

**RE-CONCEPTUALIZING INTEGRATION STRATEGIES AND
POSITIONING CHOICES:**

BEYOND THE UPSTREAM-DOWNSTREAM DIMENSION

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ABSTRACT

The structure given by the upstream-downstream limits has taken on an axiomatic recognition in the realms of strategic management and supply chain management alike. It defines vertical integration and constitutes the overall domain of business systems such as value systems, supply chains, and supply networks. But what do we miss by perceiving business systems as being delimited by 'upstream' and 'downstream' positions only? In this paper we stress that the boundaries given by these distinctions provide a limited understanding of available integration and positioning strategies. We explore an additional structural dimension and use logistic service providers to illustrate our framework. The study expands current understanding of forward and backward integration and suggests that undercurrent and overcurrent exchange streams constitute an important dimension of vertical scope, which also calls for a redefinition of supply chain management.

Key themes: business system structures, strategic management, supply (chain) management, integration, positioning.

INTRODUCTION

The notions of ‘upstream’ and ‘downstream’ are core to strategic management and supply chain management. They provide the space for vertical integration, typified by a firm’s engagement in different parts of the production process, such as extracting raw materials, manufacturing, transporting, marketing, and retailing. Upstream and downstream also define the directions of interfirm integration in much of the literature on supply chain management; these terms establish the basic supply chain structure and constitute the core of supply chain management where firms develop relationships with upstream suppliers and downstream customers.

Although being very useful for the description of integration and positioning strategies, it is noteworthy that firms appear to be confined within the conventional scope given by the upstream-downstream limits. There is nowhere else to go!¹ Maslow’s well known hammer expression: “If the only tool you have is a hammer, you will see every problem as a nail”, captures the basic problem. By being exceedingly influenced by frameworks building on sequential interdependencies, such as Porter’s (1985) value chain logic, perceivable business system structures become tied to upstream and downstream boundaries. Similarly, models of value creation activities and their apportionment across firms tend to reflect properties of the long-linked technology (e.g. Andersen and Fjeldstad 2003).

In this paper we argue that it is a problem when theory contains universal propositions about interfirm relations which are tied to upstream or downstream activities. Although the resulting line of reasoning is informative, it is also incomplete. For instance, one challenge that follows is to use the conventional framework to position a third party logistics firm (3PL) and a so called fourth party provider (4PL) in relation to one another. Who is downstream or upstream of the other? Is UPS’s inclusion of 4PL services an example of backward or forward integration?² The conventional dimensions do not capture key integration and positioning strategies; the questions asked above are incorrectly phrased since existing frameworks ‘force’ us into using an inadequate terminology.

Consequently, our research question is: what other dimensions besides upstream and downstream need to be accounted for when considering integration and positioning choices? The objective of our study is to provide a framework which reveals the potential for integration and positioning; dimensions which remain concealed in the existing frameworks.

We build our argument on Stabell and Fjeldstad’s (1998) value configuration analysis, in turn inspired by Thompson’s (1967) categorizations of organizational interdependencies and the economics of networks and interconnection (Katz and Shapiro 1985; 1992; 1994). Value configuration analysis has received considerable attention recently, in different settings such as insurance (Amit and Zott 2001); banking (Sasson and Fjeldstad 2009; Fjeldstad and Sasson, 2010); and logistics/supply management (Huemer, 2006; 2011).

Whereas Stabell and Fjeldstad’s (1998) original work focus on firm-level value configurations, much less has been done regarding business system-level configurations. We follow the authors’ argument that there are “distinct strategic business-system level implications of different firm-

¹ Also horizontal integration, that is, consolidation of firms operating in the same tier of other value systems, is defined according to the same boundary conditions.

² At the core of the Logistics Service Provider industry is a set of actors providing mediation services to manufacturers and retailer (product owners) i.e. the so called ‘primary’ actors in traditional reasoning. A 3PL is a firm that provides multiple logistics services for its customers; a 4PL focuses on administrative logistics and uses the physical resources of its 3PL partners.

level value configurations when they aggregate and interact in the business value system” (435). Structural properties of a business system define the ‘space’ where positioning and integration strategies take place. The structure of the business system is a function of the underlying value configuration of the firm: “there are unique value system scope options relative to different value configurations” (Stabell and Fjeldstad, 1998; p. 420). Logistics service providers (LSPs) are used to exemplify our arguments, and through the lens of the value network model such firms create value through the connection of clients or customers who are or wish to be interdependent. LSPs have been largely neglected in previous research (in strategic management theory and maybe more surprisingly also in supply chain management), where product owners (manufacturers and retailers) have received considerably more attention. Despite their importance, there is no tradition to regard LSPs as strategic on their own terms. They are understood from a manufacturers or retailers standpoint, perceived as operational support actors whose main function is to avoid supply chain disruptions.

The paper is organized as follows. First we present the main ideas behind the new framework. In the remaining of the paper we develop these arguments, initially by reviewing the traditional approaches regarding vertical and interfirm integration and positioning, both from a strategic management perspective and from a supply chain management perspective. Then, we describe the conventional business system structure and boundaries within which inter-organizational strategies normally are considered to take place. We thereafter reframe the business system-level strategies in light of value network business systems. Finally, we discuss the strategic implications of our approach.

ALTERNATIVE BUSINESS SYSTEM STRUCTURES

Table 1 summarizes our overview of alternative business system structures by comparing the conventional structure of a value system with the characteristics of a value network based business system.

Please insert table 1 about here

The dimensions we consider, i.e. supply structures, boundary conditions, relationship emphasis, integration and positioning, are relevant for both strategic management and supply chain management scholars. These realms have traditionally been characterized by a notable difference; strategic management research usually takes the single firm as the focal entity while work on supply chain management focuses on an inter-organizational level of analysis. Recently, however, the disciplines have found a common ground. For instance, from a strategic management viewpoint, Zott and Amit’s (2010) view of a business model as a system of interdependent activities that transcend the firm and span its own boundaries - from raw materials through to the final consumer - is closely related to the supply chain concept. From a supply chain perspective it is claimed that the nature of competition has shifted towards ‘supply chain vs. supply chain’ struggles instead of ‘firm against firm’ competition, and correspondingly that supply chains are beginning to displace firms as the competitive entity in the global marketplace (Handsfield and Nichols, 2002; Ketchen and Hult, 2007; Mc Carter and Northcraft, 2007). Integrated supply chain management is now recognized as a core competitive strategy, exemplified by the success of

firms like Wal-Mart, Dell and IKEA. Consequently, supply chains are increasingly seen as strategically important inter-organizational entities. Essential for our argumentation is that strategic management studies on business models and vertical integration share interesting similarities with those on supply chain and interfirm integration. First and foremost, they share an axiomatic loyalty to the upstream - downstream boundaries.

In the paper we broaden the traditional value chain logic by considering a different value configuration, i.e. the value network. The conventional business system is enriched by an additional structural dimension, i.e. the value network's vertical scope. Within this structure, firms provide interconnection between different layers of concurrent services and between different activities at each layer (Stabell and Fjeldstad, 1998). The associated structure of the business system thereby takes on a different shape than the traditional value system: conventional sequential chains of activities limited by upstream and downstream exchange streams are complemented with simultaneous layered networks of activities associated with overcurrent and undercurrent exchange streams (Huemer, 2006; Fjeldstad and Huemer, 2008). The overcurrent-undercurrent dichotomy follows the aquatic vocabulary used in the traditional upstream-downstream terminology. Conventional (water) undercurrents are unseen movements of water beneath the surface, perceptible only upon submersion. Similarly, since it is impossible to 'submerge' into the shallow upstream/downstream flows conventionally illustrated, we also fail to capture the 'depths' existing in mediating settings. In the remaining of this paper we will develop the implications of this alternative structure, regarding relationships, integration and positioning.

