

LINKING SUPPLY NETWORKS AND LOGISTICS SERVICE NETWORKS – TOWARDS A TRIADIC FRAMEWORK

Abstract

Purpose of the paper and literature addressed: This is a conceptual paper, which draws upon inter-organisational theory and in particular business relationships and industrial networks (see e.g. Håkansson and Snehota, 1995; Gadde et al., 2010). The aim is to develop a theoretical framework for analysis of the links between supply networks and logistics networks. The suggested framework builds on triads consisting of three main types of parties: the buyers and suppliers of goods, conceptually belonging to the supply network, and the logistics service providers that are involved in the logistics service network.

Research findings: The theoretical notion of triads points to the importance of analysing the dyadic relationships and the connections among these dyads involved in the triad. When analysing change in logistics service networks, the focal dyads consisting of buyers and suppliers of goods together with their relationship(s) with the logistics service providers are key to the understanding of how changes in ‘demand’ for logistics services are generated. The suggested micro level analysis takes its starting point in that the relationship between the buyer and supplier of goods is connected to the logistics service provider since the substance of their relationships are linked. Change in this setting includes any change in how logistics activities and resources are carried out and activated by the parties involved in the focal triad. These changes also have a potential impact on the roles of all three actors in relation to each other.

An analysis model for this triad is created. The model is based on a modified version of the framework of business relationships developed by Håkansson and Snehota (1995), which is focusing on the relationships’ substance in terms of activity links, resource ties and actor bonds, and functions for the individual firms, for the relationships and for third parties. Influence on and by ‘fourth parties’ in relation to the focal triad have also been included as a modification since the framework is basically dyadic, and we here extend it to capture all relevant dyads in a focal triad.

Main contribution: This paper contributes to the supply chain and logistics service network research in several ways. First, the framework includes indirect relationships in supply chains. Second, it adds a theoretically grounded framework to logistics research, which is generally considered managerial in nature. Finally, with the help of the framework, studies on supply chains (or networks) and logistics service networks can be integrated.

Keywords: triads, business relationships, supply networks, logistics service networks.

INTRODUCTION

This paper takes its starting point in two key arguments. First, research on logistics has generally been accused of lacking theoretical grounding and analytical rigour. Second, conceptions of supply chains or networks on the one hand, and of logistics service networks on the other, have not been sufficiently connected to each other. In order to approach both these challenges we will draw upon inter-organisational theory and in particular theoretical notions on business relationships and industrial networks (see e.g. Håkansson and Snehota, 1995; Gadde et al. 2010).

Logistics research, in general, has often been accused of being weakly theoretically grounded. For example, Kent and Flint (1997) call for useful models using sound and rigorous scientific methods that can bring marketing, engineering, operations management and logistics closer to each other. Moreover, logistics research has mainly been considered managerial in nature, lacking a rigorous orientation towards theory development, testing and application (Mentzer et al., 2004; Mentzer and Kahn, 1995). Research on ‘third party logistics’ (TPL), in particular, is claimed to be empirical-descriptive in nature, applying a positivistic research tradition with surveys as the dominant method (Selviaridis and Spring, 2007).

When supply chain management research is concerned, Fabbe-Costes et al. (2009) argue that the focus is most often set on a focal (manufacturing) firm and its customers and customers’ customers and suppliers’ suppliers, and that it rarely includes the logistics firms involved. In line with this, both Berglund (2000) and Cui and Hertz (2010) argue that ‘parallel’ to traditional supply chains there are logistics service supply chains with focal logistics firms and their customers and suppliers. The connections among these supply chains are not often investigated since ‘indirect’ relationships, i.e. relationships that are not included in the sequential linkages between buyers and suppliers of goods (Jahre and Fabbe-Costes 2005), are not taken into account. Fabbe-Costes et al. (2009) therefore suggest that logistics service providers (LSPs) need to be integrated in the clients’ chains, and that the clients need to be integrated in the chains of the LSP’s. In this paper we will focus our attention on how links between the two networks can be approached analytically by use of a theoretical framework. In order to do this we need to further inquire into the logistics service network to find ways to link it to theoretical conceptions of supply networks.

Cui and Hertz (2010:2) argue that considering the logistics firm as the focal one would contribute to our understanding of logistic management. Furthermore, logistics firms often try to develop their horizontal networks in order to obtain access to complementary resources (Berglund, 2000; Carbone and Stone, 2005) and, as suggested by Hertz and Macquet (2006), logistics firms are in essence networking firms in the sense that their business idea is based on connecting organisations, coordinating activities and combining resources. Logistics service networks have been illustrated by Abrahamsson and Wandel (1998) who state that it is not sufficient to only view the relationship between a shipper and a service provider since both parties are involved in other relationships which often strongly interact with the individual shipper-provider relationship.

In line with these ideas, Selviaridis and Spring (2007) propose network theory as a framework for mapping activity, resource, and capability dependencies for logistic services and their evolution over time.

However, when dividing the existing literature on complex logistics services, labelled as ‘third party logistics’ (TPL), into categories focusing on the firm, the dyad, and the network level, Selviaridis and Spring (2007) find the network level to be under-represented. As the TPL fulfils part or all of the logistical needs in transactions between the buyer and the supplier, a triadic approach could explicitly capture the indirect links in the network and the mediating role of TPLs. Beier (1989: 78), for one, argues that the triad should be the ‘minimum unit of analysis for logistics research’, because the carrier, having a different perspective to the transactions, occupies a potent position in a logistics triad and may be able to identify and pass on information that may lead to more efficient transaction processing. Bask (2001) points out that the term TPL in itself indicates a triadic link between suppliers, their customers and LSPs. In line with this notion, Larson and Gammelgaard (2001: 71) define a logistics triad as “a cooperative, three-way relationship between a buyer of goods, the supplier of those goods and a logistics service provider moving and/or storing the goods between buyer and supplier.

