

## **Supply Chain Management: Value Chain and Value Network Logics**

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### **Abstract**

Value creation in the supply chain literature normally banks on the value chain model (VCM). This results in a focus on succedent interdependencies, a focus on coordination by planning and a constrained view of likely positioning alternatives. This paper adds 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 gratitude of the value network model (VNM) as representing the layered supply chain relationships (SCRs) classically related with a mediating presence. Central issues in this paper's view of SCM are value logic interface, harmonization of various interdependencies and the simultaneous occurrence of both over and under current relationships as well as conventionally documented up and down stream dependencies. The complexity thus exposed recognizes new positioning options for firms in SCRs. These arguments are illustrated with help of a case study and related to previous work on supply chains and networks.

## **Introduction**

Managing SCRs is a strategic chore that can add to the competitive strength and profitability of individual firms as well as entire chains.<sup>1</sup> But in spite of the accepted importance of SCRs, little is known about the determinants of success and failure.<sup>2</sup> Reports that the U.S. food industry alone is estimated to waste \$30 billion annually through poor supply coordination illustrate a significant potential for improvement.<sup>3</sup>

Porter's well-known value chain model (VCM) and the corresponding idea of value systems have deeply influenced the understanding of how SCRs work.<sup>4</sup> These models have formed managerial thinking about such strategic issues as value creation, coordination and positioning. Though, while the VCL is found as representing a strong and suitable logical means for such areas as corporate strategy, it is also supposed to limit complete understanding of how knowledge and service based business systems function.<sup>5</sup>

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).<sup>6</sup> It handles with firm level disparities in terms of value creation, and provides an alternative understanding of the knowledge and service based activities which are vital to well functioning SCRs. VCA has never been systematically practiced to understand either supply chains or supply networks, two important representations of SCRs, though its basic advices advocates that the value chain/value systems arguments alone can provide only limited understandings of SCRs. *The research question is therefore to investigate the consequences of a VCA to the management of SCRs, focusing on supply chain value creation, supply chain structures, supply chain interdependencies, supply chain coordination and supply chain positioning.*

This paper is thus part of a current stream of research on value creation

and business development in inter firms relationships and network settings.<sup>7</sup> Specifically it relates to preceding work on SCM, industrial networks and strategic supplier networks.<sup>8</sup> It shares the apprehension expressed in the supply literature that the simple linearity of the traditional supply chain logic may hide levels of complexity that have to be addressed in managing SCRs.<sup>9</sup>

In general, this paper 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 suggests a novel way to define a firm's supply chain position beyond that covered by the conventional up-stream/down-stream terms.

The following section presents the concept of VCA and relates it to previous work on supply chains and networks. The research methodology and case follows. Theoretical and managerial implications are then discussed, with central SCM issues presented in a number of propositions. The paper ends with conclusions.

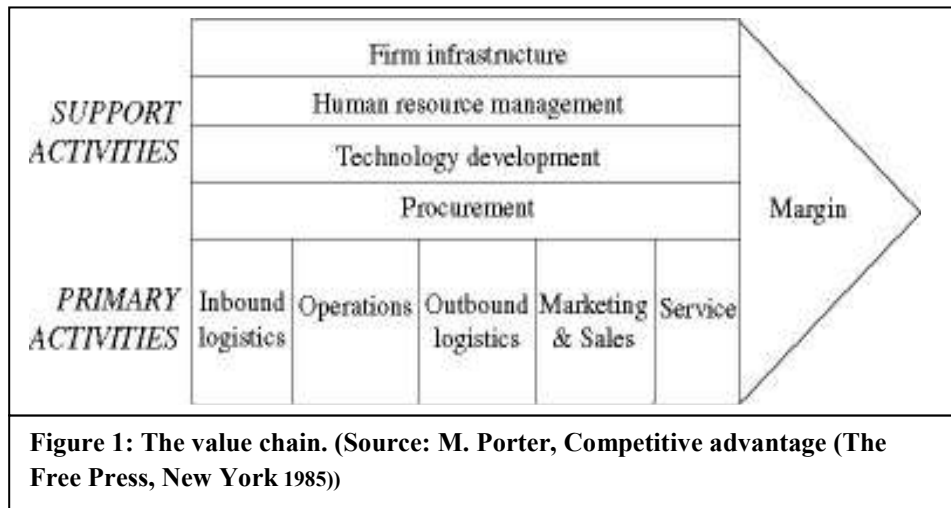
**Value configuration analysis (VCA) and SCM** The two models included in VCA both explain value creation based on the activities that individual firms carry out. On an inter-firm level of analysis, Porter defined a number of inter-linked value chains as a value system. In the SCRs context, these are 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 paper's case study is an example of such a business value systems 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 firm that