BUSINESS SYSTEM-LEVEL STRATEGIES: INTEGRATION AND POSITIONING

Integration strategies

For strategic management scholars vertical integration has traditionally been understood as the extent to which a firm owns its upstream and downstream activities, i.e. backward and forward integration. The economics and rationales of vertical integration decisions rely on a variety of theories such as industrial organization view (Porter, 1990; McGahan, 2004), transaction cost economics (Williamson, 1975), the resource-based view (Barney, 1991), and the dynamic capabilities view (Teece et al., 1997). Even if reviewing the vast literature on vertical integration is beyond the scope of the present paper, vertical integration decisions appear to be driven by two main reasons. First, a firm can integrate an activity to reduce the costs by leveraging on economies of scale or to avoid the cost of opportunisms and coordination related to external market exchanges. Second, a firm may decide to keep in-house those activities for which it has superior competences and resources. The typical concern for scholars and managers is what the firm should do itself and what it should buy or outsource to external suppliers and customers. Therefore, vertical integration decisions determine the extent to which the firm owns the business system where it operates and can follow two directions, upstream or downstream that, as highlighted by Rothaermel et al (2006), may involve different strategic challenges.

Within the supply chain management literature, integration normally refers to the process of improving collaboration through information sharing and open communication (as opposed to ownership) between the members of a supply chain. The degree of coupling between a firm and its upstream suppliers or downstream customers depends on the extent to which organizations communicate and exchange business and technological information, coordinating their decisions, actions and efforts (Paulraj, Lado and Chen, 2008). Interfirm integration may regard all the different aspects of supplier relations (Furlan et al., 2007), from logistics (Hewitt, 1997), to

contract negotiation and risk management (Cachon and Lariviere, 2001; Camuffo, Furlan, Rettore, 2007), to new product development (Sobrero and Roberts, 2002), to quality management (Romano and Vinelli, 2001), and knowledge management (Takeishi, 2001; Kotabe et al. 2003).

In recent years, scholars have started to shift the attention from dyadic buyer-supplier relationships to the interfirm integration within whole supply chains (Frohlich and Westbrook, 2001; Romano, 2003; Furlan et al., 2006). Correspondingly, an important element in a manufacturing firm's strategy is the need to develop shared operational activities, where manufacturers make strategic decisions concerning the extent of both upstream and downstream integration that they want to undertake. Frohlich and Westbrook (2001) identify four different strategies on the base of the breadth of the "arc of integration" devised by the firm (figure 1).

Please insert figure 1 about here

The different arcs illustrate various integration alternatives (labeled inward, periphery, supplier, customer and outward facing strategies) defined by the direction and degree of integration. Whereas the degree of integration concerns the extent to which the focal actor shares information with customers and suppliers, direction is, not surprisingly, a question of going upstream and/or downstream. Consequently, although there are significant variations regarding the scope of integration (e.g. Harland, 1996; Mentzer et al., 2001 Fabbe Costes and Jahre 2007), the common characteristic is that it takes place, from the focal firm's view, upstream and/or downstream.

Positioning

In the strategic management literature, positioning encompasses the firm's position within its industry represented by the value it offers to its customers, the market segments it serves, the sources of revenues, the relative positioning within the industry arena, and the price of its offer. Strategic positioning is a central issue in business model reasoning, since it influences the resources needed to perform activities, and the costs associated to these activities (Afuah, 2004). Vertical integration, i.e. to what extent a firm owns the value activities in the business system of interlinked firms, is a key dimension of its strategic positioning. Shafer et al. (2005) maintain that a firm's strategic positioning also has to consider relationships (i.e. interfirm integration) with external organizations (suppliers, customers, distribution channels) since they extend the resources owned by the company. Vertical and interfirm integration and strategic positioning are therefore closely related issues. Similarly, a firm's business model is supposed to describe the position of the firm within the structure defined by upstream and downstream limits (Chesbrough and Rosenbloom, 2002).

From a supply chain management perspective, positioning is about sustaining competitive advantage by choosing the firm's position in the sequentially interdependent structure of the business system (Cox and Lamming, 1997). Supply chain positioning forges the ability of the firm to control and/or access the critical chain assets (Cox, 1997; Cox and Hines, 1997) for the value generation process. Handfields and Nichols (2002) stress that a central objective of the supply chain manager is to position the organization in the structural system defined by upstream and downstream limits. When considering a firm's position key concerns are the number of up-

stream or downstream tiers across the supply chain and the number of actors present in each tier (Huemer, 2006)

In sum, in contemporary strategic and supply chain management reasoning, a firm's position is restricted within the up and downstream end points, as no other dimensions are recognized. This view is also entrenched in actual management behaviors, as illustrated by Carraro, an Italian firm leader in the production of driving systems for off-road vehicles (e.g. tractors, earth-moving machines, trucks). The firm was founded in 1932 as a tractor producer but during the 1970s the owner and CEO, beset by bigger producers, decided to reposition the firm by focusing on the production of single components (i.e. axles) and became a first-tier supplier to its competitors (e.g. Renault, Ford, Case, Caterpillar, John Deere). This decision was the premise for a period of remarkable growth, leading the firm to double the number of employees in a matter of just a few years. When the CEO of the firm explains the decision to reposition the firm, his narration focuses on the strategic importance of changing the position of the firm within the business system limited by upstream and downstream limits. His story stresses the fact that the firm becomes a first-tier supplier thus changing the industry arena and the whole network of upstream and downstream relationships: competitors gradually became customers or prospective customers, customers' suppliers gradually became competitors and a new set of supplier relationships were established.

STRUCTURES AND BOUNDARIES IN DIFFERENT BUSINESS SYSTEMS

Value chains and value systems

Porter's (1985) concepts of value chains and value systems provide a set of widely accepted principles that delineate the structural properties and boundary conditions where (vertical and interfirm) integration and positioning strategies are normally considered to take place.

A value chain relies on a long-linked technology (Thompson, 1967) where value is created by transforming inputs into products (Stabell and Fjeldstad, 1998). A long-linked technology generates sequential interdependencies between activities that are coordinated mainly by planning. While a value chain refers to a single firm, a value system is made up by sequentially interlinked value chain operations. The main structural dimension of a value system is the conventional vertical scope that is limited by the first upstream supplier (typically the ultraraw material supplier) and the final downstream customer (typically the retailer). The vertical scope of a value system therefore represents the structure within which firms with a long-linked value creation technology make strategic decisions of integration and positioning.

As noted before, strategic management studies on vertical integration and strategic positioning develop their theories and concepts within the structural context of value systems made of sequentially interlinked value chains and limited by upstream and downstream streams. For example, Zott and Amit (2010) suggest that a business model determines the structure of the value chain "by defining the set of activities from raw materials through to the final consumer, with value being added throughout the various activities" (page 219). Within this structure, firms select which activities to perform and specify how the activities are linked.

Besides strategic management studies on vertical integration and strategic positioning, value chain framework has had significant impacts also on the understanding of logistics and supply management. Indeed, value chain and value system cast the foundations for the typical

business system structures used by supply management scholars: supply chains and supply networks.

