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Theorizing the governance of direct and indirect transactions in multi-tier supply chains

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Abstract

An outsourcing decision does not equate to the outsourcing of a sourcing decision. Many indirect transactions with lower tier suppliers are embedded in transactions with first-tier suppliers. Building on the identification of a transaction as the fundamental unit of analysis, this study proposes that transactions comprise bundles of intertwined *direct* transactions at the firm level and *indirect* transactions at the supply chain level. These indirect transactions require separate but not independent sourcing decisions. Using a buyer's decision to control or delegate the governance of indirect transactions for an externally sourced product, this study demonstrates that disaggregating the transaction advances theory by extending the range of outcomes, refining the calculus of the make-or-buy decision, and providing a coherent theoretical framework for multi-tier supply chain management. This study considers the theoretical, managerial, and societal implications across various contingencies involving inter-firm relationships.

KEYWORDS

control-or-delegation, indirect transaction, make-or-buy, multi-tier supply chain management

INTRODUCTION

All firms invariably engage in outsourcing decisions. However, outsourcing is only the first step in a series of sourcing decisions made in the supply chain context. Let us consider Airbus' decision to buy A350 engines from Rolls-Royce. To produce its Trent XWB Engine, Rolls-Royce, as a first-tier supplier, purchases components from second-tier suppliers, including GKN Aerospace, ITP Aero, and Mitsubishi, each of which purchases subcomponents from third-tier suppliers (Tyrrell, 2021). Having decided to buy the engine itself, Airbus faces a more nuanced decision: Should it use Rolls-Royce to select and manage lower tier suppliers or make some of these decisions within Airbus? One such decision entails delegating the responsibility for producing and selecting lower tier suppliers[1] to the first-tier supplier. This is the commonly practiced outsourcing approach—the buyer (i.e., buying firm) expects the first-tier supplier to take all necessary actions to deliver the outsourced product (Bolandifar et al., 2016). Another more nuanced decision requires the first-tier supplier to carry out production without taking complete responsibility for lower tier

[1]In accordance with the convention in the multi-tier supply chain management literature (e.g., Villena & Gioia, 2018; Wilhelm et al., 2016), the term "lower tier suppliers" is employed to denote suppliers situated upstream beyond the first-tier suppliers.

suppliers. In this case, the buyer maintains a degree of control over the sourcing decisions regarding the selection and management of lower tier suppliers (Choi & Linton, 2011; Kayış et al., 2013).

In this approach, which considers control over lower tier suppliers, a buyer would need to analyze each of the outsourced product's components in the bill of materials separately and decide which component's sourcing it needs to retain control over. The literature on multi-tier supply chain management emphasizes the importance of managing lower tier supply chains for cost, product quality, supply risk, innovation, and sustainability (Choi & Linton, 2011; Mena et al., 2013; Wilhelm et al., 2016). This growing body of literature also suggests different mechanisms for exerting influence across multiple supply chain tiers (Choi, 2023; Koberg & Longoni, 2019; Tachizawa & Wong, 2014; Villena, 2019). Nevertheless, the opportunity exists to develop a simpler and more theoretically cohesive framework. We do so by building on transaction cost economics (TCE) and its extensions, augmented by the capabilities view (e.g., Argyres & Zenger, 2012; Jain & Thietart, 2014; Ketokivi & Mahoney, 2020).

However, existing work on TCE does not explicitly consider the multi-tiered nature of the transaction and the inherent interdependence between direct and indirect transactions (Chae et al., 2019). Williamson's (1985) identification of a transaction—the exchange of goods, services, or assets between economic entities—as the "fundamental unit of analysis" inspired a large and insightful literature stream on the outsourcing decision at the firm level. Nevertheless, since any given transaction is merely one link in a long chain of transactions (Yan et al., 2015), we propose advancing the theory in another direction by vertically disaggregating the transaction along the supply chain. By asserting that the transaction at the heart of the TCE comprises a bundle of intertwined direct and indirect transactions, each requiring a separate but not independent governance decision, this study aims to theorize the governance decisions regarding the transactions at the supply chain level. This study's theoretical framework differentiates between asset specificity and performance ambiguity in the context of both direct and indirect transactions.

Therefore, in this conceptual article, we integrate insights from the TCE and multi-tier supply chain management literature to answer the following research question: *How can the key premises of TCE be extended and modified into the context of multi-tier supply chains?* Extending TCE to the context of multi-tier supply chains can provide buyers with unique practical benefits by enabling them to apply a structured decision-making process to dissect and navigate multi-tier supply chains. Williamson (2008) argues that the simplicity of TCE has contributed to its broad and varied applications and urges supply chain researchers to adopt comparable approaches to theorization. Similarly, we aim to contribute to practice by providing a simple framework that buyers can apply to analyze their supply chains and exercise granular control over their sourcing decisions.

Importantly, our framework makes the following theoretical contributions. First, we introduce governance decisions for indirect transactions across the supply chain. To theorize this aspect, we expand the conception of "the transaction," not detracting from Williamson's (1985) idea that the transaction is the appropriate unit of analysis for firm governance choices but exploring previously unrecognized indirect transactions. Critically, decisions regarding indirect transactions depend on and influence decisions regarding direct transactions (Coase, 1937; Luo, 2018). This interdependence leads to a second contribution. We offer a new perspective on how firms organize transactions. This perspective expands the traditional calculus behind the make-or-buy decision at the firm level and suggests that firms consider a broader set of related decisions. For example, we argue that some of the risks ascribed to buying by the traditional view can be managed not by reverting to making a product internally but rather by making appropriate choices regarding control of the product's supply chain (Choi & Linton, 2011; Kayış et al., 2013). Third, we show the importance of disaggregating the theoretical concepts examined as drivers of the make-or-buy decision at the firm level. For example, by analyzing asset specificity and performance ambiguity at the disaggregated levels of direct and indirect transactions, we offer diverging predictions on lower tier sourcing governance that cannot be predicted under the existing TCE framework (Chae et al., 2019). In summary, we make a theoretical contribution by addressing a new and previously overlooked phenomenon and adding a level of analysis (Makadok et al., 2018) by disaggregating the transaction.

The remainder of this article is organized as follows. First, we conceptualize the governance options for indirect transactions, define the relevant concepts, and set the boundary conditions for the research. Then, we discuss the theoretical background and develop propositions on the key variables influencing governance decisions for indirect transactions. These propositions are developed based on TCE and its extension, which consider firm capability, and incorporate critical contingencies involving direct and indirect transactions into our theorization. The final section discusses the theoretical, managerial, and societal implications of governance decisions on indirect transactions and offers directions for future research.

CONCEPTUAL FRAMING OF INDIRECT TRANSACTIONS

The bill of materials details the outsourced product in a transaction between the buyer and the supplier. It lists the parts and materials that make up the outsourced product, which are expected to come from lower tier suppliers (Chase et al., 2006). In this regard, an exchange of an item includes *direct* and *indirect* transactions. A direct transaction refers to a buyer's economic exchange with a first-tier supplier; the product comes *directly* from the first-tier supplier. By contrast, indirect transactions are economic exchanges between the buyer's first-tier and lower tier suppliers or between lower tier suppliers; the parts and raw materials arrive at the buyer *indirectly* through its first-tier supplier.

