PLURAL GOVERNANCE: A MODIFIED TRANSACTION COST MODEL

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ABSTRACT

Plural governance is a form of governance where a firm both makes and buys similar goods or services. Despite a widespread use of plural governance there are no transaction cost models of how plural governance affects performance. This paper reviews the literature about plural forms and proposes a model relating transaction cost and resource-based variables to the cost of the plural form. The model is then used to analyze when the plural form is efficient compared to alternative governance structures. We also use the model to discuss the strength of three plural form synergies.

Key words: Plural form, make-and-buy, bi-sourcing, concurrent sourcing, plural governance.

JEL classifications: D21, D23, L14, L20
Plural governance is defined by Bradach and Eccles (1989: 112) as forms of governance ‘where distinct organizational control mechanisms are operated simultaneously for the same function by the same firm’, and as an example they mention that it can be observed that firms both make and buy the same part. Empirical observations have shown that many firms both make and buy, as well as transfer downstream and sell (Heide, 2003; Parmigiani, 2007), and in a franchising context the use of plural governance has been thoroughly documented (cf. Baker and Dant, 2007; Windsperger and Dant, 2006). Despite the seemingly widespread use of plural governance, it has received little scholarly attention in the economics and management literature (Parmigiani, 2007), and three problems can be identified.

First, the usefulness of traditional theories of vertical integration for explaining plural governance has been questioned. Especially the usefulness of transaction cost theory for explaining plural governance is questioned in numerous papers (e.g. Parmigiani 2007; Puranam et al., 2013), and Parmigiani (2007: 304) concludes that her empirical results suggest ‘that firms benefit from the concurrent use of the two governance modes of market and hierarchy, not the extent of one or the other. This supports concurrent sourcing as a plural governance mode’. These results are a challenge to theories of vertical integration such as transaction cost theory because they reject the market-hierarchy continuum view (cf. Williamson, 1985: 96).

Second, empirical studies of plural governance often use a simple dependent variable, i.e. they test the correlations between different independent variables and the use or non-use of plural governance (e.g. Parmigiani, 2007; Heide, 2003). Studies of franchising systems frequently place
the percentage of company operated outlets as compared to franchised outlets as the dependent variable (cf. Baker and Dant, 2007; Windsperger and Dant, 2006). Moreover, the literature on plural governance focuses on why firms choose to make and buy, and is mainly descriptive. Normative models and tests of models which directly relate plural governance to performance are few (Meiseberg, 2013).

Third, there are no papers that attempt to map the determinants of plural form performance. Research on the plural form has used different theoretical perspectives. Hence, plural form research has taken a starting point in, for example, agency theory (Heide, 2003), transaction cost theory (Dutta et al. 1995), and neoclassical economics (Porter, 1980). Few have used multiple perspectives (e.g. Parmigiani, 2007) or suggested more integrating models (an exception is Puranam et al., 2013).

The purpose of this paper is to start this mapping by developing a more detailed model of the costs of the plural form. The paper briefly reviews the literature on plural governance. Then transaction cost theory, neoclassical economics, and the resource-based view of the firm are used for discussing how the combination of buying and making the same component or service affects performance. This discussion results in an extended transaction cost model relating plural forms to performance. In the last sections of the paper, the model is used as a starting point for identifying production cost explanations for the plural form, and for discussing the strength of the plural form synergies.

**RESEARCH ON PLURAL GOVERNANCE**
Reviews of the literature on plural governance show that several different theoretical explanations for why firms both make and buy have been developed. However, few papers directly link plural governance with comparative institutional performance (Miranda and Lerner, 1995; Rothaermel, Hitt, and Jobe, 2006; Thomas et al., 1990). Based on field studies in five plural form chain restaurants, Bradach (1997) identifies and describes four processes: modeling, ratcheting, socialization and mutual learning. These processes positively affect performance in terms of uniformity and systemwide adaptation in franchising chains. Meiseberg (2013) finds a positive relationship between financial performance and franchisees’ contribution to chain synergies in terms of uniformity, franchisees’ local responsiveness, and systemwide adaptation, and Perdreau et al. (2011) find that franchising chains with high values of intangible human assets perform better with a high proportion of franchisee-owned units.

In a concurrent sourcing context Heide et al. (2013) and Mols et al. (2012) test hypotheses relating internal production to external supplier performance. Puranam et al. (2013) present a model to explain how much a firm makes and how much it buys. The model divides costs into two parts. One part is the costs of producing internally, and the other part is the costs of buying from external suppliers. The unit cost of buying from external suppliers is affected by three factors: transactional hazards raise costs, diseconomies of scale and costs of terminating internal production also raise costs, and complementarities reduce costs. The unit cost of producing internally is affected by three similar factors, bureaucratic costs of the hierarchy, diseconomies of scale of internal production, and complementarities. Thus, the plural form reduces costs by providing the system with complementarities. Furthermore, increasing marginal costs of production and exit barriers also explains why the plural form is efficient.
Transaction cost theory and plural governance

Transaction cost theory is not developed to explain the existence of plural governance. The unit of analysis is the transaction, which is defined as a transfer of a good or service across a technologically separable interface (Williamson, 1985: 1), and the transaction dimensions - transaction specific assets, uncertainty, and transaction frequency - describe the transaction and not plural governance, which is a combination of differently governed transactions. Furthermore, the theory emphasizes three governance structures: the hierarchy, the market, and the hybrid, as the possible solutions to transaction problems. These three governance structures are viewed as alternatives, and the theory does not explain the effects of combining them. Therefore the basic transaction cost model implies that the two differently governed transactions are analysed separately. Thus, a transaction cost analysis of plural governance seeks to identify different levels of asset specificity, uncertainty, and transaction frequency in the parallel transactions.