Supply chains

Christopher (2002) maintains that a supply chain is a set of organizations related by upstream and downstream linkages, where value is created by products and services directed towards the ultimate customers. A typical supply chain consists of the flow of goods from the manufacturer to the warehouse/distribution center, from there on to meet retailers' orders and finally to the consumer, according to figure 2. This structure is supported by information and financial flows.

Please insert figure 2 about here

It is commonly assumed that all individual firms operate according to the activity logic of the value chain, i.e. the value chain operates within the supply chain, and shares its focus on the 'sequential value-adding activities' of acquiring, transforming and distributing products (Ballou, Gilbert and Mukherjee, 2000). Supply chains thereby conventionally identify the pattern of value creation as linked to the pattern of sequential activities in the chain. The task of supply chain management is to align the capabilities of the firm with those of the upstream and downstream supply chain partners to deliver superior value to the end customer at less cost to the supply chain as a whole (e.g. Harrison and van Hoek, 2002: 6). Therefore, as in the value system, the key structural dimension of a supply chain is the conventional vertical scope, made of the number of upstream or downstream tiers along the supply chain (figure 2 illustrates a supply chain with four tiers). Consequently, the structural core of supply chains is the same as the one considered for vertical integration or positioning decisions.

Supply networks

Gadde et al. (2010) suggest that the supply chain perspective contributes substantially to our understanding of efficient flows, but fails to consider that chains of relationships are not independent from each other, but are embedded in networks. Overemphasizing the independence of single chains, and seeing them in isolation from their wider network structure, obscures a full understanding of how value is created by firms interacting with each other, combining resources and integrating their activities.

Despite a growing concern that the simple linearity illustrated by chain models may conceal levels of complexity that deserves attention (Cox and Lamming 1997; Norrman and Ramirez 1993; Rabinovich and Knemeyer, 2006), an increasing number of network frameworks appear to remain tied to upstream-downstream limits, as illustrated in figure 3.

Please insert figure 3 about here

A typical supply network is presented by Handfields and Nichols (2002). These authors emphasize that a focal firm is likely to be embedded or linked to a wider set of organizations than the basic supply chain illustrates. Figure 3a illustrates such a setting, where a series of linked organizations create, from the focal firm's viewpoint, an upstream supplier network and a downstream distributive network. There are many possible connections between different sequential chains, but the basic task of supply chain management is to position the firm within the supply network, and to design and streamline the relationships of the supplier network and those of the distribution network.

Another example of a network approach is given by Pil and Holweg (2006), who advance the 'value grid' framework (see figure 3b). The grid consists of a vertical, a horizontal, and a diagonal dimension. Within the vertical dimension the companies explore opportunities upstream and downstream from adjacent tiers in their value chain. In the horizontal dimension, companies identify opportunities from spanning similar tiers in multiple value chains (parallel chains). Within the diagonal dimension, "companies are supposed to take a more integrative approach when exploring more widely in other tiers and value chains for opportunities to create value" (p. 74). For example, when the firm explores new means of controlling the supply of critical components by "looking upstream and downstream in other value chains" (Pil and Holweg, 2006; p. 78) it is exploring the value grid diagonally.

While these illustrations widen the perspective of cross linked and interdependent organizations, the fundamental structural characteristic of the business systems remains intact. That is, the identified structural dimensions (e.g. the vertical, horizontal, and diagonal) are all delimited within the conventional upstream and downstream categories. Supply networks are made of sequentially interdependent supply chains and the integration and positioning strategies of single firms occur within the upstream - downstream limits of the supply network.

BEYOND THE UPSTREAM-DOWNSTREAM BOUNDARIES:

VALUE NETWORKS AND THE CORRESPONDING BUSINESS STRUCTURE

Consider how payment of an invoice over the Internet is completed, the structures which are activated and the actors that co-create value in order to complete such a service. A number of firms can be expected to participate in making the transaction possible: a bank, a telecom provider, an internet service provider, a provider of electronic ID, payment and information solutions and possibly a credit card firm. Then use the conventional upstream-downstream chain of activities to position these firms and to order their work in a sequentially shaped chain or network. Arguably, this is a challenging task, since this setting, like many others, builds on the presence of simultaneously co-producing, layered and interconnected value network operations, which are interdependent on each other (Stabell and Fjeldstad, 1998).

The value network model builds on the idea that modern society is characterized by a complex set of actual and potential relationships between actors. The organization and facilitation of exchanges between customers is fundamental to value creation in value networks. In contrast to the value chain product focus, the value network model describes the activities of those actors 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.

The service value is a function of the demand side externalities since adding one more customer to the network increases the value of the service to the other customers.

On a business system level of analysis, different value networks form co-producing layers of mediators, with one network using a 'lower-level' network structure as a sub-network. For example, to perform its payment services an electronic banking uses the internet network which itself uses the general telecom networks infrastructure, within which network operators deliver the infrastructure for telecom service providers (Fjeldstad, 1999). Similarly, consider the mobile communication industry, i.e. the set of actors providing mediation services to businesses, governments, and consumers. Andersen and Fjeldstad (2003) illustrate how different non sequential network layers include mobile network operators that operate radio base stations giving customers access, and landlines, radio link, or satellite-powered backbone networks connecting the radio base stations; mobile virtual network operators that offer mobile services to end users over the networks of mobile network operators; SMS or WAP hosts that offer processing and transmission of messages and information; payment providers that offer mobile network payment or billing services (such as PayPal); and merchant service providers that offer the exchange of products or services over the mobile phone network. Mobile virtual network operators do not operate their own network infrastructure. They provide services by linking their activities to the activities of mobile physical network operators both for origination of calls and termination.

The services of these actors are not captured by the sequential logic provided by the value chain. These actors co-create value in a synchronized, simultaneous manner. To provide the service, multiple mediators have to operate at the same time to co-produce the service. In an international telephone call, operators handling local networks are simultaneously co-producing the service with carriers providing communication between local networks (Stabell and Fjeldstad, 1998). The simultaneous and layered performance of activities generates reciprocal interdependencies between service provisioning activities. In such contexts, standards are critical for coordination of reciprocity as they enable the mediator to match compatible customers and allow communication between different layers of activity. Retail banks uses standard contracts for each category of customer to set the terms for borrowers or depositors. Telecommunication companies adopt same or compatible protocols to allow different layers of networks to communicate.

Consequently, the value network vertical scope provides a unique dimension not captured by previous network models; *"[...] the activities of a mediator build on the activities of another. Vertical scope [...] describes to what extent a firm controls all levels of coproducing activities required to complete mediation exchanges"* (Stabell and Fjeldstad, 1998: 432).

Therefore, a value network based business system is not adequately described by the conventional structure delimited by 'upstream' and 'downstream' only; in addition, overcurrent layer of services builds on undercurrent layer of activities (Huemer 2006; Fjeldstad and Huemer, 2008). A key feature of the undercurrent-overcurrent layers of activities is that they are often concurrent, performed simultaneously, rather than sequentially.

This implies that a mediating firm can also decide to move along the vertical scope of its (value network) business system. Within the vertical scope, integration and positioning strategies involve the interconnection between different undercurrent-overcurrent layers of activities. For example, an electronic payment clearance service requires the operations of an infrastructure to clear the payment and the operations of an undercurrent communication infrastructure. Both infrastructures have to work at the same time for the payment clearance service to be delivered. The payment clearance provider can choose to operate both infrastructures or to base the service

on the communication service of a telecommunication company (Stabell and Fjeldstad, 1998). To control the undercurrent-overcurrent layers of activities the mediating firm can therefore decide to either acquire other mediators or focus on information and operational integration between interdependent yet different organizations. As will be argued in the discussion section, neither of these choices are captured by the traditional notion of vertical integration, however.

