

# TOWARD A THEORY OF MULTI-TIER SUPPLY CHAIN MANAGEMENT

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Recent trends toward outsourcing and global sourcing have created longer, more complex and more fragmented supply chains. In this research, we aim to instigate a theoretical development of multi-tier supply chain (MSC) management by adopting an inductive case study research design. Following a multiple case research design, we investigate three-tier supply chains to develop a theory of MSC management. Each of the investigated supply chains consists of a buyer, supplier and supplier's supplier. Based on the case studies, propositions are built concerning how MSCs operate. As an underlying methodology, we first conduct a within-case analysis and then expand that analysis to the cross-case context. The results show the impact that the dynamics of the MSC have on power balance, structure, interdependence and relationship stability inherent in MSCs.

*Keywords: multi-tier supply chain management; buyer/supplier relationships; triadic relationships; partnering; supplier management; networks; case studies; qualitative data analysis; inductive research*

## INTRODUCTION

The days when a single organization would own an entire supply chain, like the Ford Motor Company did in the first half of the early 20th century, are long gone (Gelderman, 1989). The trends toward outsourcing and global sourcing have created more complex and fragmented multi-tier supply chains (MSCs) (Christopher & Peck, 2004; Harland, Knight, Lamming, & Walker, 2005).

It is long been recognized that the length and complexity of supply chains can have an impact on economic indicators of performance, such as cost, quality, responsiveness and resilience (Choi & Krause, 2006; Christopher & Peck, 2004; Closs, Jacobs, Swink, & Webb, 2008; Skilton & Robinson, 2009; Zsidisin, Panelli, & Upton, 2000). Several authors have argued that these impacts go beyond the economic realm, and considerations have been given to environmental and social impacts across multiple stages of a supply

chain (Bowen, Cousins, Lamming, & Faruk, 2001; Lamming & Hampson, 1996).

Despite the growing importance of MSCs, multiple challenges for researchers have been recognized (Håkansson & Persson, 2004; Lamming, Johnsen, Zheng, & Harland, 2000; Pathak, Day, Nair, Sawaya, & Kristal, 2007). The complexity of MSCs includes not only the structural issues of networks such as number of links, reverse loops and multi-way exchanges, but also the associated behavioral issues such as nonlinear dynamics, self-organization, emergence and co-evolution (Choi, Dooley, & Rungtusanatham, 2001; Eisenhardt & Galunic, 2000; Kellen & Stefanczyk, 2002; Pathak *et al.*, 2007). Therefore, our study aims to gain a more in-depth understanding of the structure, behavior and performance of MSCs.

More specifically, what happens within MSCs is still largely underexplored (i.e., how a link affects another link and how a node affects a node once removed)

(Choi & Wu, 2009a). In this study, we intend to instigate a theoretical development in the subject of MSCs by exploring the activities of three MSCs in the U.K. food industry. We chose the food industry because we wanted to include the raw materials supplier at the second-tier supplier level, and this industry allowed us to do that. Focusing on this industry in essence allowed us to cover the whole supply chain from retailer to raw materials supplier in a three-tier MSC.

We first review the extant literature on MSCs and, in particular, on triadic relationships. As the study uses an inductive approach, the literature review is *not* used to identify and define themes and hypotheses, but to explicate the need and motivation of the study. We then discuss the research design and how the data were collected and analyzed, present the results of the analysis and derive key propositions from the data. At this stage, we incorporate additional literature that is relevant to the emerging themes and relationships, following the inductive tradition. We conclude with an evaluation of the emerging theory of MSCs and provide suggestions for future research.

## LITERATURE REVIEW

Firms are increasingly extending their reach deeper into the supply chain (Choi & Linton, 2011; Pagell, Wu, & Wasserman, 2010) and operating within more complex and dynamic networks. Such arrangements have been described as systems of interconnected autonomous entities that make choices to survive and, as a collective, self-organize and evolve over time (Choi *et al.*, 2001; Halinen, Salmi, & Havila, 1999; Pathak *et al.*, 2007).

Despite a trend toward more complex and diverse supply chains, many of the key constructs used to describe and analyze them tend to be grounded on dyadic logic. For instance, Cox, Sanderson, and Watson (2001) and Cox, Watson, Lonsdale, and Sanderson (2004) recognized the complexity of multiple relationships in a supply network and proposed a way to analyze power regimes in MSCs, which focuses on the analysis of a series of dyads, combining a resource-based view (RBV) (Barney, 1991a, 1991b; Wernerfelt, 1984) and a relational view (Dyer & Singh, 1998), without taking into consideration the possible interrelations between the links among these dyads.

Critics of the dyadic approach to researching supply chains have argued that focusing on dyads does not capture the complexities of networks (Choi & Wu, 2009a, 2009b; Rowley, 1997). An alternative is the study of multi-tier systems, which avoids some of the complexities of networks without the drawbacks of the dyad. The simplest form of an MSC is a three-tier

system or triad. Triads have been proposed as the smallest unit of a network, because they make possible the analysis of the impact of a third party on a relationship between two other organizations, something that is not possible when focusing on isolated dyads (Choi & Wu, 2009a; Wu, Choi, & Rungtusanatham, 2010).

So far, most of the research into triads in supply networks has focused on buyer–supplier–supplier relationships (Choi & Wu, 2009a, 2009b; Peng, Lin, Martinez, & Yu, 2010; Wu *et al.*, 2010), with a few exceptions. Rossetti and Choi (2005, 2008), for instance, described the process of disintermediation in which the supplier's supplier cuts out the middle man and reaches directly to the buyer. Li and Choi (2009) argued that the case of services outsourcing can only be understood when considering the dynamics among the buyer, supplier and buyer's customers. Phillips, Liu, and Costello (1998) studied the manufacturer–dealer–customer relationships within marketing channels. Hingley (2005a, 2005b) looked at triads in the U.K. agri-food industry and network supply co-ordination sourcing models.

## Dealing with the Complexity of Multi-Tier Supply Chain Research

Much research into MSCs has relied upon modeling and simulation approaches. Jay Forrester's seminal paper on industrial dynamics (1958), arguably the first academic paper on supply chain management, illustrates how computers could be used to simulate the dynamics of production and distribution systems. Forrester's legacy continues to this day in the ubiquitous Beer Game (Sterman, 1988, 1992), which is used to teach the impact of decision making and feedback control systems in supply chains. The system dynamics approach (Akkermans & Dellaert, 2005; Ge, Yang, Proudlove, & Spring, 2004) continues to be widely used alongside a myriad of modeling and simulation approaches, such as discrete event simulation (e.g., Thron, Gábor, & Niaz, 2007; van der Vorst, Beulens, & van Beek, 2000; van der Vorst & van der Zee, 2010), game theory (Axelrod, 1997; Wu *et al.*, 2010) and agent base modeling (Akanle & Zhang, 2008; Li, Sheng, & Liu, 2010).

An alternative to modeling and simulation has been the use of organizational, economic and sociological theories. However, in many instances, these remain in the dyadic contexts and do not use a multi-party unit of analysis. For instance, transaction cost economics (TCE) (Williamson, 1975, 1996, 2008), using the transaction as the unit of analysis, explains inter-organizational relationships through boundary decisions. The focus is on selecting the governance structures that minimize transaction costs for a specific firm (Williamson, 2008). While such governance structures

can involve multiple firms (e.g., multiple suppliers), the theory does not help to explain the dynamics among multiple firms.