In prior logistics research, a triadic approach has been applied, for example, by Gentry (1996), who presents a study of the role of carriers in buyer – supplier relationships, and Carter and Ferrin (1995), who investigate the effect of trilateral collaboration on transportation costs for the purchasing firm, the supplier firm and the carrier firm. However, Selviaridis and Spring (2007: 138) notice that existing studies of logistics triads do not provide “supra-dyadic” insights, i.e. insights that cannot be captured by dyadic approaches. For example, they do not focus on indirect relationships and mediating roles that are essential in TPL.

The aim of this paper is to develop a theoretical framework for analysis of triads to capture the links between supply and logistics networks. The triads that we focus on consist of three main types of actors and their relationships: the buyer and the supplier of goods, and the logistics service suppliers (see Figure 1). In the second section we present the triad concept and how it has been used in prior studies. In the third section we discuss actors, activities and resources in logistics service networks. In the fourth section we focus on actors, activities and resources in supply networks. In the fifth section we discuss ‘the key dyad’ i.e. the one between the buyer and the supplier of logistics services since we consider this dyad as key in linking of the two networks. In the sixth section we present a suggestion of an analytical framework for analysis of triads consisting of buyers and sellers of goods and the logistics service provider taking care of logistics related activities in their exchange. Finally, we discuss the potential uses of the suggested framework and point to some research areas in which the framework could contribute new insights.

Figure 1 illustrates how every buyer-supplier relationship in the supply network is linked to the logistics service network. The triads of focal interest for this paper consist of a buyer and a supplier of goods and the logistics service provider who is involved in a business relationship (through which the logistics service is exchanged) with either the buyer or the supplier of goods.

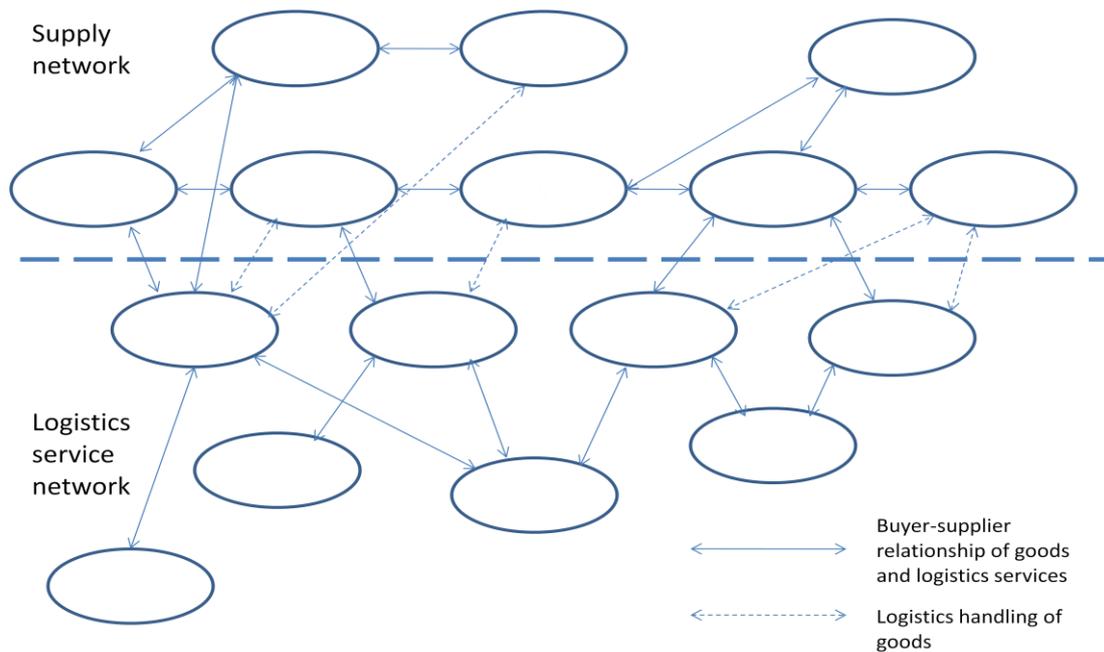


Figure 1. The links between the supply network and the logistics service network.

THE CONCEPT OF TRIADS

A business triad consists of three independent firms that are connected to each other for business purposes. This kind of a relationship constellation is the smallest conceivable unit of analysis in which it is possible to study connections between relationships (Easton and Henriques in Havila 1996; Ritter, 2000). In a triad, the dyadic relationships are embedded, besides in a focal triad, in a number of other triads, and thereby in a larger network. Ritter (2000:319) argues that it is adequate to analyse triads when addressing the interconnectedness between relationships in a network. A network can be deconstructed into triads for analytical purposes, and network effects can be revealed by using a triad. Thus, analysis of series of triads could be a way to systematically reveal the effects of connected dyads in certain processes (Dubois, 2009).

Research with triads has its roots in sociology and specifically on the early works of George Simmel, who argued that triads are a fundamental unit of sociological analysis. Simmel also found ways of how triads differ from dyads and from larger groups (Simmel in Wollf, 1950). For example, a triad is never stable in the way that there would be a perfect balance between all the three dyads. Larger groups, in their turn, tend to be more stable because of the greater diversity of relationships that can form in them. In triads, members normally have a chance to interact directly with each other meanwhile in larger groups interaction must be mediated through formal arrangements (Caplow, 1956).