THE EMERGENCE OF LOGISTICS SERVICE PROVIDERS: AN ILLUSTRATION OF VERTICAL SCOPE AND OVECURRENT-UNDERCURRENT EXCHANGE STREAMS

The great majority of studies in both strategic management and supply chain management have focused on product owners/shippers. LSPs remain largely unnoticed, perceived as support actors in a support function; yet, they represent a significant part of the economy and perform crucial tasks. Increasingly, the use of advanced logistics services is prevalent among large companies; for instance, 3M, Eastman Kodak, Dow Chemical, Time Warner and Sears Roebuck have turned large portions of their logistics operations to external LSPs (Simchi-Levi et al 2004). In this paper we regard LSPs as mediators, short for firms that employ a mediating technology, by linking customers that are or wish to be interdependent (Thompson, 1967). These suppliers are logistics experts including Fortune 500 giants like UPS and FedEx but also a large number of small and medium-sized LSPs (Berglund, et al 1999; Persson and Virum 2001).

A LSP is a provider that manages, controls, and delivers logistics activities on behalf of a shipper (Hertz and Alfredsson, 2003). LSPs may provide a bundle of services such as cross docking at terminals or consolidation services, storage or integrated-logistics value added services at warehouses and distribution centers, export/import clearance, reengineering of the chain, and track and trace information (Stefansson, 2006). Consequently, LSPs are increasingly associated with the offering of multiple bundled services, rather than an isolated transport or warehousing function.

From 3PL to 4PL services

It is, arguably, inadequate, if not impossible, to use a conventional supply chain (value chain) based view to explain different LSP integration and positioning strategies. This includes distinguishing between a 3PL and a 4PL service provider as well as explaining their value co-production. 3PLs are often viewed as asset-based logistic providers that focus on the physical aspects of the service and own most of the assets (trucks and planes, handling equipment and warehouses, distribution centers or terminal facilities) that are used to fulfill the delivery. A pure 4PL (Stefansson 2006) is an actor that works essentially without any tangible resource. Van Hoek and Chong (2001: 463) define 4PL as "...a supply chain service provider that participates rather in supply chain coordination than operational services. It is highly information based and coordinates multiple asset-based players on behalf of its clients." TLog is a Norwegian firm that operates as a pure 4PL. The firm was established in 2007 and currently operates in Norway, Sweden and Finland. The business of TLog is to design and sell supply solutions based on the coordination of activities from different carriers, storage operators, package companies and a number knowledge and service intensive firms. The core business is essentially information-based since it develops supply solutions for its customers by mobilizing resources and resorting to different logistics and knowledge-based partners without owning any physical assets. Its

business model is thereby different from 3PLs, including large 3PLs that develop 4PL services. For instance UPS, number 43 on Fortune's 500 list and the world's largest package delivery company and a leading global provider of specialized transportation and logistics business services, recently started to deliver information-based coordination activities along with operational supply chain services. In this respect the role of UPS is to source and coordinate operations on behalf of its clients. However, UPS cannot be considered a pure 4PL since it owns and directly manages a significant set of logistics assets that are utilized in the physical provision of the service.

According to figure 4 we regard logistics as an example of a mediating activity according to the value network model. That implies that LSPs rely on a mediating technology where their basic task is to connect senders and receivers, such as producers and retailers. This approach also reveals business system structures beyond the traditional upstream-downstream boundaries. We will first focus on the so called primary actors and stress the conventional dimensions, before highlighting the unique value network based dimension.

Please insert figure 4 about here

The traditional logic directs our attention to the producers and retailers; usually portrayed as value chain operators in sequential chains. The conventional vertical scope involves forward and backward integration i.e. downstream towards the retail tier or upstream towards the producer tier. The conventional horizontal scope describes the consolidation between supply chains but within the same tier (i.e. producer to producer or retailer to retailer). The diagonal scope finally, refers to movements between different tiers in different chains. This line of production oriented reasoning is informative, but incomplete.

A 3PL focuses on the physical movement of goods. It provides certain physical distribution services itself, and performs interconnect services to other providers who also carry out the physical movement of goods. This interconnect service embeds the integration processes which the 3PL takes on in order to facilitate the physical flow. In other words, a 3PL manages both goods and information flows in its network layer.

Cablog is an Italian 3PL operating in the packaged and canned food sector, as well as in the beverage sector. The firm has a share of about 10% in the Italian market with total revenues of 72 millions euro in 2009. Cablog uses Internet based software that interfaces the client ordering process and relies on a virtual private network to exchange data with clients, and a proprietary trans-codification system to read them. While clients transfer their orders to Cablog's distribution system via a standard ICT interface, which is ex-ante defined and common to all clients, there is still need of meetings, telephone calls, e-mails to allow residual information exchanges for example about actual on-hand inventory or trucks location.

One of the Cablog sources of competitive advantage is the optimization of transportation routes in order to reduce the overall logistic costs. By serving different clients and managing their information about inventory and orders, the firm is able to optimize routes while saturating the fleet of trucks. Cablog's planners receive orders and manage distribution every day once the order-receiving phase is completed. The scheduling is then used to coordinate its own facilities with those of the several 3PLs and carriers that participate in delivering the service. Continuous

mutual adjustment is then needed to face unforeseen events such as errors in loading the trucks or an incoming late order of a client. Hence, information and physical flow run simultaneously since they can hardly be chronologically disentangled.

As was mentioned above, a 4PL is an information-based actor that co-ordinates multiple asset-based organizations. A 4PL takes over the responsibility of providing coordination between the different activities in the physical network layer. One of its tasks is to integrate, by communication and information sharing, the work of different actors that perform the physical movements. Moreover, a 4PL creates an additional network layer, where it itself manages the necessary information flows, based on its information-based infrastructure. This implies that besides interconnect services within one network layer, a 4PL also provides *interlayer connectivity*; services that often are concurrent with the activities of other value co-producers in different network layers. The part of a 4PL's work that is 'upstream' of a 3PL is only the information based service which is part of planning efforts existing due to sequential interdependencies. Coordination by standardization and mutual adjustment create other scenarios; planning takes place within the context of already-existing network standards as required by the demands of pooled resource use, and plans must be continuously mutually adapted to take account of the reciprocal interdependencies present in supply relationships (Huemer 2006).

That is, LSPs commonly facilitate a large number of transactions among different users in supply networks. The activities underlying these distinct transactions share common logistic resources and hence have pooled interdependencies. Standardization both of the objects exchanged, e.g. crates and containers, and of the logistics resources employed, e.g. trucks, enable resource sharing across different users and their transactions. However, an ill-implemented standardization or uneven demand for network resources affects the interdependencies between customers that would normally be coordinated through standardization. In these cases LSPs have to manage the residual interdependencies through mutual adjustment.

A 4PL uses the physical network structures of its 3PL providers to perform its mediation exchanges, just like the previously described payment services delivered by electronic banking uses the internet network which itself uses the general telecom networks infrastructure, within which network operators deliver the infrastructure for telecom service providers. Similarly, both 4PL and 3PL deliveries are dependent on the fundamental resources that reside in what sometimes is labelled the basic infrastructures of society. Figure 4 highlights services provided by the general telecom networks infrastructure, where different telecom operators provide their services needed for communication and information flows. These essential undercurrent exchange streams must be properly executed in simultaneous processes. Other undercurrent layers are occupied by the transportation network operators responsible for the management of the physical transport network infrastructure or by actors that deal with information about the traffic and infrastructure conditions, as well as those that coordinate access to specific areas or transport network resources (cf. Foss 2009).

