives (Cao and Zhang, 2011).Humphreys et al.(2001) argued that reciprocity can facilitate information sharing

among both upstream and downstream partners in a supply chain. Hence through efficient information exchange, we argue that reciprocity will help supply chain partners to coordinate, synchronize and integrate their logistics activities and capabilities. Accordingly, we posit that:

H3: Reciprocity positively influences integrated logistics capabilities.

3.5. Power and integrated logistics capabilities

Power refers to the relative dependence between exchange members, where power gained by one member can influence the decisions and behaviors of other members (Gaski, 1984). It is argued that firms owning certain assets and resources do exert more power in an exchange as they control the distribution of assets and resources to other members who need the same (Griffith et al., 2006). Narasimhan et al. (2009) underscored power to be a key parameter in any exchange in supply chains. In a supply chain, therefore firms having more resources will exert power in supply chain relationships and will influence activities of other participating firms. In this context, we argue that the focal firm along with its key suppliers; will exert more power in supply chain relationships and argue others to cooperate and collaborate for greater supply chain benefits (Griffith et al., 2006). Hence, the powerful entities in a supply chain will direct the degree of integration of individual logistics capabilities through owning and controlling resources. We argue that this power will have a positive effect as development of supply chain capabilities will be beneficial for every member in the supply chain. Accordingly we posit that:

H4: Power positively influences integrated logistics capabilities.

3.6. Integrated logistics capabilities and supply chain flexibility

Firms in a supply chain must synchronize, unify and integrate their individual logistics capabilities with that of the focal firm for competing with firms outside the supply chain (Gligor&Holcomb, 2014). This is of immense importance as the competitive unit has shifted from firms to supply chains (Christopher, 2000). Gligor&Holcomb (2012a) conceptually argued that it's the integration of logistics capabilities at a supply chain level that will develop supply chain agility. This is based on the premise that logistics are an integral part of supply chain management (Mentzer et al., 2004) and hence logistics capabilities will contribute for the development of supply chain wide capabilities. It is argued in this study that integration will help the firms to have a improved planning for meeting contingencies in a proactive manner and hence will positively contribute for the development of supply chain flexibility. Accordingly we posit that:

H5: Integrated logistics capabilities positively influences supply chain flexibility

3.7. Supply Chain Flexibility and Firm Performance

Supply chain flexibility aims to fulfil customer dynamic requirements in a speedy manner and hence it very well satisfies the criteria of dynamic capabilities (Gligor&

Holcomb, 2012a). Dynamic capabilities are such capabilities that are developed to for adapting to changing environmental conditions and sustain a decent level of performance (Teece et al., 1997). SC agility therefore helps a firm to gain competitive edge by quickly and satisfactorily fulfilling customer requirements in the market. Extant research in supply chain management indicates a service perspective of measuring firm performance. Stank et al. (1999) propose a generic conceptualization of service performance using SERVQUAL: relational and operational. The authors view operational elements as “the activities performed by service providers that contribute to consistent quality, productivity, and efficiency” (Stank et al. 1999, 430). The relational elements are considered to focus on “activities that enhance the service firm’s closeness to customers, so that firms can understand customer needs and expectations and develop processes to fulfil them” (Stank et al. 1999, 430). Operational performance encompasses two dimensions: reliability (that indicates the dependability and accuracy of a service) and price/cost. Relational performance is observed as constituting responsiveness, assurance, and empathy. The above conceptualization of service performance is supported by Collier’s (1991) two distinct dimension conceptualizations: an internal or operations-oriented dimension of service quality performance and an external or market-oriented performance. Since SC agility helps a firm to sustain its operation through effectively fulfilling customer demands in a speedy manner; it has positive impact on both operational and relational performance (Gligor& Holcomb, 2012a). Hence we posit that:

H6a: Supply chain flexibility positively influences operational performance

H6b: Supply chain flexibility positively influences relational performance.

