

Supply Chain Management: Value Configuration Analysis Approach

A Case Study

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Abstract

Value creation in the supply chain literature normally builds on the value chain model (VCM). This results in a focus on succedent interdependencies, a focus on coordination by planning and a restricted view of likely positioning options. This article contributes an original approach to the supply chain management (SCM) debate, based on value configuration analysis (VCA). VCA recognizes the value chain logic (VCL), but finds it restraining in particular business systems, and also includes recognition of the value network model (VNM) as representing the layered supply chain relationships (SCRs) classically related with a mediating presence. In general, this article contributes in two ways: by enlightening some of the complexities to be addressed in managing SCRs and by looking at how SCRs function despite this complexity. In particular, it presents an alternative view of how value creation happens between, as well as within, firms in SCRs. It discloses how more complex sets of supply chain interdependencies exist in SCRs than in simple chains, and that these necessitate managing by a variety of coordination machineries to achieve efficient working. Finally, it suggests a novel way to define a firm's supply chain position beyond that covered by the conventional upstream/downstream terms. These arguments are illustrated with the help of a case study and are related to previous work on supply chains and networks.

Key Words

SCM, Value Configuration Analysis, Value Chain Logics, Value Network Model, Supply Chain Relation Ships, Value Creation

Introduction

Managing supply chain relationships (SCRs) is a strategic task that can add to the competitive strength and profitability of individual firms as well as entire chains (Christopher, 1998; Dyer et al. 1998; Handfields and Nichols Jr., 1999; Lee, 2002). But in spite of the accepted importance of SCRs, little is known about the determinants of success and failure (Hult et al., 2002). Reports stating that the US food industry alone is estimated to waste \$30 billion annually through poor supply coordination illustrate significant potential for improvement (Fisher, 1997).

Porter's well-known value chain model (VCM) and the corresponding idea of value systems has deeply influenced the understanding of how SCRs work (Porter, 1985). These models have formed managerial thinking about such strategic issues as value creation, coordination and positioning. However, while the value chain logic is seen as representing a strong and valid analytical tool for such areas as corporate strategy, it is also believed to limit fuller

understanding of how knowledge and service-based business systems function (Normann and Ramirez, 1993).

Value configuration analysis (VCA) is a current contribution to strategic management theory by Stabell and Fjeldstad, which both introduces the well-known VCM and also incorporates an appealing option in the value network model (VNM) (Stabell and Fjeldstad, 1998).¹ It deals with firm-level differences in terms of value creation, and offers an alternative understanding of the knowledge- and service-based activities which are central to well-functioning supply relationships. VCA has never been systematically applied to understand either supply chains or supply networks, two important representations of supply relationships, although its basic arguments suggest that the value chain/value systems line of reasoning alone can provide only partial understandings of supply relationships. The research question is therefore to investigate the consequences of a value configuration approach to the management of SCRs, focusing on value creation, supply chain structures, interdependencies, coordination and

positioning. This article is thus part of a current stream of research on value creation and business development in inter-firm relationships and network settings (Birkinshaw, 2002; Girod and Rugman, 2005; Hinterhuber, 2002; Kodama, 2005). Specifically it relates to preceding work on SCM, industrial networks and strategic supplier networks (Dyer and Nobeoka, 2000; Gadde and Hakansson, 2001; Gulati et al., 2000; Hakansson and Ford, 2002; Johanson and Mattsson, 1992; Lorenzoni and Baden-Fuller, 1995). It shares the concern expressed in the supply literature that the simple linearity of the traditional supply chain logic may conceal levels of complexity that have to be addressed in managing SCRs (Cox and Lamming, 1997; Lamming et al., 2000).

value creation occurs between, as well as within, firms in supply relationships.

In general, this article contributes in two ways: by enlightening some of this complexity and by looking at how SCRs function despite this complexity. In particular, it presents an alternative view of how value creation happens between, as well as within firms in SCRs. It discloses how more complex sets of supply chain interdependencies exist in SCRs than in simple chains, and that these necessitate managing by a variety of coordination machineries to achieve efficient working. Finally, it proposes a novel approach to defining a firm's position beyond that covered by the traditional upstream/downstream terminology. The following section presents the concept of value configuration analysis and relates it to previous work on supply

chains and networks. The article's research methodology and case follows in the next section. Theoretical and managerial implications are then discussed, with central supply chain management issues presented in a number of propositions. The article ends with conclusions and suggestions for future research.

Value Configuration Analysis (VCA) and SCM

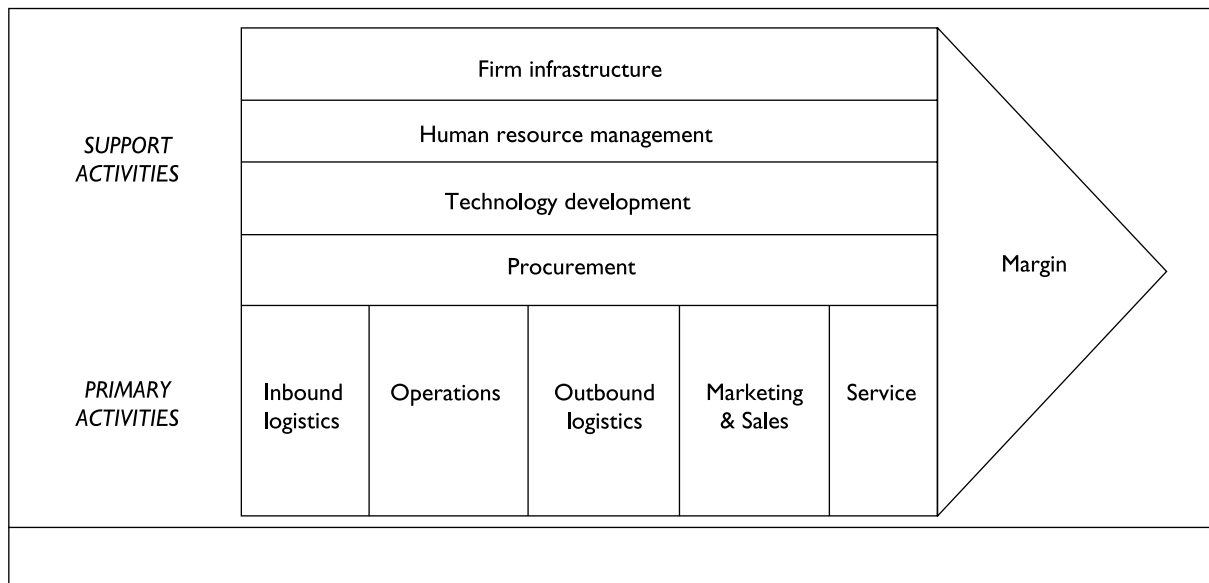
The two models included in VCA explain value creation based on the activities that individual firms carry out. On an inter-firm level of analysis, Porter defined a number of inter-linked value chains as a value system. In the SCRs context, these are referred to as supply chains, while in the terminology of VCA, inter-firm relationships are expressed in the notion of business value systems. The supply network illustrated in this article's case study is an example of such a business value system based on differing activity logics.