Finally, the complexity of 4PL services may also include additional overcurrent exchange streams. For instance, a 4PL may offer additional services such as the coordination of significant parts of the financial flow, activities which also may occur concurrently rather than sequentially. In figure 4, another network layer is operated by the 4PLs financial partner, an actor that provides a tailor-made system for factoring services as well as the necessary infrastructure for the payment flows.

To sum up, to better characterize the integration and positioning strategies of a LSP, the notion of essentially sequential up- and downstream activities needs to be complemented with the concept of value network vertical scope made of under- and overcurrent activities. By relying on

this additional dimension we can better understand the different integration and positioning strategies of LSPs, such as the difference between a 3PL and a 4PL. According to this line of reasoning, the main differences between UPS and TLog do not relate to their size or geographical scope, but rather to their positioning and integration challenges. As a ‘pure’ 4PL, TLog does not have an explicit presence in the physical network layer; it only provides coordination of different providers of physical logistics services. UPS, on the other hand, has added 4PL services to its 3PL operations. The firm still owns most part of the under-current physical layer of activities. This poses a “vendor selection” issue from the client perspective: will UPS design and manage its physical network to maximize the client service or to optimize the usage of its own assets?

DISCUSSION AND IMPLICATIONS

In the following discussion we will develop the value grid model and the arcs of integration framework, beyond their upstream-downstream limits, to further highlight key dimensions in figure 4.

Integration and positioning strategies of mediating firms

Figure 5 provides a mediation based view of the value grid (cf. figure 3b).

Please insert figure 5 about here

It is important to recall that whereas the conventional value grid is embodied within the number of upstream-downstream tiers across the chain, and the number of actors present in each tier, the mediating setting we stress here concerns the number network layers and the number of over- and undercurrent exchange streams present in each layer. Instead of stressing sequential production paths, we regard distribution as a ‘mediation path’.

We will illustrate by using the examples of Cablog and TLog previously mentioned. A change in the firms’ horizontal scope can occur in different ways. Both LSPs are involved in the fast moving consumer goods sector (beverage). TLog manages app. 20 different supply chains in this sector. It can extend its horizontal scope by increasing its own customer base, such as contracting with additional beverage producers or importers. In addition, it could develop an exchange agreement with another 4PL; that is, we are here emphasising exchange agreements with other *mediating* firms. Another illustration of horizontal scope is, for instance, if Cablog decides to work with one of TLogs 3PL providers for the physical movement of goods.

Vertical scope is, as previously argued, concurrent mediating services where one mediating firm integrates the mediation activity of other value networks. In our logistics example, this involves TLog’s 4PL services, the actual movement of physical goods by 3PLs and the parallel work done by firms operating the primary infrastructures. The emergence of a 4PL actor in Cablog’s network would further expand the vertical scope in its setting. Similarly, many websites for airline reservations have evolved into the sale of integrated hotel, airline and car-rental packages. These websites have integrated the mediation of services (car-rental, hotel reservation) that traditionally belonged to other value networks.

Diagonal scope is, for instance, an issue if TLog decides to work with Cablog for the physical movement of goods, or if TLog begins to work with Cablog's financial partner. Regarding mediation, diagonal scope refers to movements from a certain layer in one supply network to a different layer in another network.

Combinations of production-and mediation paths create a set of value logic interactions. For example, a website that connects producers and buyers of automotive parts acquires a producer of automotive parts and starts to produce itself some of the items that are sold through its website. Along the same vein, TLog could decide to open a retail outlet, or Cablog could start to produce some of the beverage. Under similar circumstances, i.e. to consider also such integration strategies, we need combine the vertical scope of value network structures with the conventional vertical dimension.

As to positioning, we can portray a more complex setting than commonly perceived. The conventional approach stresses sequential upstream and downstream positions, whereas a mediating approach highlights layered positions (as to the use of infrastructures, a 4PL depends on the trucks, trains and ships of its 3PL partners, who in turn use the roads, rails and ports of the primary infrastructure providers). Jointly, we can see that positioning is a combination of different decisions about how to position the firm both within the conventional sequential structure and within the value network's vertical scope.

In developing our framework we can identify several integration and positioning strategies that a mediating firm (like a LSP) firm can undertake along the value network's vertical scope We borrow the concept of "arc of integration" introduced by Frohlich and Westbrook (2001) to identify different strategies (figure 6).

Please insert figure 6 about here

To focus the discussion, figure 6 leaves the manufacturers/retailers out of the picture in order to stress the interfaces which are neglected in traditional frameworks. Correspondingly, manufacturer/retailer value systems representations normally leave the so called support actors (such as the LSPs) out of their frameworks (figure 1 in this paper). In other words, figure 6 is the overcurrent-undercurrent equivalent of figure 1, focusing on the dimension we wish to stress in this study. It is a simplification of any business value system but so is also the conventional boundary of figure 1.

In correspondence with the original model the arcs represent two strategic decisions; direction and degree. Direction is, contrary to the original model, not a question of upstream and/or downstream, but subject to overcurrent and undercurrent links. As to degree of integration, our framework highlights communication and information sharing (a traditional supply chain management approach) as well as ownership (a traditional strategic management view). However, neither forward nor backward integration captures this kind of vertical scope; instead, we suggest that overcurrent facing strategies are associated with upward integration, whereas undercurrent facing strategies are subject to downward integration. Here we portray an isolated carrier, a 3PL and a 4PL provider

LSPs focusing on their activity layer only without extending control either to undercurrent or overcurrent layers are, to paraphrase Frohlich and Westbrook (2001), using an ‘inward facing’ strategy. Both downward and upward integration towards undercurrent and overcurrent actors is limited to the standards that need to be shared in order for the layered and interconnected networks of activities to run simultaneously. An inward facing strategy is illustrated by an ‘isolated’ transportation company that carries out the haulage of products from one point to another. The firm needs to adopt the standards that allow compatibility with the undercurrent layers (e.g. standards about the traffic of trucks or the instruments to communicate with the network that delivers traffic information). It also needs to adopt the standards needed to communicate and coordinate with possible overcurrent actors (such as a 4PL). Integration is performed either by a 3PL or a 4PL coordinating the flow, or by the shipper.

3PLs are characterized by an ‘undercurrent facing’ strategy based on downward integration. The mediator controls physical assets and network infrastructures. A 3PL is defined by some combination of hierarchical control and more or less long-term highly integrative relationships with external actors that operate the undercurrent activities. Cablog adopts typical 3PL strategy. Overall the firm runs 5 central warehouses (mainly located in the North of Italy) and 14 transit points and owns a significant part of these assets. For the material handling and warehousing activities Cablog relies on worker cooperatives with which it has long-lasting, highly integrated relationships.

A 4PL strategy is different from a 3PL strategy regarding both direction and degree of integration. It is characterized by a broader arc of integration including additional network layers. As to degree, it differs with respect to integration mode towards undercurrent layers, based on communication and information sharing rather than control through ownership. TLog is an example of a firm employing a 4PL strategy. The firm manages relationships with 3PLs positioned in the physical layer, but the downward integration with these external actors is limited to the exchange of standard forms and reports necessary to coordinate the logistics flow. In addition it integrates upwards by mediating a set of overcurrent services (such as financial services).