Also in the business context, the third actor has often an important role between the other two, both in direct and indirect relationships; for example, between a buyer and a seller (Havila et al., 2004), between a manufacturer and an end user or industrial client (Anderson and Narus, 1990; Håkansson and Snehota, 1995; Rosenbröjer 1998), between different

nationalities and cultures (Fang, 2001; Trimarchi, 2001), and between a supplier and end user (Padro and Salle, 1994; Salo, Tähtinen and Ulkuniemi, 2008). In the service triangle (Phillips Carson et al., 1997; Gutek et al., 2002), which is a triad of a customer, service organisation, and individual service provider, the three actors are identified as the components of the service delivery process. Furthermore, three actors are involved in relationships between international corporation, sales subsidiary or agent, and their clients (Havila and Sandström, 1993; Havila, 1996). Supply chain and logistics research has also applied a triadic approach (Phillips et al., 1998; Choi and Wu, 2009).

In business network studies with triads, the focus is generally on direct *connections* between the three parties (Havila et al., 2004). In sociological studies, a specific feature of this kind of a triad is the actors' ability to distinguish the other actors of the group, to maintain the group as a unit, and to co-operate to reach common goals (Thibaut and Kelley, 1959; Homans, 1951: 135). In business relationships, this leads to differentiation of the tasks in different areas within the triad (Havila, 1996). Havila (1996) distinguishes between two kinds of triads: unitary triads and serial triads (see figure 2). The difference is the strength of the relationship between the supplier and the customer. In a *serial triad*, a system view is applied, i.e. one dyadic exchange precedes another, and the first one has an impact on the second one. A *unitary triad* functions as a group where every actor interacts with every other actor to more or less the same extent. Each of the three parties functions as an intermediating actor between the other two.

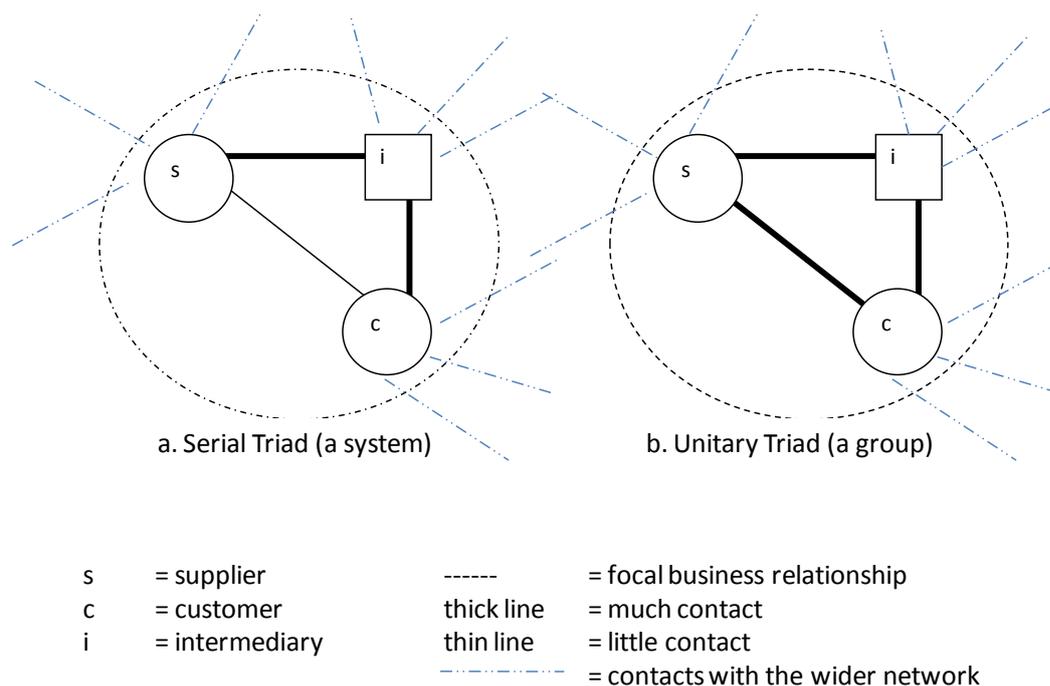


Figure 2. A serial triad and a unitary triad. Source: Havila, 1996: 27.

The actors of a triad may also have *indirect connections*. In addition to the direct relationship between two actors, there is a relationship between them that is derived from their common relationship to a third actor. Granovetter (1973: 1363) argues that if there is a relationship between actors A and B, and between actors A and C, there is also a connection between B and C, which has an impact on the relationship between actors A and B. In the triad of the supplier of goods, the buyer of goods, and the logistics service provider, the supplier and

buyer have a direct connection with each other, but typically only one of them has a direct business relationship with the logistics service provider. However, in line with Granovetter's argument, also in this relationship constellation, the indirect connection has an impact on the existent relationships. Another interesting feature of the current triad is that the actors belong to different networks. As the aim of this paper is to create a framework linking these networks, the notion of "nonredundant" contacts, i.e. contacts that are connected by a structural hole is relevant (Burt, 1995). Actors generally focus on activities inside their own network, which creates structural holes in the information flow between the networks. Behaviour, opinion, and information are more homogenous within that between groups, and the actors that are near those holes may be more innovative when integrating information they obtain from both networks (Burt, 2004: 349).