Figure 1 summarizes the proposed hypotheses in a theoretical model

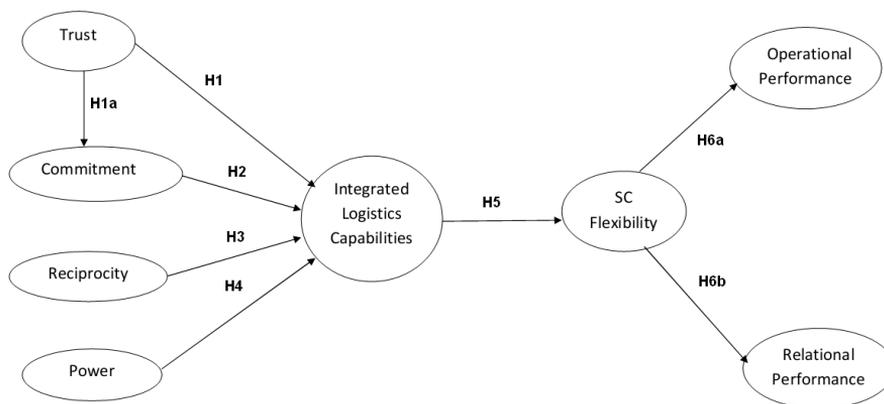


Figure I. Theoretical Model

4. Methodology

4.1. Data Collection & Sample Demographics

The data was collected through a web based electronic survey. The survey instrument was pretested by administering it to a small sample of supply chain managers drawn from a contact list (containing 1500 contacts of working professionals in various designations across different sectors in India) that was purchased from an Indian Marketing Research Firm (the firm wanted to remain anonymous). The list comprised of logistics, supply chain and purchasing managers working mostly in senior designations in the Indian subcontinent in different industries. Some of the measurement items were adapted to suit the context based on the feedback received during pretesting. Both the pre-test and final test participants were chosen from the aforementioned list based on two criteria: (1) the person is having at least 5 years of work experience in the logistics, purchasing or allied decision making and (2) the candidate is working in his current designation for at least 2 years. This brought resulted in a final list of 623 professionals. The surveyed respondents were asked to respond based on their expertise in their respective firms. Table I shows the sample profile.

Title	Number	Percentage
<i>Annual Sales Revenue</i>		
Under 1000 Cr	38	22.62
1100-2500 Cr	39	23.21
2600-5000 Cr	29	17.26
5100-10000 Cr	22	13.10
11000-25000 Cr	21	12.50
Over 25000 Cr	19	11.31
Total	168	100.00
<i>No of employees</i>		
0-50	37	22.02
51-100	38	22.62
101-200	40	23.81
201-500	23	13.69
501-1000	12	7.14
1001+	18	10.71
Total	168	100.00
<i>Industry Sector</i>		
Automobiles	23	13.69
Electrical equipments	18	10.71
Textile	12	7.14
Paper Products	29	17.26
Wood Products	13	7.74
Chemicals	26	15.48
Furniture	13	7.74
Plastic Products	34	20.24
Total	168	100.00

Table I Sample Profile

The first round of survey invitation was sent in the first week of May, 2014 via email. This was followed by two reminders, each within a gap of two weeks after the preceding survey invitation. A total of 623 emails were sent out. Out of these, 52 emails were returned as undeliverable. 177 partially complete responses were received, giving a response rate of 30.99% (177/571). However, for the final analysis we retained only complete responses. Thus, the final sample size was 168.

4.1.1 Non-response Bias

We tested for the non-response bias by comparing the early and late respondents (Armstrong and Overton, 1977). There were no significant mean differences between these two groups on key measures such as firm size and industry affiliation.

4.1.2 Common Method Bias

Since we collected from a single respondent per firm; common method may be a problem. Hence an assessment of common method bias was deemed necessary. Analysis of Harmon's single-factor test of common method bias (Podsakoff et al., 2003) showed six factors with Eigen values above one, explaining 62.8% of the total variance. The first factor explained 24.7 % of the variance, which is not the majority of the total variance. Again we resort to a second test of common method bias; we applied confirmatory factor analysis to Harman's single-factor model (Flynn et al., 2010). The model's fit indices of $\chi^2/df = 16.6$, NNFI = 0.52, CFI = 0.59 and RMSEA = 0.13 were predominantly worse than those of the measurement model suggesting that single factor model is not acceptable; thus the common method bias is negligible.