The RBV (Barney, 1991a, 1991b; Wernerfelt, 1984) and the knowledge-based view (Grant, 1996, 1997) are also frequently used lenses in supply chain research. These approaches try to explain participation in a network so as to extend and complement a firm's internal resources, including knowledge, to generate rents and develop sustainable competitive advantage. Proponents of RBV also recognize the importance of inter-organizational relationships (Barney, 2012; Priem & Swink, 2012). However, the implications of the theory for MSCs have not been laid out. The relational view (Dyer & Singh, 1998) recognizes that a firm's critical resources may span across firm boundaries and that inter-organizational relationships can be a source of competitive advantage, but it too takes a predominantly dyadic perspective.

The development of complexity theory or complex adaptive systems (CAS) theory in the natural sciences has provided a different lens with which to investigate multi-party relationships. CAS does not seek to explain why firms take part in a network, but it can help to understand the behavior of multi-party relationships in the supply network context (Choi *et al.*, 2001). It provides an alternative perspective on multi-party relationships and a new set of constructs such as co-evolution, emergence, patching and self-organization (Li, Sun, Gu, & Dong, 2007; Pathak *et al.*, 2007). Although CAS has a multi-party focus, research has remained at the theoretical and conceptual level. These researchers have called for more empirical studies.

To address the problems that complexity poses for researchers, Choi and Wu (2009a), Andersson-Cederholm and Gyimóthy (2010) and Peng *et al.* (2010) propose the triad as the "fundamental building block" of a network. Understanding how a link affects another link and how a node affects a link that is not directly connected to it unlocks the essence of a network.

The triadic relationships literature has been enriched with contributions from marketing, service delivery and operations management to ground its empirical research. Perspectives include social network theory (Andersson-Cederholm & Gyimóthy, 2010; Borgatti & Li, 2009; Galaskiewicz, 2011; Kim, Choi, Yan, & Dooley, 2011), balance theory (Carson, Carson, Knouse, & Roe, 1997; Choi & Wu, 2009b; Phillips *et al.*, 1998) and the role of intermediaries (Havila, Johanson, & Thilenius, 2004; Phillips *et al.*, 1998). The importance of social ties to the effective operation of triadic relationships (Havila *et al.*, 2004) strongly points to the usefulness of these approaches when studying the social aspects of multi-tier relationships.

Such initiatives have resulted in a series of papers exploring various aspects of triadic relationships including both buyer and supplier dynamics. There appear to be two primary structural arrangements described in the literature.

## Structural Arrangements

**Buyer–Supplier–Supplier Relationships.** The first arrangement involves the relationships between a buyer and two suppliers, and between the suppliers (Choi, Wu, Ellram, & Koka, 2002; Wu & Choi, 2005; Wu *et al.*, 2010). This triadic formation rests on the premises that companies have extended beyond supplier management and now aim to manage the supply network as a competitive resource (Stallkamp, 2005). It brings salience to the way in which suppliers work together affects their own operational performance (Choi *et al.*, 2002; Wu & Choi, 2005).

Parallel sourcing to overcome supply risk aims to create simultaneous competition and cooperation between the suppliers, known as co-opetition (Brandenburger & Nalebuff, 1996; Wu & Choi, 2005; Wu *et al.*, 2010). Co-opetition creates a sense of stability in a relationship where interactions induce reciprocity and collaboration and reduce destructive competitive behaviors (Wu *et al.*, 2010). As a consequence, the focal buyer needs to sustain the positive aspects of these relationships through sourcing strategies and proactive management tactics (Choi *et al.*, 2002; Phillips *et al.*, 1998).

**Supplier–Buyer–Customer Relationships.** One network context where the buyer needs to coordinate multiple tiers is in services outsourcing. Services outsourcing is an increasingly common phenomenon where firms contract out specific functions such as IT or customer service, as they search for reduced transaction costs (Tate & Ellram, 2006; Williamson, 2008). Here, a buyer sells the customer a service that is provided by its supplier, often co-located in the customer's organization. According to Li and Choi (2009), services outsourcing cannot be understood unless one considers it in a multi-tier supplier–buyer–buyer's customer context.

In this arrangement, the buyer may initially act as a bridge between the supplier and customer (Li & Choi, 2009). However, the growth of the relationship between the customer and the supplier may cause the bridge role to move from the buyer to the supplier — the buyer's bridge position "decays" as the supplier is brought into contact with the customer and the bridge position eventually "transfers" over to the supplier as the buyer puts the supplier in charge of delivering the services. Unless this situation is carefully managed, the buyer will lose all information and control benefits (Peng *et al.*, 2010; Zaheer & Bell,

2005) and become exposed to opportunistic behavior on the part of the supplier (Li & Choi, 2009; Williamson, 1975).

This loss of bridge position is also known as supply chain disintermediation (Choi & Hong, 2002; Rossetti & Choi, 2005). The alternative and preferable situation is for the buyer to maintain a bridge decay status, acting as a performance monitor and source of issue escalation and resolution or as a solution integrator (Li & Choi, 2009). With a focus on superior customer service, the buyer will continue to maintain a relationship with the customer and enhance its reputation in the industry and its chances of obtaining future business (Carson *et al.*, 1997; Sanders, Locke, Moore, & Autry, 2007).

**METHOD**

Research into MSCs is still emerging, and this situation calls for exploratory research that can provide an in-depth understanding of the relationships among the members of a MSC. We adopt an inductive, the-

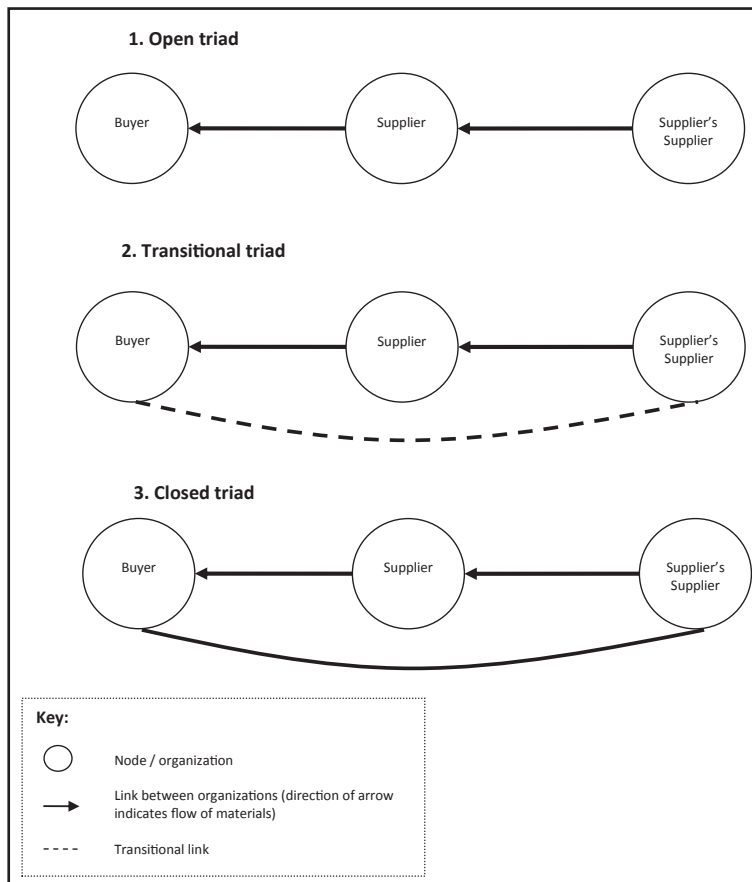
ory-building approach using a multiple case study design (Barratt, Choi, & Li, 2011; Eisenhardt, 1989; Ellram, 1996; Kaufmann & Denk, 2011; Yin, 2008) to investigate the relationships in three complementary MSCs in the U.K.'s food sector. The main unit of analysis in the study is the MSC, and the relationships among members of each MSC are treated as embedded units of analysis within each case study.

