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# The Interfirm Contracting Value of Management Accounting Information

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**ABSTRACT:** We examine how firms' management accounting information influences interfirm contract design. We theorize that comprehensive accounting information enables firms to design more complete contracts with suppliers, as indicated by increased issue inclusiveness and clause specificity. Survey data of Japanese manufacturing firms about the management of supplier relationships support the expectation that comprehensive management accounting information enables the development of more inclusive and specific contracts with suppliers. These contracts are also less subject to additional informal agreements between exchange partners. These results are consistent with the idea that better accounting information enables more complete contracting.

**Keywords:** interfirm relationships; contract design; management accounting information.

## I. INTRODUCTION

Formal contracts are considered of critical importance to the management of interfirm relationships, as they allow firms to mitigate and manage risks of exchange with business partners. Well-developed contracts include clauses for incentive alignment, safeguarding, coordination, and adaptation, enabling firms to manage relational risks (i.e., lack of cooperation that could result in opportunistic behavior) and performance risks (i.e., failure despite full cooperation) (Anderson and Dekker 2005; Das and Teng 1996). Empirical research shows that outcomes of interfirm relationships are associated with the alignment of interfirm contracts with critical transaction characteristics that proxy for risk (Anderson and Dekker 2014). Prior studies, however, also show that firms differ in the governance and contracting choices that they make for similar transactions (Anderson, Dekker, and Van den Abbeele 2017; Fabrizio 2012; Mayer and Salomon 2006). A key reason for this relates to firms' contracting ability, as firms differ in "collaborative competencies" that include their ability to coordinate, communicate, and bond with exchange partners (Kale, Dyer, and Singh 2002; Schreiner, Kale, and Corsten 2009; Wang and Rajagopalan 2015; Whipple, Wiedmer, and Boyer 2015; Zacharia, Nix, and Lusch 2011).<sup>1</sup>

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<sup>1</sup> Wang and Rajagopalan (2015) review the literature on alliance capabilities, which shows that collaborative competencies relate to both the pre-formation stage of collaboration (e.g., partner search, negotiation, contracting) and the post-formation stage (e.g., coordination, bonding, learning, termination).

Prior management studies have examined how firms develop these competencies, for example, through repeated interactions (Mayer and Argyres 2004) and specific alliance functions (Kale et al. 2002). This literature also argues that firms' existing capabilities and resources influence their ability to govern exchange relations (Mayer and Salomon 2006). Accounting research has recognized that internal accounting and control practices can affect collaborative competencies, as they influence firms' ability to contract, manage, and maintain interfirm relationships (Bauer, Henderson, and Lynch 2018; Dekker 2016; Fayard, Lee, Leitch, and Kettinger 2012). Nevertheless, while accounting research has shown much interest in the contracting value of accounting information for e.g., incentive and debt contracting, its role in interfirm contracting has seen less exploration. Although prior accounting research has examined how firms design interfirm contracts in response to exchange hazards (Anderson and Dekker 2014), these studies tend to ignore the firm's internal information environment that can affect this design.<sup>2</sup> Most of these studies instead have examined how accounting and control are designed to manage specific interfirm relationships (Anderson and Dekker 2014), rather than examining the influence of firms' internal management accounting in this design.

In this study, we examine this question and follow the argument that one of the factors that influences firms' ability to contract relates to their internal management accounting information (MAI). We broadly define the comprehensiveness of MAI as the extent to which a firm internally has access to financial (e.g., cost) and nonfinancial (e.g., quality, operational) information. We argue that more comprehensive MAI has greater contracting value as it enables the development of more complete contracts with exchange partners; that is, contracts that are more inclusive and detailed given the exchange hazards they need to address, and that are less subject to additional informal agreements used to complement incomplete contracts.