transfers 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.



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.<sup>10</sup>

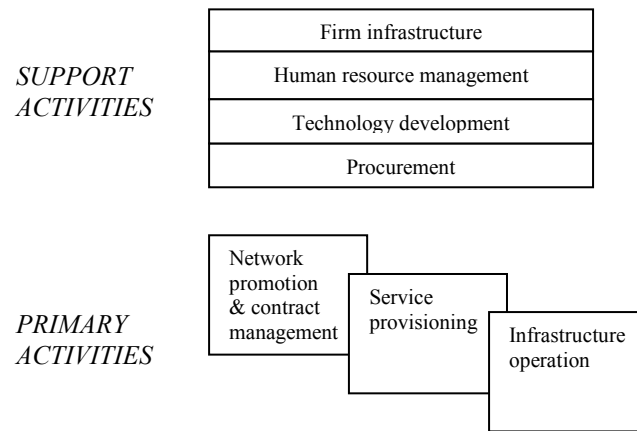
A specific emphasis on inbound logistics (raw materials handling, inspection of materials, warehousing, etc) and outbound logistics (talented decisions in planning and controlling activities such as collecting, storing and distributing products to the marketplace, including order processing and shipping)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

### **The value network**

Contrary to this model, the VNM categorizes more precisely the activities of those agents such as Logistic Services Providers who act as mediators, creating value principally by connecting clients or customers who are or wish to be interdependent. Such agents rely on a mediating technology to manage and coordinate in standardized ways operations linking multiple clients who are distributed in time and space (see Figure 2). Stabell and Fjeldstad note that primary activities for such mediating firms are:

(a) 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’)



**Figure 2: The value network (Source: C. Stabell and Ø.D. Fjeldstad, *Configuring value for competitive advantage: on chains, shops and networks*, *Strategic Management Journal*, 19(5), 413-437 1998.)**

(b) service providing (linking agents across the network and collecting payment from them for making or handling the connection); and  
(c) infrastructure operations (where the mediator operates such resources as switches and distribution centers 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.<sup>11</sup>This structure is back 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).<sup>12</sup>To understand value creation in SCRs we must, therefore, address both firm and inter-firm levels of analysis.

Traditional supply chain reasoning usually believes that all individual firms function according to the activity logic of the value chain, i.e. the

value chain functions within the supply chain, and shares its focus on the chronological value adding activities of acquiring, transforming and distributing products.<sup>13</sup> SCM models thereby conventionally discover the pattern of value creation as associated to the pattern of chronological activities in the chain (i.e. 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 networks infrastructure, within which network operators deliver the infrastructure for telecom service providers. Thus the business value system in a sole mediation industry comprises of 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 coproduce 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* mentions to the pattern of interactions, decision-making and communication that takes place amongst the firms involved. The harmonization of interdependent materials, information and financial flows eases value creation among participating firms. SCR efficiency is attained through information sharing and good coordination.<sup>15</sup>

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 (e.g. 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.<sup>16</sup> 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 interpretation, instead following Thompson's argument in distinguishing three different types of interdependencies between activities, each of which call for different coordination techniques.

- *chronological interdependencies* are coordinated by *planning*;
- *Shared interdependencies* (e.g. 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.<sup>17</sup>

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) 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 up or down-stream 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.

### **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)<sup>18</sup> - in line with the issues of concern, i.e. 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.

Inputs from these contrary networks research will be briefly reflected upon in the final analysis, although the final discussions mainly apprehend the alternative understandings that initiate from VCA.