**Case Selection**

Theoretical sampling (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Miles & Huberman, 1994) was used to select three cases corresponding to each of the MSCs structures shown in Figure 1. The "Open MSC" represents a traditional supply chain where information and product flows are linear and there is no direct connection between the buyer and the supplier's supplier, giving the supplier in the middle a mediating role.

The "Closed MSC" occurs when the buyer and the supplier's supplier have established a formal link and are directly connected to each other. This means both

**FIGURE 1**  
Theoretical Multi-Tier Supply Chain (MSC) Structures



firms have regular contact with each other, share information and manage their mutual relationship either formally (i.e., through contracts) or informally through regular interaction. In this case, the mediating role of the supplier practically disappears.

We then sought a structure in between the “Open” and “Closed” MSC, which we shall call the “Transitional MSC.” In this structure, the buyer and the supplier’s supplier stretch out to each other and begin building a link and initiating a move toward a “Closed MSC.” For instance, a buyer may insist on providing an assurance or training function to the supplier’s supplier if there is a need to guarantee products are supplied to a particular standard. This type of structure can be found in the practice of directed sourcing in the automotive industry (Choi & Hong, 2002) and is also prevalent in service maintenance networks (Peng *et al.*, 2010).

The selection of the cases was carried out with two purposes in mind: control and theoretical replication. Firstly, we aimed to achieve theoretical replication by selecting cases that fitted the three MSC structures we propose. The second purpose was to control for factors such as culture, language, legal system and economic environment. To this end, we used cases in the same country and the same industry.

Eight companies were approached initially. In each case, a conversation took place to gain a general understanding of the supply chain and to assess the company’s willingness to participate. Three companies were identified as being representative of the three types of MSC as discussed above. They agreed to participate and assisted us by securing the collaboration of the other two parties within their respective networks, using snowball sampling (Miles & Huberman, 1994; Patton, 2002; Yin, 2008). The selected MSCs represent supply chains for three products — beer, bread and pork. All three satisfied our requirements for control and theoretical replication. Table 1 outlines the main characteristics of the companies in each of the three participating MSCs. To reassure participating

companies regarding confidentiality, they were offered anonymity.

### Data Collection

Four sources of data were used: interviews, site visits, workshops and documentation. The main source of data was the semi-structured interview. The other three data sources were used mainly to triangulate the data collected through interviews.

**Semi-Structured Interviews.** In each case study, interviews were conducted in three organizations that constituted the given MSC (see Table 2). Because we were seeking the “stories” that respondents had to tell about their network relationships and because we were trying to minimize theoretical biases, our questions were posed as open requests for information about how and why the parties worked together. Examples of both positive and negative experiences were sought, and our questions were in two parts. The first was related to the specific relationships with the other members of the triad; the second focused on the network and its impact on behavior and performance (See interview protocol in Appendix A).

Informants in each organization were selected based on their knowledge and experience of the relationship with the other company, either upstream or downstream in the supply chain. This was carried out with the help of the main contact in each company who was a senior executive with responsibility for operations and supply chain management. Interviews lasted for at least 1 hour and were not recorded to facilitate a more free-flowing discussion. Notes were transcribed within 24 hours of each interview and sent to the informant for verification.

**Site Visits.** Site visits were conducted at all of the facilities of the companies involved. They allowed the researchers to understand the product and information flows, to obtain data about the inter-organizational processes and to triangulate information about the relationships with customers and suppliers. Visits also provided opportunities for informal conversa-

TABLE 1

Case Study Multi-Tier Supply Chain (MSC) Structures

	Type of MSC Structure	Buyer	Supplier	Supplier’s Supplier
Case 1: Beer	Open	Multinational brewing company	Grain trader	Farmers association
Case 2: Bread	Closed	U.K.-based baker	Miller 1	Marketing cooperative
Case 3: Pork	Transitional	U.K.-based retailer	Pork processor	Pork breeder
Specific details about companies’ sales have been removed for confidentiality reasons.				

TABLE 2  
Data Collection Methods

	Interviews (with All Three Members of the Multi-Tier Supply Chain)	Site Visits	Workshops		Documents
			No. of Workshops	Avg. Participants per Workshop	
Case 1: Beer	9	3	2	4	Contracts, supplier awards documents
Case 2: Bread	8	3	2	4	Contracts, supplier selection policy, standard terms and conditions
Case 3: Pork	11	5	2	5	Sustainability and quality policies Standards
Total	28	11	6		

tions with people shipping product to the customer on the downstream side or receiving product from the suppliers on the upstream. If during the visits we identified something new or something contradictory to our earlier findings, we requested clarification.

Visits lasted between 1 hour and half a day, depending on the scale of the operation and practical constraints at the host company. Reports were sent to the companies for verification allowing them to bring to light any omissions or misunderstandings.

**Workshops.** Workshops were offered at the request of the participating companies. In each case study, there were two workshops involving each member of the MSC, one to “kick off” the project and one to present the results pertaining to their specific supply chain. These meetings were used to secure the companies’ involvement in the study and to report on the findings.

**Documentation.** Documents concerning the relationships in the MSC were collected, such as contracts and supplier selection policies. These documents were not collected from all companies as some considered them to be confidential (see Table 2). In some cases, asking for contracts revealed that some relationships relied purely on informal agreements.

### Data Analysis

Following the inductive approach (Barratt *et al.*, 2011; Kaufmann & Denk, 2011), the evidence collected from the case studies was used to develop a set of propositions. Miles and Huberman (1994) recommend a set of principles to be observed when analyzing qualitative data. First, the coding, writing, reflecting remarks and sorting of data were formalized (Miles & Huberman, 1994). This was carried out

using a case study database (including all notes from interviews, workshops and visits; collected documents; reflections and draft reports) supported by a spreadsheet with an index of the codes used to tag the quotes and notes, and cross-references to the case study database. Second, it was necessary to isolate patterns and identify commonalities and gradually establish the generalizations that were consistent across the cases (Kaufmann & Denk, 2011; Miles & Huberman, 1994). This was carried out using matrix displays supported by the spreadsheet containing the codes and quotes pertaining to each relationship and comparing and contrasting the codes and relationships emerging in each case. Finally, these generalizations were confronted against the body of knowledge leading to the development of propositions, as presented in the cross-case analysis and propositions section.

Miles and Huberman (1994) also recommend the analysis be conducted in two stages, within-case and cross-case. Firstly, within-case analyses were conducted focusing on the salient characteristics of the relationships among the members of each MSC. Case study reports were prepared and reviewed by the informants, a measure recommended by Yin (2008) to improve validity in case study research. This was followed by a cross-case analysis to identify similarities and differences across the three MSCs and to highlight any emerging patterns, which were reflected in the propositions.

The next section describes the qualitative data that pertain to the dynamics within each of the three MSCs. It is followed by the cross-case analysis that captures the common variables and patterns across the three cases.

**WITHIN-CASE ANALYSIS**

This section presents the results of the within-case analysis for the three case studies. Each subsection presents a description of the companies participating in the three-tier supply chain and the relationships between them.

**Case 1: The Beer Supply Chain**

This case study involved a Brewer, a Grain Trader and a Farmers' Association. The Brewer is a large multinational organization with a single malting site and multiple brewing sites in the U.K. The Grain Trader is the Brewer's preferred supplier of malting barley, the main ingredient in beer. The Grain Trader is dedicated to selling crop inputs and providing services to farmers. One of the organizations selling their crop through them is a Farmers' Association, which represents a group of farmers growing various commodities including malting barley. Farmers grow the barley and the Grain Trader is responsible for its marketing, testing, storage (in some cases) and transportation. The Grain Trader manages the supply of malting barley for the Brewer, acting as a bridge between Brewer and Farmers' Association. This MSC is depicted in Figure 2.