Suppose an automaker purchases an anti-lock braking system (ABS) from a first-tier supplier (see Figure 1). This is a direct ABS transaction. To assemble the ABS, four main components (speed sensor, electronic controller, valves, and pump) must be procured from lower tier suppliers (Kumar et al., 2021). For the automaker, purchases by the ABS supplier entail indirect transactions. The automaker may decide to allow its first-tier supplier to procure these components, or it may decide to select and contract with one or more of the component suppliers (Kayış et al., 2013). For example, if an automaker contracts directly with an electronic controller supplier, it controls the governance of the indirect transaction of this component (Chae et al., 2019). If the automaker allows the sourcing responsibility for the speed sensor, valves, and pump to the ABS supplier, the buyer delegates the governance of these three components' transactions to the first-tier supplier (Bolandifar et al., 2016).

Figure 1 shows how a buyer can disaggregate indirect transactions from a direct transaction, analyze them individually, and make separate governance decisions. The reaggregated choices on governance forms for indirect transactions determine the buyer's overall control over the supply chain. This study considers the interdependence between direct and indirect product transactions.

Governance for indirect transactions

In the context of classical make-or-buy decisions rooted in TCE, governance refers to "the identification, explanation, and mitigation of all forms of contractual hazards" (Williamson, 1996, p. 5). The literature delineates the market, hierarchy, and hybrid governance forms through which organizational arrangements are conducted (Ebers & Oerlemans, 2016). In the form of market governance, transactions occur externally among firms, whereas in the hierarchy, transactions unfold internally within a firm (Williamson, 1985). The hybrid form combines elements of market-based transactions and hierarchical control (Makadok & Coff, 2009), utilizing collaborative arrangements such as alliances (Albers et al., 2016; Heide & John, 1990), joint ventures (Chang et al., 2013), and networks (Uzzi, 1996). Within each governance form, firms can strategically blend diverse governance mechanisms—tools and processes that mitigate

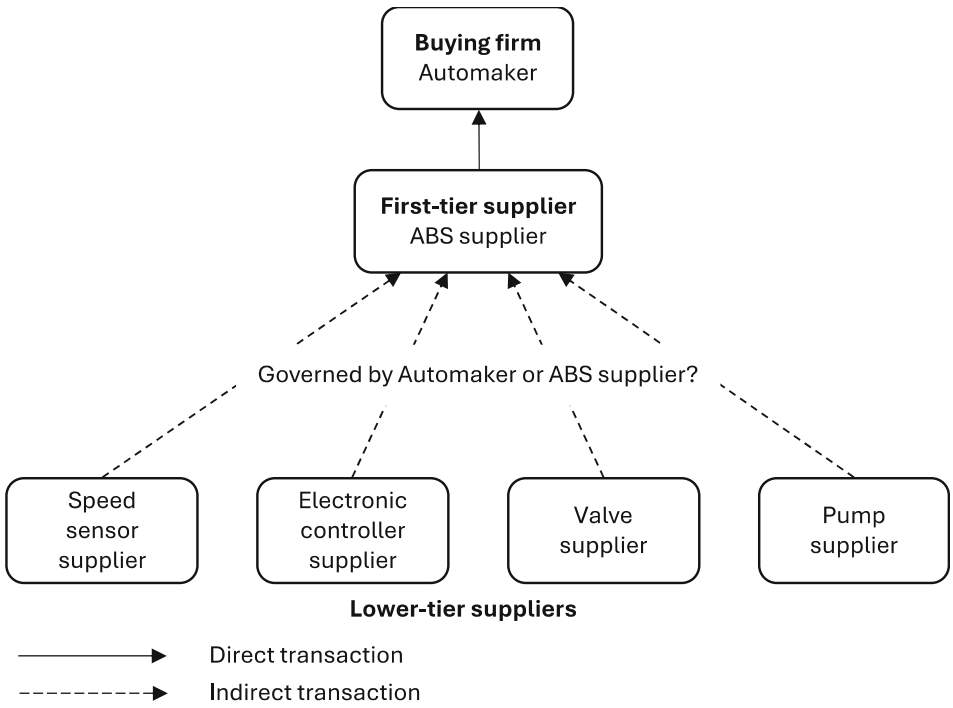

FIGURE 1 An example of direct and indirect transactions in an ABS supply chain.

transaction costs—and ensure effective coordination of economic activities (e.g., contracts, monitoring, relational norms, and trust) (Wang et al., 2020).

Extending the choice of governance form in the context of multi-tier supply chains, this study suggests three options that a buyer can adopt to govern indirect transactions: In the first option, which we call *delegated indirect transactions*, the buyer outsources the production of a product to a first-tier supplier, and delegates component-level supplier selection and management to the first-tier supplier. This configuration aligns with market-based governance, as the conventional make-or-buy decision portrays, because the first-tier supplier externally manages indirect transactions. For example, large buyers work with Li & Fung, a garment-sourcing and logistics company, as their first-tier supplier. These buyers delegate all upstream supply chain activities to Li & Fung, relying on a network of 15,000 suppliers across 60 countries and their expertise in supplier capacity and capabilities (Magretta, 1998; Urbina & Bradsher, 2013).

We designate the second option as *controlled indirect transactions*. In this scenario, the buyer outsources the production of a product to a first-tier supplier but reserves the right to source the components of that outsourced product. The buyer selects lower tier suppliers on behalf of the first-tier supplier and maintains direct contractual ties with these lower tier suppliers (Choi & Hong, 2002; Choi & Linton, 2011). This arrangement mirrors the hierarchical governance in the classic make-or-buy decision, as the oversight of designated indirect transactions occurs internally within the buyer. For example, Apple operates this way by outsourcing primary manufacturing operations to its first-tier suppliers (e.g., Foxconn). However, it assumes management of over 180 lower tier component suppliers (Apple Inc., 2023a).

The third option, a hybrid approach, involves shared responsibility among the buying firm, its first-tier supplier, and other third parties in selecting and managing lower tier suppliers. This approach requires collaborative efforts, analogous to the hybrid forms of governance in the classic make-or-buy context. The existing literature on multi-tier supply chain management advocates for collaborative strategies, such as employing approved vendor lists (Choi & Linton, 2011), establishing alliances with lower tier suppliers (Bastl et al., 2013; Mena et al., 2013), and facilitating joint supplier training, risk assessment, and performance evaluation involving the buying firm, its first-tier suppliers, other lower tier suppliers, and external entities, such as non-governmental organizations and monitoring agencies (Gong et al., 2018; Villena & Gioia, 2018; Wilhelm et al., 2016). A tangible illustration of this approach can be found in IKEA's initiative to enhance the social and environmental sustainability of its cotton textile supply chain. By engaging in training and workshops with both first-tier suppliers responsible for cutting and stitching, as well as lower tier suppliers engaged in dyeing, weaving, ginning, and farming, IKEA addresses adverse societal and ecological issues within its cotton textile supply chain (Jia et al., 2019).