### **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 exaggerating the independence of single chains, and considering them in isolation from their wider network structure, is that such thinking obscures a 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 A-R-A model - Agent bonds, Resource ties and Activity links. From the viewpoint of INR, a supply chain network is seen as groups of inter-linked 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 uncertain nature of such supply chain networks is one of their particular features: no overarching purpose rules the supply chain networks and SCRs within them have been set up for various separate purposes, and thus the set of agent bonds is not given and there is no overall network design or discipline. Consequently, there is usually no core purpose to the supply chain network, and no core firm which can be acknowledged as managing the supply chain structure.

The supply network concept is sometimes witnessed as more relevant than the supply chain view in strategic terms, since it more effectively describes the situation where firm's activities in different supply chains share common resources. In INR, resource structures are distinguished by considerable interdependencies when companies are involved in complex activities.

Such interdependencies need to be designed systematically, since value is created through a network of relationships where there are often both activity and resource reliance between different supply chains. Coordination at the supply network level can have substantial impact on the productivity of single firms as well as of the whole network.

A common belief in the significance of collective goals or common interests signifies relational norms such as trust will play a vital role in favorable coordination.

Defining a firm's position in undefined supply network structures can be challenging. But it is also important. A firm's supply network identity is

determined by its position in the structure of agents, resources and activities in the supply network and through its relationships with other network firms.

Consequently, a firm's strategic network identity covers the overall perception of a firm's magnetism (or otherwise) as an agent within its perceived supply network context. A strong and clearly defined supply 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 idea of value creation is central to strategic management theory, and a series of research within strategic management theory has enthused the supply network literature. This includes work on value groups, strategic webs and strategic networks. The focus in these studies is usually not on supply flows as such, but on knowledge sharing, learning and innovation in what can be tagged strategic supplier networks. Contrary to the more vague view of supply structures portrayed by INR, SSNR are usually managed, i.e. value creation vitally depends on the management skills of leading firms which act as centers or hubs, controlling and coordinating the network. They have a strong view of the overall business idea, appreciate the roles of a 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, e.g. considering the position of one supply network against another one, or of the supply network's position within an industry.

### **3. 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.<sup>19</sup> 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.<sup>20</sup> 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.<sup>21</sup>

The particular case chosen demonstrates the interaction between the two basic value logics in SCRs - value chain and value network logics - and illustrates both the conventional view of inter-linked chains focused in earlier supply chain research, and the layered network aspect present in the value network approach.

**Table 1. Value configuration analysis and other perspectives on supply chains and networks**

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

The case study covers an experimental illustration of supply management, interpreted from VCA reasoning, so as to suggest new perspectives on the management of SCRs. 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**