Traditional marketing theory pays attention to intermediaries, and sees them as organisations that support exchanges between producers and consumers. According to Alderson (1957: 214-216) intermediaries can create place utility, such as bridging over a geographical or technological distance, and time utility when production and consumption are separated in time. In a triad, "the third actor" may have different roles, for example, in keeping the triad together by softening the conflicts between the other two. The third actor may also act as a "tertius gaudens" (the third who rejoices), seeking to turn to his/her own advantage a disagreement between the other two. Furthermore, he/she may intentionally create conflicts between the other two in order to attain a dominant position or other gains (Simmel, in Wolff, 1950). In the current study, the role of the third actor may be compared to "Tertius iungens", the third who joins. Tertius iungens derives from the social exchange theory, and describes a behavioral orientation towards connecting disconnected people or increasing co-ordination between already connected people in one's social network. Tertius iungens as an activity may involve co-ordination without adversarial tension and competition between the parties, although the latter may be indifferent to each others' interests, or even share some common interest without being tied in any given specific activity. Tertius iungens may facilitate pre-existing ties between parties such that the coordinative role of the tertius iungens afterward recedes in importance. Tertius iungens may also initiate or facilitate interaction between parties while sustaining an essential coordinative role over time (Obstfeld, 2005).

LOGISTICS SERVICE NETWORKS

A review of the logistics literature makes it clear that the categorization of actors involved in logistics service networks, what activities they perform, and the capabilities and resources used are not always obvious. There seems to be a confusion concerning different terms of logistics firms and the activities performed and a number of different terms are being used interchangeably (Fabbe-Costes et al., 2009; Selviaridis and Spring, 2007) Furthermore, previous logistics research has mainly been focusing on complex services. For example, according to Holter et al. (2008) there are few academic sources on transport purchasing processes (in contrast to logistics services).

Several authors point at a number of logistics activities that can be outsourced to a third party, see for example Lieb et al. (1996), Dapiran et al. (1996), Peters et al. (1998) and Laarhoven et al. (2000). Activities offered by third party logistics providers may consist of operation and management basic services such as transport and warehousing. In addition, other activities can be included, for example inventory management, information related

activities, so called value added activities, such as secondary assembly and installation of products, consulting and design activities, and the length of the co-operation between shipper and provider to be at least one year, to distinguish third party logistics (TPL) from traditional "arm's length" sourcing of transportation and/or warehousing. The *scope* of the logistics service provider's (LSP) offering could vary from a single standard service (e.g. a transport from A to B) to complex service packages (e.g. an entire distribution system) (c.f Andersson and Norrman, 2002; Lieb and Randall, 1996). These packages may also contain different value adding services and IT services (Andersson, 1997; van Laarhoven et al., 2000). Basic logistics services constitute the majority of services, but they are increasingly bought in bundles (van Laarhoven et al., 2000; Berglund, 2000; Andersson, 1997; Sink and Langley, 1997).

Logistics provider can serve as a market mediator to build networks that connect supply chain partners with various specialists, where the LSPs take on different roles with regard to their supply chain partners (Ojala et al. 2008). Berglund (2000) discuss how the TPL services can be produced more efficiently by taking advantage of scale economies of different kinds which he argues can be accomplished by buying services from other providers, i.e. the development of a network of providers. Berglund (2000) argue that TPL providers can create value for their customers by using conceptual logistics skills to improve their supply chains, thereby implying an important link between the service network and the supply chain (or the supply network). Many attempts have been made to classify the different firms involved in logistics service networks, often according to the service offerings provided (see for instance Abrahamsson and Wandel, 1998; Berglund, 2000; Bask, 2001; Hertz and Alfredsson; 2003). Moreover, Stefansson (2006) is distinguishing service providers based on their position in the network.

Fabbe-Costes et al. (2009) found more than 20 different terms for logistics service providers, based on the activities performed, geographical scope and type of relationship. Actors may be categorised based on the scope of the service offerings (see for example Berglund et al. (1999) and Ojala et al. (2008). The actors providing more complex services, such as third party logistics firms, have attained increasing attention during the years. These firms have been defined as acting as middlemen between buyer and seller while they provide a bundle of services including warehousing, transportation, and value-added activities in an integrated way (Virum, 1993). Therefore they are of a special interest when discussing logistics service networks. Skjoett-Larsen et al. (2006) define a TPL as 'a middleman in the logistics channel that has specialized in providing, by contract, for a given time period, all or a considerable number of logistics activities for other firms'.

Berglund et al. (1999) describe a segmentation between providers that offer a specific service, for example distribution of spare parts (service provider), versus providers that cover a complete range of services and offer their customers logistics solutions (solution provider). *Service providers* focus on a few standard services maybe add some features to attract extra customers and use scale economies to increase profits. Standard service providers base their strength on standardisation and thus should the clients be as similar as possible. *Solution providers* focus on clients' particular needs, take over complete, well-defined processes and customise their services. Solution providers base their offering on the ability to create logistics solution and are thus able to manage complex situations that differ among the clients. The logic behind the solution position is that these providers focus on developing solutions to specific clients' requirements.