Table 1 summarizes the comparison between governance decisions within the traditional make-or-buy framework and multi-tier supply chain settings. By disaggregating the transaction into direct and indirect and presenting the indirect transaction as the unit of analysis, distinctions concerning governance approaches for indirect transactions in the multi-tier supply chain context become apparent. For instance, in a multi-tier supply chain context, many governance forms can coexist across the different components of an outsourced product. This consideration allows the buyer to expand decision alternatives from entirely delegated indirect transactions to entirely controlled ones. The behavioral assumptions and key factors listed in Table 1 are elaborated next.

Assumptions and boundary conditions

In line with TCE and related supply chain literature, this study relies on the core behavioral assumptions of bounded rationality and opportunism (Lumineau & Oliveira, 2020). Bounded rationality characterizes the decision maker's cognitive capacity as "intendedly rational, but only limitedly so" (Simon, 1957, p. xxiv). Opportunism is defined as "self-interest seeking with guile" (Williamson, 1985, p. 47). The coexistence of bounded rationality and opportunism underscores the need for buyers to protect indirect transactions along with conventional contracts with first-tier suppliers. This safeguarding becomes especially vital within the intricate landscape of information exchange spanning multi-tier supply chains (Mena et al., 2013). In addition, we assume that controlled indirect transactions incur governance costs of identifying, selecting, bargaining with, and monitoring lower tier suppliers (Choi & Hong, 2002; Wever et al., 2012) and that a buyer would compare such costs with the perceived risk of opportunism from the first-tier supplier. This study aligns with the perspective that espouses the existence of consistent patterns in human behavior and relies on deductive reasoning in established theories to acquire knowledge.

The proposed framework has several boundary conditions. Firstly, it only applies to indirect transactions within the buyer's "visible horizon" (Carter et al., 2015, p. 93). Otherwise, the buyer cannot influence indirect transactions, complicating the proposed framework.

TABLE 1 Comparing the governance decisions in the classic make-or-buy and multi-tier supply chain settings.

	Classic make-or-buy	Multi-tier supply chain
Decision	Which firm will perform the production	Which firm will govern which indirect transactions
Unit of analysis	The direct transaction between the buyer and first-tier supplier	The indirect transaction between the first-tier supplier and lower tier suppliers while considering its dependence on the direct transaction
Governance forms	• Market: The transaction occurs externally between the buyer and first-tier supplier. • Hierarchy: The transaction occurs internally within the buyer. • Hybrid: The buyer and first-tier supplier collaborate to govern the direct transaction.	• Delegated indirect transactions: The first-tier supplier selects and manages lower tier suppliers. • Controlled indirect transactions: The buyer selectively manages lower tier suppliers. • Hybrid: The buyer, first-tier supplier, and/or third-party entities collaborate to govern the indirect transactions.
Behavioral assumptions	• Bounded rationality • Opportunism	• Bounded rationality • Opportunism
Key factors influencing the decision	• Asset specificity • Performance ambiguity	• Asset specificity and performance ambiguity in direct and indirect transactions • Relative sourcing capability of the buyer and first-tier supplier

While a product's bill of materials (or work breakdown structure for a service context) usually provides the necessary visibility because it contains a comprehensive list of activities, components, subcomponents, and their corresponding suppliers (Jung & Woo, 2004; Tang & Qian, 2008), Carter et al. (2015) point out that visibility inevitably attenuates as the number of nodes between a buyer and its indirect suppliers increases. Eventually, the visibility decreases to the point where the buyer must simply accept the supply chain as it emerges (Choi & Krause, 2006). Notably, our framework pertains to the bill of materials for direct materials as opposed to indirect materials such as maintenance, repair, and operations (MRO) items and equipment.

The second boundary condition revolves around the buyer's vested interest in the product quality and sustainability of the associated supply chain processes (Gray & Handley, 2015; Wilhelm & Villena, 2021). For example, a buyer who is the ultimate brand custodian of a product has a strong interest in these factors and is thus motivated to actively engage in the selection and oversight of lower tier suppliers located further upstream (Ciliberti et al., 2008). A buyer without such an interest and thus lacking the motivation to manage the supply chain might find less use in our framework.

The last boundary condition recognizes that buyers do not always have the power to dictate to their suppliers (Hoetker et al., 2007; Kaufmann et al., 2023). First-tier suppliers may be powerful because of their scale, unique capabilities (Moeen et al., 2013), or preferential access to lower tier suppliers (Wilhelm et al., 2016). Although the general logic we develop below suggests that a buyer facing a powerful first-tier supplier might prefer to control indirect transactions to at least partially offset the power of the first-tier supplier, the buyer may not be able to impose their preferences on the first-tier supplier. In such cases, the buyer's perspective reflected in our proposition would be moot, and the choice between delegated and controlled indirect transactions would rest with the first-tier supplier, meaning that our framework may not be relevant. Still, our propositions would be applicable once we frame the first-tier supplier as the focal buyer looking upstream to consider direct and indirect transactions from its vantage point.

FOUNDATIONAL CONCEPTS

Transaction cost, firm capability, and the outsourcing decision

A firm's decision to perform an economic exchange within the firm (i.e., hierarchy) or with an external entity (i.e., market) depends on the cost of exchange (Coase, 1937; Williamson, 1975). Transactions occur when goods and services are exchanged across different

economic entities (Williamson, 1981), and transaction costs refer to the costs incurred during such economic exchanges. For example, these costs are associated with information gathering, contracting, monitoring, and other safeguarding tactics (El Ghoul et al., 2017; Wever et al., 2012; Williamson, 1985). Due to the human nature of bounded rationality and opportunism, certain transaction characteristics such as asset specificity and uncertainty increase market governance costs (Williamson, 1975, 1985). If the costs of market governance are lower than those of hierarchical governance, the firm turns to the market. Generally, a firm organizes its transactions to minimize associated costs (Williamson, 2008).

One of the first lines of inquiry in Williamson's (1985) original work considered a broad range of hybrid governance forms. Subsequent studies have placed transactions within broader contexts, such as prior or ongoing transactions (Argyres & Liebeskind, 1999; De Figueiredo & Teece, 1996; Gulati, 1995). Others consider a wider set of determinants for the make-or-buy decision, such as firm capabilities (Argyres, 1996), real options (Leiblein, 2003; Trigeorgis & Reuer, 2017), and supply base complexity (Choi & Krause, 2006). Scholars have also complemented the study of governance forms with governance mechanisms used over the course of a transaction (Hoetker & Mellewigt, 2009). These theoretical advances embrace more governance options and their determinants.

Scholars have considered the capabilities view in conjunction with TCE (McIvor, 2009). They point out how firms differ in their capabilities and resources and how their governance choices reflect their attempts to leverage and protect competitive capabilities (Barney, 1999). The primary predictions of this view focus on the relationship between capabilities and firm performance (Ketokivi & Mahoney, 2020). In addition, this theory also offers direct predictions on governance choices (Argyres & Zenger, 2012; Conner, 1991; Leiblein, 2003) and outsourcing decisions (Jain & Thietart, 2014). According to Leiblein and Miller (2003), the capabilities view "provides one means to analyze the effect of firm-level capabilities on vertical integration decisions" (p. 842). They show that the motivation to exploit firm-specific production capabilities is an essential motivator for vertical integration. Further, Argyres (1996) presents a manufacturing firm that chooses to outsource a key component despite considerable transaction costs because managers feel "we're not good at it" (p. 130). Therefore, Argyres (1996) concludes that the "relative capabilities of buyers and suppliers are important factors in vertical integration decisions" (p. 129). Similarly, McIvor (2009) argues that outsourcing decisions serve to reduce costs as well as to develop and leverage capabilities.