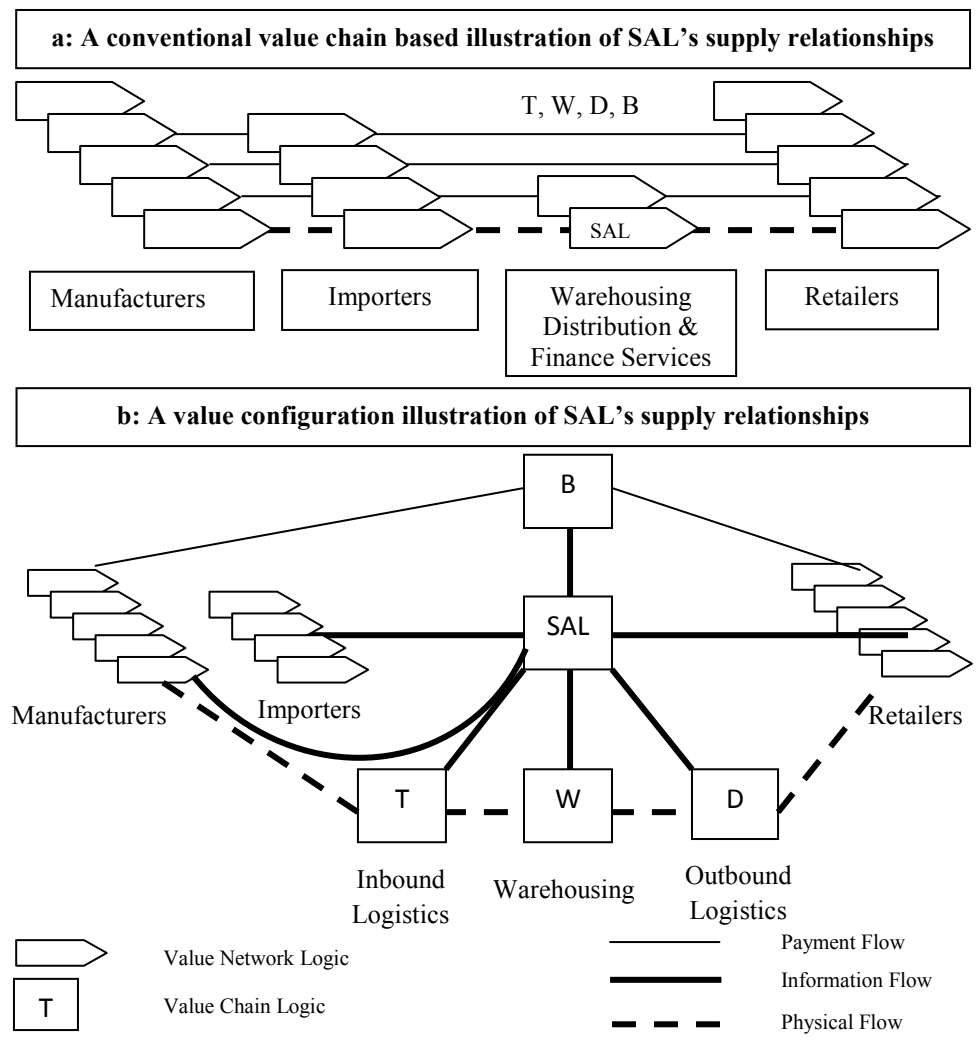
Sea Air Land (SAL), the case study focal firm, is a Delhi based LSP, performing administrative logistics services on behalf of their clients. SAL invoices goods worth about USD 50 million annually, distributed over some 30,000 shipment orders (see Table 2). The core business of LSPs is to manage other 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.<sup>22</sup> Many of SAL customers are manufacturing firms, who typically function according to traditional value chain logic.

| <b>Table 2: SAL's Basic Information</b> |  |
|---|--|
| 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)<br>Relationships to third party logistics partners, handling all the physical logistics activities such as transport and warehouse operations<br>Relationships to banks and other potential service suppliers<br>Its information systems and competence in administrative logistics |
| Market                                  | Has expanded to 50 global locations  |

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.



**Figure 3: SAL’s supply chain relationships 3a: A conventional value chain based illustration of SAL’s supply chain relationships, 3b: A value configuration illustration of SAL’s supply chain relationships.**

### **Supply network flows**

Figure 3a & b 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 flow 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 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 underlines insights from traditional value chain logic, which is part of a recognized in a VCA. Moreover, brief comments are made back to the other supply network perspectives previously discussed, i.e. INR and SSNR theories. This is followed by a discussion stressing alternative and additional insights based on a VCA.

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 inter-linked 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 is more elaborate than the 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 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 outfitted to manage by attaining high levels of standardization, where necessary discouraging certain customers. Thus clients requiring non-standard movements of goods face comparatively unattractive price levels. 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.

### ***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 builds 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 & 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 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 coordination, 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 coordination 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 coordinate 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.

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 so doing 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.