Though plural governance emphasizes that firms are making and buying the same good this does not imply that the two parallel transactions/relationships are similar in terms of transaction frequency, asset specificity, and uncertainty (Williamson, 1985: 96). Firstly, if the number of goods made is different from the number of goods bought then the transaction frequency is different. Secondly, the ‘... parties to a transaction commonly have a choice between special purpose and general purpose investments’ (Williamson, 1985: 54), and when the assets supporting the market governed transactions are different from the assets supporting the hierarchically governed transactions then the degree of asset specificity also differs. Finally, the non-strategic lack of communication or the behavioral uncertainty can also differ (Williamson, 1996, Mols, 2000). If higher levels of asset specificity, uncertainty, or transaction frequency can be observed for the
hierarchically governed transactions than for the market governed transactions then transaction cost theory can explain the existence of concurrent sourcing. However, if different levels of asset specificity, uncertainty, and transaction frequency cannot be observed, transaction cost theory is not immediately able to explain the existence of concurrent sourcing.

Another explanation is offered by Parmigiani (2007: 289), who proposes that ‘[t]he greater the asset specificity of the good, the higher the percentage of its requirements the firm will produce internally. Therefore, moderately asset-specific goods will be concurrently sourced’. Furthermore, goods with moderate levels of volume and performance uncertainty are also predicted to be concurrently sourced. Thus, Parmigiani (2007) changes the transaction dimensions and connects them with the specific good, which is sourced either from outside or produced internally. This makes it possible for her to use transaction cost arguments despite the change in unit of analysis. However, the empirical results show limited support for her transaction cost explanations, which is in accordance with Heriot and Kulkarni (2001), who conclude that their findings regarding the use of intermediate sourcing strategies cannot be explained by transaction cost theory alone.

Several researchers question the usefulness of transaction cost theory for explaining plural governance (e.g. Parmigiani, 2007; Puranam et al., 2013). Parmigiani (2007) notes that transaction cost theory is not able to explain why a firm should split the volume requirements between their external suppliers and internal production facilities. She writes (2007: 289): ‘... goods aren’t truly identical if produced by different technologies. Suppose the good is homogeneous and the firm is purposefully splitting the volume requirements between their internal facility and outside suppliers. The TCE/continuum view does not address this possibility and, moreover, cannot distinguish this case of using market and hierarchy simultaneously from the case of using these two governance
modes for two related goods.’ Puranam et al. (2013:1147) echo this by their comment that ‘Williamson (1985: 96) argues that when firms appear to be both making and buying the same good, a closer examination should reveal that the internally produced good actually involves higher asset specificity – what appear identical are in fact heterogeneous transactions. The claim therefore is that what appears on the surface to be a case of a firm procuring the same component through make and buy is actually the firm procuring two distinct components each being procured by the appropriate means.’ Therefore, plural governance is viewed as an anomaly in transaction cost theory, and usually such dual systems have either been excluded from the empirical tests of transaction cost theory (e.g. Walker and Weber, 1984) or have been categorized as hybrids placed between the market and the hierarchical solutions (Dant, 1996; John and Weitz, 1988).

The disagreement regarding the usefulness of transaction cost theory may have two reasons. First, a number of researchers may implicitly define concurrent sourcing or plural governance as a phenomenon, where the same assets or technologies are used for both making and buying the same goods. However, a narrow definition of plural governance, which excludes transaction cost explanations, may also exclude other explanations which emphasize differences between suppliers/distributors and their assets, resources, and capabilities. Secondly, there may be a disagreement regarding the ability of different technologies to produce the same goods. According to transaction cost theory, firms can usually choose between special purpose and general purpose investments (Williamson, 1985: 54). Thus, the same components can be produced by different mixes of technologies and thus, different levels of asset specificity.

However, transaction cost theory cannot immediately explain why and how a firm should split its volume requirements between suppliers (Parmigiani, 2007; Puranam et al., 2013). These predictions
are not part of the basic transaction cost model, and instead the volume split can be explained by complementarities and constraints which are not part of the basic transaction cost model (Puranam et al., 2013).

**AN EXTENDED TRANSACTION COST MODEL**

The critic of the transaction cost model may explain why none of the existing models consider all the relationships between transaction cost variables, the plural form, and performance. In the following, it is discussed how these variables affect the comparative performance of the plural form. Based on transaction cost theory and Puranam et al.’s (2013) model of plural sourcing, a transaction cost model is suggested. The transaction cost model is complemented by neoclassical and resource-based theories, which focus on production costs. These two theories have often been used for complementing transaction cost theory (e.g. Mayer and Salomon, 2006; Parmigiani, 2007). In the following each element of the model is explained, and Figure 1 shows an overview of the model. The model consists of a number of variables affecting the costs of alternative governance structures.
Transaction-specific assets have lower value when used in other transactions or by other users. On the market, investments in specific assets make it difficult to make adaptations and changes in the contract, and they may be worthless if opportunistic partners hold up the firm. Therefore, the higher the asset specificity, the lower the performance of the market (Williamson, 1991), and transaction cost theory predicts that a significant level of transaction-specific investments leads to the
internalization of the transaction. Transactions involving non-specific investments are efficiently governed by the market because of the high-powered incentives of the market (Williamson, 1985).

There may be many reasons why similar products are produced by different levels of asset specificity. The internal and external relationships may be used for different tasks, for example a few internal units may be needed for new product development and testing (Bradach, 1997), or internal production may be needed for solving non-decomposable problems. When the level of transaction specific assets differs between the internal and the external suppliers, the prediction will be that internal suppliers will be associated with higher degrees of asset specificity (Williamson, 1985).

When the level of asset specificity is the same for all transactions, then the plural form is inefficient according to transaction cost theory. The larger the difference between the two governance structures chosen for the plural form the less the plural form is in accordance with transaction cost theory, and thus the higher are the transaction costs. So the immediate prediction is that the plural form will have higher transaction costs the more dissimilar the two governance structures are.