**Brewer–Grain Trader Relationship.** The Brewer outsourced most of the supplier management activities to the Grain Trader using a medium-term (yearly) contract, instead of traditional spot contracts. Members of both organizations met on a monthly basis to discuss operational issues, such as inventory levels, state of the crop, and quality and delivery issues. The contract stipulated that the price of grain was linked to the market price plus a management fee.

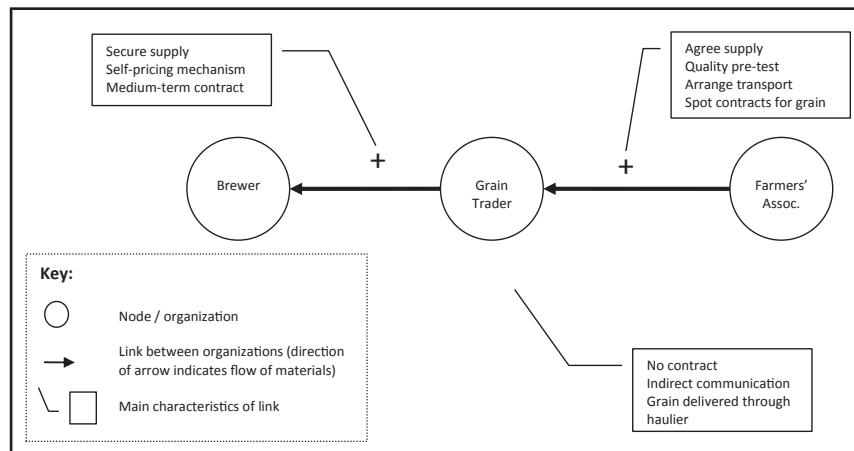
The data revealed a very strong relationship between Brewer and Trader, and both parties agreed they were

getting value out of the relationship. They also admitted caring about their partners' success; however, neither partner wished the other to succeed at their expense. Transparency of risks and rewards was seen as essential to maintaining a sense of fairness in the relationship. When asked about the value of the relationship, one of the interviewees from the Brewer expressed: "The relationship is valuable for us because they are the best supplier. There are many valuable things we get out of the relationship, particularly in terms of certainty which we can then pass down to the farmers." Similarly, interviewees at the Grain Trader said: "Benefits are equally shared. We both get good things and we are now getting the farmers involved... From my position I feel that the relationship is working to advantage both sides. We communicate well, rectifying any problems or issues smoothly."

There was also agreement that yearly contracts brought stability to the relationship, improving communication and allowing both parties to focus on improving quality and efficiency. However, there appeared to be some uncertainty from the Grain Trader concerning the long-term future of the relationship as the contracts had to be renewed on a yearly basis. "The contractual arrangement has given stability to the relationship. It took us out of the competitive nature of the business... We are just hoping this agreement will last for longer."

**Grain Trader–Farmers Association Relationship.** The Grain Trader and the Farmers' Association maintained a relationship to supply not only the Brewer but also many other customers with different kinds of grain. They would test grain quality and agree on prices with the farmers using spot contracts (i.e., short-term contracts to trade a specific amount of grain for a specific price). Once the barley was

**FIGURE 2**  
The Beer Supply Chain



ready to be shipped, they would arrange for a logistics provider to pick it up at the farm and deliver it to the Brewer.

The relationship between the Grain Trader and the Farmers' Association was perceived as positive, particularly by the farmers. The strongest point of the relationship was considered to be its ability to motivate quality improvements and innovation. There was another surprisingly strong point — the farmers seemed to feel secure about their long-term prospects, which encouraged future investments. This was surprising considering the farmers maintain only short-term contracts; however, the knowledge that they were part of a medium-term contract with a high-profile brewing company appeared to make a difference for them. "Now we know where our grain is going and we can work with them to test new [grain] varieties more suited to their needs."

A negative point in this relationship was the concern on the part of the Grain Trader regarding the farmers' ability to deliver reliable quality grain at the agreed times. This had led to some deterioration in trust, and interviews revealed that the Trader did not trust some farmers but admitted they depended on them for the supply of grain. "Many farmers don't understand their impact on our performance. They seem to have other priorities."

**The Brewer–Farmers Association Relationship.** The Brewer and the Farmers' Association had no direct relationship. However, it was clear that both were aware that they depended on each other and that they had an impact on each other's performance. The Grain Trader acted as an intermediary, which gave them (i.e., the Grain Trader) a degree of power in the supply chain. However, they also felt vulnerable as there were no specific mechanisms for preventing farmers selling directly to the Brewer other than the annual contracts they had in place.

In this particular supply chain, the presence of the Grain Trader in its role as intermediary appeared to exist only because the Brewer allowed it. The opportunity for exploiting the information asymmetry created by its role as intermediary was reduced considerably because the product being traded was a commodity priced in the open market. Given this situation, it was very difficult for the Grain Trader to take advantage by playing the other parties off against each other. Instead, they derive benefits by mediating between the Brewer and Farmers' Association. It appeared that the Brewer, the largest player in the supply chain, allowed the Grain Trader to act as a coordinator but would not tolerate it if it were to take advantage of its position.

## Case 2: The Bread Supply Chain

This supply chain represents the relationship between a large commercial Baker, a Milling company

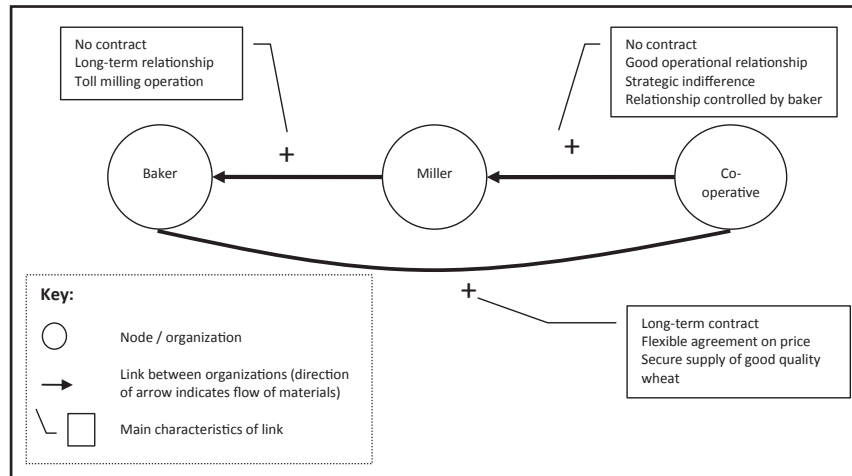
and a marketing Co-operative. The Baker is a large U.K.-based family business producing bread and other baked goods, with a strong brand name and long tradition of high-quality products. They own multiple bakeries in the U.K. and supply all of the large retailers in the country as well as many small retailers. The Miller is a subsidiary of one of the world's leading agricultural processors and one of the U.K.'s largest wheat millers. Their role is to mill the wheat into flour, which is then shipped to the Baker. The marketing Co-operative, at the other end of the MSC, is owned by farmers who grow wheat and other arable commodities. The Co-operative is responsible for marketing the grain, taking orders from the Baker and arranging for product to be delivered at the Miller for processing. This supply chain is depicted in Figure 3.

**Baker–Miller Relationship.** Under a "directed sourcing" arrangement, the Baker was responsible for sourcing the wheat rather than the Miller sourcing its own grain inputs. The Baker established a contract with the Co-operative and asked the Miller to purchase grain against that contract, and the Baker asked the Miller to ensure the quality and on-time delivery of the grain from the Co-operative. In other words, the Baker paid the Miller for the service and for the grain it purchased from the Co-operative. The Miller, in turn, paid the Co-operative for the grain and kept its milling service "fee." Interestingly, the Baker and Miller did not have a long-term contract in place — only an agreement to mill a specified amount. This appeared to be the legacy of a long-term relationship that had been working well. When asked about this type of arrangement, one employee at the Miller commented: "Perhaps we'll need to formalize the relationship more in the future, but it's never been a problem."

