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Concurrent sourcing and supplier opportunism

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Concurrent sourcing and supplier opportunism

ABSTRACT

The term “concurrent sourcing” refers to the practice of a firm to simultaneously make and buy the same components. This paper presents an agency model for explaining how and when concurrent sourcing reduces the likelihood of external supplier opportunism. In the proposed model, the external supplier’s expected costs of opportunism are determined as a product of four factors. These four factors are: buyer’s likelihood of discovering supplier opportunism, buyer’s internalized quantity as reaction to supplier opportunism, asset specificity of external supplier’s investments, and multiplier effects. Each of these factors are explained and discussed in the paper. The paper also offers a number of theoretical and managerial implications.

Keywords: opportunism; business-to-business relationships; concurrent sourcing; plural sourcing; plural governance, agency theory; transaction cost theory; plural form, make-and-buy; tapered integration.

1 INTRODUCTION

Concurrent sourcing is the phenomenon where a firm simultaneously buys and makes the same good or service (Parmigiani, 2007). Concurrent sourcing is a widespread phenomenon that can be found in both the private (Heide et al., 2014; Nordigården et al., 2014) and the public sectors (Hansen et al., 2011; Hefetz et al., 2014). Carrer et al. (2014) describe a Brazilian firm operating six slaughterhouses. This firm uses concurrent sourcing and combines its own production of cattle with a range of sourcing arrangements including spot market and longer-term contracts when buying cattle for its slaughterhouse production. Among the advantages identified are that concurrent sourcing reduces the risk of depending on a small number of suppliers, and it also provides flexibility regarding the quantity and quality of cattle needed to serve uncertain market demands. Similarly, case studies of a designer and manufacturer of clothing (Jacobides and Billinger, 2006), of mortgage banking (Jacobides and Hitt, 2005), and of plants processing sugar canes (Feltre and Paulillo, 2015) describe how firms both make and buy in parts of their value chains. Concurrent sourcing may arise temporarily when firms either insource or outsource their production, but Parmigiani (2007) and Heide et al. (2014) conclude that their data indicate that concurrent sourcing is a stable sourcing mode.

Recent papers identify a number of different explanations for the existence of concurrent sourcing (e.g. Krzeminska et al., 2013; Menard, 2013; Puranam et al. 2013). For example, both Puranam et al. (2013) and Parmigiani (2007) mention that concurrent sourcing provides the buyer with superior information on cost, prices, and other benchmarks, and it also serves as a threat of backward

integration. In other words, concurrent sourcing is a safeguard that lowers external supplier opportunism.

Previous studies about supplier opportunism have shown that a number of transaction characteristics and management control mechanisms affect supplier opportunism (e.g. Lonsdale et al., 2015; Yan and Kull, 2015; Wang et al., 2014). For example, mutual relationship specific investment, product complexity, and technological novelty (Yan and Kull, 2015) increase opportunism, whereas quality of information shared (Wang et al., 2014), reputation effects, credible legal threats (Lonsdale et al., 2015), and coordination effort (Yan and Kull, 2015) decrease supplier opportunism. Among the consequences of supplier opportunism are negative effects on trust and long-term orientation (e.g. Chung, 2012), and lower efficiency and quality in cooperation about new product development projects (Yan and Kull, 2015). Despite an increasing number of papers about concurrent sourcing, only Heide et al. (2014) develop the link between concurrent sourcing and external supplier opportunism. They find that concurrent sourcing in itself suppresses supplier opportunism towards the buyer and that monitoring and solidarity norms have different effects on supplier opportunism in a concurrent sourcing context than in a singular sourcing context.

In this paper, we attempt to develop the link between concurrent sourcing and supplier opportunism. We seek to contribute by presenting a model for explaining how concurrent sourcing reduces the likelihood of external supplier opportunism toward the buyer. The model suggests that concurrent sourcing in some cases affects buyer's likelihood of discovering supplier opportunism and buyer's reaction to supplier opportunism, and thereby it increases supplier's expected costs of opportunism. However, it also suggests that this effect on supplier's cost of opportunism is contingent on the level of supplier's transaction specific investments and network effects. We also contribute by

explaining what types of information market sourcing, concurrent sourcing, and internal production provide access to for the buyer, and hence when it is an advantage to use concurrent sourcing for discovering supplier opportunism. The paper ends by offering theoretical and managerial implications.

2 LITERATURE REVIEW AND MODEL

2.1 Literature review

Opportunism is defined by Williamson (1985, p. 30) as “self-interest seeking with guile”, and it is a widespread problem in buyer-seller relationships (Wathne and Heide, 2000). Opportunism may occur because of asymmetric information. With asymmetric information, it takes time and may be impossible to discover opportunism. For example, the German company Joh. Gg. Zölls Vertriebs GmbH had a contract with Scanomat A/S regarding delivery of 1000 coffee machines in a three year period 2003-2006. However, the coffee machines did not work properly, and after repairs of the machines, meetings, and mails between the two companies, Zöll terminated the agreement due to breach of contract. The conflict also resulted in a court case (Verdict case H-75-07).