4.2 Survey Instrument

All the constructs used in the model have established scales for measurement and hypothesis testing. The measures were suitably adapted (wherever needed) to suit the context. A total of 28 survey items (refer. Table II) were used to measure independent and dependent variables in the study.

4.2.1 Trust, Commitment, Reciprocity and Power

Trust was measured with three items that enquired the respondents if their firm can depend on its supply chain members; can trust them completely and if their supply chain members have a high level of integrity. The items for measuring trust were suitably adapted from Morgan & Hunt (1991) and Fynes et al. (2005). Commitment was measured with three items that enquired of the respondents if their firm is totally dedicated in maintaining its supply chain relationships; it wants to continue its relationships for long time and if it gives the maximum effort in maintaining the same. The items for measuring commitment were suitably adapted from Fynes et al.(2005) and Morgan and Hunt(1991).Reciprocity was measured with four items that enquired respondents if their firm has fair policies for dealing with their partners; if their partners treat them fairly and if their partners contribute to existing relationship. The items for measuring reciprocity were suitably adapted from Wu et al. (2014). Power was measured with three items that enquired respondents if their firms possess equal power along with their partners to influence each other in matters of strategic decision making, R & D, sale, production and distribution. The items for measuring power were suitably adapted from Wu et al.(2014).All the constructs were operationalised on 1 to 7 Likert scale where 1=Strongly Disagree ; 4=Neutral and 7=Strongly Agree.

Constructs	Measurement Items <i>*All constructs were measured as 1=Strongly Disagree and 7=Strongly Agree</i>
Trust Adapted from Zacharia et al.(2009)	Our supply chain members trust each other completely. Our supply chain members can be counted on to help us. Our supply chain members have a high level of integrity.
Commitment Adapted from Morgan & Hunt(1994)	Our firm is totally dedicated to its relationship with supply chain members. Our firm wants to pursue our supply chain relationships indefinitely. Our firm delivers its maximum effort for maintaining its supply chain relationships.
Reciprocity Adapted from Griffith et al.(2006)	Our firm has fair policies for dealing with our supply chain partners Our firm is equitable in treating our supply chain partners Our supply chain partners positively contribute to this relationship Our supply chain partners generally treat us fairly
Power Adapted from Wu et al.(2014)	Our firm and its supply chain partners possess equal power to influence each other in decision, R & D, sale, production and distribution Our supply chain partners have power to influence our decision, R& D, sale, production and distribution Our firm has power to influence our partner;s decision,R& D, sale, production and distribution
Integrated Logistics Capabilities Adapted from Gligor & Holcomb(2014)	Our firm's internal logistic activities are closely coordinated. Our firm's logistics activities are well integrated with suppliers' logistics activities Our integrated capabilities are characterized by excellent distribution, transportation, and/or warehousing facilities The inbound and outbound distribution of goods with our suppliers is well integrated
SC Flexibility Adapted from Moon et al.(2012)	Our supply chain has good number of suppliers for raw materials supply Our supply chain has greater scope for new product development Our supply chain as ample scope for changing distribution facilities Our supply chain has enough scope for changing delivery modes and schedules
Operational Performance Adapted from Stank et al.(1999); Gligor & Holcomb(2014)	Our firm delivers undamaged orders each time. Our firm delivers accurate orders at all times. Our firm always meets deadlines as promised to supply chain partners.
Relational Performance Adapted from Stank et al.(1999); Gligor & Holcomb(2014)	Our firm develops formal relationships with its supply chain partners. Our firm exchanges recommendations for continuous improvement with its supply chain partners. Our firm helps its supply chain partners successfully perform tasks. Our firm knows its supply chain partners' needs well

Table II. Survey Instrument

4.2.2 Integrated Logistics Capabilities and SC Flexibility

The dependent variables in this study were integrated logistics capabilities, SC flexibility operational performance and relational performance. Integrated logistics capabilities were measured with four items that enquired respondents if their firm's logistics activities are well integrated with that of its key suppliers; if their logistics capabilities are characterized through excellent distribution, warehousing and transportation facilities and if the inbound and outbound distribution of goods are well integrated. The items for measuring integrated logistics capabilities were suitably adapted

from Prajogo&Olhager (2012).SC flexibility was measured after suitably adapting the measurement items developed by Moon et al. (2012).It consists of a seven item scale that ask executives of their perception of the degree of flexibility their focal firms have in terms of distribution facilities, no of suppliers, range of products and services offered by the firm including flexibility in delivery schedules.