Integrating the TCE and capabilities views, Argyres and Zenger (2012) suggest that firm boundary choices depend on the joint consideration of transaction costs and the complementarity of assets. For example, even when an outsourced activity—whether production or service provision—incurs high transaction costs, the firm is unlikely to perform the activity internally if the acquiring capabilities do not complement the firm's existing capabilities. Similarly, a firm will tend not to internalize complementary activities if outsourcing incurs low transaction costs. This interactive role of transaction costs and capability factors in outsourcing decisions has gained empirical support (Hoetker, 2005; Jain & Thietart, 2014; McIvor, 2009).

Multi-tier supply chain management

The literature on multi-tier supply chain management (Mena et al., 2013; Tachizawa & Wong, 2014; Wilhelm et al., 2016) provides insights into the management of indirect transactions. As suppliers are "embedded in larger supply networks rather than in isolation" (Choi & Kim, 2008, p. 5), an understanding of lower tier suppliers becomes imperative for the buyers to develop effective supply chain management strategies. These lower tier suppliers have a considerable influence on buyers' costs (Bolandifar et al., 2016; Choi & Hong, 2002), quality (Tse & Tan, 2011), supply risk (Wang et al., 2021), innovation (Choi & Linton, 2011), and sustainability (Choi & Linton, 2011; Villena & Gioia, 2018). Accordingly, supply chain researchers have suggested using technologies to map extended supply chains (New, 2010) and forming alliances or maintaining cooperative relationships with lower tier suppliers (Bastl et al., 2013; Mena et al., 2013).

Choi and Linton (2011) highlight the need for a multi-tier perspective to manage sustainability. Others developing multi-tier sustainable supply chain strategies have considered various approaches, including direct, indirect, and collaborative approaches with third-party entities (Koberg & Longoni, 2019; Tachizawa & Wong, 2014). One approach involves buyers specifying ecological and social requirements directly to lower tier suppliers or directly selecting such suppliers (e.g., Grimm et al., 2016; Mena et al., 2013; Wilhelm et al., 2016). A more indirect approach entails buyers collaborating with their first-tier suppliers to cascade sustainability initiatives throughout the supply chain (e.g., Villena & Gioia, 2020; Wilhelm & Villena, 2021). Collaboration with third parties requires the involvement of non-

governmental organizations and monitoring agencies in supplier training, risk assessment, and performance feedback (Gong et al., 2018; Villena & Gioia, 2018). Tachizawa and Wong (2014) emphasize the importance of considering various contingency variables such as power, stakeholder pressure, and knowledge resources to determine the most suitable approach for promoting sustainability within the supply chain. This study aims to assist buyers in making such decisions by breaking down direct and indirect transactions, expanding on the core tenets of TCE, and consequently offering a more streamlined and structured decision-making process for firms seeking to navigate the complexities of multi-tier supply chains.

Emphasizing the dangers of excessive delegation of control to first-tier suppliers, Choi and Linton (2011) maintain that buyers should proactively connect with key lower tier suppliers. The mechanism for such direct relationships with lower tier suppliers is called directed sourcing, in which a buyer establishes direct contractual relationships by selecting lower tier suppliers and asking first-tier suppliers to use the components supplied by the lower tier suppliers (Choi & Hong, 2002; Hartley & Choi, 2020). Directed sourcing arrangements are commonly used in the automotive industry (Bagul & Mukherjee, 2019; Kirchoff et al., 2018; Park & Hartley, 2002). For example, Honda maintains direct contracts with key lower tier suppliers to control costs and quality (Choi & Hong, 2002). Although directed sourcing can initially create competitive tension and potential conflicts between the buyer and first-tier supplier, it may provide a sense of interdependence and stability in the long run (Mena et al., 2013).

Forging direct relationships with lower tier suppliers through directed sourcing is intricately linked to the theoretical concept of structural holes (Burt, 1992). This concept pertains to the state where individuals or groups lack direct connections yet remain indirectly linked through intermediaries bridging disconnected parties (Burt, 2015; Soda et al., 2018). When the buyer delegates the management of second-tier suppliers to the first-tier supplier, the first-tier supplier occupies a bridge position between the buyer and second-tier suppliers (Burt, 2000, 2002; Li & Choi, 2009). The first-tier supplier in this bridge position can exert control over the information flow and activities that involve lower tier suppliers, and the buyer can find it challenging to ensure first-tier suppliers' compliance (Li & Choi, 2009; Tachizawa & Wong, 2015). For example, first-tier suppliers with control over lower tier sourcing can disguise component costs or quality from the buyer (Choi & Linton, 2011). The brokerage position of the first-tier supplier plays an integral role in multi-tier supply chain management, and we build on this concept when developing our propositions.

FORMULATION OF PROPOSITIONS

Based on the concepts discussed, we develop propositions building on TCE's extensions that integrate the capabilities view (e.g., Argyres & Zenger, 2012; Leiblein & Miller, 2003) and the multi-tier supply chain management literature. We organize the propositions by first considering asset specificity and then jointly considering performance ambiguity and the relative sourcing capability between the buyer and the first-tier supplier. Given the buyer's outsourcing decision, we consider the governance decisions on indirect transactions in the presence of an external first-tier supplier.

Asset specificity

Asset specificity refers to "durable investments that are undertaken in support of particular transactions" (Williamson, 1985, p. 55). Since specific assets lose value when redeployed outside a transaction with an exchange partner, contractual or relational safeguards are used to mitigate such risks (Geyskens et al., 2006). Consequently, TCE predicts that a buyer is inclined to internalize transactions with substantial asset specificity (Williamson, 1975, 1985) or establish long-term relationships across multiple products (Cao & Lumineau, 2015).

Researchers have expanded this observation by highlighting how asset specificity can be asymmetrical between buyers and suppliers (Jia, 2013; Subramani & Venkatraman, 2003). *Buyer side* asset specificity exists when using another supplier's input increases the buyer's costs (e.g., production processes must be redesigned). *Supplier side* asset specificity comes into play if investments made by the supplier are of less value in the service of another buyer (e.g., casting dies specialized for a single buyer). We will consider both.

Our critical advance is to examine asset specificity separately for *direct* and *indirect* transactions. First, we consider asset specificity in a direct transaction of an outsourced product. For the buyer, the cost of switching its first-tier supplier increases if the buyer makes substantial investments in the first-tier supplier (Argyres & Zenger, 2012). This can create hold-up problems (i.e., difficulty in switching suppliers) and increase the risk of opportunism by the first-tier supplier (Handley & Benton, 2012). By contrast, when the first-tier supplier has made substantial investments specific to the buyer, these investments make the supplier dependent on the buyer, allowing the buyer to leverage this dependency to counteract the supplier's opportunistic behaviors (Jia, 2013; Subramani & Venkatraman, 2003). Therefore,

the risk of opportunism involving a first-tier supplier depends on the balance of relationship-specific investments between the buyer and its first-tier supplier.