Opportunism may also occur when a firm is locked-in with a supplier and therefore cannot easily switch to another supplier. An example is described by Parmigiani and Mitchell (2009, p. 1074):

“... the executives were concerned about supplier opportunism, particularly for die construction.

They noted that ‘when tool shops are busy, prices go up two times and delivery increases from 2–3 weeks to 10–12 weeks,’ and were wary of the ‘kitchen remodeler trick’ in which suppliers would agree to a job but later negotiate for higher prices and/or later deliveries due to unforeseen circumstances.”

Agency theory (Bergen et al, 1992) and transaction cost theory (Williamson, 1985) both focus on how firms may efficiently control opportunism and thereby reduce transaction costs. Therefore they are often used as theoretical starting points for explaining opportunism in buyer-seller relationships and the ability of different contracts and governance structures to reduce opportunism (e.g. Kang and Jindal, 2015; Liu et al., 2014; Heide et al., 2014). In agency theory, an agent's characteristics and behaviour are not immediately observable to the principal, and the agent will try to exploit this opportunistically. For example, a supplier may not tell the truth about the quality of his abilities to produce a certain component (adverse selection) and may degrade the quality of products produced (moral hazard) if it leads to a higher payoff. There are two solutions suggested by agency theory. First, the principal screens agents before offering them a contract. Second, the principal designs a contract so that the agent's actions wanted by the principal also give the highest payoff to the agent. After the contract has been signed, the principal may also monitor the behaviour and the performance of the agent (cf. Bergen et al., 1992). Transaction cost theory suggests that transaction specific investments (asset specificity) may result in opportunism. "Asset specificity refers to durable investments that are undertaken in support of particular transactions, the opportunity cost of which investments is much lower in best alternative uses or by alternative users should the original transaction be prematurely terminated" (Williamson, 1985, p. 55), and it creates dependence. Hence, firms making transaction specific investments run the risk that their partners try to exploit their dependence and appropriate the value created in the relationship. The solution in transaction cost theory is to write contracts that protect transaction specific investments. This may not be possible because of environmental uncertainty, and hence a combination of uncertainty and idiosyncratic investments makes internal production the efficient mode of organizing transactions (Williamson, 1991).

Based mainly on these two economic theories, several papers describe opportunism and governance mechanisms to reduce opportunism in buyer-supplier relationships (Brown et al., 2000; Hawkins et al., 2008; Morgan et al., 2007; Wathne and Heide, 2000). A central assumption is that firms and individuals behave opportunistically when the cost of opportunism is lower than the gains from opportunistic behaviour. Shapiro and Stiglitz (1984) developed a model in which workers shirk, i.e. behave opportunistically, when the benefit from shirking exceeds the expected cost from being discovered. The expected cost to the worker is the probability that the worker is caught and fired and for a period receives an unemployment compensation that is lower than the present wage. Hill (1990) identifies two situations where it is an advantage for a firm to behave opportunistically; first, when opportunism is not detected, and second, when the returns from opportunism are higher than the value of the future cooperation that may be lost if the opportunism is discovered. Nooteboom (1996) develops a model in which the probability of loss caused by opportunistic partner firms is given by the multiplication of three factors: (1) the partner's incentives towards opportunism, (2) the partner's opportunities for opportunism, and (3) the partner's propensity towards opportunism. By including propensity towards opportunism, Nooteboom (1996) recognizes that not all partners are equally likely to behave opportunistically and that their norms and values may differ. On the other hand, he also recognizes that trust may break down, and generally there is a broad recognition that a rational calculation approach to opportunism may be useful. More recent models have combined agency theory and transaction cost theory with network theory (Liu et al, 2014), cultural and institutional factors (Yan and Kull, 2015), social norms (Heide et al., 2014), relational exchange perspectives (Zhou and Xu, 2012), and social exchange theory (Chung, 2012) to explain supplier opportunism.

Empirical results support the prediction that relationship specific investments and behavioural uncertainty increase partner opportunism, whereas social interactions, trust, and shared values are negatively related to partner opportunism (Wang et al., 2013). Other results indicate that satisfaction is negatively related to opportunism (Rindell et al., 2013), and that opportunism is an important dimension of relationship quality (Hutchinson et al., 2012). Theoretical work by Burki and Buvik (2010) suggest that there is a negative relationship between relationship duration and opportunism. However, these papers do not mention concurrent sourcing, and generally there are few papers about concurrent sourcing as an alternative to other sourcing arrangements central in transaction cost economics and purchasing and supply chain literature, such as single sourcing, multiple sourcing, and in-house sourcing (Buvik and Andersen, 2015; Mols, 2010; Nordigården et al., 2014).

