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## **Toward the Theory of the Supply Chain**

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### **Abstract**

As our discipline has matured, we have begun to develop theories of supply chain *management*. However, we submit that a major omission of theory development in the supply chain management discipline is that we have failed to develop a theory of *what* we are managing – a theory of the supply chain. Using a conceptual theory building approach we introduce foundational premises about the structure and boundary of the supply chain, which can serve as the basis for much needed, additional development of the theory of the supply chain.

**Keywords:** *theory of the supply chain; conceptual theory building; networks; complex adaptive systems; boundaries*

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## INTRODUCTION

The term supply chain management is credited to consultants (Oliver & Weber, 1982), was quickly introduced into academia (Ellram & Cooper, 1990; Jones & Riley, 1987), and has since helped to unite procurement, operations, and distribution into the more unified discipline of supply chain management. As our discipline has matured, we have seen the emergence of theories of supply chain management (SCM). For example, Chen and Paulraj (2004), Cooper, Lambert, and Pagh (1997), and Croxton et al. (2001) use a conceptual theory building approach to develop frameworks and identify the key constructs and processes surrounding SCM; and Lambert, Cooper and Pagh (1998) and Mena, Humphries, and Choi (2013) use an inductive, multiple case study approach to develop theories of supply chain management.

The development of such overarching theories, as well as more granular theories and frameworks, is a natural outcome of the evolution of a discipline (Smith & Hitt, 2005). And indeed, we have seen increasing calls for developing theories within the supply chain management discipline, when appropriate, rather than solely relying upon theories from other disciplines (e.g., Cousins, Lawson, & Squire, 2006; Carter, 2011; Fawcett & Waller, 2011). Considering the current state of theory development, we begin with an observation that there may be a rather large omission and oversight in the conceptualization, and emerging theories, of supply chain management: before we continue to build theories of supply chain *management*, we must first develop a theory of *the supply chain* – the phenomenon that we purport to manage. We propose that to have meaningful theories about managing the supply chain, we need to have a theory of the supply chain itself.

Our discipline's current perspective of the supply chain may be oversimplified – whether we think of it as a chain or even a broader network. In particular, one major omission in our conceptualization is that we tend to think of the members of the supply chain through which products physically flow, and generally fail to explicitly take into account the many additional members of the supply chain that play a vital but indirect, supportive role in the movement, storage, and transformation of product across organizations. Another significant omission is that we do not have a clearly defined yet nuanced means by which to assess the boundaries of the supply chain. Instead, we tend to conceptualize the supply chain in either an overly simplified (e.g., a supplier-manufacturer-distributor triad) or overly complex (e.g., vast networks of companies) manner that does not allow a reasonable balance between realism and pragmatism.

Our purpose in writing this paper is to present a preliminary effort toward the development of a theory of the supply chain. Our hope is that this initial conceptualization will provide a foundation for continuing efforts both to refine this theory building effort and to develop additional, ancillary theories of the supply chain. In the sections that follow we take a network perspective, and use the lens of complex adaptive systems to introduce foundational premises surrounding our theoretical conceptualization of the structure and the boundaries of the supply chain. We conclude by proposing several potential future research questions and by discussing the managerial implications of our theorization.

### **THE SUPPLY CHAIN IS A NETWORK**

Broadly, we conceptualize a supply chain as a network. As succinctly stated by Borgatti and Li (2009, p. 6): “SCM has not been just dyadic, as say, most of resource

dependency has been, but has – through the notion of chains – implicitly considered paths through a network of firms.” Much earlier, marketing channels scholars considered how distributors, dealers and other downstream members of the supply chain are structured in terms of their management (Bucklin, 1966); Thorelli (1986) used the term “competing networks” to describe what are essentially supply chains within a market; Ford (1990, p. 441) contended that, “No pair of firms operates in isolation from others”; and Lambert, Cooper, and Pagh (1998) discussed the supply chain network within the context of managing the supply chain.

Supply chain researchers have begun to move beyond the buyer-supplier dyad to consider triads as “the smallest unit of a network” (Mena, Humphries, & Choi, 2013, p. 59). As noted by Choi and Dooley (2009, p. 25), the supply network research, “strives to examine the network beyond the dyad, from triads to the extended network.” This supply network research has examined phenomena such as buyer-supplier-supplier relationships and archetypes (Wu & Choi, 2005), coalition behavior of both buyer-supplier-supplier and buyer-buyer-supplier triads (Bastl, Johnson, & Choi, 2013), and the structural embeddedness of a supplier within a broader supplier network (Choi & Kim, 2008).