In multi-tier supply chains, the first-tier supplier occupies a bridge position (Burt, 1992, 2000, 2002) between the buyer and lower tier suppliers (Choi & Hong, 2002). The first-tier supplier may leverage this bridge position and behave opportunistically by withholding information regarding indirect transactions or controlling lower tier supplier activities (Li & Choi, 2009; Tachizawa & Wong, 2015). In this situation, controlled indirect transactions may offer buyers an attractive option. By maintaining direct contractual links with lower tier suppliers, the buyer short circuits the bridge position occupied by the first-tier supplier.

Therefore, the buyer is faced with a balancing act. Maintaining direct contractual relationships with lower tier suppliers incurs the additional governance costs of identifying, selecting, negotiating with, and monitoring those suppliers (Wever et al., 2012), which favors delegating indirect transactions to the first-tier supplier. However, when the buyer's specific investments in the transaction surpass those of the first-tier supplier, there is an elevated risk of opportunistic behavior by the first-tier supplier, including opportunistically leveraging the bridging position between the buyer and indirect suppliers, as discussed above. Accordingly, direct contractual relationships with lower tier suppliers, which remove the avenue for opportunistic behavior, become more valuable and may eventually outweigh the additional governance costs.[2] Thus, we propose the following proposition:

> **Proposition 1.** A buyer is more likely to consider controlled indirect transactions when its relationship-specific investments are greater compared to those of the first-tier supplier in the relationship between the buyer and the first-tier supplier.

This proposition considers the asset specificity of the transaction between the buyer and first-tier supplier. We now consider the characteristics of indirect transactions and offer predictions on whether a particular indirect transaction will be governed in a controlled or delegated manner.

It is not uncommon for a buyer to make specific investments in transactions with a lower tier supplier. Prior transactions involving similar components or even earlier versions of the component currently under consideration may mean that the buyer has previously invested in relationship-specific physical or human assets relevant to the buyer's new product lines (Ragatz et al., 1997; Song & Di Benedetto, 2008). Specific physical and human assets refer to investments in production equipment and the transfer of know-how (De Vita et al., 2010; Williamson, 1985). These specific assets develop through face-to-face interactions and guest engineering programs (Dyer, 1996) as well as through a buying firm's prior experience and familiarity with lower tier suppliers (Chae et al., 2019).

For instance, Apple's engineers collaborated with a second-tier supplier, Catcher Technology, to develop the MacBook's aluminum body (Satariano & Burrows, 2011). Building on this human asset specificity, Apple extended the application of the Catcher's aluminum body to iPads and iPhones (Dou et al., 2014). Although the first-tier supplier Foxconn itself has aluminum body production capability, Apple bypassed Foxconn and used Catcher's aluminum body. Once specific investments were made in this second-tier supplier, Apple became inextricably connected to it and ensured access to Catcher's aluminum body, which now obligated Apple to engage in controlled indirect transactions (Blankfeld, 2015). If Apple's specific investments in this lower tier supplier were considerably lower, it might have been less motivated to source directly from the second-tier supplier.

Extending this logic, a buyer who has made greater specific investments in relationships with lower tier suppliers would become more vulnerable to the risk of losing the value of those investments if the first-tier supplier could freely choose lower tier suppliers (Chae et al., 2019). Delegating the sourcing of a highly specific component to a first-tier supplier may expose the buyer to the risk of the first-tier supplier replacing the lower tier supplier (Kähkönen et al., 2023). Selecting and managing lower tier suppliers for an indirect transaction where the buyer has made specific investments would alleviate this risk. Therefore, we propose the following:

> **Proposition 2.** When a buyer has previously invested in specific assets related to a lower tier supplier, the buyer is more likely to adopt the controlled indirect transaction approach toward this lower tier supplier.

[2]These advantages must be weighed against the risk of creating a convenient excuse for the first-tier supplier, potentially blaming lower-tier suppliers selected and managed by the buyer for any shortcomings caused by the first-tier supplier. The successful use of controlled indirect transactions by companies including Apple provides evidence that a combination of a priori contracting and post hoc performance management (enhanced by the buyer's control of the indirect transaction) can address this complication. The exact approach buyers use is worthy of further study.

Joint consideration of sourcing capability and performance ambiguity

Firms differ in *sourcing capability*. Sourcing capability is a bundle of skills and resources, including the integration between purchasing and other functions, collaboration with suppliers, technical skills of purchasing managers, and detailed purchasing procedures (Bowen et al., 2001). Sourcing capabilities help buying firms mitigate contractual hazards, including performance ambiguity (Legenvre & Gualandris, 2018). These capabilities are often gained through experience (Leiblein & Miller, 2003), technical expertise (Handley, 2017), and supplier relationships (Kotabe et al., 2003).

Consider the case in which a buyer's sourcing capability exceeds that of the first-tier supplier. A naïve prediction is that the buyer favors controlling indirect transactions. Conversely, delegating indirect transactions to the first-tier supplier seems sensible when the first-tier supplier has superior sourcing capabilities. Indeed, a first-tier supplier's ability to manage relationships with upstream suppliers is often a crucial part of its value propositions (Wilhelm et al., 2016). Although this basic logic seems sound, it fails to account for a critical contingency, *performance ambiguity*.

Performance ambiguity refers to "the inherent difficulty faced by the buyer in accurately evaluating the supplier's performance" (Stump & Heide, 1996, p. 436).[3] Accurately measuring the performance of a supplier's products is often daunting (Chandler et al., 2009). For example, although buyers can review suppliers' statistical process control data and engage in incoming inspections, further use or processing may reveal flaws. Identifying the source of a flaw is difficult, and the supplier may even assert that the fault lies with the buyer (Gray & Handley, 2015; Krzeminska et al., 2013; Mayer, 2009). Suppliers may also have incomplete information about buyers' expectations (Kauppi et al., 2024). Under such conditions of performance ambiguity, the buyer is vulnerable to opportunistic supplier behavior (Carson et al., 2006; Mayer, 2009; Mellewigt et al., 2018). For example, suppliers can covertly use lower quality materials and shirk other contractual responsibilities (Barzel, 1982; Demsetz, 1988; Wathne & Heide, 2000). Buyers must also consider the social and environmental aspects of a supplier's performance—often difficult to evaluate—that can affect their reputation (Cousins et al., 2004). Studies have found that performance ambiguity is one of the most difficult challenges in managing supplier relationships (Gray & Handley, 2015).