Concurrent sourcing is an empirical phenomenon that has also been labelled upstream tapered integration (Harrigan, 1983, 1984; Porter, 1980), plural sourcing (Puranam et al., 2013), mixed strategies (Nordigården et al., 2014), and plural governance in industrial purchasing (Heide, 2003). With concurrent sourcing, different governance structures are combined and used for transfers of identical goods or services, and Puranam et al. (2013) emphasise that concurrent sourcing is different from the hybrids in Williamson's (1985) transaction cost theory, and that standard transaction economics cannot explain concurrent sourcing. Studies and models of concurrent sourcing try to explain either the choice of concurrent sourcing (Parmigiani, 2007) or the cost of concurrent sourcing (Puranam et al., 2013). No papers focus on the link between concurrent sourcing and external supplier opportunism, and only two papers use agency theory for explaining concurrent sourcing. Heide (2003) finds that information asymmetry in the relationship between external supplier and buyer increases the likelihood that the buyer shifts to concurrent sourcing.

Heide et al. (2014) find that the ability of monitoring to suppress supplier opportunism is stronger when buyers use concurrent sourcing than when they use a singular sourcing. However, their results indicate that solidarity norms' ability to suppress supplier opportunism is stronger when buyers use a singular sourcing mode. They also find support for the hypothesis that in concurrent sourcing relationships monitoring and solidarity norms increase supplier performance.

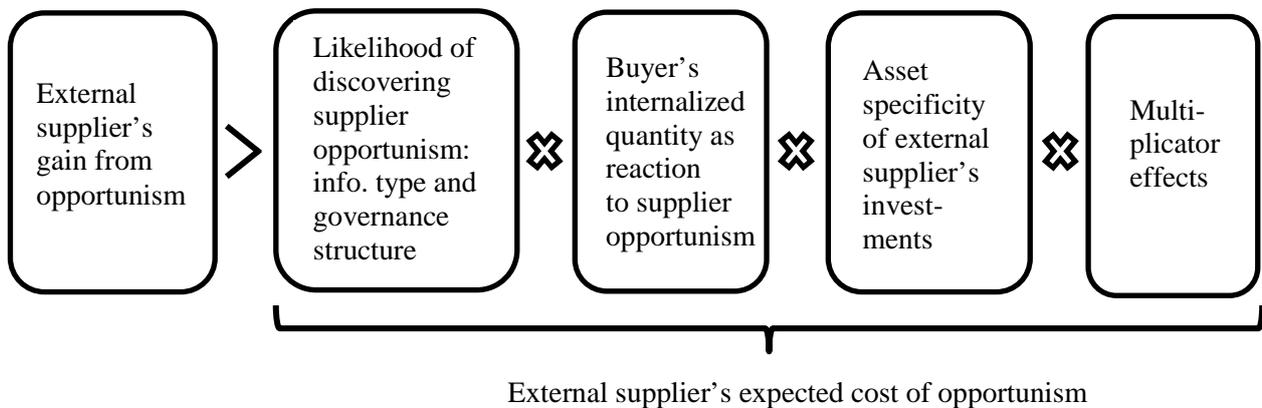
2.2 A model of supplier opportunism

In Figure 1, we present an overview of the model for explaining how concurrent sourcing affects supplier opportunism toward the buyer. The model is an economic principal-agent model that is useful for analysing how concurrent sourcing affects a supplier's incentives for opportunism toward the buyer. The model suggests that the likelihood that concurrent sourcing reduces external supplier opportunism is determined by an inequality. The lower (higher) the external supplier's expected gains from opportunism compared to the external supplier's expected costs of opportunism, the lower (higher) is the likelihood that external suppliers will behave opportunistically. Furthermore, the external supplier's expected costs of opportunism are determined as a product of four factors that are explained and discussed in the following sections (see Figure 1).

The model is similar in kind to other agency models that suggest that opportunism is based on rational calculations of expected net economic gains from opportunistic behaviour (e.g. Shapiro and Stiglitz, 1984), but in this paper, the model is used for explaining how concurrent sourcing affects supplier opportunism towards a buyer. Though the model is mainly developed based on Shapiro and Stiglitz's (1984) agency model, it also borrows concepts from transaction cost theory (Williamson, 1991) and neoclassical economics (Puranam et al, 2013). The model is complementary to existing hypotheses which are deduced from transaction cost theory and which

propose that asset specificity and vertical integration reduce opportunism (e.g. Brown et al., 2000). However, transaction cost theory is unable to explain concurrent sourcing (Puranam et al., 2013), and it does not explicitly take a buyer's perspective on supplier opportunism, and hence it does not explain how different factors interact to determine supplier's expected cost of opportunism. In the following sections, it is also explained how concurrent sourcing is different from market sourcing and internal production with regard to discovering supplier opportunism, reacting to supplier opportunism, and signalling a multi-period reaction.