Heskett et al. (1964:43) present their view of the 'logistics service network' as: 'There are two basic elements in the logistics system of a business firm. The first of these is a set of fixed points, or facilities, which may vary in number from two to several thousand. These points are connected by the second element of a logistics system, a transportation network.' To exemplify, the 'fixed points' – or facilities – can be warehouses, terminals, hubs, while the 'transportation network' includes vehicles (trucks, trains, ships, etc.) and carriers (pallets, packages containers etc.) and equipment for moving, sorting, storing, handling etc. Based on this view one might argue that the core of logistics reside with these resources and that the activities performed are derived from these resources. However, this focus on resources in logistics shifted to a focus on activities and the efficient performance of activities. This is exemplified by Ballou (1978:9), arguing that: 'Business logistics deals with all move-store activities that facilitate product flow from the point of raw material acquisition to the point of final consumption as well as the information flows that set the product in motion for the purpose of providing adequate levels of customer service to reasonable cost.' This change of focus is brought up for discussion in Jahre et al. (2006). They argue that instead of regarding resources as important only as facilitators of activities, they are important in themselves since they contribute to value generation in terms of the benefits they contain. They distinguish between four different logistics resources (facilities, products, business units, business relationships) and how these are combined and developed to generate value in the logistics service network.

SUPPLY NETWORKS

The emergence of the concept of supply networks has been influenced by two distinct streams of research; the industrial network research conducted by the Industrial Marketing and Purchasing group (IMP), and the research on supply chain management, which is based on strategic management, operations management and logistics research (see e.g. Lamming et al., 2000). The IMP approach sees supply network as a network consisting of business relationships, which can be described in terms of activities, resources and actors (Håkansson, 1987). Based on the resource collections, actors perform activities, and participate in business relationships which are created through activity links, resource ties, and actor bonds. Supply networks are formed by webs of actors, and the activity patterns they accomplish through their resource constellation (Håkansson and Snehota, 1995). The need to extend the scope of research from supply chain to supply network originates from the desire to understand the developments in the purchasing side of the supply. While the emphasis on the chain thought is on competition, the network thinking has its focus on the effort to achieve efficiency improvements (Gadde and Persson, 2004; Lamming et al., 2000). Specifically technical developments in production, transportation and information systems have facilitated new distribution strategies and network perspectives (Gadde and Persson, 2004; Gadde, 2004; Hoyt and Huq, 2000). Supply networks are also related to innovation, organizational learning, and knowledge sharing (Dyer and Nobeoka, 2000; Håkansson et al., 1999; Harland et al., 2001).

The role of purchasing has become increasingly important, due to, for example, specialization and outsourcing. The new requirements on the supply side force companies to reconsider purchasing strategies and purchasing behavior (Gadde, Håkansson and Persson, 2010). In an industrial setting, the context of purchasing management has moved from the "simple"

outsourcing of production and supply of resources to complex decisions including, for example, design and product development (Gadde and Håkansson, 2001). Suppliers can be significant contributors for technical development and innovation for the buying firm, and the success of a company is dependent on its operations on the supply side (Gadde et al., 2010; Svan and Westerlund, 2009). In line with this, Gadde et al. (2010: 5) argue that the word purchasing should be questioned, and that the concept of “management of supply networks” would be more suitable.

There is no single definition of the concept of supply networks. According to Harland (1996), a supply network is a set of supply chains, which describe the flow of goods and services from original sources to customers. Christopher (1992) treats supply networks as a manageable set of operational tasks performed in supply chains to serve end-customer segments now and in the future. When compared to the wide and unmanageable industrial networks conceptualized by the IMP group (e.g. Ford, 1990; Håkansson and Snehota, 1995), these definitions are limited to operational and managerial activities. Harland, Lamming, Zheng and Johnsen (2001: 22) agree that the supply network concept is more complicated than supply chain concept. They describe supply networks with mess and complexity, ‘involving lateral links, reverse loops and two-way exchanges’, which include a ‘broad strategic view of resource acquisition, development, management and transformation’.

The features of each supplier relationship are dependent on their complementarities with the structure of activities and resources of the focal buyer company, as well as on its other supplier partners. The decisions regarding a specific client or supplier may have an impact on the relationships with other clients and suppliers, and on the wider network (Ford and McDowell, 1999; Håkansson and Snehota, 1995; Roseira, Brito and Henneberg, 2010). For example, if a supplier decides to develop a new technology to be applied in a specific relationship, this technology may become the standard through the network. Similarly, improvements in product quality by a specific supplier may lead to a situation where the buyer requires quality improvements from its other suppliers (Roseira et al., 2010).

A considerable part of a company’s total resource base is located beyond its possession, and controlled in co-operation with other firms (Andersen and Christensen, 2005; Dubois and Gadde, 2000; Gadde et al., 2003; Gadde, 2004; Holmen, Pedersen and Jansen, 2007). Therefore, the collaboration, not only between buyer and suppliers, but also among the suppliers, is emphasized (Dubois and Gadde, 2000). In the same vein, Håkansson, Havila and Pedersen (1999) argue that a supplier has a higher likelihood of learning and innovating when it is connected with the buyer’s other suppliers.

INTERFACES BETWEEN BUYERS AND SUPPLIERS OF LOGISTICS SERVICES

From the viewpoint of the dyad involving the supplier of goods and the buyer of goods, the logistics service provider is the link to the logistics service network. The logistics service network is somehow activated by the business exchange in the abovementioned dyad, through its relationships(s) to the LSP. From the LSP’s point of view, we discuss two issues. (1) the content of the offering and (2) how the offering is developed and by what actor(s).