Revisiting the role of sourcing capabilities in light of performance ambiguity provides critical nuances for this logic. Having superior sourcing capabilities favors a buyer directly controlling indirect relationships, but only when there is substantial performance ambiguity regarding those indirect transactions (Kayış et al., 2013). Performance ambiguity is never entirely absent. However, when performance ambiguity in indirect transactions is *not substantial enough*—meaning that any performance shortcomings by lower tier suppliers are easily detected by either the buyer or the first-tier supplier—the benefits of the buyer's superior sourcing capability would remain largely unused. In such cases, there would be little advantage over delegating the indirect transactions to the first-tier supplier (Mayer & Salomon, 2006).[4]

By contrast, if performance ambiguity in indirect transactions becomes substantial, a buyer is motivated to examine the relative sourcing capability in terms of who can govern indirect transactions more efficiently. Buyers can stratify different purchasing categories, compare sourcing capabilities, and decide which categories of indirect transactions to control (Pressey et al., 2009). For instance, while Apple controls indirect sourcing decisions for parts that require technical expertise, it turns to Foxconn to make sourcing decisions for MRO items (Apple Inc., 2023b). Thus, we propose the following proposition:

> **Proposition 3.** In the presence of substantial performance ambiguity in an indirect transaction, a buyer is more likely to control that indirect transaction when its sourcing capability is superior to that of its first-tier supplier and more likely to delegate the indirect transaction when the first-tier supplier has a superior sourcing capability.

Performance ambiguity can also exist in the direct transaction between buyers and first-tier suppliers and can be particularly challenging to manage in a multi-tier supply chain context (Wilhelm et al., 2016). When the performance ambiguity for a final component is not substantial enough, any shortfalls in the quality of the subcomponents can be easily detected by evaluating the final component, allowing the buyer to effectively hold the first-tier supplier responsible for the performance of

[3]Performance ambiguity and behavioral uncertainty (Williamson, 1985; Wuyts & Geyskens, 2005) are used interchangeably in the TCE literature. We use the term performance ambiguity, as it is more specifically used in the buyer–supplier relationship context (Gray & Handley, 2015; Stump & Heide, 1996).

[4]One could, of course, consider other transaction hazards with a similar logic. We focus on performance ambiguity given its recognized role as one of the most difficult-to-manage transaction hazards in buyer–supplier relationships (Mellewigt et al., 2018).

its upstream suppliers (Choi et al., 2021). Therefore, opportunism by the first-tier supplier in the selection and management of lower tier suppliers is unlikely, and there is little need for the buyer to control indirect transactions.

For example, when Google and Flex made specific investments to develop Google Chromecast together (Flex Ltd., 2024), Google relied on Flex's superior sourcing and manufacturing capabilities and delegated all sourcing and manufacturing decisions to Flex. As Google Chromecast is a relatively simple product, the performance ambiguity in the direct transaction with Flex remained negligible for Google, which then delegated all component-sourcing decisions without concerns of opportunism from Flex.

By contrast, if the performance ambiguity regarding the direct transaction is high, the buyer may be reluctant to delegate lower tier sourcing activities to the first-tier supplier, lest it falls into an exchange hazard situation (Weber & Mayer, 2014; Williamson, 1985). Given that the buyer has difficulty evaluating the quality of the components it provides, a first-tier supplier may take advantage of its gatekeeping position. The first-tier supplier could manipulate, disguise, or conceal information on component cost or quality from the buyer, including potentially choosing inferior lower tier suppliers or exerting minimal effort in managing upstream suppliers (Bolandifar et al., 2016; Kayış et al., 2013). For example, Keyboardio, a manufacturer of high-end computer keyboards, discovered that its first-tier supplier had outsourced the production of keycaps to a second-tier supplier that used lower quality materials when it physically visited its first-tier supplier after months of wrangling over unsatisfactory quality (Keyboardio, 2019). In this case, closer contact with key indirect suppliers would benefit the buyer. By availing supply chain information directly from key lower tier suppliers (Choi & Linton, 2011), the buyer can enhance its understanding of the factors that determine the performance of the final component. Combining upstream and downstream knowledge can improve the buyer's ability to evaluate the final product's performance and increase the probability of mitigating the first-tier supplier's opportunistic behavior (Harrigan, 1984; Parmigiani, 2007).

When a buyer's sourcing capability is superior to that of its first-tier supplier, building closer contact with indirect suppliers by controlling indirect transactions is a straightforward option. The buyer is well equipped to successfully oversee indirect suppliers and manage the additional governance costs of identifying, selecting, negotiating with, and monitoring these suppliers to ensure their quality and improve their ability to evaluate the performance of the final component. Therefore, we offer the following proposition:

> **Proposition 4.** In the presence of substantial performance ambiguity in a direct transaction of the component supplied by its first-tier supplier, a buyer with a sourcing capability superior to that of the first-tier supplier is likely to control key indirect transactions.

By contrast, controlling indirect transactions is less attractive to a buyer with lower sourcing capability than its first-tier supplier. As the buyer would be less effective in controlling governing transactions with lower tier suppliers than with first-tier suppliers, it would benefit from the first-tier supplier's superior sourcing capabilities (Weigelt, 2013). However, fully delegating indirect transactions to the first-tier supplier would prevent closer contact with the lower tier suppliers that the buyer seeks when there is performance ambiguity in direct transactions (Choi & Linton, 2011).

The buyer may consider the hybrid approach discussed above to balance these competing demands. This approach involves shared responsibility among the buying firm, its first-tier supplier, and other third parties in managing lower tier suppliers (Koberg & Longoni, 2019). By collaborating with both first-tier and lower tier suppliers, the buyer can partially leverage its first-tier supplier's sourcing capability while remaining in contact with lower tier suppliers to reduce the risk of opportunism (Lumineau & Oliveira, 2020). Therefore, we propose the following:

> **Proposition 5.** In the presence of substantial performance ambiguity in a direct transaction of the component supplied by its first-tier supplier, a buyer with a sourcing capability inferior to that of the first-tier supplier is likely to choose a hybrid approach to governing indirect transactions.

Proposition 3 precedes Propositions 4 and 5 given the recognition that in cases of substantial performance ambiguity in an indirect transaction, a buyer with a superior sourcing capability compared to its first-tier supplier will opt to control the indirect transaction, irrespective of the performance ambiguity in the direct transaction with the first-tier supplier.

DISCUSSION AND CONCLUSION

Theoretical contributions

This study extends the decision to outsource at the firm level to what occurs across the supply chain. Sourcing

decisions involving indirect transactions are separate from yet closely linked to the buyer's decision to outsource a product from the market. Extending the literature built on Williamson's (1985) seminal work, we offer a novel theoretical framework that explains when firms may benefit from controlling direct and indirect transactions across their supply chains. The existing literature mainly focuses on transactions between partners engaged in the final exchange (e.g., Argyres & Zenger, 2012; Ebers & Oerlemans, 2016; McIvor, 2009). We expand the theoretical considerations of outsourcing decisions from a dyadic context to a multi-tier-level context (i.e., direct and indirect transactions across the buyer, first-tier supplier, and lower tier suppliers). Our intention is to enrich and broaden the scope of the theory by "scaling up" TCE (Ketokivi & Mahoney, 2020).

Careful consideration of the interdependencies between direct and indirect ties allows us to offer a new perspective on how firms organize transactions. This approach suggests that theorizing about an outsourcing decision can be changed to consider a broader set of outcomes unique to the current literature (Ebers & Oerlemans, 2016). The dependent variable is no longer simply make-or-buy but rather a make-or-buy decision involving production and additional governance decisions related to component sourcing activities for the product (Tachizawa & Wong, 2014).