Value Creation Logics Compared

The Value Chain

The original focus of Porter's value chain firm (see Figure 1) was to transfer raw materials into relatively standardized, physical products, where the value of the product in the market is the medium that makes difference from competitors' product.

Figure 1. The Value Chain



Source: Porter (1985).

The process focus in traditional SCM makes it natural to concentrate on activities such as the optimization of production and operations as a key reason of value, and this focus corresponds well with the VCM (Christopher, 1998; Gadde, Hakansson, Jahre and Persson, 2002).

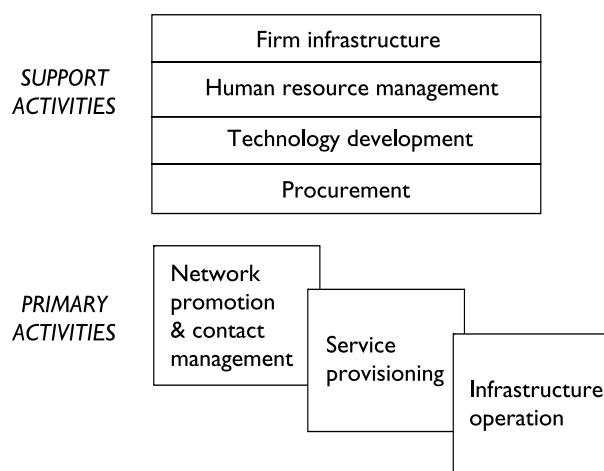
An explicit emphasis on inbound logistics (raw material handling, inspection of material, warehousing, etc.) and outbound logistics (multifaceted decisions in planning and controlling activities such as collecting, storing and distributing products to the marketplace, including order processing and shipping) explains the model's appeal to the SCM field.

The Value Network

Contrary to this model, the value network model catalogues more accurately the activities of factors such as Logistic Services Providers (LSPs) who act as mediators, creating value primarily by connecting clients or customers who are or wish to be interdependent. Such actors rely on a mediating technology to handle and coordinate in standardized ways operations involving multiple clients who are distributed in time and space (see Figure 2). Stabell and Fjeldstad note that primary activities for such mediating firms are:

1. Network promotion and contract management (promoting and building the network by acquiring customers and managing service provision contracts, including 'the starting, maintenance and closing of contracts to cater whatever service the intermediary offers to furnish').
2. Service providing (linking agents across the network and collecting payment from them for making or handling the connection); and

Figure 2. The Value Network



Source: Stabell and Fjeldstad (1998).

3. Infrastructure operations (where the mediator operates such resources as switches and distribution centres for telecom providers, branch offices and financial assets for financial services companies, and warehouses and vehicles for logic service providers [LSPs]).

Value Creation, Supply Chain Structures and Interdependencies

In the supply chain literature, SCRs are characteristically represented in supply chains, depicted as the flow of goods from the manufacturer to the warehouse, from there on to meet retailers' orders and finally to the consumer (Lamey, 1996). This structure is backed by information and financial flows.

The Supply Chain Council defines supply chains as comprising 'every effort involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer (a definition agreed by much of the literature) (Supply-Chain Council, chain org/ Resources; Christopher, 1998). To understand value creation in SCRs we must, therefore, address both firm and inter-firm levels of analysis.

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Traditional supply chain reasoning usually believes that all individual firms function according to the activity logic of the value chain, that is, the value chain functions within the supply chain, and shares its focus on the chronological value adding activities of acquiring, transforming and distributing products (Ballou et al., 2000; Cox and Lamming, 1997). SCM models thereby conventionally discover the pattern of value creation as associated to the pattern of chronological activities in the chain (that is, when direct interdependence can be located and its order specified), although these two may not essentially be the same, since the natural interface between value adding steps may not agree with the legal or practical interfaces between firms. In line with Porter's interpretation, a firm's value chain is thus rooted in a system of sequentially interdependent value chains (the value system), and it is this that generates the value of the product in the market place. VCA arguments, however, advise that it is not only the VCL that operates within SCRs. In a sole mediation system, different value networks shape co-producing layers of mediators, with one network using a 'lower-level' network structure as a sub-network. For example, electronic banking uses the internet as its medium for payment services, which itself uses the general telecom network infrastructure, within which network operators deliver the infrastructure

for telecom service providers (Fjeldstad, 1999). Thus, the business value system in a sole mediation industry comprises a set of co-producing, layered and interconnected value networks, which are interdependent on each other.

The concept of business value system thus provides a structure for study firms which co-produce value from activities which involve different VCLs, adding to the complexity of the interdependencies existing within SCRs. These interdependencies vary from those highlighted in value chains in that their activities are not essentially sequential. While the layers may hold sequential activity chains, other co-producing value creation activities will also take place in parallel, further enhancing value creation at the network level.

Coordination and Positioning

Coordination pertains to the pattern of interaction, decision-making and communication that takes place amongst the firms involved. The harmonization of interdependent material, information and financial flow eases value creation among participating firms. SCR efficiency is attained through information sharing and good coordination (Lee, 2002; Romano, 2003).

A basic attribute of the value chain as specified by the layout of the primary activities in the generic model shown in Figure 1 is a long linked technology. Tasks are serially performed, and thus interdependencies are chronological (for example, the outputs of inbound logistics are the inputs of operation activities). Chronological interdependencies are effectively coordinated by *planning*, including the designing of time schedules for the dependent entities, such as those existing in the primary activities between supply chain partners (March and Simon, 1958). Planning is also looked upon as the major factor for integrating and managing SCRs, and is anticipated to impact significantly on supply chain efficiency.