Similarly, we adopt a network perspective, where the supply chain is a network consisting of nodes and links. In their conceptualizations of a marketing channel, Stern and El-Ansary (1977, p. 7) note that, “channel intermediaries are not, in fact, functioning as enlisted member components of a distribution system, but (are instead) ... the result of ... independently made decisions.” Bucklin (1970, p. 18) also takes a multi-organizational perspective, and defines a node as an establishment: “any business operation conducted at a single, definable location”. More explicitly, we broadly define a

node as an establishment which is an *agent* that has the ability to make decisions and maximize its own gain within the parameters in which it operates (e.g., manufacturers, warehouses, transportation carriers, and financial institutions). We define a link as the connection between two nodes. Links represent transactions consisting of the flow of materials, information, and/or finance between nodes. We make this conceptualization explicit in our first foundational premise (FP):

**FP1:** The supply chain is a network, consisting of nodes and links.

While the conceptualization of the supply chain as a network is far from novel, we use FP1 as a necessary building block in developing the foundational premises which follow. We next refine this conceptualization, by using complex adaptive systems as a theoretical lens.

### **THE SUPPLY CHAIN IS A COMPLEX ADAPTIVE SYSTEM**

An agent as a node in a supply chain can look upstream toward its suppliers and downstream toward its customers. However, the visibility in either direction is invariably going to be limited. What lies beyond the realm of its visible range simply *emerges* for this agent (Choi and Krause, 2006). To that end, a supply chain as a network operates as a self-organizing system (Holland, 1995) called a complex adaptive system (CAS) (Choi, Dooley, and Rungtusanatham, 2001). In the same vein as Choi et al., (2001), we advocate that managers and scholars largely acknowledge the need to manage the supply chain as a system (Frankel et al., 2008), but that the supply chain as a system is dynamic, complex, and difficult to predict and control. For these reasons, it is insufficient to treat a supply chain as “simply a system”, but rather as a complex adaptive system in which, “managers and researchers can interpret the (supply chain) behavior in a more complete

manner and develop interventions that are more likely to be effective,” (Choi et al., 2001, p. 352).

Each node in the supply chain has control over resources and accountability in terms of operating as a profit or a cost center, and thus has agency. The agent consequently attempts to manage a portion of its upstream and downstream supply chains to maximize its gain. Within the visible range of the supply chain, the agent tries to focus on centrally *controlling* operations to increase performance for its benefit. For instance, a distributor will focus on selecting the best manufacturers on the upstream side and expanding its customer base downstream. A manufacturer may try to implement a JIT system or VMI with its upstream suppliers and to establish downstream distribution centers at the right locations. However, beyond the visible range, the agent has no choice but to accept what happens there. The collection of all these agents together form a supply chain as a self-organizing, emergent CAS.

This leads to our next foundational premise:

**FP2:** The supply chain as a network operates as a complex adaptive system, where every agent grapples with the tension between control and emergence.

With this theorization of the supply chain as a complex adaptive system and network, we next develop a more granular conceptualization by considering the relativity of the supply chain with respect to a particular firm and product.

### **THE SUPPLY CHAIN IS RELATIVE**

As an agent surveys upstream and downstream, it sees within its visual range not just one supply chain but many supply chains. Upstream, it typically sees different agents (i.e., first-tier suppliers) for various parts, assemblies and modules it procures from them. Downstream, it sees different agents depending on the type of products it is delivering.

For instance, Honda sees different first-tier suppliers for its center console assemblies for its Accord versus its Acura CL/TL models (Choi & Hong, 2002). It may also see different first-tier suppliers for different types of assemblies such as a center console versus an instrument panel. Downstream, Honda may see different dealerships for its motorcycles versus automobiles or for its Honda line versus its Acura line.

Further, what the agent sees may vary depending on the type of raw materials and parts that it sources and delivers. For instance, for a raw material or part that undergoes a transformation process and becomes part of its product, the agent can see the supply chain in both the upstream and downstream directions. However, for an MRO item that is consumed within its own organization, it may see the supply chain on the upstream side but not on the downstream.