This relationship was viewed as very positive by both parties. The high point was around the stability of the relationship. Despite the informal (no contract) nature of the relationship, the companies have been trading for over 10 years. However, there was an indication that the understanding of goals and measures could be improved. An employee from the Miller commented, "We wonder at times if the local UK strategy aligns with their corporate worldwide vision. We would like to know where we fit." On the other hand, one interviewee from the Baker stated, "I'm not sure how mature they are for the performance measurement system. I don't know how they are interpreting it." At an operational level, the relationship seemed to function well as suggested by the following quotes, "The relationship is excellent, and at ground level very practical and visible" (Miller) and "At bakery level the relationship works reasonably well" (Baker). Communication was considered good; however, the interviews indicated that it could be improved.



**FIGURE 3**  
The Bread Supply Chain



**Miller–Co-operative Relationship.** Although the Miller and the Co-operative had a buyer–supplier relationship in terms of the materials flow, they did not have contracts in place and were dedicated to managing operational issues related to the delivery and quality of wheat. When assessing this relationship, both organizations were positive about the operational aspects and claimed to have no problems with each other. However, they admitted that the key relationship for them was with the Baker, not with each other. This relationship was almost entirely controlled by the Baker, who leverages its position to make the other two organizations work together smoothly. So, although at an operational level the relationship between both organizations was cooperative, at a strategic level the relationship could be described as indifferent.

**Baker–Co-operative Relationship.** For the Baker, high-quality wheat is a key ingredient in bread making, and it actively looks for the best farmers for its supply of wheat. To do so, it had established a long-term contract with a Co-operative for the supply of best quality milling wheat. The Co-operative was then responsible for sourcing according to forecasted volumes. An unusual feature of this relationship was that the Baker was engaged in the sourcing of goods at the second-tier level — what is commonly referred to in the industry as “directed sourcing.” In this arrangement, the Baker controls the price. However, the Baker is not responsible for paying the Co-operative directly. While it has an agreement on the price with the Co-operative, the Co-operative will charge the Miller for the grain. Such an arrangement indicates how important it is for the Baker to obtain good quality grain at the right price. To cater to price variations

in the market, the contract between Baker and the Co-operative incorporates a flexible pricing structure.

Both Baker and Co-operative assessed their relationship as extremely good. The interviews indicated that both parties were satisfied with the relationship and were committed to each other. The Co-operative clearly saw this relationship as value adding: “By constructing the right contract we’ve reached a point where pricing is simple and non-combative! This has led to a huge rise in value in all other parts of the relationship.” Similarly, the Baker also had a positive view of the value obtained from this relationship. However, both sides agreed that communication could be improved, and for the Co-operative, this might require some internal adjustments. Also, the Baker perceived that there were some small issues concerning creativity and reliability at the Co-operative. Further, the Co-operative expressed some concerns about the future commitment of the buyer, but they did not consider it to be a major threat.

In this supply chain, all three parties were directly connected (closed) and have a positive relationship with each other. However, the relationship between the Miller and the Co-operative left some doubts about the permanence of this characterization. For instance, if the performance in terms of delivery and quality was to deteriorate, frictions between Co-operative and Miller could quickly emerge and they would start blaming each other. In terms of materials processing, the Miller controlled the flow of materials, but in reality, the Baker held the power. The Baker could take the role of coordinator to resolve the conflicts between them, as their only incentive to collaborate was to satisfy the Baker. However, the stability of this relationship appeared to be just hanging in the

balance. As one of the interviewees from the Miller observed: "There is a general hate between Farmers and Millers, but [the Baker's] brand helps the supply chain work better. It makes everybody move in the same direction."

### Case 3: The Pork Supply Chain

A major Retailer, Processor and Breeder had operated in a linear supply chain, effectively as two back-to-back dyads, for over 10 years. However, recently the Retailer, in the interests of ensuring its environmental and social responsibility credentials, began involving itself in assuring the production methods of the Breeder, thus creating the supply chain relationship configuration shown in Figure 4. The Retailer is one of the big supermarkets and wields considerable power in the U.K. market. The Processor is the main U.K. pork processing company. The Breeder has grown from a small family firm to one of the largest in the U.K. It owns a road haulage business and has pioneered environmentally "friendly" production methods. In the last 3 years, a new premium range of pork products has been developed, which required the Processor to work more closely with the Breeder to meet stringent production and quality standards.

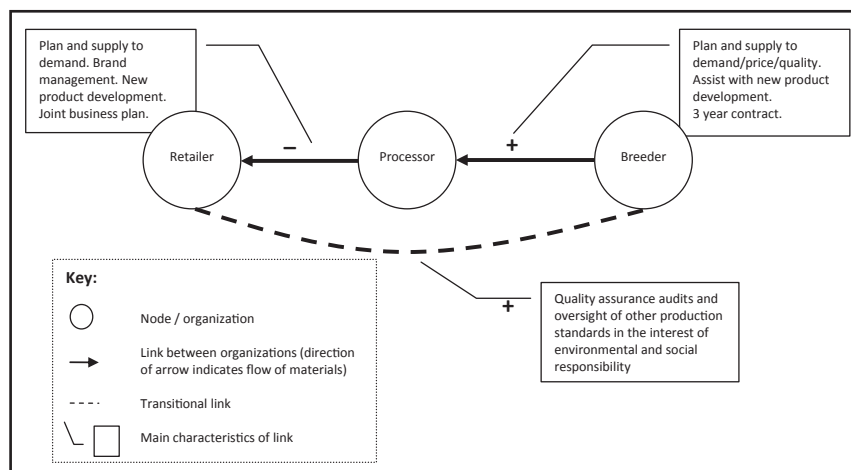
**Retailer–Processor Relationship.** The Retailer had a culture of adversarial relationships with its suppliers and a strong sense of being the dominant partner. A comment from the Processor's Operations Director highlights this: "The Retailer is a 'poker'; he is constantly poking us in the chest looking for things we are already doing."

Recent bad publicity and a report by the regulatory authorities had forced the Retailer to adopt more "collaborative" behaviors. However, it continued to

rotate its channel managers frequently to prevent them from getting too close to the suppliers. Also, it placed orders in the market for competitive bidding, ignoring the impacts on value for money and price stability from the incumbent supplier. The increasing competition in the major supermarket space had forced the Retailer to cut staff, making it heavily dependent on its pork Processor as a product conduit and for market knowledge, but it also perceived this as a loss in its influence. A senior buyer commented: "They [the Processor] are very good at what they do and we set them hard targets which they achieve but, we wish they would tell us more about what they are doing."

Although the Retailer had initiated a business plan with the Processor, there was no long-term contract; each order was considered to be a contract. The Processor had thrived in a traditionally concentrated market. It was innovative with a succession of new, successful products and was highly knowledgeable about customer demand trends. Despite its strong position in an industry where there are now fewer alternative sources, the Processor was unsettled by the lack of a long-term contract with the Retailer and the Retailer's often adversarial behavior. "They make no effort to give us price stability and are always threatening to compete with our business despite the excellent job we do for them." "The Retailer is never available to talk to us about their poor demand forecasting system and yet penalize us if too much or too little stock is delivered." Consequently, the Processor had tried to exert its power within the supply chain to prevent the Retailer from gaining knowledge of its cost structure and to bolster its power position in what it perceives to be a less than equitable relationship. "Our customer [the Retailer] doesn't need to

**FIGURE 4**  
The Pork Supply Chain



know what we are doing; he would only 'ride' us harder if he knew about our process costs. We just guarantee to exceed his expectations and deliver every time."