Several authors have noted that if a buyer using an external supplier establishes an internal production unit, it provides an alternative source of supplies, and it may take less time and be less costly for the buyer to expand the internal production capacity compared to a situation without an internal production unit (Bradach and Eccles, 1989). Plural governance does not affect the level of transaction-specific assets, but it provides the buyer with more alternatives and thus with a termination safeguard (Dutta et al., 1995). With a termination safeguard, the external supplier is less likely to exploit investments in transaction-specific assets, and if the buyer is held-up, the buyer can
mitigate the negative consequences by terminating the relationship and instead expanding internally. Therefore, plural governance moderates the negative relationships between transaction-specific assets and performance.

However, this does not answer questions like: Why is the ability to internalize production not a sufficient safeguard? How much internal production is needed, and how does internal production lower transaction costs for the total plural system?

There seems to be some disagreement as to the effectiveness of the plural form to serve as a safeguard (Michael, 2000; Kidwell and Nygaard, 2011; Mols et al., 2012). By setting up internal production in combination with an external supplier, it is less costly if the external supplier fails to deliver. For example, the most profitable business can be maintained by the internal production, and it is less costly to scale up an existing internal production. However, most importantly the plural form is a signal to the external supplier. First, it demonstrates that it is technically possible for the buyer to replace the external supplier. Second, the components delivered by the internal supplier show the external supplier that the transaction specific asset owned by the buyer can be used productively even if the external supplier is replaced by internal production. In other words, the plural form indicates that the assets owned by the buyer are not idiosyncratic and will not lose all their value, if the relationship with the external supplier is terminated. Third, the choice of plural form combining market and hierarchy signals that the buyer is close to being indifferent between make and buy. When this signal is true, it does not cost anything. If the signal is false, then the signal costs more the larger the part of the production that is internalized. So the plural form credibly shows the external suppliers the point at which they are no longer able to appropriate more of the value created in the relationship with their buyer. However, the strength of the signal depends
on the amount of internal production. A small internal production may signal that it is costly to internalise and therefore the buyer prefers to buy from the external supplier. Fourth, the effect is larger the higher the degree of asset specificity of the investments made by the external supplier. If his assets are idiosyncratic he will have most to lose from termination of the relationship. Fifth, if the plural form solves the hold-up problem, why does it not replace the hierarchy? It has been shown that the plural form may be a means to put downward pressure on the prices asked by the external suppliers (Beladi and Mukherjee, 2012). When the external supplier’s assets are idiosyncratic, only the hierarchy offers protection of the assets. Though the plural form can often be decided unilaterally by the plural sourcer, it is not likely to be the case, when assets are idiosyncratic.

With these signals expectations converge, haggling and renegotiations are kept at a minimum, and the transaction specific investments are safeguarded. For example, Michael (2000) finds that the plural form decreases conflicts and litigation. When there are no transaction specific assets there are no problems related to the use of the market. In this case the plural form safeguard is not needed. When all assets are idiosyncratic the plural form will not solve the hold-up problem. So the prediction is that the plural form safeguard is only efficient when there are problems related to transaction specific assets, but when these assets are idiosyncratic the plural form may not prevent hold-ups – it may actually be a means to support hold-ups of the external suppliers.

**Performance uncertainty and the plural form measurement synergies**

Performance uncertainty (or internal uncertainty) refers to the complexity and difficulty of measuring performance. Dutta et al. (1995) describe performance uncertainty as information
asymmetry and as a problem connected with setting performance benchmarks. Thus, performance uncertainty increases the cost of measuring performance, it makes it difficult to discover opportunistic behaviour, and it degrades the incentives of both market and hierarchy. However, with plural governance it is possible to use information from one relationship in the evaluation and controlling of other relationships (Bradach and Eccles, 1989; Dutta et al., 1995; Heide, 2003). While a uniform system may have to accept information asymmetry, this can be changed by combining a hierarchically governed relationship with a market-governed relationship. In line with this, Walker and Weber (1984) argue that buyers with experience in producing a component are better informed and thus better able to avoid opportunistic suppliers. In other words, a hierarchical relationship provides more detailed knowledge of costs and hence a useful benchmark with which market relationships can be compared. Furthermore, plural governance may also help managing performance uncertainty internally in the firm (Parmigiani, 2007; Puranam et al., 2013).

However, information provided by internal production will not always be useful for constructing good benchmarks for external suppliers, and price and quality information from external suppliers may not be relevant as benchmarks for internal suppliers. There are three types of information:

- Information provided by the market and by inspection of products bought on the market. When a firm buys a product, it gets access to this information that can be used to benchmark internal production. 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. Thus, this information may be revealed over time.

- Information that can be provided by producing in-house and which can be compared with the information that can be obtained on the market. Internal production costs can be compared with external suppliers’ prices and product qualities.
The third type of information can only be collected and verified by observing the production process. This could be information about elements of the product or production processes that are not verifiable by inspection or that are extremely costly to verify. This information can only be obtained by internal production, because external suppliers are unwilling to give a buyer access to all aspects of his business (e.g. Barzel, 2005). Therefore the third type of information cannot be used for benchmarking external suppliers.

When there are many alternative suppliers and market information is readily available, internal production may not improve benchmarks. When there are few suppliers and market information is not readily available, the first two types of information are available with the plural form. In this case the plural form creates spill-over and consequently mitigates the negative effect of measurement difficulties on performance. When the third type of information is most relevant, there are no plural form measurement synergies.

**Transaction frequency and set up costs**

Transaction frequency enters the transaction cost framework because, in the case of few and non-recurring transactions, it is impossible to recover the cost of specialized governance structures. Therefore a high transaction frequency is a necessary condition for an efficient hierarchy. Williamson (1985: 60) argues that: ‘Specialized governance structures are more sensitively attuned to the governance needs of nonstandard transactions than are unspecialized structures, ceteris paribus. But specialized structures come at great cost, and the question is whether the costs can be justified. This varies with the benefits on the one hand and the degree of utilization on the other’.
Thus, the higher the transaction frequency, the lower are the average costs per transaction and the less important are the investments in setting up a governance structure.