Nearly every agent is at the convergence of multiple supply chains. There are so many different supply chains bisecting the agent that it is necessary to define the specific supply chain (relative to the agent and a specific input or output), to make the conceptualization of the supply chain tractable. Therefore, we propose that there is no overarching, absolute supply chain for an agent. Whenever one addresses the supply chain for a particular agent (i.e., a company), one would have to specify the referent (e.g., Apple iPod touch, Intel 3<sup>rd</sup> Generation Xeon processor) for that agent as the unit of analysis. In this regard, we submit that supply chains are always relative to their reference points. Thus:

**FP3:** The supply chain is relative to a particular product and agent.

We refer to this particular agent as the focal agent (focal firm). We define a product as an input to or an output of the agent, which has physical substance and which

moves into or out of a node via a physical mode of transportation (e.g., rail or motor carrier). The supply chain is thus *relative* to the focal agent and a specific product, and will likely look different (and perhaps entirely different) for another agent and/or point of reference.

### **THERE IS A PHYSICAL AND A SUPPORT SUPPLY CHAIN**

Building on these foundational premises, we further differentiate between what we refer to as the physical supply chain and the support supply chain. The physical supply chain, displayed in Figure 1a, looks much like the traditional supply chains that appear in textbooks and on classroom whiteboards. A node in the physical supply chain is an agent with a permanent, physical location where activities occur that add form, place, and/or time utility (Coyle, Bardi, & Langley, 2003), and is represented by ovals in Figure 1. A link, which is represented by a solid line in Figure 1, consists of the physical movement of a product between these nodes. There will generally be two additional links that connect nodes in the physical supply chain – the movement of information and the movement of finance. For the sake of parsimony, we designate both the information and finance links with the same dashed line in Figure 1.

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Insert Figure 1 About Here  
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Early marketing channels literature mentions “the numerous agencies and institutions that facilitate the passage of title and the physical movement of ... goods,” (Stern & El-Ansary, 1977, p. 4), but does not explicitly map these agents in conceptualizing the downstream channel. We define the support supply chain as consisting of nodes through which a product (relative to the focal agent) does not flow,



but which support the physical supply chain of that product. Examples of such support nodes include financial institutions, brokers, and truckload transportation. Figure 1b displays the physical supply chain shown in Figure 1a, along with at least a portion of its support supply chain. Nodes in the support supply chain are represented by rectangles. Note that the support supply chain nodes are connected to other nodes (both physical and support) by dashed lines, representing information and/or finance. They are not connected by solid lines because the focal agent's product in this case does not move through, for instance, a transportation broker's office or a financial institution.

Finally, there are cases where a carrier or other support supply chain node might also operate a physical node in the supply chain. For example, with less than truckload (LTL) carriage, the carrier would generally operate terminals for consolidating and break-bulking freight. An example of this sort of operation is displayed in Figure 1c, where a product moves from the focal agent (node) through two warehouse terminals (which are permanent physical locations where form, place, and/or time utility are added to the product) to the focal agent's customer in the physical supply chain.

Based on the above definitions and description of the physical and support nodes and links, we put forth:

**FP4:** The supply chain consists of both a physical supply chain and a support supply chain.

This dichotomy of the physical and support supply chain provides a more granular understanding and potential mapping of the supply chain. In comparison with earlier maps of supply chains that focus on the flow of physical goods (e.g., Choi & Hong, 2002), this realization allows for agents, such as third party logistics providers, to be treated as either a physical or support node, thereby offering a more complete picture of

how value-adding activities are organized in a supply chain. In addition, our conceptualization of the physical and support supply chain differs from the primary and secondary supply chains that are introduced by Lambert et al. (1998) in several ways: first, value can be added through not only form utility, but also place and time utility; second, our conceptualization of the physical supply chain allows a focal firm to better understand how a product flows through its supply chain; and third, our unit of analysis is explicitly at the granular level of a particular product for a focal agent.

Further, unlike even earlier conceptualizations of marketing channels, which focus on time, place, and possession utility of the final consumer, our conceptualization allows for the unit of analysis to be any node in the physical supply chain. Also in contrast to early marketing channels conceptualizations (e.g., Stern & El-Ansary, 1977), our focus is on the physical flow of products through these nodes, rather than the “flow of title”. Our conceptualization thus allows for a more accurate mapping and understanding of the supply chain as a physical structure of nodes and links, including the ability to take into account increasingly complex scenarios where a firm might own multiple physical nodes across different levels of the supply chain (e.g., Alcoa) and/or where the firm is a “hollow corporation” that owns few, if any physical nodes (e.g., Nike).