Figure 1: The effect of concurrent sourcing on external supplier opportunism



2.3 Likelihood of discovering external supplier's opportunism

In a buyer-supplier relationship, asymmetric information may lead to supplier opportunism. With concurrent sourcing, it is possible to use information from internal production for the evaluation and controlling of external suppliers, and hence mitigate supplier opportunism (Heide, 2003). This is also supported by Heide et al (2014), who found that in a concurrent sourcing context, buyer

monitoring of supplier suppresses supplier opportunism towards the buyer, whereas monitoring in a singular sourcing context is less effective. Although concurrent sourcing is more effective than singular sourcing for avoiding supplier opportunism, it is not always sufficient for avoiding supplier opportunism. We suggest that concurrent sourcing provides at least two out of three types of information, and that the simultaneous access to the two types of information reduce supplier opportunism. These three types of information are:

- The first type of information is available from the market and by the inspection of products bought on the market. When a firm buys a product, it gets access to these *market-based benchmarks* that can be compared with internal production and other external suppliers' offerings. This information may be readily available from several alternative suppliers, or can be obtained when negotiating to buy from or continuously buying from a specific supplier. For example, Buvik and Andersen's (2015) results indicate that multiple external suppliers reduce information asymmetry problems and opportunism in buyer-supplier relationships.
- The second type of information is obtained in-house and can be compared with supplier offerings. For example, internal production costs and product qualities can be compared with external suppliers' prices and product qualities. Heide (2003) argues that such internal information is useful for setting meaningful standards for suppliers and also helps monitor suppliers. Whence, without internal production, a firm does not know the production costs and may have difficulties evaluating the quality of a component. We label this second type of information *internal production-based benchmarks*. Only buyers that use concurrent sourcing can compare internal production-based benchmarks and external supplier performance, and such comparisons may be necessary for discovering supplier opportunism.

- The third type of information can only be collected and verified by observing the production process. It represents *unique production information*, and it is information about elements of the product or production processes that are not verifiable by inspection or that are extremely costly to verify. For example, the durability of a component may depend on the temperature at which it is painted, but a simple inspection may not reveal the exact temperature. The quality of a product may also depend on the unobservable and unverifiable conditions, under which it is produced, sorted, transported, and stored (temperature, noise, space, physical impacts, etc.). This information can only be obtained via internal production, because external suppliers are unwilling to give a buyer access to all aspects of his business (Barzel, 2005). Since this type of information is only available from internal production, it cannot be compared to equivalent information regarding suppliers' products and production processes and is thus not useful for benchmarking external suppliers.

When market-based benchmarks are sufficient for evaluating supplier performance, and market information is readily available, then it is possible to discover opportunism by use of market information, and thus concurrent sourcing does not improve the likelihood of discovering supplier opportunism. When there are few or only one external supplier and market information is not readily available or trustworthy, the internal production-based benchmarks remain available with concurrent sourcing. In this case, concurrent sourcing eliminates asymmetric information and makes it possible to discover supplier opportunism related to observable qualities, prices, and costs. When the third type of information (unique production information) is most relevant, concurrent sourcing does not improve the likelihood of discovering supplier opportunism. This means that when the unique production information is not relevant for discovering opportunism, then concurrent sourcing makes it possible to discover supplier opportunism. When the unique

production information becomes relevant, concurrent sourcing may not help discover all supplier opportunism. So with concurrent sourcing, the likelihood of discovering supplier opportunism is lower the higher the relevance of unique production information for evaluating supplier performance.

2.4 Buyer's reaction to external supplier's opportunism

When a buyer discovers supplier opportunism, the buyer may decide to tolerate the opportunism or to react. If the buyer decides not to react to supplier opportunism, then there is no cost of opportunism for the supplier. Consequently, the supplier's gain from opportunism will be higher than the costs, and it will not have any effect that the buyer has discovered the supplier's opportunism.

Concurrent sourcing has been argued to provide the buyer with a termination safeguard (Puranam et al. 2013). It is assumed that small scale internal production demonstrates an ability to further integrate, and hence the termination safeguard implies that the buyer either terminates the relationship with the supplier or internalizes a proportion of the quantity supplied by the supplier. The larger the quantity the buyer decides to produce internally, the larger the external supplier's lost sales and profit will be.