Broadly, we consider sourcing decisions for both direct and indirect transactions. Even if the focus is on traditional organization-level outsourcing decisions, considering the available options for governing sourcing decisions in indirect transactions can offer more refined predictions. For example, our theoretical framework could be extended to argue that controlling indirect transactions for sub-components could allow a firm to buy even a highly asset-specific component by reducing the first-tier supplier's ability to engage in unauthorized design changes or subcontracting (Caro et al., 2021). Similarly, we argue that controlling indirect transactions can reduce the risk of buying a component imbued with performance ambiguity by giving the buyer greater control over the inputs in the production process (Choi & Linton, 2011).

Disaggregating transactions also require disaggregating many commonly considered explanatory variables (Tosi et al., 1997). Disaggregation occurs in two manners. The first is the disaggregation of monolithic theoretical concepts. For example, we suggest different roles for capabilities related to production and capabilities related to sourcing (Bowen et al., 2001). In doing so, we argue that considering relative sourcing capability separately from production capability yields diverging predictions regarding decisions governing indirect transactions. The second is the disaggregation of theoretical concepts based on whether they occur in direct or indirect transactions. For example, Proposition 3 suggests that if a buyer has lower sourcing capability than its first-tier supplier and there is considerable performance ambiguity in the direct transaction, performance ambiguity in the indirect transaction can push the buyer toward delegated indirect transactions, as it wishes to pass the responsibility and associated risk of evaluating ambiguous inputs onto the first-tier supplier. The new perspective we offer is critical for understanding the interdependent nature of these transactions within a multi-tier context (Mena et al., 2013; Wilhelm et al., 2016).

The current literature on multi-tier supply chain management has emphasized the pivotal role played by first-tier suppliers in expanding sustainability initiatives toward lower tier suppliers (e.g., Villena, 2019; Wilhelm et al., 2016). Furthermore, it examines various supply chain structures (e.g., open, closed, and transitional) and arrangements (e.g., direct, indirect, and third-party) to effectively manage both first-tier and lower tier suppliers. Additionally, researchers have examined the underlying motivations behind the adoption of specific supply chain structures and arrangements (e.g., Koberg & Longoni, 2019; Mena et al., 2013; Tachizawa & Wong, 2014). The literature has identified several critical determinants that drive the selection of multi-tier supply chain arrangements, such as power dynamics, stakeholder pressures, material importance, industry characteristics, interdependency, geographical distance, and knowledge resources (Tachizawa & Wong, 2014). These insights have contributed to a more profound understanding of the intricacies inherent in managing multi-tier supply chains.

Our contribution to this evolving body of literature is the presentation of a straightforward theoretical framework that extends and enriches the fundamental tenets of TCE. Our theoretical framework serves as a practical tool for equipping buyers with a structured decision-making process tailored to the intricate management of multi-tier supply chains. Our work responds to the calls of Williamson (2008) and Zipkin (2012) for a pragmatic approach that readily translates into simple and actionable guidance for managers in their decision-making endeavors.

Managerial implications

This study proposes a decision-making framework that offers guidance to managers regarding the governance of indirect transactions. The framework is illustrated in Figure 2. When applying the framework to manage

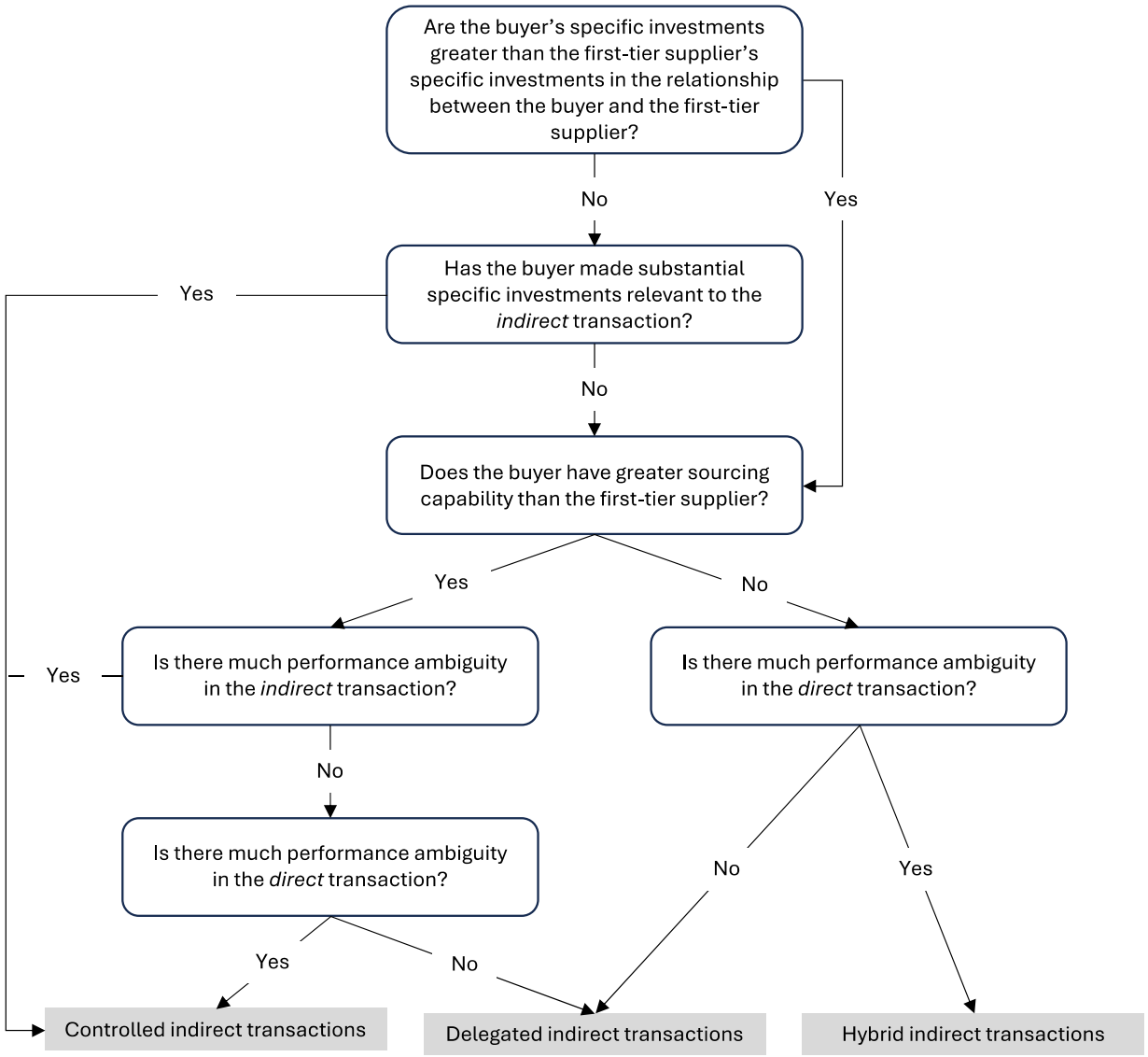

FIGURE 2 Decision framework for the governance of indirect transactions.

multi-tier supply chains, buying companies gain access to a broader array of strategies than they might initially recognize. For instance, even when market governance does not appear attractive in the classic make-or-buy decision, hierarchical governance does not need to be the sole recourse if transaction cost reduction can be achieved by strategically employing controlled indirect transactions with specific lower tier suppliers.