Plural governance has higher set up costs than any of the other governance structures, because two different governance structures have to be set up and managed. The firm has to invest in an internal organization, and at the same time gather knowledge of the market, establish relationships with suppliers or distributors, write contracts etc. This requires different capabilities and investments, and Lafontaine (1992) finds that there may be enormous costs connected with developing, maintaining, and enforcing a variety of contracts. Bradach (1997) writes that “[t]he most obvious drawback is that executives must be effective in operating with two entirely different organizational designs”. They have to be aware that they are dealing with two different systems and that they have to use two very different managerial styles. Bradach (1997: 300) also notes that “Anecdotal evidence from the chains I studied suggested that it was difficult to find people good at both. In addition, a separate administrative structure may be required for each arrangement, which, under some conditions, may create prohibitively high costs”. In addition to these costs the plural form may affect the atmosphere (Williamson, 1975) and create costly conflicts.

This suggests that the set up costs for the plural form are higher than the sum of the set up costs for each of the two governance structures combined in the plural form. Applying Williamson’s (1985) arguments about transaction frequency, this means that the plural form will require a high transaction frequency to be efficient.

Table 1 presents an overview of how the transaction cost determinants affect the cost of the market, the hierarchy and plural governance.
### TABLE 1: TRANSACTION COST DETERMINANTS AND MODES OF ORGANIZATION

<table>
<thead>
<tr>
<th>Transaction cost determinants</th>
<th>Modes of organization</th>
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<tbody>
<tr>
<td></td>
<td>Market</td>
</tr>
<tr>
<td><strong>Asset specificity</strong></td>
<td>For low levels of asset specificity market governance minimizes TC.</td>
</tr>
<tr>
<td><strong>Plural form safeguard</strong></td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Performance uncertainty</strong></td>
<td>For low levels of performance uncertainty market governance minimizes TC.</td>
</tr>
<tr>
<td><strong>Plural form measurement synergies</strong></td>
<td>Not available.</td>
</tr>
<tr>
<td><strong>Transaction frequency</strong></td>
<td>Because of low set up costs market governance may be efficient for low transaction frequency</td>
</tr>
</tbody>
</table>

**Capabilities and plural form knowledge synergies**

The resource-based view suggests that firms with different resources and capabilities have different production costs (Peteraf, 1993). The capabilities are assumed to be immobile (Barney, 1991). They
are costly to develop and difficult to price and transfer, and therefore firms will generally perform the activities that they are good at, while leaving other activities to external suppliers and distributors (Argyres, 1996; Mayer and Salomon, 2006). Accordingly the resource-based view complements transaction cost theory (e.g. Mayer and Salomon, 2006). Firms with a capability advantage will have lower costs when using the hierarchy. So the immediate prediction of the resource-based theory is that only when neither the external suppliers nor the internal production unit have a capability advantage will the production cost of the plural form be as low as for either the market-based or hierarchical governance. The more different the capabilities possessed by the external and internal suppliers the more costly the plural form will be. Therefore, the larger the differences in capabilities are, the lower the likelihood that we will observe the plural form.

However, when buyer and/or supplier have significant expertise there may be knowledge synergies from the plural form. Hence, Parmigiani (2007) proposes that a firm will make to take advantage of its own expertise, and buy in order to learn from suppliers. So the synergies come from learning from external suppliers and thereby improve own capabilities, or from transferring knowledge to external suppliers. The internal production and investments in internal R&D develop an absorptive capacity, which is necessary in order to benefit from the spillovers from the external relationships (Veugelers and Cassiman, 1999; Cassiman and Veugelers, 2006; Parmigiani, 2007). Finally the plural form permits a firm to simultaneously exploit the strong internal and external capabilities, but without changing their strength. For example, the internal knowledge improves the governance of the external suppliers (Tiwana & Keil, 2007; Mayer & Salomon, 2006). The result is a more efficient use of capabilities (Parmigiani, 2007) and thus, plural governance enhances the positive relationships between capabilities and performance.
When the capabilities are mainly specialized skills (skills held by only one party) and to a lesser degree redundant skills (Parmigiani and Mitchell, 2009; Krzeminska et al., 2013), then the potential value of knowledge transfer is high. Bradach (1997: 291) describes how such transfer of knowledge requires a high similarity in order to provide readily available and acceptable information for use in the franchisee units. So it requires a high degree of similarity to be able to persuade franchisees to change their behavior in the way suggested by company consultants. Bradach (1997) refers to an interview with a company manager saying that they need to be able to demonstrate the upside before a change is accepted by a franchisee. This demonstration requires own units for testing and gathering information about the effects of suggested changes. Furthermore, Bradach (1997) points to the fact that the performance comparisons also helped pave the way for knowledge transfers. If the franchisees could see that company units performed better, then they were more willing to accept transfer of new knowledge from company units and to accept the suggested changes.

Krzeminska et al. (2013) identify different degrees of similarities in the plural form, and describe how they affect the knowledge synergies, and Puranam et al. (2013: 1149) speculate that these knowledge synergies are stronger for “relatively novel production technologies, where much remains to be learned about optimal production.” This suggests two things. First, knowledge synergies decrease over time and therefore plural forms based on knowledge synergies are likely to be temporary. Second, plural forms based on knowledge synergies are more likely in more dynamic environments with technological uncertainties (Krzeminska et al., 2013).

Economies and Diseconomies of scale

Economies and diseconomies of scale affect the efficiency of the different governance structures.
With significant economies of scale one producer is efficient, and there will be little likelihood of observing plural forms. Even, when two vertical stages are perfectly matched then there will be no scale advantages or disadvantages by using more than one supplier. However, diseconomies of scale at an upstream stage make several suppliers efficient. Whether one of these suppliers will be internal is determined by other factors in the model.