VCA differs from this line of reasoning, instead of following Thompson's (1967, pp. 17, 62) argument in recognizing three distinct types of interdependencies between activities, each of which call for different coordination techniques.

- *chronological interdependencies* are coordinated by *planning*;
- *Shared interdependencies* (for example, when firm's activities in different chains share common resources) are coordinated by *standardization*, which facilitates 'the operation of the mediating technology over time and through space by promising each segment of the firm that the other segment is operating in well-matched ways'; and

- *Mutual interdependencies*, where the events of a network agent need to be brought along the lines of those of one or more others. Such situations cannot be specified or planned for, but are coordinated by *mutual adjustment*, which occupies the transmission of new information during the process of action (Thompson, 1967).

Coordination also depends on a firm's position in the supply chain. Managers are typically taught that acquiring and sustaining competitive advantage depends on understanding the firm's position in the successively interdependent value system, and (as Cox and Lamming note [1997, pp. 53–62]) that their duty is to take the responsibility of *value chain positioning* to optimize this benefit. When considering a firm's strategic position, key interests are the number of upstream or downstream layers across the supply chain, and the number of agents present in each layer. Thus, in supply chain interpretation, a firm's strategic positioning choice is constrained within the end points of the chain, as no other dimensions are realized.

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Different Supply Network Perspectives

VCA is not alone in contributing a networked view of SCRs. This section reviews two complementary viewpoints on networks—industrial network research (INR) and research on strategic supplier networks (RSSN)²—in line with the issues of concern, that is, value creation, supply chain structures, supply chain interdependencies, supply chain coordination and finally supply chain positioning. Table 1 indicates these matters and also presents a comparative summary of the insights provided by VCA.

Insights from industrial and strategic supplier network research will be briefly reflected upon in the final analysis, although the final discussions mainly concern the alternative understandings that originate from value configuration analysis.

Industrial Networks Research (INR)

Industrial network researchers suggest that the supply chain approach contributes considerably to our understanding of efficient flows, but falls short to consider that SCRs are not independent of each other, but are entrenched in networks. The risk of overemphasizing the independence of single chains, and seeing them in isolation from their wider network structure, is that such thinking obscures a

Table 1. Value Configuration Analysis and Other Perspectives on Supply Chains and Networks

Analytical framework/ value-creating logic	Value Configuration Analysis		Supply Chain	Industrial Networks	Strategic Supplier Networks
	Value configuration analysis	Value configuration analysis	Value chain/system analysis	Actor bonds, resource ties and activity links (the ARA model)	1. Activity (value chain) or resource/knowledge explanations 2. Value constellation/web or strategic network
Supply structure	Interlinked chains and co-producing layered networks	Interlinked chains and co-producing layered networks	Single value chains in a value system	Interlinked supply chains embedded in indistinct actor, resource and activity networks	Defined networks with leading firm acting as hub
Interdependencies	Shared, sequential and mutual	Shared, sequential and mutual	Sequential	Stress that firms should build interdependencies in a systematic way	Stay independent, competitive interactions Relational view, social embeddedness
Coordination	Implicit a need for planning, Standardization and mutual adjustment	Implicit a need for planning, Standardization and mutual adjustment	Planning	Mutuality Relational norms, trust See value configuration analysis	Arm's length contracting Relational norms Creating a shared sense of purpose Trust and identity building
Positioning	Horizontal and vertical scope in business value system	Horizontal and vertical scope in business value system	Within end point of the chain	Positioning within networks provides strategic network identity	Positioning within an industry or between different networks

Source: Johanson and Mattsson (1992); Hakansson and Ford (2002).

full understanding of how value is created by firms interacting with each other, combining resources and integrating their activities in industrial networks.

Industrial networks are based on the ARA model—Agent bonds, Resource ties and Activity links. From the viewpoint of INR, a supply chain network is seen as groups of interlinked chains of supply activities, resource ties and agent bonds (ARA). Different agents may analyze the network, its boundaries and the nature of its SCRs in relatively different ways which may not match up with an ‘outside’ analytical overview. The indeterminate nature of such networks is one of their particular characteristics: no overarching purpose governs the networks and the relationships within them have been established for various separate purposes, and thus the set of actor bonds is not given and there is no overall network design or discipline. Consequently, there is usually no core purpose to the network and no core firm which can be identified as managing the structure.

Defining a firm’s position in indeterminate network structures can be challenging. But it is also important. A firm’s network identity is determined by its position in the structure of actors, resources and activities in the network and through its relationships with other network firms. Consequently, a firm’s strategic network identity captures the overall perception of a firm’s attractiveness (or otherwise) as an actor within its perceived network context. A strong and clearly defined network position will make a firm a strong competitor in its own field and thus an attractive network partner.

Strategic Supplier Networks Research (SSNR)

The notion of value creation is central to strategic management theory, and a stream of research within strategic management theory has inspired the supply network literature. This includes work on value constellations, strategic webs and strategic networks. The focus in these studies is usually not on supply flows per se, but on knowledge sharing, learning and innovation in what can be labelled as strategic supplier networks (These studies generally depict relationships in a manufacturing context and from the ‘overview’ perspective of large dominating manufacturing companies).

Contrary to the more indistinct view of supply structures depicted by industrial network literature, strategic supplier networks are usually managed, that is, value creation critically depends on the management skills of leading firms which act as centres or hubs, controlling and orchestrating the network. They have a strong view of the overall business idea, appreciate the roles of diverse partners functioning in many different locations and provide apparent

rules for participation in the network’s activities, timely value creation through disciplined efficiency. Agent firms in such supply networks tend to identify strongly with the core firm, share its firmness and understand the overall network structure, and this shared understanding and wisdom of mutual purpose also add to enhancing value creation.

Overall, SSRN embrace a great width of perceptions on questions of independence or interdependence. The traditional view has involved independence and arm’s length relationships. More recent relational perspectives of strategy are more representative of SSRN, although the degree of dependence may vary significantly between centre firm and other network agents. In SSRN, firms in different value groups are relatively interdependent on one another, and cooperation within the defined network boundaries is the decree. Such networks are described by social embeddedness where rules for collaboration and participation in the network are key characteristics for the network’s competitiveness.

Systems that support to integrate the network, suitable governance mechanisms and the development of wisdom of trust and reciprocity are stressed. In terms of positioning, this series of literature tends to emphasize competitive dimensions, for example, considering the position of one supply network against another one, or of the supply network’s position within an industry.