Accordingly, in the alternative framework 3PLs operate in one network layer with two exchange streams (goods and information). Moreover, the 3PLs have to integrate with undercurrent layers (such as primary infrastructure operations). A 4PL creates an additional layer in the supply network, which consists of one information based exchange stream. The 4PL’s information flow concerns coordination of the physical movement of goods and financial information, in addition to an optional set of value added services that it mediates via other firms. This implies that a 4PL reduces the sophistication of 3PL services to more basic transportation and warehousing activities, by taking over the information flow that the 3PL runs in systems without 4PLs.

A question which follows is why it makes sense to add network layers, like 4PLs do, when cutting tiers otherwise is seen as a good cost cutting strategy in traditional frameworks. Following the conventional value chain view, each sequential activity set represent a cost stage (and hence the margin at ‘the end’ in Porter’s original model from 1985). Similarly, each tier in a supply chain is supposed to represent an additional buyer-supplier interface that adds to the consumer’s final cost. However, a consequence of not following the conventional direction is that the alternative framework *does not* highlight traditional buyer-supplier interfaces. Instead, the notions of overcurrent and undercurrent emphasize relationships to value co-producers positioned in different network layers, where value is not simply ‘added,’ but is mutually ‘created’ and ‘re-

created' among actors (cf. Ramirez 1999). It is in this light which mediating business structures (including a 4PL strategy) need to be evaluated.

The mediation networks made available by undercurrent services are necessary resources in the provisioning of overcurrent services. Conversely, overcurrent exchange streams set up resources for undercurrent exchange streams; they provide uses of the latter. Stated differently, vertical service layers are complements, and interlayer access relations provide the actors with control over critical mediation network resources. To illustrate, the demand for mobile communication increases with demand for merchant services. Similarly, the demand for 3PL services increases with demand for 4PL services, as do the demand for basic societal infrastructures.

The firms performing the activities of the different layers have reason to cooperate, because they jointly create a system good (Farrell & Katz, 2000) where the value of the services provided by firms at a particular layer is dependent on the availability and characteristics of the services offered by firms operating layers below or above. However, complementors also compete for extraction of the value of their combined offerings.

A 4PL thereby has a more complex choice set available than the conventional framework suggests. Its neutrality is based on both traditional and alternative integration options; such as backward towards clients and downward towards 3PLs. As to traditional backward/forward integration (acquiring or being acquired by product owners/supply chains), the LSP needs to consider the implications of managing independent customers' supply chains in the same system as it coordinates those it itself either is controlled by or controls itself. It also needs to consider the degree of downward vertical integration, which may result in vendor selection issues regarding the use of physical logistics resources.

CONCLUSION

Walker (2007) claims that work on vertical integration is in its infancy as an area of research; that current empirical research on vertical integration is incomplete in the context of existing theory and that the existing theories of vertical integration are incomplete in the context of the empirics. Building on the idea that an understanding of business interactions need to include the existing structures of relationships and interdependencies between and around the involved actors (Ford 2009), this study offers an alternative framework of the business system level implications of Stabell and Fjeldstad's (1998) value configuration analysis. Empirically it highlights LSPs and their value co-production which transforms given boundaries, resulting in new value creation systems (cf. Ramirez 1999). The widely accepted value chain logic leads to conventional boundaries of business systems that conceal other important structural dimensions and constrains firms to certain integration and positioning options. Firms' strategic positioning within business systems such as value systems, supply chains, or supply networks become restricted within the end points of the chain, as no other dimensions are recognized. As a consequence, LSPs and other mediators have traditionally been pictured around supply chains comprising channel structures of intermediaries that are linearly related to one another. This view characterizes LSPs as non value adding entities struggling to get a share of the margin in the supply chain (Rabinovich and Knemeyer 2006). As stated by Frohlich and Westbrook (2001), many questions remain unanswered about how best to characterize supply chain strategies. Like the great majority of strategic management and supply chain management scholars, they framed their inquiry from the perspective of the manufacturer; is it more important to link with suppliers, customers, or both?

We do not disagree with this question, but rephrase it in the light of alternative business models and business system structures.

Our framework embeds a couple of significant implications. In strategic management theory, the meaning and scope of vertical integration needs to be reconsidered. Vertical integration is commonly accepted to be the same as when a company expands its business into areas that are at different points of the same production path. It is noteworthy that these 'different points' are defined from a sequential worldview where a physical product, either explicitly or implicitly, is in focus. The present alternatives are forward integration downstream, or backward integration upstream.

In our framework integration takes place when a company expands its business into areas that are at different layers of the same mediation/distribution service (or 'path'). The strategic alternatives involve inclusion of undercurrent activities by downward integration, or upward integration towards overcurrent exchange streams. UPS's inclusion of 4PL services is neither an example of backward integration, nor of forward integration, but upward integration. LSPs' ability to provide connectivity between these layers is, we claim, a crucial source of their competitive advantage.

Overcurrent-undercurrent flows are concurrent rather than sequential, and needs to be coordinated accordingly. As a consequence, both the structure of supply systems and the notion of supply chain management need to be redefined. Supply chain management is currently perceived to be the same as managing upstream and downstream relationships with suppliers and customers. The central objective of the supply chain manager is to position the organization in the structural system defined by upstream and downstream limits. This provides a partial understanding only. The supply chain manager faces a more complex set of decisions regarding integration and positioning including relationships subject to over-and undercurrent boundaries as well.

While this paper highlights the implication of our framework for mediators like the LSPs, future research could investigate the implications for manufacturers and retailers. Several manufacturers run totally-owned logistics business units that provide logistics services also for other clients. The effective integration of different value creation logics represents a key challenge and a unique opportunity for competitive advantage (Stabell and Fjeldstad, 1998). Our framework can also be useful when a manufacturer or a retailer is considering outsourcing strategies to a mediating firm. For example, from the viewpoint of manufacturers/retailers, only two interfaces are normally considered before assessing outsourcing of logistics services: the LSP client and the LSP final customer interface (Maltz and Ellram, 1997). We do not disagree with this advice as such, but suggest that besides the conventional upstream-downstream interfaces, an LSP should be also evaluated for its overcurrent and undercurrent interfaces.

Empirical qualitative and quantitative research is needed to illustrate strategies and positioning choices with respect to performance. This includes normative indications about preferable integration and positioning strategies along the value network's vertical scope. Future research can include, for instance, what impact 4PL actors actually have on the performance of 3PL providers. Future research could also consider the meaning of vertical diversification; today equal to integration in up-ad downstream based supply chains.