For instance, in the midst of production delays that plagued the Boeing 787 Dreamliner project in 2009, Boeing encountered a situation in which one of its fuselage suppliers, Vought, demonstrated insufficient capabilities to manage its supply chain effectively. Consequently, Boeing opted to acquire Vought's South Carolina manufacturing facility as a solution (Drew, 2009). However, an alternative approach could involve expanding the utilization of controlled indirect transactions. For instance, Boeing could have reached deeper into a select group of lower tier suppliers and managed them, as Honda and Toyota did with their lower tier suppliers (see Choi & Hong, 2002). This approach would have relieved Vought of responsibility for directly managing its indirect suppliers while still capitalizing on Vought's manufacturing capabilities.

To comprehensively evaluate their available choices and make well-informed decisions concerning indirect transactions, buyers must extend their scrutiny to a broader array of criteria encompassing considerations beyond previous suggestions. This expanded assessment should include factors such as relative sourcing capability and the established dimensions of asset specificity and performance ambiguity in direct and indirect transactions.

Furthermore, our propositions imply that buyers possess the flexibility to leverage controlled indirect

transactions as a means to partially harness the benefits of learning by doing (Adler & Clark, 1991; Pisano, 1994; Von Hippel & Tyre, 1995) rather than committing entirely to firm-level production or the concurrent sourcing (i.e., both making and buying) approach (Parmigiani, 2007). This nuanced approach allows buyers to tap into incremental learning and knowledge accumulation advantages while maintaining a strategic balance in their operational choices.

Societal implications

The theoretical framework presented in this study has several societal implications for sustainable supply chain management. By exploring how buying firms can become involved in sourcing decisions across supply chains for their outsourced products (Choi & Linton, 2011), our framework has the potential to influence how businesses operate within broader societal and ecological contexts (Wieland, 2021).

One notable societal implication is the potential to promote more responsible and ethical supply chain practices. In an era in which supply chain transparency and ethical sourcing are a growing concern for consumers and regulators (Kim & Chae, 2022; Sodhi & Tang, 2019), the framework's structural way of considering indirect transactions and governance could encourage buyers to develop efficient models to scrutinize their supply chains for ethical and sustainability issues. This meticulous examination can instigate positive transformations, including mitigating exploitative labor practices and reducing occupational hazards throughout the supply chain, extending far beyond the confines of first-tier suppliers (Wilhelm & Villena, 2021).

For example, consider the revelation that certain garments produced for Disney, Sears, and Walmart were traced back to the Tazreen factory in Bangladesh, where a tragic fire claimed the lives of 112 workers in 2012 (Motlagh & Taylor, 2013). At the time, these three corporations maintained that they did not know of their involvement with this factory, as manufacturing was subcontracted through fashion sourcing and logistics giant Li & Fung (Ali Manik & Yardley, 2013). We hope that this study's practical guidelines for governing indirect transactions will contribute to empowering firms to prevent disasters stemming from a lack of supply chain transparency.

Furthermore, the framework's focus on controlled indirect transactions provides a potential avenue for fostering sustainable supply chain practices. Sustainable sourcing and responsible procurement have become critical issues for businesses seeking to reduce their environmental footprints and meet sustainability goals (Choi & Linton, 2011; Villena & Gioia, 2020). By strategically employing controlled indirect transactions with lower tier suppliers, firms can exercise greater control over their supply chains, ensuring compliance with sustainability standards and practices (e.g., control over the implementation of zero-emission strategies across the supply chain). Indeed, buyers who are larger, more sophisticated, or more reputationally exposed than their first-tier suppliers have no choice but to do so. This approach aligns with the global push toward responsible and sustainable supply chain management, contributing to the broader societal goal of sustainable development.

Limitations and future research

This study relies on conceptual theory building. To bolster the credibility and applicability of our theoretical framework, future research should strive to provide empirical validation through a combination of qualitative and quantitative investigations. A promising avenue for such empirical inquiries is to initiate a comprehensive examination of products with transparent bills of materials (in the case of goods) or work breakdown structures (pertaining to services). Subsequently, researchers can identify the relevant suppliers of each constituent component within these products. This initial groundwork paves the way for the observation of genuine buyer decisions as they grapple with the selection of controlled, delegated, or hybrid strategies in governing indirect transactions.

To provide a deeper understanding and strengthen the robustness of our framework, it is prudent to conduct longitudinal case studies. These studies should trace the evolution of governance decisions concerning indirect transactions over extended periods and provide insights into the framework's efficacy under varying conditions and over time. Additionally, large-scale panel data analyses encompassing a spectrum of contractual relationships with lower tier suppliers across multiple products and industries can be conducted. Such comprehensive analyses would enhance the framework's predictive power and facilitate a nuanced comprehension of its practical relevance in diverse real-world scenarios.

It would also be valuable to delve deeper into the intricate dynamics governing indirect transactions regarding concurrent sourcing. Concurrent sourcing, defined as a firm's simultaneous production and purchase of the same component (Heide et al., 2014; Parmigiani, 2007), shares common ground with controlled indirect transactions in offering buyers a means to address challenges such as asset specificity and

performance ambiguity without committing solely to internal production. However, the research focus has traditionally differed, with concurrent sourcing investigations centered on the balance between internal production and external procurement in direct transactions. An intriguing avenue for exploration is studying how decisions about concurrent sourcing interact with choices concerning the governance of indirect transactions.

To advance our understanding of this domain, future studies could adopt a more nuanced approach by delving into the theoretical distinctions between various hybrid governance strategies for indirect transactions. These might encompass the use of network governance (Powell, 1990; Provan & Kenis, 2008) involving multiple stakeholders in activities such as supplier training, risk assessment, and performance feedback (Gong et al., 2018; Tachizawa & Wong, 2015; Villena & Gioia, 2018). Integrating network governance approaches with the theoretical framework presented in this study would allow researchers to shed light on their merits, drawbacks, and suitability under different circumstances, thus enriching our understanding of governing indirect transactions.

It is also worth noting that the applicability of this novel theoretical perspective extends beyond the realm of traditional supply chain relationships. Managing both direct and indirect transactions can be extended to diverse purposes, such as R&D partnerships, and may encompass various forms of relationships, including alliances. This study's theoretical framework can be further expanded to explore the cross-level connection between the supply chain and the political–economic system (Wieland, 2021) by examining the societal and ecological linkages between first-tier and lower tier suppliers. Extending the insights from this study to these broader domains represents a logical and promising theoretical extension with the potential to enhance our comprehension of complex decision-making processes in myriad contexts.

CONCLUSION

Disaggregating "the transaction" into the multi-tier context advances theory and managerial decision-making. It does so by returning to the foundational concept of the literature on make-or-buy decisions. It offers a reconceptualization that is compatible with yet distinct from other extensions of Williamson's (1985) original insights. Shifting the unit of analysis to include indirect transactions while considering its dependence on direct transactions changes both the outcomes and causal factors involved in outsourcing decisions at the supply chain level. We have used concrete examples of controlled and delegated indirect transactions. Direct and indirect transactions in almost every relationship between firms make this new perspective broadly relevant.

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