### **THE SUPPLY CHAIN IS BOUNDED BY A FUZZY HORIZON**

Our description of the physical and support supply chain in Figure 1c allows us to conceptualize the structure of the supply chain, and provides us with a point of departure for next considering the boundary of the supply chain. Håkansson and Johanson (1990, p. 460) state that, “In principle ... industrial networks are unbounded, but the observer (or a specific actor) may, for analytical purposes, set suitable boundaries.” If the supply

chain is relative to a specific product that comes into or leaves a focal agent, then that focal agent must recognize that there is a boundary to that supply chain in terms of the agent's awareness of other nodes. Thus, the supply chain is not only relative to a focal agent and a particular product, but it is also bounded, in a sense, based on the extent to which the agent is *aware* of the physical nodes and links that move and add value to the product and the corresponding support nodes.<sup>1</sup>

This horizon or visibility boundary is based on the knowledge of the focal agent about the existence of another node, the location of that node, and the activities that occur within that node. The first two parts of this definition, the knowledge of the existence of a node and its location, means that this knowledge extends beyond simply understanding that there is some amorphous, lower-tier supplier, to knowing the name and location of production of that specific supplier. This suggests a largely dichotomous visibility; the focal agent either knows or does not know who and where, for instance, a second-tier supplier or customer-of-a-customer is. The second part of this definition, the activities that occur within a node, implies a continuum of visibility on the part of the focal agent.

The supply chain generally continues beyond this visible horizon, and there are additional nodes and links that the focal agent is unaware of. Therefore, the bounding of the supply chain by the visibility of the focal agent creates a parsimonious unit of analysis that is neither overly simplified (i.e., the dyad or triad) nor overly complex (i.e.,

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<sup>1</sup> Håkansson and Snehota (1990, p. 531) state, "The definition of a "boundary", when applied to any social system, is naturally quite arbitrary ... and depends on the intentions and aims of the observer. When the perspective of management is adopted ... an organization's boundaries should thus be set as coterminous with the limits of its activity control." We have purposefully used "awareness", rather than control, as the basis for the boundary of the supply chain for two reasons. First, actions taken by a focal node might impact another node that is not visible to the focal node. Second, even if a focal node cannot influence another node in the supply chain, it may still want to have visibility to that other node; for example, a focal agent may not be able to influence a second tier supplier, but it could still develop an alternative source of supply or build inventory in anticipation of a supply shortage.

a vast supplier network that changes its shape constantly). It also allows for more careful attention to the management of the supply chain – a point addressed by Cooper et al. (1997) and Lambert et al. (1998) in their conceptualizations of supply chain *management*.

We formally state this conceptualization of the boundary of the supply chain as:

**FP5:** The supply chain is bounded by the visible horizon of the focal agent.

Where does the visible horizon lie, and what are its characteristics? The visible horizon will vary depending on the supply chain (the particular product and agent) and will also likely differ in the upstream and downstream directions for the agent, and the particular product. For example, research has suggested that many firms are integrated upstream to about the same extent that they are integrated downstream, with greater levels of combined supplier and customer integration leading to higher levels of performance improvement (Frohlich & Westbrook, 2001; Thun, 2010). Is this true for all types of supply chains? For example, when would the position of the focal agent in the supply chain impact the efficacy of extending the visible horizon upstream versus downstream? And how would the specific product type impact the effectiveness of extending the visible horizon? For product types, one might turn to Kraljic's (1983) categorization of spend on the focal agent's inbound side or the product's market segment on the outbound side.

Further, if one were to take an absolute rather than relative perspective on supply chains, one may be predisposed to assuming a clear, determinate boundary of a supply chain. However, we have argued that a supply chain is a network that is relative to a product that comes into or leaves a focal agent. A fastener manufacturer and a sunroof manufacturer, even though they are in different lines of business, might see some parts of

their supply chains overlap. Yet, two competing fastener manufacturers would see different supply chains depending on their procurement and marketing policies. As a CAS, nothing stays constant and changes occur simultaneously. Boundaries are fuzzy in this regard, and can only be discussed in terms of “awareness.”