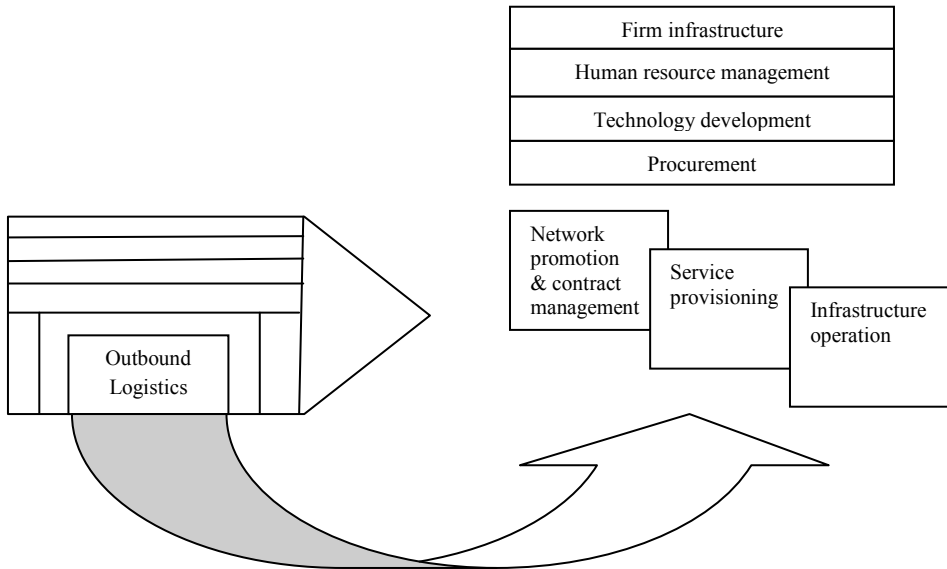
In the VNL, it is the synchronization of simultaneous parallel activities that is the base of value generation, and the balance of cost and value of scale and capacity utilization need to be optimized. Value will depend on network size, i.e. the number of users that are in the network<sup>24</sup> and the composition of the network, i.e. which nodes can be connected.

Arguably, the value chain and VNMs together compose the basic reasonings of SCRs. However different business models may co-exist 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 demonstrate the different value creating reasonings in a supply chain setting, taking the example situation of when a manufacturer’s outbound logistics operation is outsourced.

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



**Figure 4: An example of value logic interaction - value network interpretation of the value chain’s outbound logistics.**

single and interlinked chains in the supply chain literature needs to be added with an understanding of co-producing, multi layered and interconnected supply chain structures. This paper 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.

### **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 the need to differentiate between different types of interdependencies, and focuses explicitly on shared (e.g., when different network activities use shared resources) and mutual interdependencies (e.g. when the logic of one supply chain is exchanged for the logic in another).<sup>25</sup> However, this paper’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 above accord with this paper’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 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 focus 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 paper highlights again the need to practice coordination mechanisms in SCRs which complement with the precise interdependencies identified. Thus, besides planning, standardization and mutual co-operation 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 by Fjeldstad and Ketels somewhere else in this issue.<sup>26</sup>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 Figure 3a&b. The traditional value chain view (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.

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 up and down stream

relationships needs to be complemented with a 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.

| <b>Table 3- Theoretical Propositions</b>   |
|--|
| <p><b>Value Creation Reasoning &amp; Supply Chain Structures</b></p> <ul style="list-style-type: none"> <li>• The VCM provides useful but only partial understandings of value generation in supply chain relationships.</li> <li>• The VNM provides a complementary understanding of value generation for firms focusing on mediation (such as distribution).</li> <li>• By admitting that different value models co-exist in generating efficient SCRs, the phrase <i>Value Logic Interaction</i> 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.</li> <li>• 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.</li> </ul> <p><b>Interdependencies, Coordination and Positioning</b></p> <ul style="list-style-type: none"> <li>• The chronological interdependencies stressed in the supply chain literature needs to be complemented with a focus on shared and mutual interdependencies.</li> <li>• 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.</li> <li>• Coordination in SCRs should complement with existing interdependencies, employing planning, standardization, and mutual adjustment techniques to manage chronological, shared and mutual interdependencies.</li> <li>• The notions of over and undercurrent layers provide an additional positioning boundary and understanding of activities that are concurrent rather than chronological.</li> </ul> |

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 & contract management. And the answer depends on how the firm has prearranged its network of SCRs, and specially, 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, co-exists 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 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.

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 up and down stream limits. Supply chain structures where single or interlinked chains often coexist 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 re-positioning in the vertical layers of SCRs.