The VCA [implies] that strategic understanding and analysis of firms depends on the perspective taken, and analytical tools must be appropriate to the firm in question.

Research Methodology

Case Study Design

This study defines VCA in the context of SCRs. There is currently a limited body of experiential research in the area of SCRs, and the viewpoint taken is often narrow in that data from only one participant (usually the manufacturer) is provided (Hult et al., 2002). Implicit in a VCA is a conviction that the strategic understanding and analysis of firms depends on the viewpoint taken, and the analytical tools must be selected to be suitable to the type of firm in question. When faced with the likelihood of such multiple viewpoints, a qualitative research approach can reveal new or alternative meanings and interpretations (Lincoln and Guba, 2000). The case study methodology adopted here is also suitable when looking for fresh perspectives on an already researched topic as well as being pertinent when little is known about a phenomenon (Eisenhardt, 1989).

The particular case chosen illustrates the interplay between the two basic value logics in supply relationships—value chain and value network logics—and demonstrates both, the conventional view of interlinked chains stressed

in previous supply research and the layered network dimension present in the value network approach.

The case study involves an empirical illustration of supply management, interpreted from value configuration reasoning, with the purpose of suggesting new perspectives on the management of supply relationships. The primary source of case study data was a series of interviews with senior managers of the case study local firm between 2009 and 2010. In order to appreciate the full breadth of its supply network operations, interviews were also conducted with other supply network members, including a customer, two of its third party LSP, a bank operating as a service supplier and a retailer representing end customers.

Case Study

Sea Air Land (SAL), the case study focal firm, is a Delhi based LSP, performing administrative logistics services on behalf of their clients. SAL invoices goods worth about USD 50 million annually, distributed over some 30,000 shipment orders (see Table 2).

The core business of LSPs is to manage other firms' supply chains, and, arguably, VCA is especially pertinent for such firms which depend on a mediating role in a market which has received little attention in the growing SCM literature.³

Many of SAL customers are manufacturing firms who typically function according to traditional value chain logic.

In fact, managers of such firms could benefit, either when outsourcing logistical activities or when managing their own distribution operations, from a better understanding of the alternative VNM. The network is illustrated in the following section.

Value Configuration Analysis of SAL's Supply Chain Relationships

The case study examines the three supply flows in SAL's supply chain relationships. Insights into the SAL case are

given from the value chain logic (VCL) and value network (VNL) previously reviewed, and the main discussion of the case is based on VCA, with an emphasis on VNL.

Supply Network Flows

Figures 3a and 3b demonstrate the three basic flows involved in SAL's operation of goods, information and payment/billing presented in the two contrasting VCA styles. Figure 3a shows a traditional value chain perception of SAL's SCRs, and Figure 3b the alternative VCA, which includes both the value chain network and the value chain logics. SAL creates value in its supply chain network by optimizing and integrating the processes of managing flows of goods, information and payment for number of importer clients. The basic task is to connect sender and receiver by transporting products from manufacturers to retailers. SAL places orders on its (importer) clients' behalf and organizes freight of all shipments from producers around the world. It also handles warehousing and onward distribution to the retailers.

SAL offers an integrated service to its clients by handling three distinct types of flows through the supply network—the first two of which are supplied by other providers but managed and coordinated by SAL, and the third is SAL's own operation.

The Physical Flow

SAL's primary business idea has been to develop relationships with partner logistics providers, and physical logistical operations (distribution, warehousing and transportation) are executed completely by specialist third-party operators. Thus, transportation from the manufacturers is outsourced to *T*, *W* is the key supplier for storage and warehousing, while *D* handles outbound distribution to retailers.

The Payment Flow

As one of India's big financial service groups, SAL's banking partner *B* provides its corporate clients a full range of

Table 2. SAL's Basic Information

Founded	1996
Employees Approx.	100
Core fields of competence	Administrative logistics: The operational control of the flow of goods, information and billing
Customer offering	Through various relationships, SAL handles all logistics activities—inbound transport, storing, packing, order receiving, picking, outbound distribution and invoicing—for its customers. The customers are, in turn, responsible for marketing, sales and brand building of the products.
Core resources	The size of its network (25 supply chains) Relationships to third party logistics partners, handling all the physical logistics activities such as transport and warehouse operations Relationships to banks and other potential service suppliers Its information systems and competence in administrative logistics
Market	Has expanded to 50 global locations.

Source: SAL's Website and Interview with SAL Managers.

Figure 3: SAL's Supply Chain Relationships

Figure 3a: A Conventional Value Chain-based Illustration of SAL's Supply

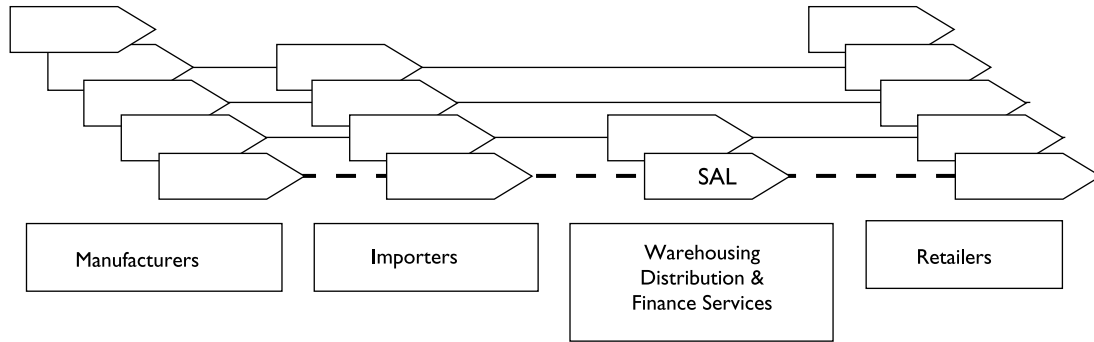
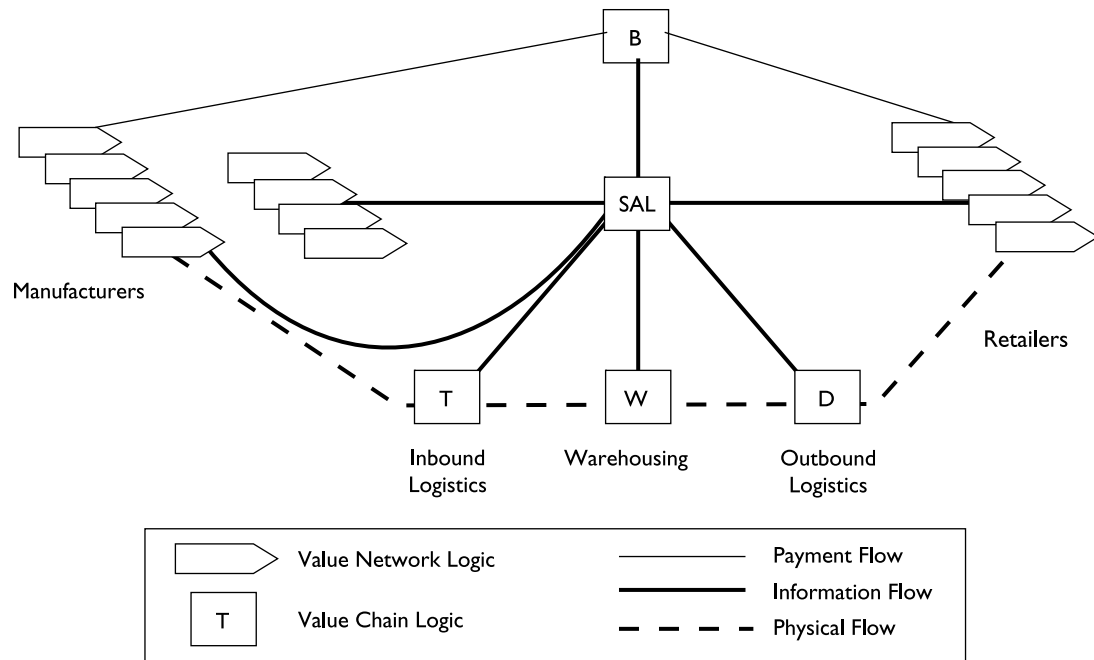