Depending on the scope of services in the offering the interaction between the buyer and the seller of logistics services has different needs of coordination, i.e. operational, functional,

geographical and development (Andersson et al., 2007). According to Andersson et al. (2007) shippers often perceive the coordination activities carried out by LSPs to be insufficient. The shippers perceive that the coordination focus on price, contract negotiations and operational issues and lack proactivity from the LSPs. There has also been a perceived lack of coordination between strategic and operational work at the TPL providers (ibid.). However, these authors put forward the hypothesis that service providers in the future will be more involved in the definition of resources, processes and to some extent also intangible output. This means working more with integrated relationship management. This potential change in relationships indicates a shift into more of a function or performance describing definition of the service. In line with this thought TPL has also been defined from a more relational perspective.

All in all, the scope of services included in what is known as a 'TPL service package' is becoming wider and the services are also becoming increasingly complex (Andersson and Norrman, 2002; Chapman et. al., 2003). In relation to this fact an interesting aspect is how the offering is specified by the buyer of the logistics service. Buying and selling advanced/complex/bundled logistics services (i.e. a function) put high demands on how the service is defined (cf. Andersson and Norrman, 2002). Axelsson and Wynstra (2002) emphasise the importance of defining a service when buying services in general, while Sink and Langley (1997) argue that the service definition is one of the most difficult steps in the process of buying third party logistics services. However, it is also considered one of the most important issues since it is closely linked to some of the key success factors for third party logistics, such as well defined requirements, procedures and systems (Andersson, 1997; Bagchi and Virum 1998; van Laarhoven and Sharman, 1994).

One way of categorising how offerings are developed is presented by Araujo et al. (1999) who define four types of possible interfaces between a buyer and a supplier: standardized, specified, translational, and interactive. In our setting a *standardised interface* means a standard offering from the LSP, i.e. a standard logistics service that is provided to many customers. A *specified interface*, in turn means that the customer specifies the logistics service in detail without consideration to the conditions of the LSP or other parties. Andersson and Norrman (2002) observe that the responsibilities of the logistics design did most often reside in the shipper organisation while the service was defined in more detail by the shipper. A *translational interface* implies that the customer provides the LSP with some requirements that can then be translated into an offering by the LSP in a way that fits as well its own as the other parties' resource collection. There is no question that services need to be clearly defined, both with respect to type and scope of the service. However, at the same time, the specification should not limit the providers' ability to design and implement efficient solutions. If the buyer influences the specification of the service too much, the service provider will be unable to take full advantage of his resources in designing efficient solutions and that may hamper e.g. the ability to achieve economies of scale. According to Hertz and Alfredsson (2003) logistics service providers could become more efficient and effective if they standardised processes while at the same time serving their customers in such a way that each one got an adapted package of services. The provision of logistics services, hence, needs to be coordinated both internally within the providers' organisations and externally by adapting to different customers' needs (Andersson et al., 2007). Finally, the *interactive interface* deals with the situation where the LSP and the buyer of the logistics service together, and in interaction, develop an offering that fits both parties, and which takes

into consideration also the demands and conditions of ‘other related parties’, i.e. the LSP’s other customers and the buyer’s other LSPs.

When the offering is defined it needs to be ‘produced’. In order to do so different parts of the logistics service network can be activated. So, the character of the relationships and interfaces among the actors will have an impact on how the production of logistics services can be accomplished; which resources that are used, how activities are linked, and what actors that are included. In the next section we will look further into the focal triad in which the key dyad connects the buyer and supplier of goods with the logistics service provider.

TRIADS AS A BASIS FOR ANALYSIS IN THE LINK BETWEEN SUPPLY AND LOGISTICS SERVICE NETWORKS

The theoretical notion of triads points to the importance of analysing the dyadic relationships and the connections among these dyads involved in the triad. In the case of analysing change in logistics service networks we argue that the focal dyads consisting of buyers and suppliers of goods together with the relationship(s) with the logistics service providers are key to the understanding of how changes in ‘demand’ for logistics services are generated and how these are transferred to logistics service providers and their networks. Figure 3 illustrates a focal triad wherein the supplier of goods (S) and the buyer of goods (B) have a business relationship to which relationships with the logistics service provider (LSP) is connected through the coordination of activities that are carried out. However, typically only one of the parties (S or B) is involved in a business relationship with the LSP and at the same time there is an indirect relationship between two of the parties. This triad can be compared to a type of a serial triad, however of a different kind than previously discussed.

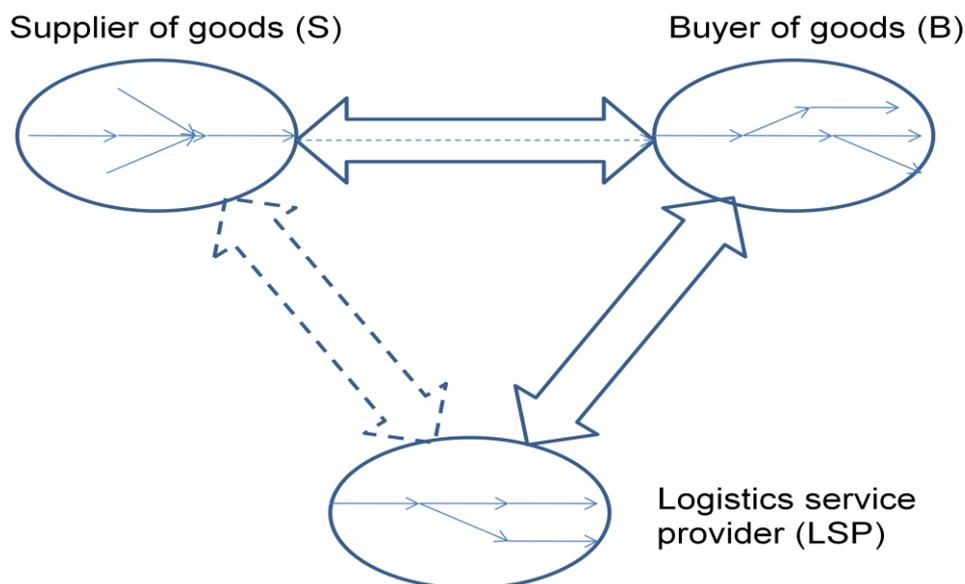


Figure 3. The buyer and supplier of goods in relation to the logistics service provider and their relationships.