How much the buyer decides to internalize as a reaction to supplier opportunism depends on the buyer's cost of internalizing. The buyer's cost of internalizing is the difference between external supplier prices and cost of internal production. In the literature about concurrent sourcing and vertical integration, the following factors have been identified as relevant for determining these costs: production costs/capabilities, transaction costs, asset specificity, transaction frequency,

uncertainty, incentive and knowledge complementarities between internal and external production, economies and diseconomies of scale, and economies of scope (e.g. Heide et al, 2014; Mols et al., 2012; Parmigiani, 2007; Puranam et al. 2013; Williamson, 1991). For example, the buyer may be subject to diseconomies of scale and may have weaker capabilities than the supplier, and thus vertical integration results in higher production costs (Puranam et al., 2013). Furthermore, vertical integration may increase transaction cost because of lower powered incentives (Williamson, 1991), and buyer's transaction specific assets lose their value (Buvik et al., 2015).

A buyer using concurrent sourcing has knowledge about production cost and demonstrates an ability to internalize. The buyer knows when it may be efficient to internalize, and the supplier knows that the buyer is able to react to opportunism by internalizing. Hence, concurrent sourcing is a safeguard because the buyer signals to the external supplier that opportunism will be countered by a decrease in the quantity bought from the external supplier. A buyer using market sourcing may also internalize when prices are raised or quality is degraded, but here the supplier will be less certain that the buyer will react to opportunism.

Since internalizing production is costly, only buyers with financial resources are able to change from concurrent sourcing to full vertical integration. Thus, a buyer needs financial resources for the external supplier to believe the threat of full vertical integration. On the other hand, the smaller the external suppliers, the less costly it will be for the buyer to internalize the production of a single external supplier. Therefore concurrent sourcing reduces supplier opportunism more when the buyer buys from several small suppliers.

Both the buyer and the external supplier may have a strong interest in continuing with concurrent sourcing and avoiding complete internalization (Puranam et al., 2013). Full vertical integration may take time and require additional investments in equipment, buildings, and employee training. However, if the supplier asks for a high mark-up or the needed quality inspections are time consuming, then it may not cost the buyer to vertically integrate. Therefore, the buyer's reaction to supplier opportunism will be to fully vertically integrate, which may be costly to the supplier.

Why do the buyer not merely shift supplier instead of internalizing? If neither the buyer nor a new supplier have to invest in transaction specific assets, then it will be efficient for the buyer to shift supplier. However, if a shift of supplier requires investments in transaction specific assets, then the investors may hesitate and the actual shift will take time. The dilemma is that low transaction specific investments make it easy to attract new alternative suppliers. However, a low level of transaction specific assets makes the right hand side of the model nearly equal to zero, and consequently the likelihood of opportunism from the new supplier is also high.

2.5 External supplier's transaction specific assets

In Figure 1, the degree of asset specificity refers to how much the supplier's asset will lose in value if the relationship with the buyer is terminated (Williamson, 1991). According to transaction cost theory, firms can choose between special purpose and general purpose investments (Williamson, 1985: 54). Thus, the same components can be produced and delivered by different mixes of technologies, and thus different levels of asset specificity in terms of site specificity, physical specificity, human assets specificity, brand name specificity, dedicated assets, and temporal specificity can be used for producing and distributing identical goods (Williamson, 1991).

For example, a supplier may place his production facilities next to a buyer, invests in special tools, invest in training, invest in JIT-system, and make other adaptations to serve the specific needs of the buyer. Such relationship specific investments support the sales of components to the buyer, they create value in the relationship with the specific buyer, and hence they are necessary for a buyer-supplier relationship to contribute to competitive advantage (Buvik and Andersen, 2015; Buvik et al., 2015; Kang et al., 2009).

The downside of specific investments is that the supplier becomes locked-in to a specific buyer. Hence, specific assets create dependence and a supplier that invests in transaction specific assets risks that buyers exploit this dependence (Buvik and Andersen, 2015). Therefore investments in transaction specific assets are safeguarded. Some of the safeguards mentioned in transaction cost theory are reciprocal investments by the buyer to create a hostage situation where both parties may lose if their relationship is terminated (Williamson, 1985). However, empirical studies show that suppliers often make such relationship specific investments unilaterally (Ebers and Semrau, 2015; Kang, et al., 2009).

When a supplier's assets are idiosyncratic, the assets have no value if the relationship with the buyer is terminated. So if the buyer decides to internalize half of the quantity that is usually bought from an external supplier, then the supplier has a loss roughly equal to half of the value of the transaction specific assets. In other words, the supplier's transaction specific assets represent a loss to the supplier if his opportunism is discovered and the buyer reacts by terminating the relationship with the supplier. When a supplier's assets are non-specific, the assets will not lose value when the relationship with the buyer is terminated. In this case, the supplier merely starts selling to an

alternative buyer, and thus concurrent sourcing will have no effect on the supplier's cost of opportunism.