Figure 3b: A Value Configuration Illustration of SAL's Supply Relationships



Source: Cox and Lamming (1997); Lamming et al. (2000).

financial and advisory services, including effective follow-up of accounts receivable, flexible working capital facilities and credit risks for customer losses. From SAL's perspective, B provides a custom-made system for factoring services in addition to the essential infrastructure for the payment flow.

The Information Flow

The heart of SAL's own infrastructure is its integrated logistics governance system that manages the supply network's flow of goods, including purchasing, transportation, warehousing, ordering of sales and invoicing. SAL's logistics coordinators monitor their clients' supply chains, issuing purchase orders to producers worldwide. All matters

regarding maintaining the quality of products while they are within the supply network are SAL's responsibility.

Insights from the Value Chain and Previous Network Perspectives

This section highlights insights from conventional value chain logic, which is part of and acknowledged in a value configuration analysis. Moreover, brief comments are made pertaining to the other network perspectives previously discussed, that is, industrial and strategic supplier network theories. This is followed by a discussion stressing alternative and additional insights based on a value configuration analysis.

According to value chain-based supply logic, a full analysis of SAL's supply network configurations includes an understanding of manufacturers' emphasis on optimization of production and operation as key sources of value creation. SAL also recognizes that its services are delivered in a system of interlinked value chains, involving multiple tiers which can each have multiple agents. In order to manage the physical flow effectively, SAL must understand the conventional major chronological chain interdependencies in the supply network as identified by mainstream supply research. (Clearly, D cannot distribute goods until after T has first collected them and then W warehoused them.) SAL's expertise in managing transport plans to coordinate such interdependencies is vital, and its logistics coordinators cooperate strongly with its third-party operators in a process where trust is a fundamental coordinating mechanism. Successful coordination and planning of distribution to retailers permits SAL to control, in a cooperative mode, the supply chains for 25 competing clients. In terms of positioning, as shown in the value systems logic of Figure 3a, SAL's position is defined within the sequential manufacturer-end customer supply chain.

The reviewed SNLs add to this an understanding that, unlike a typical industrial network firm, SAL recognizes, and in effect 'orchestrates', its supply network, demonstrating an understanding of its partners' roles that are more elaborate than the roles other agents have. But SAL is not the powerful lead firm in charge of the network like a typical strategic supplier network firm. SAL has no ambitions to give it a common identity as 'its' network. As in 'basic' industrial network arguments, agents have different views of the supply network, depending on their position and role, and while some manufacturers see only 'their own' supply chain, with outsourced logistics, others are more aware of the parallel supply chains that make up the supply network. Industrial network theory also focuses on how SAL can make itself a more attractive logistics partner through the relationships it has developed. Managers searching for insights on how SAL might position itself towards competing LSPs and their supply systems can turn to strategic supplier network reasoning.

The Value Network and SAL's Supply Relationships

Value Creation Logic

The VNM shown as part of Figure 3b illustrates one of SAL's primary activities: 'network promotion & contract management'. In a value network, the size of the network and who the other members of the network are, are the core value drivers and the mediator's skill to connect between

members is a core strategic issue. By managing number of different supply chains, the size of SAL's supply network becomes very attractive for third-party distributors and for, say, factoring services. The theory suggests that a larger network is more attractive *ceteris paribus*: in this case, the network's considerable size has made it possible for SAL to bargain good deals for its customers, besides providing large business prospects for suppliers operating both the physical and the payment flows. Such deals mean that SAL creates value at the supply network level of analysis.

Value creation at the network level also depends on network composition, in terms of which agents can be joined. To be effective, a mediator must build-up competencies and systems fit for the customers and markets it aims to work in. Once built up, the mediator can search for other appropriate markets and customers, and thus offer enhanced synergies for existing clients. The significance of both developing and then maintaining the identity of network composition can be seen in SAL's pricing strategy, where it strives to maintain the type of supply network it is best out-fitted to manage by attaining high levels of standardization, and where necessary, discouraging certain customers. Thus, clients requiring non-standard movements of goods face comparatively unattractive price levels (Similar patterns have been noted in the insurance industry) (Rothschild and Stiglitz, 1976). The ability to insist on such standards, which will be further discussed below, is vital for network efficiency, but can also produce lock-in effects.