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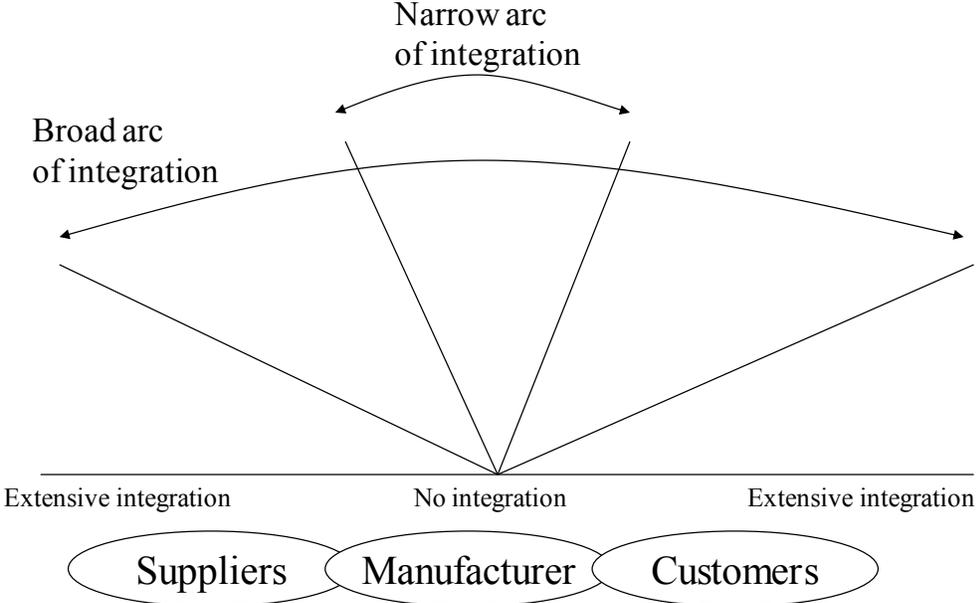
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Figure 1. Upstream-downstream arcs of integration



Frohlich and Westbrook (2001)

Figure 2. The conventional supply chain structure

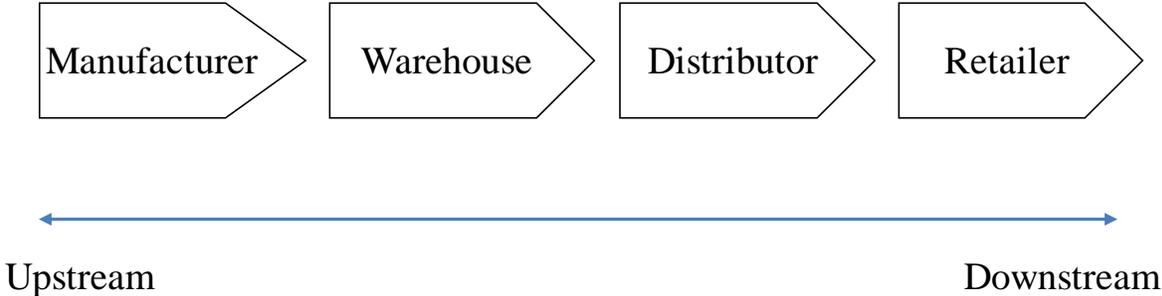
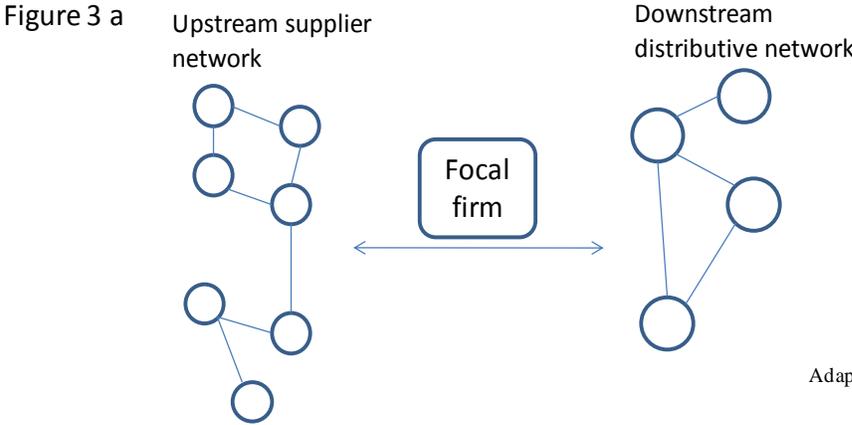
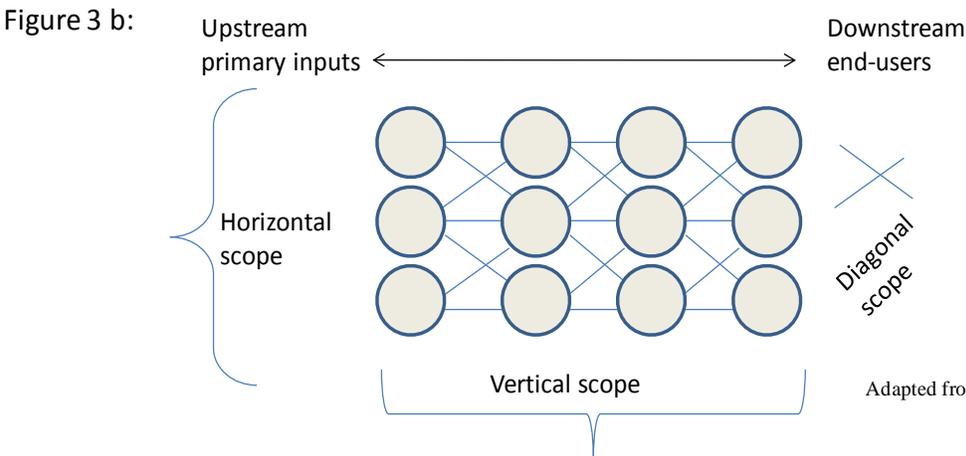


Figure 3 (a&b). Supply networks



Adapted from Handfield and Nichols (2002)



Adapted from Pil and Holweg (2006)