The advent of a Closed MSC had created additional tension between the Processor and the Retailer. Seeing that its power position was being undermined by the Retailer's relationship with the Breeder, the Processor had instigated regular supply chain meetings attended by all three parties to provide it with a better view of, and an opportunity to be involved in, the new relationship between the Breeder and the Retailer. This had a beneficial impact on the overall effectiveness of the MSC's operation through improved communication and as a result better coordination of material flows. Moreover, in anticipation of the Retailer gaining more knowledge of the production process, and potentially squeezing them further on price, the Processor had turned this threat into an opportunity by proposing to the Retailer an improved price structure based upon known production costs to supersede the current, unstable system. By going for a more stable price structure with the Retailer, the Processor appeared to be attempting to turn this relationship into a positive one, bringing stability to the MSC.

**Processor–Breeder Relationship.** As a result of the Processor's leadership, the Breeder had become extremely efficient and capable of producing stock to the highest standards. They had jointly invested in production processes that met sustainability standards. These two companies worked very closely together in all aspects of planning and production and had jointly developed methods of achieving flexibility to meet extremely variable and unpredictable end-customer demand patterns. However, they tended to suffer from market price instability, due to the Retailer's competitive practices, which impacted their planning and scheduling.

As a response to the lack of relationship stability with the Retailer, the Processor and the Breeder had established a 3-year framework contract — even though the Retailer was not providing the contractual stability to the Processor, the Processor was providing it to the Breeder. Naturally, the Breeder had benefited from a close relationship with the Processor and is investing in further capacity to meet the anticipated success and expansion of the premium range of products. "Originally the Processor owned us but sold the breeding side to concentrate on processing; hence, his people know our business inside and out. This is great because we are of one mind in everything we do."

**Retailer–Breeder Relationship.** The issues of traceability and environmental stewardship had recently become important for the Retailer. Therefore, understanding what goes on upstream in the supply chain became a high priority. As a result, their technical

personnel often visited the farms to collect data on production methods and to carry out periodic quality audits. "Today, we must be competitive in environmental issues. We thus take a deep interest in assuring the production standards across our supply chain. This is why we visit the farms and closely scrutinize the breeding methods."

The Breeder appeared to embrace outwardly the increasing interest of the Retailer in its business because it knows the Retailer is "all important." However, in private discussions, the sentiment was more cautious. For instance, in developing a closer relationship with the Retailer, the Breeder had to openly disclose a wide range of information about his production techniques. It was also concerned about alienating the Processor. "Actually it's quite nice to have the Retailer take an interest in us but we have to be careful we don't say too much and upset our Processor." This development resulted in a change of the situation for the Breeder, that is, taking a sensitive, mediating role between the Retailer and the Processor.

## CROSS-CASE ANALYSIS AND PROPOSITIONS

Comparing cases (Miles & Huberman, 1994) offers us three dominant themes common to all cases. These themes are structural power, interdependence and relationship stability. Power appeared to be a function of the structural position in the MSC (i.e., intermediary). Interdependence manifested itself as a desire for or acceptance of the situation where the MSC partners derive confidence from the group's ability to operate as an entity. Relationship stability within the MSC was affected both positively and negatively by issues that caused tensions between the partners. The details are presented in Table 3.

In the cross-case data analysis, we looked for common patterns to formulate propositions. We organized the propositions in each of the three key themes that emerged from the within-case analysis as shown in Table 3. Following the inductive nature of the research, we incorporated literature at this stage to compare and contrast our findings, essentially using the literature as an additional source of validation as advised by Eisenhardt (1989) and Kaufmann and Denk (2011). We use B, S and SS to refer to the buyer, the supplier to the buyer and the supplier to the supplier, respectively.

### Power, Structure and Sustainability

In all three cases in this research, the SS provides essential raw materials for the final product — barley for beer (Case 1), wheat for bread (Case 2) and pigs for pork products (Case 3). These resources can have

**TABLE 3**  
**Summary of Three Cases**

	<b>Case 1: Beer</b>	<b>Case 2: Bread</b>	<b>Case 3: Pork</b>
Multi-tier supply chain (MSC)	Open MSC Introduction of <i>Supplier</i> has created an intermediary.	Closed MSC All firms are formally linked.	Transitional supply chain Link between <i>Buyer</i> and <i>Supplier's Supplier</i> is being established.
Structural power	<i>Buyer</i> has access to global markets, which are its main source of power. <i>Supplier</i> acts as an intermediary enabling information flows and coordinating physical flows but with no significant competitive gain as prices are controlled by the market. <i>Supplier's Supplier</i> operates as a commodity provider with limited power.	<i>Buyer</i> uses its strong brand to create a common goal for the supply chain. <i>Supplier</i> is treated as commodity provider with limited power. However, the supplier's reliability over a long period brings stability to the supply chain. <i>Supplier's Supplier</i> has a strong impact on product quality, safety and sustainability.	<i>Buyer</i> sees itself as dominant but depends on the supply chain for market knowledge, product innovation, quality, safety and sustainability. <i>Supplier</i> intends to protect its power position, which could be undermined by the establishment of a relationship between <i>Buyer</i> and <i>Supplier's Supplier</i> . <i>Supplier's Supplier</i> has a strong impact on product quality, safety and sustainability.
Interdependence	Operational interdependence among companies in supply chain. Members are positive about their relationships. However, this is a relatively new relationship and a degree of uncertainty about the future is present, although tensions have not yet emerged.	All relationships are positive. The longevity of the <i>Buyer-Supplier</i> relationship has resulted in stability and interdependence. <i>Supplier's Supplier</i> is proud of contributing to a strong brand with a reputation for high quality. Flexible pricing incentivizes <i>Supplier</i> loyalty.	Possible reduction of power for <i>Supplier</i> has increased tensions and stimulated measures to increase interdependence. As power positions have softened, interdependence has grown. Tensions between processor and retailer due to possible loss of influence by processor.
Relationship stability	Some tensions about length of contract.	Some tensions about costs.	All parties are interdependent, retailer for quality and innovation, others for access to market.
Collaborative performance	Collaborative performance managed as independent dyads rather than MSC. The introduction of intermediary allowed focuses on quality and delivery instead of price.	The parties increased the transparency of information in the relationships. Stronger teamwork at all levels of the MSC.	All parties focused on the complete supply chain to improve planning and cost management.

a strong impact on the final quality and sustainability of the product, particularly in Case 3. Furthermore, increasing pressures, from both consumers and governments, to maintain the safety of products also puts great responsibility on the providers of the basic raw materials. Increased responsibility represents increased power for the supplier's supplier.

In the MSC context, each member had access to different resources and contributed in different ways to the relationship. In this research, we have found that the buyer had power because it had resources (i.e., ability to offer contracts) and also because it was the conduit to the market (i.e., positional power). The supplier might have positional power as long as B and SS do not exchange information, so it remains as the intermediary. Finally, although the supplier's supplier appeared, through its position at the end of the supply chain, to have minimal power, it had access to natural and technical resources, which might have been essential for the success of the supply chain.

Two of the cases were selected because they appear to have a stable structure: "Open MSC" (Beer) and "Closed MSC" (Bread). In the "Open MSC," the S had taken a bridging role, which provided a source of power; however, this power appeared to be mitigated by the resources of both buyer and supplier's supplier. In the "Closed MSC," the Supplier had very limited power as there is no bridge position. Finally, in the "Transitional MSC," which was the only case in a state of flux, it was possible to see a change in the power structure, as the bridge position of the supplier decayed. This shift in power appeared to be produced by structural changes alone. Based on this analysis, we propose that:

**Proposition 1:** When the structure of an MSC changes, the resource-based power balance among its members shifts, regardless of the resources possessed by each member.