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Supply Structure

SAL's management acknowledges that the vertical scope of a mediation exchange usually requires multiple levels of co-producing mediation activities, where one agent's activities build on those performed by others. Figure 3b demonstrates three layers present in the supply network, with SAL providing one itself and providing access to the other two. Within this network, the physical layer agents (T , W and D) operate their infrastructures (warehouses and trucks, etc.), have their own contracts with customers (which include SAL) and provide a variety of services, primarily the physical distribution and storage of the goods. At the financial layer, SAL provides access to B 's services, which offer a mediating function between lenders and borrowers, the object of transfer being money rather than goods. The third layered and concurrent flow concerns information and is operated directly by SAL. Thus, SAL's function is both, to provide access to the different network layers and

to enhance the network's efficiency by managing the information flows disseminated between operators on the other two layers.

Interdependencies, Coordination and Positioning

There are dependencies between chronological activities in any given supply chain, but also between activities in the parallel supply chains that SAL is involved in, and activity adjustments in one supply chain may have aftermaths for the other chains. To attain efficient operation across the network and through the supply system, SAL must coordinate coexisting chronological, shared and mutual interdependencies.

Shared resources such as SAL's control and information systems, management resources and logistics expertise, as well as its partners' physical distribution resources, create a set of mutual interdependencies in the supply network. For these to be efficiently coordinated, it needs standardization across clients' supply chains in activities such as picking routines, procurement routines and stock handling. Standardized information in the form of bar codes displayed on packages eases tracking of the physical movement of goods, and a failure to stick to this information standard will demand extra co-ordination by joint adjustment.

Plans often need readjusting: a producer may have production delays or failed to produce the required volume; a transport operator may not have enough of the right kind of trucks in the right area; a retailer may be renovating its shops and need new delivery routines, different trucks or unloading routines. Such situations demonstrate the mutual interdependencies typical of a parallel-layered network and need co-ordination by joint adjustment. One apparently minor occurrence may influence the whole network's activity pattern: it is SAL which manages the information flows necessary to mobilize different resources to handle the new situation. The competitiveness of SAL's supply network depends on its ability to co-ordinate different interdependencies and explains its decision to control the network information flows. Information is essential whether it serves to confirm existing plans or to point up the need for adjustment.

The competitiveness of SAL's supply network depends on its ability to coordinate different interdependencies [by controlling] network information flows.

By identifying both the conventional chain dimension and the opportunities offered by the layered supply setting, SAL's management has developed its understanding of its position and potential strategic role in the supply network. Earlier to 1996, it was purely a logistics integrator,

focusing on administrative logistics in the physical layer. Today, SAL acts as a network integrator, combining the size of its network and its access to other network layers to provide additional services, such as factoring. In doing so, SAL has been aware of the supply network's vertical scope and its own position in it. SAL is currently considering offering accounting and IT services, which would further develop its role as a network integrator, increasing the number of simultaneous activities across the networks layers rather than within the sequential pattern of activities as emphasized by traditional SCM frameworks. SAL regards its position in the layered and interconnected supply structure as a core strategic issue.

Supply Management: Theoretical and Managerial Implications

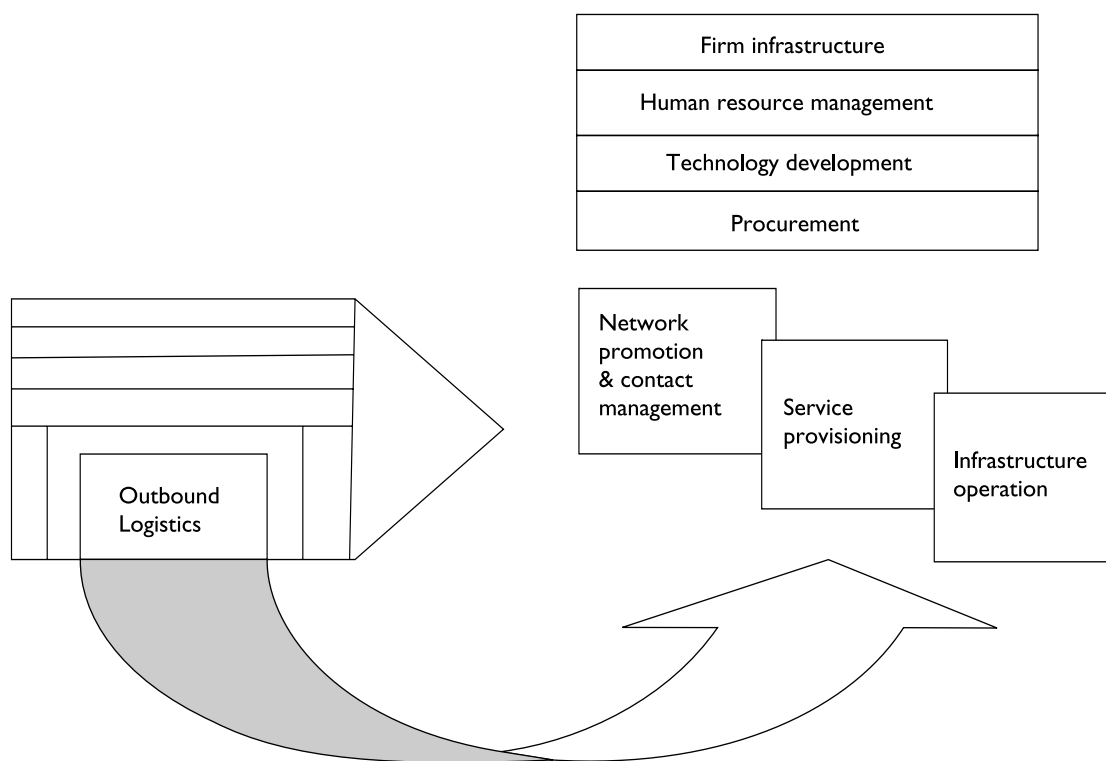
Value Creation Logic

To appreciate how value is generated, one must understand the nature of the activities being carried out, and some activities are better recognized via mediation reasoning rather than through conventional manufacturing reasoning. Value is not always generated through producing and/or marketing a product, but also through developing connections and mediating them competently. Both value chains and value networks can depict SCRs which engage the production and delivery of goods and services, but particularly the VNM can recommend increased insights as to how value is generated. Supply chain activities can be analyzed in terms of different value reasonings and there are vital differences as to how these two models analyze the drivers of cost and values. The VCL principally has a cost orientation, with the different primary activities representing successive cost stages. The margin at the end of the chain (Figure 1) supports this logic.