The visibility of a focal agent is also likely to be attenuated. In physics, attenuation is defined as the gradual loss of intensity of the flow of a physical property and Webster’s Dictionary describes it as a reduction or tapering in thickness, density, or force. The process of attenuation in supply chains suggests that the boundaries of the supply chain become less clear as the distance from the focal agent to other agents increases. This distance can be an attribute of physical distance and cultural distance (Hofstede, 2001) between the focal agent and another agent, as well as a factor of the number of nodes that separate the focal agent from another agent in the supply chain (referred to as closeness centrality in the parlance of social networks). This attenuation leads to a gradual decrease in visibility as distance increases and a visible horizon of the supply chain that is fuzzy for the focal agent, much as an individual’s visibility becomes less clear as he or she peers off into the physical horizon.

This leads to our final foundational premise:

**FP6:** The visible horizon of the focal agent is subject to attenuation, where distance is based on factors including physical distance, cultural distance, and closeness centrality.

We have progressively developed six foundational premises, wherein a new foundational premise is grounded in earlier foundational premises. With these foundational premises in hand, we conclude by describing the avenues for future research

based on testing, modifying and extending our conceptualization of the supply chain, and the managerial implications of our conceptualization.

### **WHERE DO WE GO FROM HERE?**

Our conceptualization of the supply chain allows for a distinct (relative to a particular product and a focal agent), bounded (by the visible horizon, which is subject to attenuation), and thus parsimonious unit of analysis. At the same time, this conceptualization allows us to differentiate between the physical and support supply chain, which leads to a more nuanced perspective of the value-adding roles of different nodes with agency and the respective links that exist among them. However, we recognize we are far from developing a formal theory of the supply chain. It is our hope that our present study serves as a starting point.

To facilitate our discussion of future research opportunities, we juxtapose the structure (physical and support) and boundary (inside and outside the visible horizon) of the supply chain in the matrix shown in Figure 2. This juxtaposition of supply chain structure and boundary highlights the focus of most of the academic research on the portion of the physical supply chain within the visible horizon. Research has also begun to focus on the support supply chain – for example the incipient supply chain finance research is beginning to unearth the movement of capital behind the physical supply chain. Figure 2 also highlights the white space and opportunities for research focusing on the fuzzy supply chain – agents that are near the horizon, where the focal agent may not have much awareness about the activities that occur within the node – and the supply chain that lies beyond this visible horizon.

Our conceptualization of the supply chain can also inform managers concerning their blind spots. Like their academic counterparts, managers have historically focused on managing the physical supply chains that lie within their visible horizons (the upper-left hand corner of the matrix), with a relatively recent emphasis on managing certain parts of their visible support supply chains (Johnson & Hofmann, 2014; Sampson & Spring, 2012). Most organizations are still grappling with how to manage the physical supply chains that reside beyond the visible horizon (the upper, right-hand corner of the matrix); for example, the vast majority of firms are struggling with how to identify and report the use of conflict minerals as required by the Dodd-Frank Wall Street Reform and Consumer Protection Act (Chasan, 2014). Finally, it is likely that the management of the support supply chain that resides beyond the visible horizon is barely on the radar screens of most managers.

### **Addition Conceptual Development**

We see at least five avenues for further developing our conceptualization of the supply chain. *First*, there are numerous research questions which might arise based on our conceptualization of structure – the physical and support supply chain – and the boundary of the supply chain as the visible horizon. Could we conceptualize the portion of the supply chain that lies beyond the visible horizon? Perhaps researchers can help managers to identify and manage critical suppliers that often exist beyond their visible range. Called “nexus suppliers”, the strategic value of these suppliers comes from their “network portfolios and resultant portfolio of interorganizational ties” (Yan, Choi, Kim, & Yang, 2015) – and potential sources of disruption (e.g., the supplier, Evonic, which produced more than 50% of the world’s demand for PA12 resin, but was not visible from

the perspectives of its second-tier customers). Would such a conceptualization differ between the physical and support supply chain?

*Second*, there are opportunities to develop additional dimensions of the supply chain, and to refine the dimensions that we have put forth. A dichotomy we have proposed for bounding the supply chain is that a focal agent either knows (has awareness) or does not know (does not have awareness) who a second-tier supplier or customer is. There is an opportunity to refine this conceptualization at the fuzzy horizon, by developing a more formal continuum in terms of the extent of knowledge that a focal agent has about a visible supply chain node's operations and processes.