The empirical results regarding the hostage effect are mixed. For example, Buvik and Andersen (2015) find a positive association between suppliers' specific investments and buyer's authority and control over suppliers. This result suggests that suppliers' specific investments attenuate supplier opportunism. However, they also find that suppliers' specific investments are weaker associated with buyer control over the supplier, when the buyer uses multiple suppliers compared to sole sourcing. Hence, in their context, multiple sourcing has the same effect on the relationship as supplier specific investments. Brown et al. (2000) find that franchiser specific investments interact with relational exchange to reduce opportunism, but they do not find an independent effect of specific investments on opportunism.

2.6 Multiplier effects

The effect of supplier opportunism may extend beyond a short period and beyond the focal relationship. Multi-period effects may be present if the buyer internalizes a large part of the external supplier's production and therefore invests in capital goods or human assets that are transaction specific and do not deteriorate or get obsolete. These transaction specific investments in internal production lose their value if the buyer after a short period decides to source from the external supplier again. Therefore, such investments make it difficult for the external supplier to increase sales to the buyer or to re-enter the relationship with the buyer, and hence there may be long-term costs of supplier opportunism.

As noted by e.g. Wathne and Heide (2000), opportunism in a buyer-supplier relationship may also have reputation effects. This effect is present when opportunism in one relationship increases the costs for the supplier in other relationships, because other buyers fear that the supplier may act opportunistically in other relationships and therefore implement safeguards that are costly for the supplier. The supplier may even lose business to competitors, because buyers prefer buying from suppliers that do not have a reputation for being opportunistic. The model proposes that this network effect on opportunism is dependent on the other factors in the model. Hence, in a concurrent sourcing context, the network effect is suggested not to be present if the opportunism is not discovered, and if the buyer does not react to the supplier's opportunism.

3 DISCUSSION AND THEORETICAL IMPLICATIONS

Except for work by Porter (1980) and Harrigan (1983, 1984), concurrent sourcing has only recently caught the attention of researchers (Heide et al., 2014; Parmigiani, 2007). This paper adds to this research by suggesting an agency explanation for how concurrent sourcing limits supplier opportunism. Central in the model is the interaction of several components for explaining supplier opportunism. Hence, the model makes explicit some of the assumptions made when using partial hypotheses for the prediction of when concurrent sourcing reduces supplier opportunism. The model is also different from previous literature (e.g. Heide, 2003; Heide et al., 2014) about concurrent sourcing because it emphasizes the limits of concurrent sourcing for reducing supplier opportunism. For example, the model proposes that concurrent sourcing only lowers supplier opportunism when internal production-based benchmarks are relevant, when buyers are able and willing to react to supplier opportunism, and when suppliers have invested in transaction specific assets. Only in conjunction do these factors limit supplier opportunism. Hence, the model is

different from existing literature about concurrent sourcing because it predicts that if one factor in the model is absent, then increasing the levels of the other factors has no effect on supplier opportunism.

Another contribution in this paper is the identification of three types of information relevant for discovering opportunism, and the suggestion that concurrent sourcing only improves the discovery of supplier opportunism when both *market-based benchmarks* are not immediately available and sufficient for evaluating supplier performance and *unique production information* is not relevant for discovering opportunism. In contrast, existing literature about concurrent sourcing has viewed information asymmetry and performance uncertainty as a one-dimensional construct. For example, Heide (2003, p. 19) suggests that “the greater the information asymmetry in a market relationship, the greater is the likelihood that the market relationship will be augmented with internal organization”, and based on transaction cost theory, Parmigiani (2007, p. 290) predicts that concurrent sourcing is only used for goods with moderate performance uncertainty.

Buyers’ reactions to supplier opportunism are the most complex element in the model, and the literature is sparse about buyers’ reactions to supplier opportunism. In the concurrent sourcing literature, it is usually assumed that concurrent sourcing discourages supplier opportunism, because it demonstrates an ability to vertically integrate as an alternative to buying only from the supplier (e.g. Porter, 1980; Puranam et al., 2013), but others question that a small-scale internal production is an effective safeguard against opportunism (Mols, 2010).

Buvik and Andersen (2015) argue that multiple sourcing has theoretical points of resemblance with the concurrent sourcing, because both structures improve the buyer’s ability to evaluate supplier

performance and may serve as a safeguard for the buyer. We specify the different types of information provided to the buyer by use of either multiple external suppliers or concurrent sourcing and argue that the access to different types of information is a distinguishing characteristic of concurrent sourcing. The model points to two differences between concurrent sourcing and multiple market sourcing. Compared to multiple sourcing, concurrent sourcing (1) may reduce information asymmetry and (2) sends a signal that opportunistic suppliers can be replaced by internal production. This is consistent with results presented by Heide et al. (2014) who suggest that concurrent sourcing has some unique attributes that are not present when buyers use multiple market relationships.