Diseconomies of scale of internal production can arise for different reasons. One reason is fluctuating demand or volume uncertainty. With fluctuating demand the internal production unit risks having excess capacity in some periods and lacking capacity in other periods. This low use of capacity results in diseconomies when all requirements are produced in-house (Puranam et al., 2013). Another source of diseconomies of scale is where only a small scale internal production is needed for an activity. This activity could be the development and testing of new products (e.g. Bradach, 1997), or it could be solving non-decomposable problems (Nickerson and Zenger, 2004). Non-decomposable problems require knowledge sets that may only be available with internal production. However, the knowledge set may not require that all production is done internally, and consequently solving non-decomposable problems as a function of quantity produced exhibit low initial costs but significant diseconomies of scale.

**Lock-ins**

With lock-ins a buyer is forced to use a specific governance structure for part of his requirements. If the structure that the buyer is locked in-to is inefficient, then for the rest of his requirements he will use another governance structure, and hence the plural form will arise (Puranam et al., 2013). Thus, plural forms solely caused by lock-ins have higher costs than the singular forms.
Lock-ins may be caused by uncertainties. For example, technological changes may affect asset specificity and cost of performance measurements and render long-term contracts and hierarchies inefficient. When such long-term contracts are not easily changed they become lock-ins that may lead to the plural form. Puranam et al. (2013) mention that firms may have difficulty terminating internal production because of employment contracts, regulation, unions, and other commitments, and Parmigiani’s (2007) results corroborate that it is more difficult for unionized firms to completely outsource.

Table 2 presents an overview of how the production cost determinants affect the cost of the market, the hierarchy and plural governance.

<table>
<thead>
<tr>
<th>Production cost determinants</th>
<th>Modes of organization</th>
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<tbody>
<tr>
<td><strong>Market</strong></td>
<td><strong>Plural governance</strong></td>
</tr>
<tr>
<td>Diseconomies of scale</td>
<td>By splitting production among more external suppliers the cost of production is low.</td>
</tr>
<tr>
<td>Lock-ins</td>
<td>Lock-ins to the hierarchy makes it very costly to use the market.</td>
</tr>
<tr>
<td>Capabilities</td>
<td>With relatively strong external supplier capabilities the market has lowest production costs.</td>
</tr>
<tr>
<td>Plural form knowledge</td>
<td>Not available</td>
</tr>
</tbody>
</table>
**THE PLURAL FORM SYNERGIES**

In the model in Figure 1, each of the three plural form synergies are only associated with one independent variable. However, the strength of the plural form safeguard, the plural form measurement synergies, and the plural form knowledge synergies are not independent of the other factors in the model. In the following, we describe how the plural form synergies may vary.

**The plural form safeguard**

With significant diseconomies of scale more internal production increases average production costs and full vertical integration may not be economically possible for the buyer. Therefore the external supplier will not believe the plural form safeguard signal. So diseconomies of scale favor splitting supply among several suppliers, but it weakens the plural form safeguard, because termination of the external relationship is not a credible threat, as it raises costs. Consequently, in cases where the external supplier has the role of handling volume fluctuations, internal production is a weak safeguard. Similarly, when firms produce internally to solve non-decomposable problems or to develop and test new products, the plural form safeguard is weak. A plural form caused by lock-ins is also costly to replace with a singular form, and consequently the plural form safeguard is weak.
Economies of scale make it relatively costly to have a small internal production, and production costs increase when production is split among internal and external suppliers. Large scale internal production lowers marginal production costs, but then the external supplier may not be able to operate at the efficient scale and thus experiences higher production costs. This has three effects. First, for small firms/buyers not able to operate at an efficient scale the plural form increases production costs, and therefore it does not provide a strong safeguard. Second, for buyers able to operate at an efficient scale the plural form may serve as a safeguard. Third, the decreasing marginal cost of internal production makes the plural form unstable.

Firms with weak capabilities may be unable to replace an external supplier. If firms with weak capabilities internalize production, then their costs of internal production are higher than the external supplier’s production costs. Therefore the plural form safeguard is weak for plural sourcers that have a significant capability disadvantage. Usually small firms have less resources and weaker capabilities, so the prediction is that the plural form is ineffective as a safeguard for small firms.

With no capability disadvantage for a plural sourcer, internal production costs and external supplier costs are nearly the same. So it does not increase production costs if the buyer internalizes a large part of the production. Therefore the mere internalization of part of the production may be an effective signal to the external suppliers and thus, the plural form safeguard is strong.

**The plural form measurement synergies**

Bradach (1997: 290) mentions two factors which were important for the effectiveness of measurement synergies in the plural forms he studied. First, people identified strongly with either
the company side or the franchisee side. This strong identification was necessary to induce competition between the different units. If they had the same identity, the competitive element would be weaker. Second, the similarity of the units made it easier to make performance comparisons that could be accepted by both sides. So the similarities of activities, customers, and markets made performance comparisons being perceived as more legitimate. Also Parmigiani and Mitchell (2009) and Krzeminska et al. (2013) have suggested that a high degree of similarities between internal and external production is important for the benchmark to be effective.

With diseconomies of scale the costs of small scale internal production are low. Thus, the costs of obtaining benchmarks are low. Furthermore, internal production does not over-estimate external suppliers’ costs, and thus internal production costs can immediately be used as benchmarks for external suppliers. However, when diseconomies of scale are caused by activities such as solving non-decomposable problems, product development, and product testing, then measurement synergies are less effective. Furthermore, external suppliers that handle volume fluctuations also face different demand patterns. These causes of diseconomies of scale make it difficult to compare internal and external production. Therefore, the usefulness of internal production for setting benchmarks is reduced by such dissimilarities.

With economies of scale the costs of small scale internal production are high. Therefore, economies of scale increase the costs of benchmarking, and the observed production costs are difficult to immediately apply for benchmarking external suppliers. The same problem appears when a firm is at a capability disadvantage compared to external suppliers. Hence, with a capability disadvantage, internal production overestimates costs of production, and thus internal costs may not be useful for
benchmarking external suppliers. With no capability disadvantages the internal production provides relevant benchmarks.