Figure 4 A business system including the vertical scope of value networks

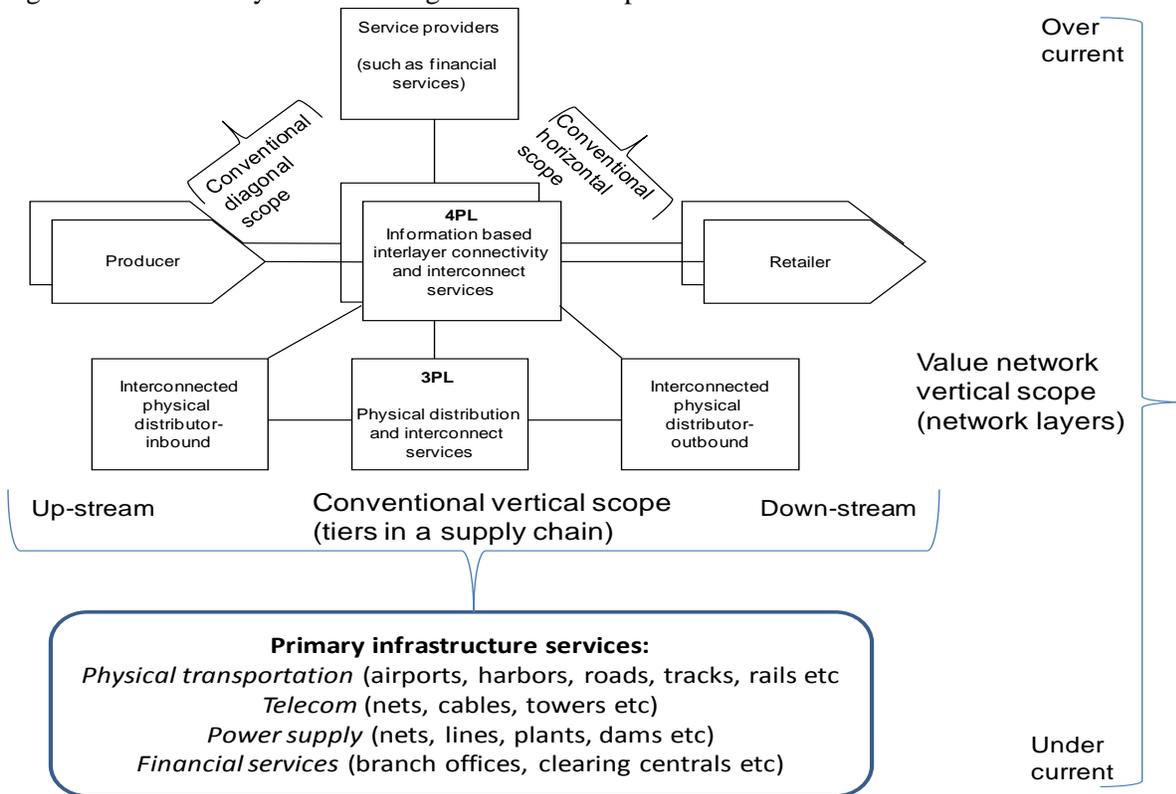


Figure 5 A mediation based value grid

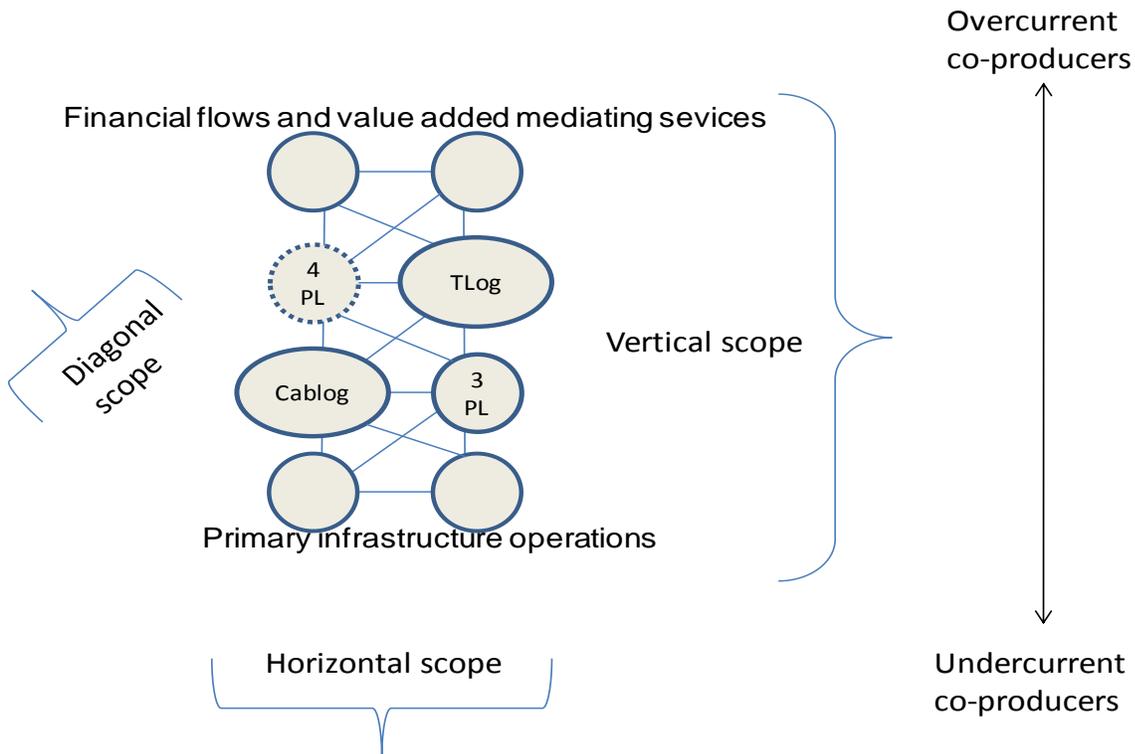


Figure 6 Undercurrent-overcurrent arcs of integration

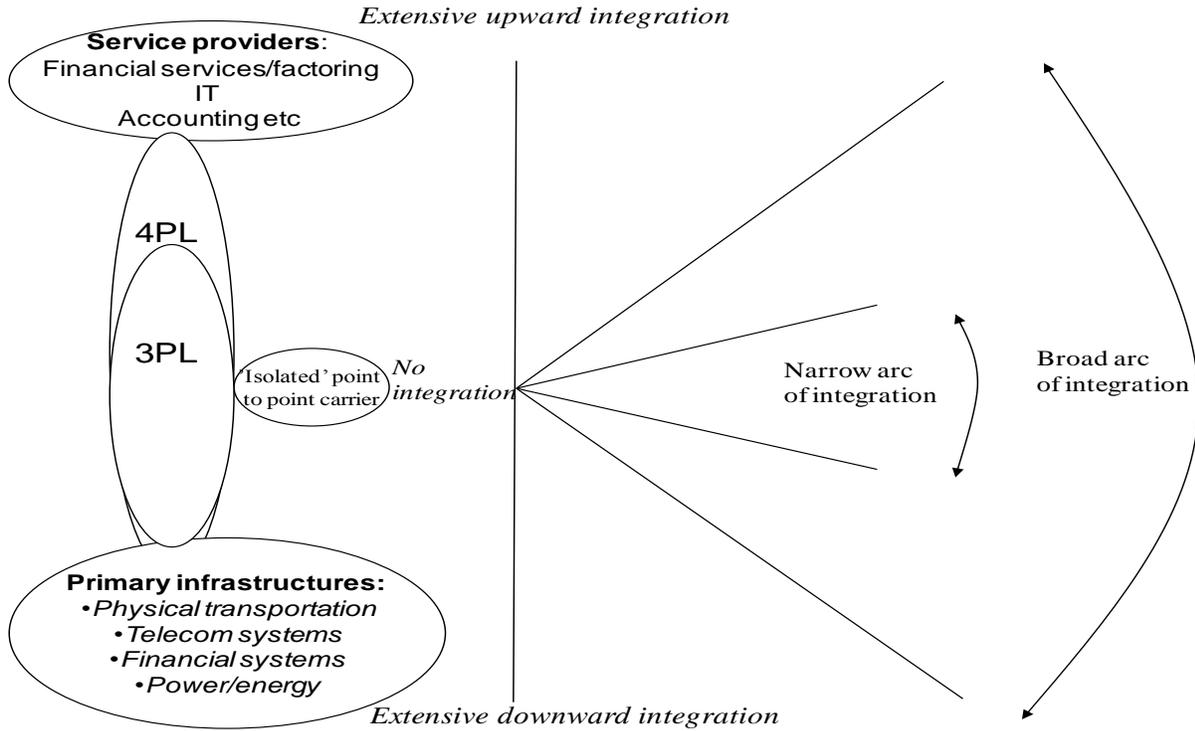


Table 1. Alternative business system structures

Dimensions	Production paths	Mediation paths (e.g. distribution)
<i>Supply structure</i>	Sequential chains with horizontal, vertical and diagonal scope.	Layered networks with horizontal, vertical and diagonal scope.
<i>Boundary conditions</i>	Upstream-downstream	Overcurrent-undercurrent
<i>Relationship emphasis</i>	Buyer-supplier	Co-producer
<i>Integration</i>	Backward and forward integration in chains.	Upward and downward integration in networks.
<i>Positioning</i>	According to the number of upstream and/or downstream tiers across the chain, and the characteristics of the actors present in each tier.	According to the number of overcurrent and undercurrent network layers and the characteristics of the actors (including the number of exchange streams) present in each layer.