The suggested micro level analysis takes its starting point in the relationship between the buyer and supplier of goods, and how this relationship is connected with the logistics service provider since the substance of their relationships are linked. Change in this setting includes any change in how logistics activities and resources are carried out and activated by the parties involved in a focal triad (see Figure 3). These changes also have a potential impact on the roles of the actors in relation to each other. This could be defined as a triad of the type *tertius iungens*.

Hertz and Alfredsson (2003) address the importance of analysing the influence the service providers' customers and also their customers have on the service providers. According to Andersson et al. (2007) TPL providers must coordinate their internal capabilities with their strategic objectives, which must be derived from their customer base, if TPL shall continue to grow and add value in supply chains. To develop efficient service production two coordination dimensions are considered of particular importance. TPL-providers can develop their relationship management through a dedicated coordinating function, which serves their customers specific operational and strategic needs through all phases in TPL relationships. These external needs must also be coordinated internally so the provider can learn from their customers' specific needs.

Analysis of the triad can be made in accordance with a modified version of the framework of business relationships developed by Håkansson and Snehota (1995) and with a focus on the relationships' substance in terms of activity links, resource ties and actor roles and functions for the individual firms, for the relationships and for third parties. Influence on and by 'fourth parties' in relation to the focal triad have also been included as a modification since the original framework is basically dyadic and we here extend it to capture all relevant dyads in a focal triad. The framework, with particular focus on the focal triad of interest, of the substance and functions of the relationships is shown in Table 1.

		Substance layer		
		Activities	Resources	Actors
Function layer	The firm(s)	<i>Activity structure of the buyer and supplier of goods and of the logistics service provider (LSP)</i>	<i>Resource collection of the buyer and supplier of goods and of the logistics service provider</i>	<i>The roles of the buyer and supplier of goods and of the logistics service provider</i>
	The relationship(s)	Activity links (a) between the buyer and supplier of goods, (b) the buyer of goods and the LSP and (c) the supplier of goods and the LSP	Resource ties (a) between the buyer and supplier of goods, (b) the buyer of goods and the LSP and (c) the supplier of goods and the LSP	Actor roles in relation to (a) the buyer and supplier of goods, (b) the buyer of goods and the LSP and (c) the supplier of goods and the LSP
	Connections between the focal dyads and the third party	Links between each focal dyad and the third party in the triad	Ties between each focal dyad and the third party in the triad	Roles in the relations between each focal dyad and the third party in the triad
	Network/ fourth parties	Links to fourth parties in relation to the triad from the perspectives of (a) the B, (b) the S, and (c) the LSP.	Ties to fourth parties in relation to the triad from the perspectives of (a) the B, (b) the S, and (c) the LSP.	Roles to fourth parties in relation to the triad from the perspectives of (a) the B, (b) the S, and (c) the LSP.

Table 1. Framework for analysis of triads with a focus on buyers and suppliers of goods and the related LSPs (Modified from Håkansson and Snehota 1995).

The firms' complete activity structures, resource collections and sets of actor roles are neither possible nor necessary to capture in order to understand how changes impact on them. However, attention to the fact that activities are subject to interdependence, that resources are combined in different ways within and across firm boundaries, and that actor roles are connected is necessary in order to analyse change. Moreover, the way in which the triadic focus limits the scope of what needs to be included in the analysis is instrumental since the network notion otherwise may hamper the analysis by its overwhelming complexity (Halinen and Törnroos, 2005).

Analysis of the relationship layer is enabled by analysis of the substance of the relationships and the associated interdependencies that are managed by or through the relationships. This analysis provides a basis for identifying and analysing connections to *the* third party in the triad and to relevant fourth parties that influence and are influenced by what happens in the focal dyads and in the triad respectively. Inclusion of such 'fourth parties' to the triad is essential in order to address antecedents of changes and of their effects (see Figure 4).