4.2.3 Operational and Relational Performance

Operational performance was measured with three items that enquired respondents if their firm manages to meet delivery schedules; deliver accurate orders and undamaged goods most of the time. The items for measuring operational performance were suitably adapted from Gligor&Holcomb(2014).Finally, relational performance were measured with four items that enquired the respondents if their firm develops formal relationships with its supply chain partners; if it knows the needs of its supply chain partners and helps them to improve their activities. The items for measuring relational performance were suitably adapted from Gligor&Holcomb (2014). All the constructs were operationalised on 1 to 7 Likert scale where 1=Strongly Disagree; 4=Neutral and 7=Strongly Agree.

4.2.4 Control Variable

Like established studies in organizational research, we took firm size (natural logarithm of annual revenue) as control variable.

4.3 Scale Validation

The current study employed Partial Least Squares for scale validation and hypothesis testing. PLS is a structural equation modelling based methodology that deploys a component based approach for estimating the parameters. The benefit of using PLS extends from allowing the researcher to model formative constructs to estimating the required parameters with a minimal sample size. For PLS, the required sample size is 10 times the no of indicators of the largest construct present in a theoretical model. As PLS does not provide a significance test or interval estimation, a bootstrapping analysis was conducted with 1000 sub-samples for calculating the path coefficient, statistical significance and allied parameters. The procedure was executed in two steps. First, reliability and convergent validity was assessed. The second step assessed the discriminant validity.

The study first assessed reliability using the criterion, Cronbach's alpha larger than 0.7 (Chin, 1998). Convergent validity was next assessed using multiple criteria: (1) item loading larger than 0.70 and statistical significance, (2) composite construct reliability larger than 0.80 and (3) average variance extracted (AVE) larger than 0.50 (Fornell and Larcker, 1981). Further, discriminant validity was assessed using the criterion: the square root of AVE for each construct greater than its correlations with all other constructs ((Fornell and Larcker, 1981).As indicated in Table 3, standardized item loadings range from 0.71 to 0.95, composite reliabilities range from 0.88 to 0.95,and average variance extracted (AVEs) range from 0.64 to 0.86. In Table 4, the square root of AVE for each construct is larger than its correlations with all other constructs. Hence, these results show a highly acceptable level of reliability, convergent and discriminant validity.

Construct	Items	Item Loadings	Composite reliability	AVE	Cronbach's Alpha
Trust	3	0.88-0.92	0.935	0.826	0.895
Commitment	3	0.88-0.95	0.951	0.865	0.924
Reciprocity	4	0.71-0.86	0.882	0.653	0.825
Power	3	0.88-0.92	0.931	0.818	0.887
Integrated Logistics Capabilities	4	0.76-0.87	0.88	0.647	0.819
SC Flexibility	4	0.82-0.89	0.921	0.745	0.885
Operational Performance	3	0.89-0.90	0.93	0.816	0.885
Relational Performance	4	0.86-0.92	0.939	0.792	0.911

Table III: Convergent Validity

Construct	TR	COM	REC	POW	ILC	FLEX	OP	RP
Trust (TR)	0.908							
Commintemnt (COM)	0.220	0.930						
Reciprocity (REC)	0.392	0.036	0.808					
Power (POW)	0.382	0.180	0.330	0.904				
Integated Logistics Capabilities(ILC)	0.503	0.285	0.509	0.562	0.804			
SC Flexibility (FLEX)	0.354	0.128	0.462	0.353	0.642	0.863		
Operational Performance (OP)	0.274	0.278	0.181	0.223	0.204	0.370	0.903	
Relational Performance (RP)	0.087	0.092	0.195	0.157	0.317	0.417	0.191	0.889
Diagonal value: Squared root of AVE, Non-diagonal value: Correlation								

Table IV: Discriminant Validity

5. Hypotheses Testing

PLS was used to estimate the path coefficients in the structural model. The estimation was executed in two steps (Chin, 1998). First, it was required to estimate the path coefficients and statistical significance for the dominant paths. Second, coefficient of determination (R-square) for endogenous variables was computed to assess their predicted power. Figure II presents the results of the hypotheses testing using PLS in the structural model.