The plural form knowledge synergies

A number of authors describe plural form knowledge synergies (e.g. Parmigiani, 2007). Bradach (1997) describes the transfer of knowledge from franchisor to franchisees. He finds that for the knowledge transfer to be legitimate and effective it is necessary for the franchisors to demonstrate the advantages of new routines and products. This is done by showing a higher performance of the internal units which have adopted new procedures and products. Parmigiani and Mitchell (2009) propose that the potential of the knowledge synergies depends on the similarities on non-learning dimensions and performance differences caused by the learning dimensions.

Whereas dynamic environments and technological uncertainty promote plural forms based on knowledge synergies (Krzeminska et al., 2013), the dynamic environment has a negative effect on the other plural form synergies. For example, in dynamic environments the hybrid breaks down (Williamson, 1991). Therefore the plural form will consist of market and hierarchy and be more costly. When environments are turbulent, it is difficult to determine the causes of performance, and therefore plural form benchmarks are of less value.

Table 3 presents an overview and conclusions regarding the previous analysis of the plural form synergies.
<table>
<thead>
<tr>
<th></th>
<th>Dis-economies of scale</th>
<th>Economies of scale</th>
<th>Capability disadvantage</th>
<th>Similar capabilities</th>
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<tbody>
<tr>
<td><strong>Plural form safeguard</strong></td>
<td>Safeguard is weak since the marginal cost of internal production is increasing, and thus the more internal production the higher the costs. Full vertical integration may be economically impossible.</td>
<td>Safeguard is weak for firms operating at an inefficient scale of production. Safeguard is strong for large firms able to operate at an efficient scale of production.</td>
<td>Safeguard is weak, because of high cost of internal production. Full vertical integration may be economically impossible.</td>
<td>Safeguard is strong, since it will not cost extra to internalize a larger portion of the focal firm’s requirements.</td>
</tr>
<tr>
<td><strong>Plural form measurement synergies</strong></td>
<td>Benchmarks based on small internal production are relevant and costless.</td>
<td>Benchmarks based on small internal production are costly and overestimate external supplier’s cost of production.</td>
<td>Benchmarks based on internal production overestimate external supplier’s cost of production.</td>
<td>With no capability disadvantages the internal production of the focal firm will provide relevant benchmarks.</td>
</tr>
<tr>
<td><strong>Plural form knowledge synergies</strong></td>
<td>Value of improving internal capabilities is limited by diseconomies of scale.</td>
<td>Value of improving internal capabilities may be high given large scale internal production.</td>
<td>Knowledge transfer to the internal supplier may be valuable.</td>
<td>Knowledge transfer between the internal and external supplier may be valuable.</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td>The set up cost of the plural form may not be off-set by the plural form safeguard. However, plural form measurement synergies and knowledge synergies may make the plural form efficient.</td>
<td>The set up cost of the plural form cannot be off-set by the plural form safeguard and measurement synergies for most firms. The plural form is unstable.</td>
<td>A significant and permanent capability disadvantage cannot be off-set by the plural form.</td>
<td>With equal capabilities the plural form safeguard and measurement synergies are strong. Knowledge synergies also improve plural form performance. Therefore the plural form may be efficient.</td>
</tr>
</tbody>
</table>

**EXPLANATIONS FOR THE PLURAL FORM BASED ON COMBINATIONS OF TRANSACTION COST AND PRODUCTION COST DETERMINANTS**
In Table 4 we combine capability advantages, asset specificity, and performance uncertainty, with diseconomies of scale, and two types of lock-ins and compare the results with a situation with no diseconomies of scale and lock-ins. A firm’s choice of suppliers is used to illustrate the consequences of the analysis, and in Table 4 the number of external and internal suppliers is placed inside the round brackets.

<table>
<thead>
<tr>
<th>Asset Specificity and Performance Uncertainty</th>
<th>No Diseconomies of Scale and Lock-ins</th>
<th>Diseconomies of Scale</th>
<th>Lock-in to the Hierarchy</th>
<th>Lock-in to the Hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Asset Specificity and Low Performance Uncertainty</strong></td>
<td>Market (a single external supplier)</td>
<td>Market (multiple external suppliers)</td>
<td>Market + hierarchy (one external supplier and one internal supplier)</td>
<td>Hybrid + market (two external suppliers)</td>
</tr>
<tr>
<td><strong>Medium Asset Specificity or Medium Performance Uncertainty</strong></td>
<td>Hybrid (a single external supplier)</td>
<td>Hybrid (multiple external suppliers)</td>
<td>Hybrid + hierarchy (one external supplier and one internal supplier)</td>
<td>Hybrid (one external supplier)</td>
</tr>
<tr>
<td><strong>High Asset Specificity or High Performance Uncertainty</strong></td>
<td>Hierarchy (a single internal supplier)</td>
<td>Hierarchy + hybrid (one internal supplier and multiple external suppliers)</td>
<td>Hierarchy (one internal supplier)</td>
<td>Hybrid + hierarchy (one external supplier and one internal supplier)</td>
</tr>
<tr>
<td><strong>External Suppliers with Strong Capability Advantages</strong></td>
<td>Market (a single or few external suppliers)</td>
<td>Market (multiple external suppliers)</td>
<td>Market + hierarchy (one or few external suppliers and one internal supplier)</td>
<td>Hybrid + market (one or more external suppliers)</td>
</tr>
<tr>
<td><strong>Strong Internal Supplier Capability Advantages</strong></td>
<td>Hierarchy (one internal supplier)</td>
<td>Hierarchy + market (one internal supplier and multiple external suppliers)</td>
<td>Hierarchy (one internal supplier)</td>
<td>Hybrid + hierarchy (one external supplier and one internal supplier)</td>
</tr>
</tbody>
</table>
First we look at the two transaction dimensions, i.e. the first three rows in Table 4. In the first column there are neither diseconomies of scale nor lock-ins. Without lock-ins and diseconomies of scale transaction cost theory can explain the governance structure. Thus, firms use a single supplier, and with high asset specificity or high performance uncertainty the prediction is that the hierarchy is efficient, i.e. an internal supplier.