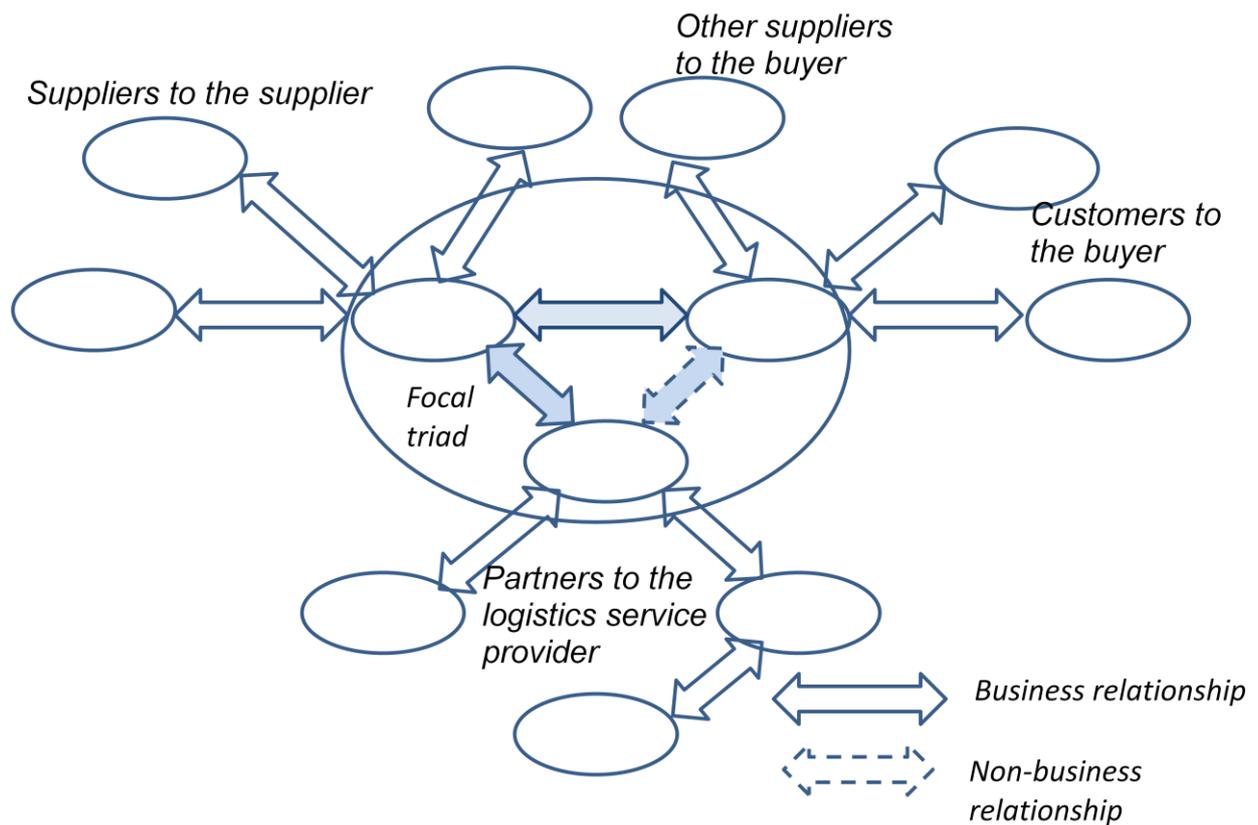


Figure 4. The focal triad in its network of ‘fourth parties’

‘Fourth parties’, and the relationships with them, may be involved in different ways and to different extents in relation to the focal triad. They are identified and analysed with regard to their influence, or by how they are influenced, by changes that take place in relation to the focal triad

CONCLUDING DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH

We set out to tackle two challenges: (1) the lack of a solid theoretical basis for studies on logistics service networks, and (2) the separation between studies of supply networks on the one hand and logistics service networks on the other.

We suggest that a continued focus on ‘labelling’ various actors within logistics service networks is not productive in order to advance the understanding of the structures and processes going on in these networks. Instead we suggest a focus on description and analysis of resources and activities and the various roles that actors in the logistic service networks may take in relation to other parties. We furthermore suggest that this generic framework can support an understanding, and possibly also a development, of the increasing variety of specialists in logistics service networks and that it is a suitable ground for analysis of change in these structures. Each actor can take on many different roles in relation to other actors and these roles may change over time as the substance and functions of their relationships change. Hence, this approach enables a theoretical platform for systematic study of change in logistics service networks.

In view of an expected increase of the interest in developments of more elaborate relationships between buyers and suppliers of logistics services, the framework suggested in this paper may support analysis of these new forms of exchange and networking. Starting in standardised interfaces which do not require any particular in-depth analysis of the network contexts in which they take place, the more elaborate forms of interfaces (Araujo et al., 1999) require a contextual understanding to be efficiently applied. Two broad issues of current managerial relevance and of interest for further studies, for which the framework would be useful, are addressed below.

From a logistics service network perspective the efficiency of logistics operations is subject to increasing pressure. Increasing the efficiency of the uses of the resources within the logistics service network, e.g. increasing the filling rates, designing more efficient routes etc, cannot be made with assumptions of *given* demands of transport services. Relationships between buyers and suppliers of goods develop over time with various consequences for the requirements on logistics services. For logistics service providers these changes may entail opportunities if they are aware of and alert to this part of their business context and even more so if they are actively involved in the interaction with the buyer and suppliers of goods. Hence, new 'business models' may arise and their logic can be understood by use of the suggested framework since such new roles also entail some form of change in the activities performed and of the resources activated. These developments of actors, activities and resources all need to be understood in the contexts of broader actor networks, activity patterns and resource constellations. The framework may contribute to this understanding at the business level, in contrast with traditional market analysis approaches that focuses on the aggregated level of business exchange.

From a supply network perspective the issue of how to make better use of logistics service networks can be expected to become increasingly salient with growing demands of logistics services, owing to increasing specialisation and globalisation, and with increasing costs for transport (Ehsanifar et al., 2011). Previously the services of the logistics service providers have often been taken for granted and made subject to standardised exchange. The services are then treated as commodities where costs should be minimized (Potter and Lalwani, 2005). These practices do not promote long-term relationships and joint development of new solutions. However, an improved understanding of the specific conditions for these actors' efficiency may result in adjustments in the exchange of goods between buyers and suppliers in supply networks in order to better fit with e.g. the demand patterns of other customers of the logistics service providers. If all three actors in the focal triad, with their knowledge of relevant 'fourth parties' that may influence and be influenced, can be involved in making continuous adjustments of their exchanges, the possibilities to increase the efficiency of their operations may be dramatically enhanced.

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