In the VNL, it is the synchronization of simultaneous parallel activities that is the base of value generation, and the balance of cost and value of scale and capacity utilization needs to be optimized. Value will depend on network size, that is, the number of users that are in the network (Katz and Shapiro, 1985) and the composition of the network, that is, which nodes can be connected.

Arguably, the value chain and VNMs together compose the basic reasonings of SCRs. However, different business models may coexist in developing efficient SCRs, thus developing value reason interactions. The expression is proposed to help in an understanding of the aggregated business logic and the individual value reasoning driving different supply agents. Figure 4 demonstrates the different value-creating reasonings in a supply chain setting, taking the example situation of when a manufacturer's outbound logistics operation is outsourced.

Figure 4. An Example of Value Logic Interaction—Value Network Interpretation of the Value Chain’s Outbound Logistics



Source: Stabell and Fjeldstad (1998).

The left hand side illustrates the manufacturer’s value chain perspective, while the right hand side illustrates a ‘translation’ of the situation according to value network reasoning, portraying a mediator’s value network approach.

Supply Structures

Modern supply chain logic defines value chains as forming sequentially interrelated value systems consisting of different agents, each adding value to the output from the preceding chain.

The basic network argument has been that a supply chain gains network characteristics when multiple chains are joined. Previous supply network research has thus increased our understanding of interconnected chains, but the activities explained are likely to flow in ‘shallow’ up and downstream relationships.

The focus on single and interlinked chains in the supply chain literature needs to be added with an understanding of co-producing, multilayered and interconnected supply chain structures. This article defines the vertical scope as the vital additional structural property in VNL. It is not essentially the number of chains that create network characteristics but the ‘depth’ that the VNM recognizes through

its recognition of interconnected network layers. This structural characteristic has consequences for existing supply interdependencies and thus coordination, as well as for possible positioning options, issues further discussed later.

Previous supply network research has described activities as flowing in ‘shallow’ up- and down-stream relationships.

Interdependencies

VCL includes identification and understanding of chronological interdependencies, which are well-covered in the supply literature. But recent industrial network research (INR) literature, building explicitly on Thompson and on Stabell and Fjeldstad’s VCA, focuses on the need to differentiate between different types of interdependencies, and focuses explicitly on shared (for example, when different network activities use shared resources) and mutual interdependencies (for example, when the logic of one supply chain is exchanged for the logic in another) (Dubois et al., 2004; Hakansson and Persson, 2004). However, this article’s line of reasoning suggests that the interdependencies presented in any given supply chain system will depend not just on the number of chains that comprise the network, but also on the kind of value reasoning

interactions that take place. This view of SCRs as surrounded by chronological, shared and mutual interdependencies also implies that single chains can consist of multiple interdependencies.

Coordination

Several insights from the literature reviewed earlier accord with this article's view of SCM. Industrial network research (INR) suggests that different supply chains may depend on common resources and, therefore, activities need to be coordinated accordingly. This line of research focuses on the corresponding significance of trust and brand building between different supply chains. Strategic supplier networks research (SSNR) includes insights into learning and knowledge processes within a lead firm's supply chain context, and the significance of trust and brand building within this system. However, the conventional SCM focuses on planning for chronological interdependencies looks unbalanced considering the presence of network layers that can be found even within single supply chains.

Subsequent from the more complicated view of structures, value reasoning and interdependencies suggested by VCA, this article highlights again the need to practice coordination mechanisms in SCRs which complement with the precise interdependencies identified. Thus, besides planning, standardization and mutual cooperation practiced to deal with shared and mutual interdependencies, respectively, can be supposed to play vital roles in both single supply chains and conventional supply networks alike.

Positioning

VCA is a helpful tool to understand the strategic positioning of firms, an argument also focused on by Fjeldstad and Ketels somewhere else in this issue (Fjeldstad and Ketels, 2006). The single positioning aspect focused in traditional supply chain models needs to be complemented with the aspect given by the layered supply network. Consider again SAL's position in Figures 3a and 3b. The traditional value chain view (Figure 3a), with its terminology restricted to defining upstream and downstream positions, gives a lateral boundary for understanding the centre firm's supply chain position (its spatial position) and the order or sequencing of its activities (in time). Thus, for example, an optional demonstration of *B*'s position would be to place it between distribution and retailing. While increasing the number of layers in the chain, *B*'s position is still constrained by the conventional supply chain boundary.

The idea of essentially chronological up and down-stream relationships needs to be complemented with a concept and terminology to describe the 'depth' that can be created in SCRs, chains as well as networks.

SAL's position in the layered and interconnected supply structure, and its formerly discussed development from a logistics integrator to a network integrator, are not covered sufficiently by such conventional constrained terminology. The idea of fundamentally sequential upstream and downstream relationships needs to be complemented with an idea and terms that can explain the 'depth' that can be generated in SCRs, chains as well as networks. The time dimension reinforces this claim: chronological sequencing coexists with concurrent layered activities. Figure 3b demonstrates how, from SAL's perspective, its suppliers running the physical flow demonstrates an 'under-current' layer (as SAL's medium for physical transfer), whereas its association with its banking partner *B* can be characterized as an *over-current* relationship.

Such terminology can be observed to offer both an added positioning boundary and a more advanced understanding of activities that are simultaneous rather than sequential. SAL's idea to leverage the size of its network to bargain good deals on IT and accounting services for its customers would increase the significance of its mediation of such over-current activities, and also increase the concurrent activities taking place in the network, and thus the scope of its value generation. The insights in this section are summarized as Table 3.

Managerial Implications

As the theoretical implications reveal, a value configuration approach (VCA) to supply management discloses increased complexities. Supply managers can deal with these complexities in a number of ways. SAL may claim in their advertising to be the 'right chain for manufacturers' products', but for SAL this is a marketing position, not a strategic issue. From its strategic viewpoint, the question is reversed: 'What is the right product/relationship for our supply chain network?' and this recounts directly to its VNM activity of network promotion and contract management. And the answer depends on how the firm has pre-arranged its network of SCRs, and especially to the need to attain standardization as a crucial coordinating mechanism. On a supply chain level analysis, the value chain's product orientation, with its stress on optimization of manufacturing processes, coexists with the reasoning of mediation, where value network size and composition are key value drivers. The focus here is on activities. Some firms focus on conventional manufacturing and others on distribution (mediation), and those who combine these assignments will experience intra-firm value reasoning interactions. As firms interact, so their activities will affect on each others' and managers' need to appreciate that these interactions can involve different value reasoning. They will need to inform themselves about the differences that may drive

Table 3. Theoretical Propositions**Value Creation Reasoning and Supply Chain Structures**

- The VCM provides useful but only partial understandings of value generation in supply chain relationships.
- The VNM provides a complementary understanding of value generation for firms focusing on mediation (such as distribution).
- By admitting that different value models coexist in generating efficient SCRs, the phrase *Value Logic Interaction* supports in understanding the collective business reasoning of the supply chain system as well as the reasoning driving individual firms in the supply chain system.
- The focus on single and interlinked chains in the supply chain literature needs to be complemented with an understanding of co-producing, layered and interconnected supply chain structures.