Table 4 illustrates some central implications for managers.

| <b>Table 4. New supply complexities and possible managerial responses</b> |  |   |
|---|--|---|
| <b>Revealed Complexity</b>  | <b>Managerial response</b>   | <b>Possible Advantage</b>   |
| 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  |

## **Conclusions**

As in other areas of strategic management, the supply literature is ‘chained to the value chain’, to borrow Normann’s phrase. This paper 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 co-exist. Likewise, the notions of over and under current activities and the positioning options they disclose should attention both pure logistics operators and product managers operating their own supply chains.

## References

1. M. Christopher, *Logistics and SCM: Strategies for Reducing Cost and Improving Service*, Financial Times & Pitman Publishing, London (1998); J. H. Dyer, D. S. Cho and W. Chu, Strategic supplier selection: The next “best practice” in SCM, *California Management Review* 40(2), 57-77 (Winter (1998)); R. B. Handfields and E. L. Nichols Jr., Introduction to SCM, Prentice-Hall, New Jersey (1999); H. L. Lee, Aligning supply chain strategies with product uncertainties, *California Management Review* 44(3), 105-119 (Spring (2002)).
2. G. T. M. Hult, D. J. Ketchen Jr. and E. L. Nichols Jr., An examination of cultural competitiveness and order fulfillment cycle time within supply chains, *Academy of Management Journal* 45(3), 577-586 (2002).
3. M. L. Fisher, What is the right supply chain for your product? *Harvard Business Review* March-April, 105-116 (1997)
4. M. E. Porter, *Competitive advantage*, The Free Press, New York, NY (1985).
5. R. Normann and R. Ramirez, From Value Chain to Value Constellation: Designing Interactive Strategy, *Harvard Business Review* July-Aug., 65-77 (1993);
6. C. Stabell and Ø. D. Fjeldstad, Configuring value for competitive advantage: on chains, shops and networks, *Strategic Management Journal* 19(5), 413-437 (1998); In order to understand different type of business activities this approach has recently been advocated by e.g. R. Amit and C. Zott, Value creation in E business, *Strategic Management Journal* 22(6/7), 493-521 (2001); A. N. Afuah and C. Tucci, *Internet business models and strategies: Text and cases*, McGraw-Hill, New York (2000).
7. A. Hinterhuber, Value Chain Orchestration in Action and the Case of the Global Agrochemical Industry, *Long Range Planning* 35, 245-267 (2002); J. Birkinshaw, Managing Internal R&D Networks in Global

Firms: What Sort of Knowledge is Involved?, *Long Range Planning* 35, 245-267 (2002); M. Kodama, Knowledge Creation through Networked Strategic Communities: Case Studies on New Product Development in Japanese Companies, *Long Range Planning* 38, 27-49 (2005); S. J. G. Girod and A. M. Rugman, Regional Business Networks and the Multinational Retail Sector, *Long Range Planning* 38, 335-357 (2005).

8. See e.g. J. Johanson and L.G. Mattsson, Network Positions and Strategic Actions - An Analytical Framework, in B. Axelsson and G. Easton (eds.), *Industrial Networks: A New View of Reality*, Routledge, London, 205-217 (1992); L.E. Gadde and H. Ha°kansson, *Supply Network Strategies*, Wiley, Chichester (2001); H. Ha°kansson and D. Ford, How should companies interact in business networks, *Journal of Business Research* 55(2), 133-139 (2002); G. Lorenzoni and C. Baden-Fuller, Creating a strategic center to manage a web of partners, *California Management Review* 37(3), 146-163 (1995); J. H. Dyer and K. Nobeoka, Creating and managing a high-performance knowledge-sharing network: The Toyota case, *Strategic Management Journal* 21, 345-367 (2000); R. Gulati, N. Nohria and A. Zaheer, Strategic networks, *Strategic Management Journal* 21, 203-215 (2000).
9. A. Cox and R. Lamming, Managing supply in the firm of the future, *European Journal of Purchasing & Supply Management* 3(2), 53-62 (1997); R. Lamming, T. Johnsen, J. Zheng and C. Harland, An initial classification of supply networks, *International Journal of Operations & Production Management* 20(6), 675-691 (2000).
10. Christopher (op. cit. at Ref 1); L.E. Gadde, H. Ha°kansson, M. Jahre and G. Persson, More instead of less: Strategies for use of logistics resources, *Journal on Chain and Network Science* 2, 81-91 (2002).
11. J. Lamey, SCM. *Best Practice and the Impact of New Partnerships*, *Financial Times*, London (1996).