It is possible to deduce a number of testable hypotheses from the model. Some partial hypotheses are straightforward such as (a) concurrent sourcing reduces supplier opportunism when internal production-based benchmarks are relevant for discovering opportunism, and (b) the more value the supplier's assets lose if the relationship with the buyer is terminated, the lower is the likelihood that the supplier will behave opportunistically. It is also possible to focus on the interaction of more variables and then deduce more complex hypotheses that capture larger parts of the model. For example, the higher the supplier's investment in transaction specific assets, the more concurrent sourcing reduces a supplier's opportunism. Another possible hypothesis is that the stronger the reputation/network effects, the more concurrent sourcing reduces a supplier's opportunism.

All relevant information is seldom available for decision makers, and bounded rationality, uncertainty, and ambiguity may lead to variance in actual behaviour (Menard, 2013). Facing uncertainty and ambiguity, buyers cannot be sure whether a supplier has actually behaved opportunistically or has merely been affected by uncertain factors outside of the supplier's control.

Furthermore, suppliers may fear that they will be punished by the buyer when they are negatively affected by unforeseen changes in their environments. However, with concurrent sourcing, buyers have more information, and thus they will be less likely to mistakenly punish suppliers for what appears to be opportunistic behaviour.

4 MANAGERIAL IMPLICATIONS

Each of the five factors in the model in Figure 1 offer managerial implications. In the following, the managerial implications of each of these factors are discussed.

First, when suppliers' gains from opportunism increase, then the likelihood of supplier opportunism increases. Therefore, buyers should limit suppliers' gains from opportunism. This can primarily be done by continuously evaluating suppliers' deliveries and avoiding long periods without focus on discovering supplier opportunism. In the literature on quality control, several different management practices are described such as quality inspections policies, close inspections of incoming components, contractual provisions for quality, rewards for better quality, penalties for poor quality, and applying final customer complaints for evaluations (e.g. Zu and Kaynak, 2012). The buyer may also time or even delay payments to suppliers when they fear opportunism. If suppliers are paid after their deliveries have been controlled and tested, then components of low quality can be returned to the supplier and payment for the components can be denied. Concurrent sourcing supports buyers that try to limit suppliers' gains from opportunism because the internal production may replace the products of the external supplier when for example low-quality components are returned to the supplier, and it is difficult for the supplier to immediately replace them with high-quality components.

Second, buyers should choose governance structures that are efficient for discovering opportunism. When information from internal production is necessary for eliminating asymmetric information in a buyer-seller relationship, then concurrent sourcing may be the efficient governance structure. In this case, market governance or long-term contractual relationships with a single supplier do not enable the buyer to discover supplier opportunism. Internal production may protect against opportunism, but the hierarchy has high bureaucratic costs, low-powered incentives, and may not operate at an efficient scale (Williamson, 1985, 1991). Finally, hierarchies are not able to exploit relatively stronger capabilities among external suppliers (Mayer and Salomon, 2006).

Third, the buyer should send credible signals to external suppliers that opportunism will trigger an internalization of the production and hence terminate the relationship with the suppliers. Several authors have argued that concurrent sourcing provides the buyer with a safeguard (Porter, 1980; Puranam et al., 2013). However, this model emphasizes that the effect of concurrent sourcing is limited by the cost to the buyer from internalizing a larger proportion of the external supplier's production. Hence, buyers should be prepared to tolerate some level of opportunism and only react to supplier opportunism when they are able to internalize the external production at low costs.

Fourth, the buyer should persuade external suppliers to invest in transaction specific assets. With higher asset specificity, the external supplier's potential cost of opportunism is likely to increase, and thus supplier opportunism will be lower. However, suppliers may lack economic incentives for such investments, they may have another strategic focus than the relationship with the specific buyer, or they may not want to increase their dependence of a new buyer. The buyer may encourage suppliers to invest in their relationship by (1) having competent boundary spanners that

communicate openly and timely about the buyer's intentions and strategic plans and by (2) being patient and letting trust develop in the relationship before asking for risky investments (e.g. Claycomb and Frankwick, 2010; Zhang et al., 2015). Furthermore, the buyer may offer different safeguards to the supplier, for example long-term contracts (e.g. Wagner and Bode, 2014) or relationship specific investments that signal commitment and serves as hostages (Williamson, 1985). If it is crucial for a buyer to avoid quality problems, then the model suggests that the buyer may decide to pay a higher mark-up to the external supplier. With a higher mark-up, the supplier loses more from terminating the relationship with the buyer, and thus the supplier is less likely to act opportunistically. Hence, the model predicts that a buyer that puts downward pressure on supplier prices should expect increased supplier opportunism, whereas a willingness to pay higher prices should lead to less supplier opportunism.