Traditionally, inter-organizational power has been seen as being derived from resources, where a firm's resources at a given time are those tangible and intangible assets, which are tied semi-permanently to the firm (Wernerfelt, 1984). In this situation, resource-based power is when a firm holds resources that others do not have, which adversely affects their costs and/or revenues. Moreover, the firm will use these resources and encourage a lack of transparency to cement its position. However, all three cases show how the supplier's structural position between the buyer and the second-tier supplier played the central role similar to that described by Hingley (2005b) as "super middleman." The role of the middleman can be interpreted using the concepts of a "structural hole," which refers to the "lack of connections

between agents or groups that are not directly linked together" (Burt, 1992, 2000; Simmel, 1950) and the "bridge" (Li & Choi, 2009; Tsai & Ghoshal, 1998; Zaheer & Bell, 2005). Both Simmel (1950) and Burt (1992) proposed that the firm that finds itself in a bridge position over a structural hole may find itself having power that comes from its structural position.

The research also uncovered that, in Cases 1 and 3, there was a directed effort by the buyer to connect with the supplier's supplier to influence certain characteristics of the product, such as quality, traceability and sustainability. Sustainability is rapidly becoming a factor that could lead to competitive advantage and, at least in the case of food products, raw materials tend to have a strong impact on sustainability. In Cases 1 and 2, the production of grain has an effect on several environmental indicators such as greenhouse gas emissions, water and land use. In Case 3 (Pork), it was observed that Retailer (B) was reaching out to Breeder (SS) under its corporate social responsibility agenda to gain greater control over certain aspects of the supply chain such as environmental impact and animal welfare standards. Similarly, in Case 2 (Bread), it was clear that the Baker (B) was stretching out to the supplier's supplier to gain greater influence on issues such as quality, safety, cost and sustainability. In particular, their concern to obtain "quality grain at the right price," motivated them to put a contract in place with the supplier's supplier.

Fundamentally, the Buyers of all three MSCs focused on product design and marketing, while the suppliers engaged in manufacturing and trade. Only the supplier's supplier was handling the raw materials that are embedded in the final product. The raw materials in an undifferentiated state would have comparatively more sustainability and quality implications. Further, once embedded, problems become more difficult to detect. Therefore, we propose that:

**Proposition 2:** A buyer who wants to influence key product characteristics needs to connect directly with its supplier's supplier who works with undifferentiated resources.

This research involved organizations at three supply chain levels. However, it is likely that this proposition applies to longer and more complex supply chains where suppliers that have a strong environmental impact (Choi & Linton, 2011), such as those involved in the extraction of natural resources, might be very distant in the supply chain. According to Choi and Linton (2011), if organizations want to influence the overall quality, environmental or social impact of the products and services they provide, they need to reach out to those key suppliers upstream that lie beyond their top-tier suppliers.

This proposition is also consistent with the relational view of the firm (Dyer & Singh, 1998). In particular, it aligns with this view's proposition that a greater proportion of "synergy-sensitive resources" would tend to increase the value of such resources and increase the potential for relational rents. In this case, the behavior observed by the buyers, as they try to establish links with supplier's suppliers, indicates they are seeking to influence such synergy-sensitive resources to generate value.

### Interdependence

In all three case studies, participants revealed an overarching sense of interdependence (i.e., mutual dependence for success or survival) and overall satisfaction with their participation in the MSC. However, the degrees of expressed interdependence varied. In fact, there was a correlation between the level of connections and the collective sense of interdependencies.

In Case 1, the Open MSC, there was a view that the Grain Trader (S) brought benefits to the MSC by achieving economies of scale and potentially cost reductions to be shared across the supply chain. The perception was that all firms were benefiting from participating in this relationship. However, there was a perception that these benefits were primarily operational and cost focused and there was uncertainty about future developments. In Case 3, the Transitional MSC, the dynamic of the relationship became more complex and the collective sense of interdependencies seemed to grow. For instance, a degree of tension existed between the Processor (S) and the Retailer (B) over the increasing influence of (B) over the Breeder (SS). However, instead of creating a more acrimonious relationship, this apparent tension stimulated the adoption of positive measures (better communications and a more stable price structure) that have increased interdependence. As members of the MSC realized, they depend on each other and they opted for building closer ties.

In Case 2, the Closed MSC, all relationships among members of the supply chain appeared to be positive, and the long-term associations between the companies, even in the absence of contracts, were an indication of trust and cooperation. Interviewees from all three organizations indicated a strong sense of interdependence and admitted they did not believe the other parties in the MSC would take advantage at their expense. Being "closed" means all members of the MSC know and understand each other, they have a clear view of the value-add each member contributes to the MSC and understand each other's challenges. This visibility strengthened the sense of interdependence among members of the MSC.

**Proposition 3:** As an MSC transitions from an open to a closed structure, the sense of interdependence among its members grows.

Balance theory (Simmel, 1950) has been used to describe organizations and networks, in particular triads, involving a buyer and its suppliers (Choi & Wu, 2009b; Madhavan, Gnyawali, & He, 2004). In their effort to apply balance theory to the context of buyer-supplier-supplier triads, Choi and Wu (2009b) considered closed triads as well as open triads. Their discussions seem to suggest that closed triads have more complicated interdependencies, supporting our Proposition 3 above.

Dyer and Singh (1998) propose that if partners can align the transactions with appropriate governance structures, they can gain greater potential for relational rents. In this case, we can see that a closed structure provides a governance mechanism that has tighter self-enforcing agreements and stronger informal social controls, which are reflected in a greater sense of interdependence. It is also apparent that firms move into this state in the expectation of gaining greater rents, which would be consistent with Dyer and Singh's proposition extended to a multi-party perspective.

### Relationship Stability

The three supply chains in this research were selected deliberately because they had a distinctive structure. In the Open MSC (Case 1), the Grain Trader (S) was introduced as an intermediary, fulfilling an agency function by relaying orders, providing information and facilitating the process, while the direct relationship between the other two parties (buyer and supplier's supplier) was severed. The buyer had *de facto* relinquished responsibility and control over the source of raw materials to a supplier. This structural arrangement had simplified the management for the buyer and led to cost reductions through economies of scale. However, there were tensions between buyer and supplier due to concerns about the length of the contract. The future stability of the MSC's relationships had been put into question.

In the Closed MSC (case 2), the relationships appeared to have blossomed under the leadership of the buyer, who maintained open communication with both the supplier and supplier's supplier, and helped to resolve conflicts between them. This cooperative arrangement, based on mutual trust and commitment, had brought stability to a relationship that had been operating for over a decade and appeared to have brought together all the members of the MSC "pulling in the same direction." Although this arrangement appeared to satisfy all three members of

the MSC, it was acknowledged that it required a considerable amount of effort to manage it. For instance, the Baker (B) was committed to organizing a Farmers' (SS) conference every year, awarding prizes for quality and delivery performance to the farmers. These activities, which are relatively rare at a second-tier level, require investments in terms of time and money, but help to increase perceptions of stability within the MSC.

Finally, in the Transitional MSC (Case 3), the Retailer (B) was trying to create a Closed MSC by establishing a link with the Breeder (SS), and the result was a more dynamic and better engaged MSC. However, this has also created additional demands for all members of the MSC, particularly in terms of management time devoted to coordinating activities. Both case 2 (Closed) and case 3 (Transitional) appear to show that as the MSCs become fully linked, information becomes more transparent, helping the members unite around a common goal and diminishing the possibility of opportunism and adversarial behaviors while bringing stability to the relationships. However, this stability comes at a cost, mainly in the form of management effort. Therefore, we propose that:

**Proposition 4:** Closed (Open) MSCs offer stronger (weaker) perceptions of stability but require additional (and require fewer) management resources.