For the influence of Trust on commitment; the corresponding path was found to be positive and statistically significant (0.22; t = 2.243). This showed support for our proposed hypothesis H1a. Also the path coefficient for the influence of trust on integrated logistics capabilities was also positive and significant (0.213; t=2.035).Hence H1 is supported. Again, H2 discussed a positive influence of commitment on integration of logistics capabilities. The corresponding path coefficient is positive and significant (0.164; t=2.312). Hence H2 is supported. H3 discussed a positive influence of reciprocity on integration of logistics capabilities. The corresponding path coefficient is positive and significant (0.304; t=3.122). Hence H3 is supported. H4 discussed a positive influence of power on integration of logistics capabilities. The corresponding path coefficient is positive and significant (0.350; t=3.995). Hence H4 is supported. H5 posited a positive

influence of integrated logistics capabilities on the SC flexibility. The corresponding path coefficient is positive and significant (0.643; $t=5.872$). Hence H5 is supported. H6a posited a positive influence of SC flexibility on operational performance. The corresponding path coefficient is positive and significant (0.371; $t=3.634$). Hence H6a is supported. Finally, H6b posited a positive influence of SC flexibility on relational performance. The corresponding path coefficient is positive and significant (0.418; $t=3.231$). Hence H6b is supported. Hence the model established trust, commitment, reciprocity and power as influential antecedents required for successful integration of logistics capabilities. Further it was empirically established that effective integration of logistics capabilities will result in improved and flexible and more efficient supply chains. Trust as a precursor of commitment explained around 4.8 percent of the variance in the same. Further, trust, commitment, reciprocity and power together accounted for explaining 50.6 percent of the variance in integrated logistics capabilities. The antecedents along with integrated logistics capabilities accounted for explaining 41.3 percent of the variance in SC flexibility. Finally, SC flexibility in the proposed model explained 13.7 percent and 17.5 percent of the variance in operational and relational performance respectively. To summarize, the proposed hypotheses have found their empirical support and the model have explained a substantially the variance in the respective endogenous variables at the appropriate places. Table 5 summarizes the hypotheses and the estimated path coefficients and their significance.

Hypothesis	Path estimate	T-value	Result
H1. Trust positively influences integrated logistics capabilities	0.213	2.035	Supported
H1a. Trust positively influences commitment	0.22	2.243	Supported
H2. Commitment positively influences integrated logistics capabilities	0.164	2.312	Supported
H3. Reciprocity positively influences integrated logistics capabilities	0.304	3.122	Supported
H4. Power positively influences integrated logistics capabilities	0.35	3.995	Supported
H5. Integrated logistics capabilities positively influences SC flexibility	0.643	5.872	Supported
H6a. SC flexibility positively influences operational performance	0.371	3.634	Supported
H6b. SC flexibility positively influences relational performance	0.418	3.231	Supported

Table V. Hypotheses Testing Results Summary

6. Findings and Discussion

The current investigation has empirically established the validity of the proposed relationships in an integrated model. The findings show several important links between the attributes of social exchange perspective and integrated logistics capabilities and finally with SC flexibility. In the first place, the study has showed the importance of trust among the supply chain partners for effective integration to take place. It is argued that for developing supply chain capabilities; logistics capabilities of individual firms must be integrated at the supply chain level. For effective integration to happen; partners in a value chain must be able to trust each other openly. Kwon and Suh (2005) underscored that supply chain relationships can be effective only if the partners in a network have faith in each other's abilities and unify their individual efforts. Morgan and Hunt (1994) further stressed that once the members develop mutual trust; they will also be more

committed towards executing their duties and responsibilities. This is also shown in our investigation that trust do exerts a positive influence on commitment. The members in a value chain are more duty bound as they feel a better state of belongingness to their assigned duties and activities. Also supply chain partners donate their maximum effort for information dissemination that helps in enhanced visibility of inventory status, logistics condition of individual members in the value chain.