*Third*, our dichotomization of the physical and support supply chain, along with our focus on a physical product, might limit the generalizability of our theorization by excluding the *service* supply chain. Due to the ethereal quality of services and the instantaneous production and consumption of services, many service supply chains may have very different characteristics. Thus, future research might extend our conceptualization by more explicitly considering the service supply chain.

*Fourth*, the visible horizon, as a boundary to the supply chain, likely varies depending on the focal product and the location of the focal agent. Further conceptualization of the visible horizon, along with empirical research, might yield additional insights into how the visible horizon may differ, and the ways in which it can be effectively managed, given these differing contexts.

*Fifth*, we have not included the consumer in our conceptualization of the supply chain, based on our definition of a node as an establishment (Bucklin, 1970). This definition certainly allows for parsimony. However, the goal of supply chain



*management* is generally considered to be one of providing the most appropriate and competitive mix of price and service to the final consumer (Ellram & Cooper, 2014). Thus, another extension of our conceptualization would be the inclusion of the consumer, in a manner that would improve the generalizability and realism of our theorization, without unduly increasing its complexity.

In conclusion, our objective and starting point was to fill what we view as a significant void, by beginning to develop a theory of the supply chain that will lead to a common understanding and the ability to better assess what we know, don't know, and should know as scholars and practicing managers. Our hope is that our conceptual theory development efforts will serve as a starting point for future research and dialogue among both supply chain management scholars and practitioners. Further, we hope that our theorization will aid supply chain scholars in continuing to develop our discipline's own theories of supply chain *management*.

### **Empirical Testing and Investigation**

Our hope is that our conceptualization of the supply chain will also lead to future empirical investigation. Here, there are also numerous and ripe avenues for research – both inductive and deductive. As one example, Thorelli (1986) discusses power and trust within the context of the “network paradigm”. These constructs, along with others such as commitment and opportunism, relate to how firms attempt to *manage* the supply chain. While these and many other constructs of a similar vein have been extensively studied over the past two-plus decades (e.g., Crosno & Dahlstrom, 2010; Geyskens, Steenkamp, & Kumar, 1998; Leuschner, Rogers, & Charvet, 2013), there may be an opportunity to

extend and add precision to these constructs in terms of their relationships with the supply chain (e.g., supply chain structure and supply chain visibility).

Another rich avenue for future research would be to study the evolution of supply chains. Databases such as Bloomberg and FactSet, along with dynamic visualization software such as SoNIA and NetVis, might allow this prescription to be methodologically viable. Such investigations would not only help to identify previously unknown supply chain archetypes, but develop an understanding of how such archetypes might change over time. Coupled with additional secondary data sources, we could learn more about how these changes might be impacted by, and impact, firm performance.

A related area of inquiry would be to investigate the life cycles of supply chains – how supply chains are initiated, why some supply chains grow, and why some supply chains expire. Another area of inquiry might be to investigate the relationship between “black swan” events – high-profile, difficult to predict, and rare events (Taleb, 2010) – in the supply chain with supply chain structure. Such studies could develop insights concerning how firms might be better able to identify the location of such events, a priori, based on supply chain structure, and where it most makes sense to expand the visible horizon. Yet another avenue for future research would be to investigate how the structure of the supply chain might be related to the ability of firms to more effectively innovate and engage in new product development (see Carnovale & Yenyurt, 2015). Researchers might also investigate the “extra-net competition” (Cunningham & Culligan, 1988) of supply chains competing against one another. By focusing on a focal agent and a focal product, researchers might remove the error variance of multiple product lines and make such studies possible.

Finally, research is needed to better understand the factors that lead to the visible horizon and attenuation. For example, how do physical distance, cultural distance, and psychological distance affect a focal agent's boundary of the supply chain?

## **Conclusion**

To lay down the underpinnings of the theory of supply chain, we have proposed six foundational premises. We realize that in isolation, the individual concepts of our conceptualization have appeared in the existing literature. However, when integrated together, they provide a holistic conceptualization of the supply chain—what it is and how it behaves. By doing so, provide the context in which the existing concepts fit together, and lend precision to key terms and constructs, including the term “supply chain” which forms the basis of the rubric of our discipline. Our hope is that what we have done here will offer other researchers in the discipline fodder for extending the conceptualization of the supply chain, through both additional theorizing and empirical investigation.