## DISCUSSION AND CONCLUSIONS

Our study examined the structural dynamics involved in three multi-tiered supply chains (MSCs). Our approach was an inductive, theory-building methodology using qualitative case studies. We explored three cases of MSCs in the U.K. food industry. Based on these cases, we have been able to formulate four propositions.

Proposition 1 refers to the relationship between supply chain position and power. Depending on their position in the supply chain (buyer, supplier and supplier's supplier), the members of the MSC appear to draw power from different sources. Buyers can act as bridges between the MSC and the marketplace, suppliers act as a bridge across the MSC and suppliers' suppliers have access to resources such as raw materials and expertise. This proposition is consistent with the literature that conceptualizes the bridge and structural hole (Burt, 1992, 2000; Simmel, 1950).

How to manage the sustainability in extended MSCs is becoming an increasingly important topic (Choi & Linton, 2011; Matos & Hall, 2007; Pagell *et al.*, 2010; Seuring, 2004). Proposition 2 provides one theoretical perspective regarding this emerging issue. In all three cases, the raw materials had a strong impact on sustain-

ability because it is at this stage that the majority of natural resources tend to be consumed. For instance, in Case 3, we observed how the Retailer (B) was reaching out to the supplier's supplier under its social responsibility initiative to gain control of certain aspects of the supply chain, such as environmental impact, traceability and animal welfare standards. This proposition extends the findings of Pagell *et al.* (2010) who pointed out how buyers engaged in sustainable sourcing were looking for closer collaboration with suppliers and suppliers' suppliers. In food supply chains, the further upstream an organization is the more impact it is likely to have on sustainability. Clearly, sustainability is not the only reason for a buyer to reach out toward the supplier's supplier — others could include quality and safety — but we found this was a salient reason in all three case studies.

Proposition 3 deals with the interdependence that exists among the members of the MSCs under study. In all three cases, it appeared that as the members of the MSC became aware of the interdependent relationships they had with other members of the MSC, and as the triad moved into a closed structure, they relied more on trust and cooperation than on power to achieve their objectives. This is consistent with the findings of Havila *et al.* (2004) who established that commitment and trust are central to the development of supply chain relationships, and with those of Peng *et al.* (2010), who asserted that a high level of trust will lead to a higher perceived cooperative performance. Choi and Wu (2009b) characterized two different roles a firm can have in a supply network — *tertius iungens* and *tertius gaudens*. The former role focuses on acting as a conduit for information, and the latter on acting as a broker for leverage. According to this study, it appears that realization of interdependence persuades organizations in favor of a *tertius iungens* orientation rather than a *tertius gaudens*.

Proposition 4 argues that fully Closed MSCs are more stable, which is consistent with the findings of Choi and Hong (2002), but they require additional management resources and skills. When a network is closed, each member is in a better position to triangulate the information it receives from its partners and thus is less exposed to opportunism and adversarial behavior. Conversely, Proposition 4 posits that Open MSCs demand fewer management resources, but are less stable. This is because they are more exposed to unilateral actions by any member of the MSC, which could have unexpected consequences on behavior and outcomes. In Case 3, for instance, a unilateral action by the Retailer (B) led to an unplanned change in the balance of power in the pork supply chain. This resulted in improved cohesion within the MSC, but required additional management resources from all its members.

### Implications for Research and Practice

Our findings offer academics a new perspective on MSCs. The study indicates that the competitive dynamics of MSCs across three tiers appear to be different from those found in research occurring across only two tiers. For instance, in buyer–supplier–supplier triads across only two tiers, co-opetition is purported to take place as the two suppliers seek to collaborate while competing against each other for the buyer's orders (Choi, 2007). In MSCs, competition takes a different form. All participating nodes have different capabilities and do not compete for sales, but they do compete for a greater share of the revenues that flow through the same supply chain. These dynamics, which were evident in all three cases, raise new questions about how revenues are, and should be, shared. In case 2, for instance, the buyer and the suppliers' supplier had established a long-term contract with flexible agreement on price to cater for market fluctuations and ensure a more equitable distribution of costs and risks. While this kind of contract has been documented in the literature, their impact on performance and stability of the network is not well researched. A better understanding of this kind of agreement would be of benefit to both academics and practitioners.

Our research also suggests that competition for control combined with the importance of structural position is what determines power in an MSC. We can thus begin to see why companies may try to jockey for better positioning within a supply chain. One way this can be carried out is by linking with other firms at tiers beyond their direct suppliers or customers. Our exploratory cases investigate three-tier supply chains but supply chains often cut across many more tiers. We believe in coming years we will see many more companies forging relationships across supply networks for various reasons such as sustainability, cost, quality and technology (Choi & Linton, 2011). For academics, this opens opportunities to further understand the dynamics of MSCs, in particular the implications of different structural arrangements and governance mechanisms on performance.

The findings will also be of interest to practitioners who operate in complex MSCs. The propositions can help understand changes in power balances with customers and suppliers at multiple tiers and assess the possible implications of structural and contractual arrangements for power, stability and control. For example, Proposition 2 gives practitioners an argument to build relationships with organizations across multiple tiers to influence key characteristics of the product such as quality and sustainability, a move that we documented in cases 2 and 3. Similarly, Proposition 4 indicates that investments in management

resources are required to influence stability and control across multiple tiers. Practitioners will have to decide where and when they need to invest their resources if they want to influence specific parts of their network.

Understanding the dynamics of MSCs can offer practitioners improved means of proactively managing relationships across multiple tiers to increase performance, either by better positioning in the supply chain or through more effective use of management resources.

### Limitations and Further Research

Conclusions are limited by the consideration of only three cases even though they provide in-depth perspectives of the relationship dynamics. We recognize that future research should be conducted to test the propositions derived from this research and to expand the generalizability of the findings. One opportunity is to investigate MSCs in other industries, particularly industries with more complex and longer supply chains, such as automotive or electronics. A second area for further research would be to look into multinational MSCs to gain a deeper understanding of how changes in contextual variables might affect the findings.

Another limitation of the research is that the measurement of the strength of links used to classify MSCs into the different states is not precise. Most supply chain relationships are not purely adversarial or collaborative, and this classification appears to be overly blunt. Further research should focus on developing a more structured approach to measuring the link between relationship dynamics and performance. Lastly, there appears to be value in investigating the relationship between stability and relationship performance because Case 3 suggests a lack of stability does not necessarily result in poor relationship performance.

The study of MSCs is in its infancy. This exploratory study provides the foundation for a fertile area of MSC dynamics for future research.

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APPENDIX A  
SEMI-STRUCTURED INTERVIEW PROTOCOL

Company Name	Date Position
<b>Introduction</b> Explain context of the research and clarify the interview will focus on the specific relationships within the supply chain Remind interviewer that the information will be presented as anonymous	
<b>Part 1: Dyadic relationships</b> 1.1 For how long has your organization been working with company A? 1.2 Can you describe the relationship between your organization and company A? 1.3 How frequently do you meet with company A? 1.4 What information does your organization share with company A? 1.5 Can you explain why the relationship with A is of value to your organization? 1.6 Can you provide examples of positive experiences with company A? 1.7 Can you provide examples of negative experiences with company A? 1.8 Repeat same questions for company B? (if applicable)	
<b>Part 2: Multi-tier relationships</b> 2.1 For how long have the three companies been working together? 2.2 Can you describe how the three companies work together? 2.3 How frequently do the three companies meet as a group? 2.4 What information does your organization share with both A and B? 2.5 Can you explain why it is of value for the three companies to work together? 2.6 Can you describe any instances when the relationship with A has affected the relationship with B? 2.7 Can you describe any instances when the relationship with B has affected the relationship with A? 2.8 Can you provide examples of positive experiences working jointly with A and B? 2.9 Can you provide examples of negative experiences working jointly with A and B?	
<b>Close</b> Any questions you'd like to ask us about the research? Thank you!	