12. *Supply-Chain Council*, *chain org/Resources*, available at: <http://www.supply-chain.org>, (FAQ). See also e.g. Christopher (op. cit. at Ref 1).
13. See R. H. Ballou, S. M. Gilbert and A. Mukherjee, New managerial challenges from supply chain opportunities, *Industrial Marketing Management* 29, 7-18 (2000); also Cox and Lamming (op. cit. at Ref 9).
14. Ø. D. Fjeldstad, The Value System in Telecommunication, in K. Eliassen and M. Sjøvaag (eds.), *Liberalizing European Telecommunication*, Routledge, London, 238-256 (1999).
15. P. Romano, Co-ordination and integration mechanisms to manage logistics processes across supply networks, *Journal of Purchasing & Supply Management* 9, 119-134 (2003); Lee (op. cit. at Ref 1).
16. J. G. March and H. A. Simon, *Organizations*, Wiley, New York (1958).
17. J. D. Thompson, *Organizations in action*, McGraw-Hill, New York, (1967) p. 17 & 62.
18. See e.g. Johanson and Mattsson, and Hakansson and Ford (op. cit. at Ref 8). There is also a network view of supply relationships among supply scholars, often building on industrial network research, see e.g. C. M. Harland, Supply chain management: Relationships, chains and networks, *British Journal of Management* 7, 63-80 (1996); Lamming et al (op. cit. at Ref 9); C. Harland, J. Zheng, T. Johnsen and R. Lamming, A conceptual model for researching the creation and operations of supply networks, *British Journal of Management* 15, 1-21 (2004); J. Mills, J. Scmitz and G. Frizelle, A strategic review of “supply networks”, *International Journal of Operations & Production Management* 24(10), 1012-1036 (2004); 22. 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, and Dyer and Nobeoka (op. cit. at Ref 8). Exceptions from the hub-managed networks are the multicentred networks described by R.J. Liu and J. Brook-field, Stars, rings and tiers: Organizational networks and their dynamics in Taiwan's machine tool industry, *Long Range Planning* 33, 322-348, (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.

19. Hult et al (op. cit. at Ref 2).
20. Y. S. Lincoln and E. G. Guba, *Naturalistic Inquiry*, Sage, Newbury Park, CA (1985); R. E. Stake, Case studies, in N. K. Denzin and Y. S. Lincoln (eds.), *Handbook of qualitative research*, Sage, Thousand Oaks, 435-454 (2000).
21. K. M. Eisenhardt, Building theory from case study research, *Academy of Management Review* 14(4), 532-541 (1989).
22. 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 M. Berglund, P. van Laarhoven, G. Sharman and S. Wandel, Third party logistics: Is there a future?, *International Journal of Logistics Management* 10(1), 59-70 (1999); G Persson and H. Virum, Growth strategies for logistics service providers: A case study, *International Journal of Logistics Management* 12(1), 53-64 (2001).
23. See M. Rothschild and J. Stiglitz, Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information, *Quarterly Journal of Economics* 90(4), 629-649 (1976).
24. M. Katz and C. Shapiro, Network externalities, competition and compatibility, *American Economic Review* 75, 424-440 (1985).
25. A. Dubois, K. Hulthe'n and A.C. Pedersen, Supply chains and interdependence: a theoretical analysis, *Journal of Purchasing and*

Supply Management 10(1), 3-9 (2004); H. Hakansson and G. Persson, Supply chain management: The logic of supply chains and networks, International Journal of Logistics Management 15(1), 11-26 (2004).

26. Ø. D. Fjeldstad and C. H. M. Ketels, Value configurations and competitive advantage: Analyzing the case of a Swedish Life Insurance company, Long Range Planning 39(2), 109-131 (2006).

27. See Lincoln and Guba & Stake (op. cit. Ref 20).