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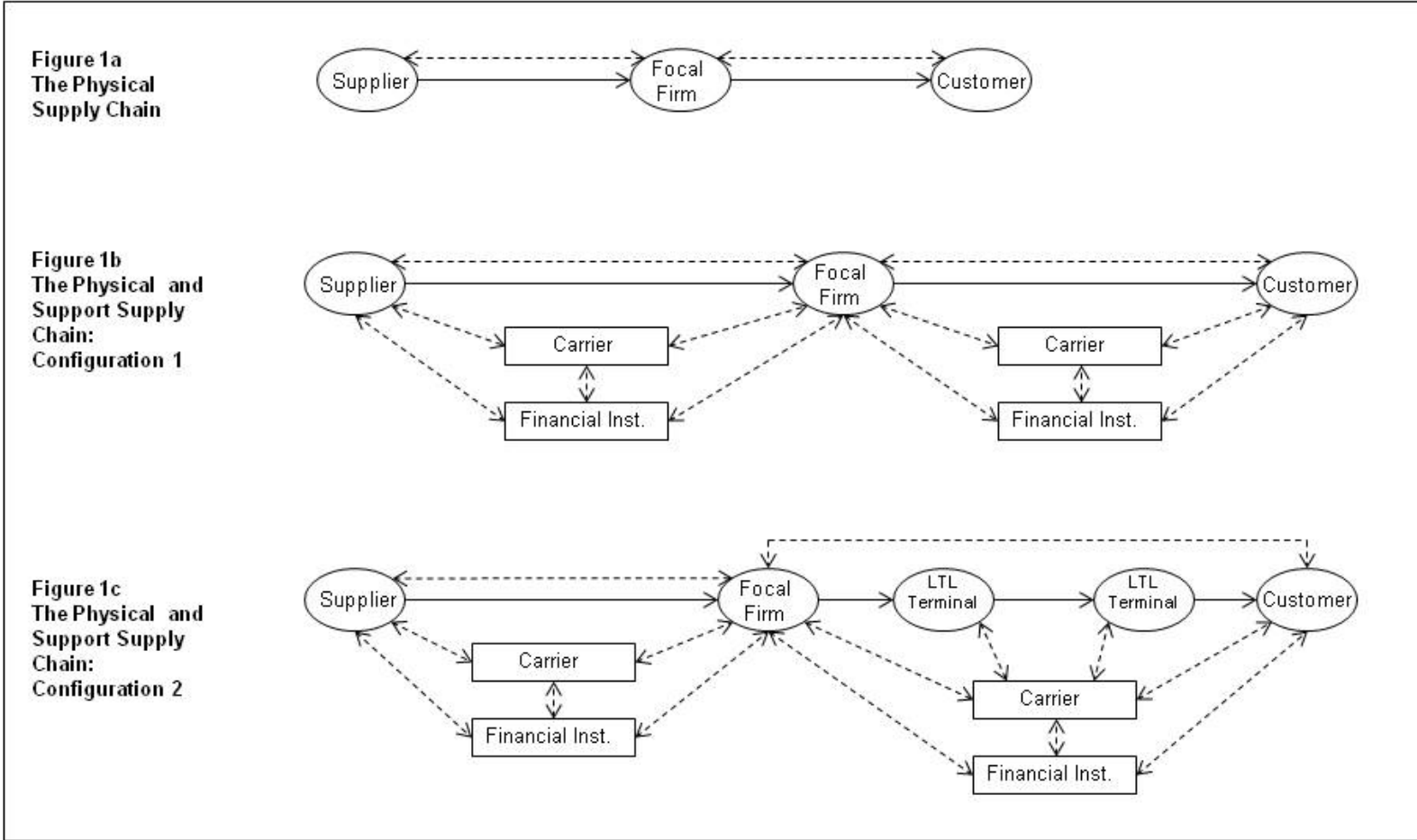
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**FIGURE 1**  
**The Physical and Support Supply Chain**



Note: Ovals represent physical supply chain nodes and rectangles represent support supply chain nodes. Solid lines represent the flow of product between physical nodes; dashed lines represent the flow of information and/or finance between physical and/or support nodes.



**FIGURE 2**  
**Juxtaposition of Supply Chain Structure and Boundaries**

|          | Within the Visible Horizon | Outside the Visible Horizon |
|----------|----------------------------|-----------------------------|
| Physical | ++                         | -                           |
| Support  | +                          | --                          |

Note: ++ (a great deal of research and managerial focus), + (some, relatively recent research and managerial focus), - (very little research and managerial focus, and -- (almost no research and managerial focus).