Reciprocity was identified and established as another important attribute that can contribute positively to the integration of logistics capabilities. This is another significant contribution of this study. Reciprocity denotes the ability of different value chain members to expect a similar kind of behavior in return and allied benefits. This is facilitated when partners in a supply chain formulate policies and procedures that are unbiased and likely to result in equal opportunities for every partner. In reciprocity; partners equally value each other's contribution, identify and acknowledge the same which results in enhanced relationships and transparency. Eventually this positively contributes to unification of efforts and capabilities of individual logistics capabilities.

A crucial contribution of this study was the incorporation of power as an influential antecedent for logistics integration. In a supply network, every member generally has access to a specific set of resources (which may be due to its core competencies; negotiation skills and contacts in the market). Hence parties having access to scarce resources can exercise greater control and authority over others in a network and can influence the formulation of policies and procedures. Accordingly, the presence of such powerful members must be monitored. As shown by the study that power positively helps in logistics integration; this might imply that the members are exercising their power in a positive manner thereby contributing to the overarching goals and aims of the supply chain.

The study therefore has argued to practitioners and supply chain managers that they should encourage procedures and practices that can strengthen supply chain relationships based on trust and commitment. Further, they should focus on organizing training programs and knowledge exchange forums where partners in supply chain can share their experiences and expect appropriate returns of their investments (both in terms of tangibles and intangibles). All these will help in coordinating the individual logistics activities of the partnering firms in a supply chain network. Also, for a focal firm this will affirm the ground for unifying its key processes with those of its key supplier's processes. Finally, trust, commitment, reciprocity will help in efficient inbound and outbound distribution of goods through unifying the individual logistics capabilities. As shown by the current investigation, this integration of logistics capabilities will help the supply chain members to work in a synergistic manner and devise alternate states of operations for ensuring continuity of supply chain operations in the event of a disaster. This capability will be manifested if the supply chain can accommodate last minute changes in delivery modes and schedules can alter its distribution facilities etc.

Lastly, the study has investigated the impact of SC flexibility on supply chain performance. The current study has used a service perspective for measuring supply chain performance in line with Stank et al. (1999). Using a operational performance measure, it was shown that supply chain flexibility helps a firm in delivering undamaged and accurate orders every time. Further supply chain flexibility helps a supply chain to

meet its delivery schedules and deadlines accurately. On the relational front, supply chain flexibility helps the value chain to create, enhance and sustain its relationships with its suppliers and customers. Further, it helps a focal firm in assessing its supplier's needs and requirements and accordingly helps them to grow and execute associated activities.

7. Conclusions and Suggestions

In line with the tenets of social exchange perspective, this study has proved the dominant role of trust, commitment, reciprocity and power in the development of supply chain flexibility through effective integration of logistics capabilities at the supply chain level. Another contribution of this investigation is the empirical validation of the proposition by Gligor&Holcomb (2012) that it's the effective integration of logistics capabilities of individual partners in a supply chain that ultimately results in supply chain capabilities. Also the study has again empirically established that trust is a pre-cursor of commitment in any supply chain. Lastly, collecting data from a wide range of industries has helped to increase the generalizability of the findings and have confidence in the same. However, the current study has its own limitations too. Firstly, the study has collected responses from single informant per firm. Hence future studies should collect from multiple informants per firm to have a more accurate perception being captured of the actual picture. Secondly, the study using a social exchange perspective had investigated the impact of four attributes (e.g. trust, commitment, reciprocity and power) on logistics integration. Further studies should explore other possible attributes either using a social exchange perspective or some other relevant theories. Third, future studies should explore other allied theoretical perspectives that can be used for exploring such investigations with allied or new attributes. Fourth, further studies can extend the above framework for exploring the developing of other supply chain capabilities e.g. agility, resilience, robustness etc. The study has finally suggested managers to build a culture based on trust, commitment, reciprocity and power where supply chain partners can exchange their know-how and experiences and help in each other's growth thereby benefitting the entire supply chain.

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