Fifth, the buyer should make sure that the supplier knows that once the relationship is terminated, then the buyer will not return as a customer. In other words, the buyer should try to signal that supplier opportunism is never forgiven. Concurrent sourcing may signal that the buyer is likely to further integrate, but it does not signal any stability of the chosen governance structure. However, if full vertical integration requires the buyer to make significant sunk investments in durable and transaction specific assets, then the buyer is not likely to externalize production again. Therefore, the supplier will know that once the buyer has internalized the production of a component, the decision is costly to reverse, and thus once the relationship with the supplier is terminated, it will not be re-established. Furthermore, it may be useful to tell the supplier that opportunism is made known to other potential buyers, and that these other buyers react to supplier opportunism even when they are not hurt by the opportunistic actions of a supplier.

The four factors which determine the cost of opportunism are complementary, which means that the effect of one element depends on the state of the other elements, and that an increase in one element has a positive effect on the other elements' ability to mitigate supplier opportunism. However, if one of the elements in the model is absent, then the effect from concurrent sourcing on supplier opportunism is also absent. For example, discovering opportunism has no effect if the supplier does not believe the buyer will react by internalizing, or if the supplier has not invested in transaction specific assets. Therefore, buyers have to make sure that all four elements in the model are in place if they want to minimize supplier opportunism.

Finally, the buyer also faces higher cost when using the model to reduce supplier opportunism. Each of the elements in the model may add to the buyer's costs. Especially, the effort to reduce suppliers' gains from opportunism, the set-up and management of a concurrent sourcing arrangement, and the reactions to actual supplier opportunism may be costly to the buyer. Supplier investment in transaction specific assets and the sharing of information about supplier opportunism with other buyers may be less costly. The cost of avoiding supplier opportunism suggests that it is efficient for the buyer to accept some level of supplier opportunism, i.e. the buyer should have a tolerance for opportunism (Dutta et al., 1994).

For the buyer there may be more advantages from concurrent sourcing than a reduction in existing suppliers' opportunism. As proposed by Heide (2003), concurrent sourcing may also have a positive effect on the buyer's relationships with downstream customers. If these customers are aware of the concurrent sourcing arrangement, they may be less concerned about quality problems. Another possible network effect is that new potential suppliers with weak production capabilities and low product quality may avoid buyers that use concurrent sourcing, and hence the buyer may avoid

significant adverse selection problems where potential suppliers misrepresent their skills, service levels, and component qualities.

5 LIMITATIONS AND FUTURE RESEARCH

The model takes a broad view of opportunism and does not distinguish between different types of opportunism. As hinted on, the model suggests that concurrent sourcing is efficient for limiting opportunism for two reasons. First, concurrent sourcing provides the buyer with more information, and hence helps limit opportunism caused by asymmetric information. Second, concurrent sourcing also helps safeguard transaction specific investments, and hence it limits opportunism manifesting itself as hold-up.

The model and the discussion focus on the supplier's cost of opportunism in a concurrent sourcing context. Since concurrent sourcing has limited effect on suppliers' gains from opportunism, the left hand side of the model is not developed in this paper. However, suppliers' expected gains from opportunism may also be decomposed into more factors (Nooteboom, 1996). Thus, when a buyer discovers supplier opportunism, he may try to contain the negative effects of this opportunism. For example, the supplier's gains may be limited by the buyer's actions, such as the withholding of payments for deliveries and the return of low-quality components.

The effects from concurrent sourcing may also be present when the products or services which are made internally and bought from the external supplier are not perfectly similar (Krzeminska et al., 2013). This means that the application of this model can be extended to situations where the components or services which are made internally and bought from the external supplier are not

similar. In such situations, the effect of concurrent sourcing will depend on the degree of similarity between the two products or services. The more similar the internal production and the external supplier production, the more relevant it will be to compare the two sources of supply, and thus the easier to discover and react to supplier opportunism.

The assumption of opportunism in buyer-supplier relationships has been questioned by numerous authors (e.g. Ghoshal and Moran, 1996). Non-economic factors such as trust and norms of relational exchange may reduce the level of opportunism below what is predicted by the suggested model (e.g. Brown et al., 2000). Such factors are in conflict with the assumption of opportunism in transaction cost theory and agency theory. However, it can be difficult to determine which norm is dominating in a buyer-seller relationship, and the dominating norms may also change during the course of a buyer-seller relationship lifetime (Nooteboom, 1996).

Although recent research indicates that many firms and public organizations use concurrent sourcing (Hansen et al., 2011; Parmigiani, 2007), and although items are available for measuring opportunism as well as many other variables (e.g. Brown et al., 2000), there are very few studies of buyer-seller relationships in a concurrent sourcing context (for an exception, see Heide et al. 2014). Furthermore, concurrent sourcing arrangements are not observable for researchers, and thus collecting data that can inform us about concurrent sourcing will be time-consuming. Therefore, even a few case studies or merely semi-structured interviews may provide us with new knowledge about this interesting phenomenon (e.g. Carrer et al., 2014).

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