In the second column in Table 4 we have diseconomies of scale. Diseconomies of scale make it costly for a firm to produce all requirements internally or to source from only one external supplier. Therefore with significant diseconomies of scale it becomes efficient for firms to have two or more suppliers. When the level of asset specificity is high or the level of performance uncertainty is high, transaction cost theory predicts that the hierarchy is efficient, i.e. the use of external suppliers increases transaction costs. However, diseconomies of scale make it costly to produce all requirements internally, and thus the results from transaction cost theory are changed. With significant diseconomies of scale the use of one or more external suppliers lowers production costs. When the use of external suppliers reduces production costs more than it increases transaction costs, it becomes efficient to use external suppliers for some of the requirements. Therefore make-and-buy is efficient. This means that when firms face diseconomies of scale and the level of asset specificity and performance ambiguity increases, then the likelihood of plural governance increases.

With low levels of asset specificity and low levels of performance uncertainty transaction cost theory predicts that market sourcing is efficient. However, two types of lock-ins may affect the choice of sourcing arrangement. First, there may be lock-ins to the hierarchy (Puranam et al, 2013). Second, there may be lock-ins to the hybrid. In the third column in Table 4 we have the lock-ins to the hierarchy. The lock-ins to the hierarchy make it costly for a buyer to rely on external suppliers.
for all the requirements. The buyer reduces the cost of sourcing by internalizing part of the production because of the commitment to produce internally (Puranam et al., 2013). Therefore these lock-ins combined with low levels of asset specificity and low levels of performance uncertainty result in plural governance. If the level of asset specificity or performance uncertainty increases to a medium level then the choice of market governance becomes inefficient and is replaced with hybrid governance of the external supplier.

In the last column in Table 4 we have the lock-in to the hybrid. The lock-in to the hybrid makes it costly for a firm to break a contract with an external supplier. The buyer therefore reduces the cost of sourcing by maintaining the relationship with the external supplier. However, when the levels of asset specificity and performance uncertainty are either very low or very high, this hybrid becomes inefficient according to transaction cost theory. In these two situations the firm may try to use the efficient governance structures for parts of the requirements while maintaining the hybrid, and this leads to plural sourcing. When asset specificity and performance uncertainty are low, the hybrid is combined with a market governed relationship, and when asset specificity or performance uncertainty are high, the hybrid is combined with the hierarchy.

As illustrated in Table 4 the combinations of diseconomies of scale and lock-ins with the basic transaction cost model may explain why some firms both make and buy an identical good or service. Though, the lock-in to the hierarchy and the lock-in to the hybrid may be efficient at the time they are implemented, they are inefficient in the long-run. Therefore, when lock-ins lead to choices of plural governance, these choices are probably temporary solutions. It is also worth noting that a combination of diseconomies of scale and lock-in to the hierarchy is sufficient to make the plural form efficient.
The last two rows in Table 4 show that production cost alone may make the plural form efficient. When capabilities are different and there are no diseconomies or lock-ins, either make or buy will be the solution. However, this changes with diseconomies of scale and lock-ins. For example, strong internal capabilities lead to internal production, but with diseconomies of scale it becomes efficient to split the production between internal and external production. So the lock-ins or diseconomies of scale may lead to other governance structures than would have been chosen based purely on capabilities reasoning.

**Plural governance versus Williamson’s hybrid**

Parmigiani’s (2007) results indicate that plural forms are different from Williamson’s (1991) hybrid, i.e. singular governance structures based on medium- and long-term contracts and with average properties compared to market and hierarchy. Our model is in accordance with Parmigiani’s findings. In addition the model predicts when the hybrid has lower or higher costs than the plural form.

The plural form has higher costs than the hybrid, when external suppliers have significant capability advantages, or when there are significant economies of scale that makes it inefficient to split production among two units. Furthermore, the plural form also has higher set up and management costs than the hybrid and thus, for low transaction frequencies the hybrid is more efficient.

The plural form has lower costs than the hybrid, when the plural form synergies are so high that they compensate for the higher set up and management costs of the plural form. This may be the
case when asymmetric information and different beliefs make it difficult to agree on long-term contracts. Here the plural form safeguard and measurement synergies reduce asymmetric information, make expectations converge, and thereby reduce haggling and contract negotiations. Knowledge transfer in the plural form may also reduce production costs below the production costs of the hybrid. Finally, we also saw from Table 4 that the plural form is efficient for different combinations of diseconomies of scale, lock-ins, asset specificity, performance uncertainty, and capabilities.

**DISCUSSION AND CONCLUSIONS**

Table 4 presented transaction cost and resource-based propositions that predict when the plural form is likely to be efficient. One result is that production costs alone may determine when the plural form is efficient, but also transaction cost variables and plural form synergies are important. These results are in accordance with the complementarity-model developed by Puranam et al. (2013). The model in Figure 1 is different from Puranam et al’s (2013) model by being based on transaction cost and resource-based theories. Therefore the model relates asset specificity, measurement difficulties, transaction frequency, and capabilities to plural form efficiency. This enables us to compare the costs of the plural form with the costs of the hybrid and for example predict that for low transaction frequencies the hybrid is more efficient than the plural form. Another difference is that in our model the plural form safeguard, the measurement synergies, and knowledge synergies are not independent of the other variables in the model. Finally, Table 4 showed that diseconomies of scale and lock-ins not always lead to plural forms.
The model highlights that the effectiveness of the plural form safeguard depends on the capabilities of the internal and external production units, economies of scale and scope, and lock-ins. A closer look at the plural form safeguard also shows that it is inefficient when asset specificities are either low or very high. This means that models of how much to produce internally in order to have an effective plural form safeguard should state their assumptions about all these factors. For empirical comparisons seeking to understand the plural form safeguard, the model also points to the importance of including data on these variables. Thus, the model adds to the literature about the effectiveness of the plural form safeguard (e.g. Kidwell and Nygaard, 2011) by pointing to factors that may be equally as important as how much to produce internally in order for the plural form safeguard to be effective. Furthermore, the model shows that tolerance of opportunism in the plural form is likely to depend on more factors than merely asset specificity and degree of vertical integration.