Interdependencies, Coordination and Positioning

- The chronological interdependencies stressed in the supply chain literature needs to be complemented with a focus on shared and mutual interdependencies.
- Interdependencies in a given supply chain system are function of the number of supply chains comprising the supply network, but also by the value reasoning interactions taking place.
- Coordination in SCRs should complement with existing interdependencies, employing planning, standardization and mutual adjustment techniques to manage chronological, shared and mutual interdependencies.
- The notions of over and undercurrent layers provide an additional positioning boundary and understanding of activities that are concurrent rather than chronological.

Source: These propositions have been developed by the researcher as part of the study.

Table 4. New Supply Complexities and Possible Managerial Responses

Revealed Complexity	Managerial Response	Possible Advantage
Differences in value creation logic	Acknowledge the different value creation models and the notion of Value Logic Interaction	Improved understanding of the functioning of single firms as well as of the supply system
Additional structural dimension	Consider the layered network and the corresponding notions of over- and under-current relationships/activities	A novel view of possible positioning options and strategic opportunities
Multiple interdependencies	Coordinate existing interdependencies	Coordination of sequential and concurrent activities improves efficiency of supply flows

Source: This table is an outcome of the study, representing new supply chain complexities and what should be the possible managerial responses, after study SAL Case.

value and cost in different activities to improve their understanding of the aggregated business logic of complex supply chain systems, as well as of single firms that have internalized different reasoning within their own boundaries. A central message of the value reasoning interaction notion is that, understanding such different business models considerably improves the potential for co-producing value in SCRs.

An essential message of the value logic interaction concept is that understanding different business models significantly improves the possibilities for co-producing value in SCRs.

Interdependencies which are chronological, shared and mutual are managed by coordination in the form of planning, standardization and mutual adjustment. Clear identification by managers of the interdependencies they have in relation to other agents will ease the corresponding coordination responses and support well-functioning supply chain relationships. The conventional focus on coordination by planning remains pertinent, but it will likely take

place within the framework of already existing network standards as needed by the demands of mutual resource use, and it must be continuously jointly adapted to take account of the mutual interdependencies present in SCRs. Firm positioning in value network supply systems is no longer restricted within conventional shallow upstream and downstream limits. Supply chain structures where single or interlinked chains often co-exist with layered network dimensions open up additional options for strategic expansion, as the concepts of over and under current layers and activities offer the option of repositioning in the vertical layers of SCRs.

Table 4 illustrates some central implications for managers.

Conclusions

As in other areas of strategic management, the supply literature is 'chained to the value chain', to borrow Normann's phrase. This article clears reservations as to the utility of

the VCM and the idea of value systems as general representations of value creation, coordination and positioning in SCRs. It suggests that VCA including the VNL provides a productive alternative and can disclose a number of complexities in SCRs, including differences in value creating reasoning, sets of interdependencies and more complex supply chain structures.

The models offered in VCA provide different analytical insights. These insights will be of interest in varying degrees to different managers, depending on their firm's particular activities, but an understanding of value reasoning models can be helpful across a more generalized area than is specifically demonstrated here. Manufacturing- and product-focused firms running their own distribution chains or networks can benefit from an alternative view of mediation and understanding of how different value reasoning coexist. Likewise, the notions of over- and under-current activities and the positioning options they disclose should attract attention both pure logistics operators and product managers operating their own supply chains.

[the concept] of over- and under-current activities makes known interesting positioning options for both 'pure' logistics operators and product managers operating their own supply chains.

Future research may continue this article's line of inquiry in different ways. A limitation of this article is that it does not present cross-case comparisons, something that future studies should consider. Our understanding of the strategic work conducted by supply managers would also benefit from more empirical studies, including in-depth analyses of other types of LSPs and their different network relationships. VCA applied to large manufacturing firms that mix both value chain and value network reasoning internally would likewise be interesting, and provide illustrations of other value logic interactions. Studies on how a third VCA model—the value shop, focusing on problem solving activities—interacts with both value chain and value network logics would be enlightening in terms of product and service development. Another specific area of interest for further study is the linkages between different forms of coordination and how they affect relationship development in supply networks—how are new standards developed and what role does mutual adjustment play in that process?

Porter's basic value chain analysis of chronological business collaboration has much to praise it, especially when applied to industrial and manufacturing systems. But more recent, business activities require more subtle developments in thinking and in analysis tools. As the business environment becomes ever more interlinked, and as

services- and knowledge-based activities overtake manufacturing as business growth areas, advantages will accrue to those who can think and see in more sophisticated terms. Such developed insight will enable them to conceive, design and then manage more complex networks, and to assess both, the value creation strengths of their current network position and the potential of alternative options.

Notes

1. In order to understand different types of business activities, this approach has recently been advocated by Amit and Zott (2001) and Afuah and Tucci (2000).
2. See, for example, Johanson and Mattsson (1992); Hakansson and Ford (2002). There is also a network view of supply relationships among supply scholars, often building on industrial network research, see, for example, Harland (1996); Lamming et al. (2000); Harland et al. (2004); Mills et al. (2004). The growing interest and managerial attention to supply issues include research on firms such as Benetton, Toyota, Compaq, DEC and Xerox. The importance of network flows for manufacturing firms is present in for example Apple's distribution and the logistics for McKesson in the work of Lorenzoni and Baden-Fuller (1995) and Dyer and Nobeoka (2000). Exceptions from the hub-managed networks are the multi-centred networks described by Liu and Brookfield (2000). Resource and knowledge explanations are also central to work that describes the advantages that follow from working in different kinds of constellations, webs or networks involving a relational view of strategy.
3. For discussions on the recent growth in the third-party logistics market, as well as in the number of logistics service providers offering third party services, see, Berglund et al. (1999); Persson and Virum (2001).

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