When market information is not readily available, the plural form may mitigate the negative effect of measurement difficulties. However, when relevant information for benchmarks is not available from external suppliers, the plural form does not solve the performance measurement problem. Economies of scale and capability disadvantages increase the relative costs of the plural form, and available benchmarks become less useful.

It is unclear from the model which elements will be most important in determining the efficiency of the plural form. As argued by Krzeminska et al. (2013) measurement synergies will be effective, when there are a high degree of similarity between the market and hierarchy, whereas knowledge synergies are stronger when there are differences between the hierarchy and the market in terms of knowledge. Our analysis adds that the effectiveness of the plural form safeguard is also weakened
by differences between the hierarchy and the market. Especially differences in capabilities and (dis)economies of scale which make internal production costly lower the safeguarding effect of a small internal production.

Several papers have described how synergies affect both internal and external suppliers (Parmigiani, 2007; Jacobides and Billinger, 2006), but as indicated by e.g. Vanneste and Frank (2012), the existence of an external supplier will not have an equally strong effect on the internal production units. Firms are reluctant to terminate their internal production, and this reluctance affects the behavior of the internal production unit. This suggests that the plural form safeguard and the measurement synergies are less effective for mitigating problems caused by low-powered incentives in the hierarchy. Therefore, the three plural form synergies improve external supplier performance more than internal supplier performance. So external sourcing of very few components or services does not lead to significant plural form synergies. Instead the reasons for plural forms where only a small part of the requirements is supplied by external suppliers may be found among the production cost explanations in Table 4. Alternatively, differences in asset specificity and uncertainty may explain these plural forms.

The suggested model merely maps the variables affecting the costs of the plural form. Thus, the model predicts when the plural form will be chosen from economic efficiency reasons. However, it is not possible to equate actual choices with economic efficiency. For example, Menard (2012) identifies three determinants for the choice of the plural form. First, ambiguity about the advantages of alternative governance structures causes decision makers to choose the plural form. This ambiguity is mainly related to difficulties in determining the actual level of asset specificity. Second, the complexity surrounding the governance decision may make it hard for bounded rational
agents to find the optimal governance structure, and this uncertainty makes them choose a combination of relevant governance structures, i.e. the plural form. Finally, the plural form may be chosen for strategic reasons in cases where it is important for the focal firm to strengthen monitoring and control. There may also be a number of factors preventing the choice of the plural form. For example, Santos and Eisenhardt (2005) argue that firms are not likely to adopt boundaries that challenge organizational identity, and they predict that organizational identity will be more dominating in ambiguous environments.

The model (Figure 1) allows for differences in asset specificity and uncertainties in different parts of the plural form. This makes it possible to immediately test the model in settings, where it may be difficult in advance to make sure that the level of asset specificity is exactly the same for the internal and the external suppliers. If there are differences in asset specificity, and asset specificity is not part of the model, then tests of the model may overestimate the effect from synergies and diseconomies of scale. It therefore also points to the importance of controlling for asset specificity in empirical work on the plural form.

The model is a general model. It is not restricted to any specific industry or to downstream or upstream activities. However, as with other models, a number of variables may influence the model by shifting the cost curves or in other ways moderating the different relationships between variables. For example the institutional environment may change the cost of using one part of the plural form, and thus it may either promote or hinder the use of the plural form. High frequencies of disturbances make the hybrid inefficient (Williamson, 1991), and therefore it makes plural forms consisting of combinations of hybrids inefficient.
Future research

It has been assumed (e.g. Williamson, 1985) that buyers are reluctant or simply refuse to buy from producers that are also close competitors. On the other hand, Jacobides and Hitt (2005) argue that the exploitation of strong productive capabilities determines the development of value chains, and that it results in more permeable vertical structures combining making and buying. These two views result in opposite hypotheses regarding the willingness of firms to sell to or buy from competitors, and it complicates theoretical and empirical research on plural governance.

A large number of other unsolved problems remain, which make plural governance an interesting area of research. Only one paper focuses on different types of plural forms (Krzminska et al., 2013), and plural governance has only recently been studied in a dynamic perspective (cf. Jacobides and Billinger, 2006; Jacobides and Hitt, 2005; Jacobides and Winter, 2005). This paper illustrates, how transaction cost analysis can be used to explain plural forms, despite the fact that transaction cost theory uses the transaction as its unit of analysis. However, there may be a need to reconsider the unit of analysis, and develop new concepts to describe the plural form.

Managerial implications

The adding of another governance structure to an existing governance system does not automatically bring plural form synergies. The plural form safeguard depends on many other factors than merely the addition of internal production. With weak internal capabilities the plural form may not provide important synergies but merely increase costs. Thus, for managers it may be more important to focus on improving internal capabilities than to seek to implement a plural form.
Furthermore, the plural form requires active management to harvest the benefits. Synergies require communication, gathering of information, and active comparisons. This increases the costs beyond the costs of individual governance structures, because it adds new activities that are not present in a singular governance structure.

Without learning effects or differences in capabilities the plural form is most likely to be efficient in or around the points where the costs of two alternative singular governance structures are the same. Here the plural form safeguard and measurement synergies cost less and are most effective. This suggests that in these situations managers should consider exploring whether the plural form is more efficient than the singular structures.

REFERENCES