To test our hypotheses, we collect survey data from Japanese manufacturing firms about their relationships with existing and new suppliers involved in their supply chain management efforts. We capture information about the set of suppliers they transact with instead of a specific supplier relationship. We do so because we expect MAI to have a general influence on the contracts that buyers enter into, which this firm-level measurement level allows us to examine.<sup>3</sup> Results show that, controlling for transaction and firm characteristics that proxy for exchange hazards, more comprehensive MAI enables firms to develop more inclusive and detailed contracts that are also less subject to additional informal agreements meant to complement the contract. Additional explorations of *how* MAI influences interfirm contract design show that these effects are mediated by *ex ante* planning and negotiation with suppliers, which involves exchange of cooperation information such as cooperation goals, scenarios, and methods. In these mediation tests, MAI also directly influences clause specificity and use of informal agreements, indicating it enables buyers to unilaterally specify more detailed clauses, while avoiding less enforceable informal agreements. The results support the idea that comprehensive MAI enhances contract completeness by enabling firms to identify and specify a greater range of issues to be contracted, and to do so in greater detail.

This study contributes to the accounting and interfirm contracting literatures by providing evidence on the interfirm contracting value of firms' internal MAI. Particularly, we view MAI as an organizational resource that contributes to firms' ability to generate information relevant for interfirm contract design. Prior accounting research has extensively examined the contracting value of accounting information in other contracting settings, such as incentive and debt contracting. The interfirm contracting literature has extensively examined the influence of exchange hazards on contracting choices, but has largely neglected the influence of firms' internal information environment. This study thus contributes to these literatures by providing theory and evidence on how firms' internal accounting information supports interfirm contract design, and particularly how in the presence of exchange hazards MAI facilitates more complete contracting.

## II. HYPOTHESIS DEVELOPMENT

A generally accepted idea in the accounting literature is that high-quality accounting information enhances firms' contracting efficiency, and economic models of accounting have placed much interest in the contracting value of accounting information, such as incentive and debt contracting (e.g., Lambert 2001). Similarly, analytical research has addressed the value of accounting information in interfirm contracting such as interfirm transactions and long-term relations with suppliers (e.g., Baiman and Rajan 2002). Not much empirical research, however, has provided evidence on the interfirm contracting role of firms' accounting information. More generally, the accounting literature has provided only modest attention to the interrelations between intrafirm and interfirm accounting and control (Dekker 2016). Most prior studies in this area have addressed the

<sup>2</sup> In contrast, experimental accounting research has provided greater emphasis on the role of accounting information in buyer supplier negotiations (e.g., Drake and Haka 2008; Masschelein, Cardinaels, and Van den Abbeele 2012).

<sup>3</sup> This does not preclude that relationship-specific factors such as trust in a supplier can influence how MAI is used during the planning and contracting stages (Dekker 2004), nor that suppliers can also influence contract design to different degrees and vary in the MAI that they possess. As our data collection is not at the level of relationships with a specific partner, this precludes us from examining variables at the level of specific relationships, however.

question of how internal management accounting, particularly firms' cost information, influences interfirm cost management practices. Studies, for instance, have shown how "weak" internal cost information and unsophisticated cost systems can constrain initiatives such as open book accounting and interorganizational cost management (Caglio 2018; Fayard et al. 2012; Wouters, Anderson, and Wynstra 2005).

A few prior studies illustrate how internal MAI influences firms' ability to contract with exchange partners. For instance, Dekker (2004) observed how imperfect cost information about supply chain activities constrained partner firms in developing agreements for dividing costs and benefits of joint innovation activities. Because of the measurement problems, firms wrote an incomplete contract and made an informal agreement to negotiate *ex post* a fair division of costs and benefits. Bruin (2019) observed how weaknesses in a contractor's internal accounting led to contractual disputes with a client firm, leading to a breakdown of trust and contract termination. These field observations converge with the larger sample evidence of Bauer et al. (2018), who argue that the quality of suppliers' internal controls and accounting information affects their ability to contract with buyers and maintain the relationship (i.e., with low-quality information, negotiation and monitoring problems arise, resulting in earlier relationship termination).<sup>4</sup> They also converge with the finding of Bai, Coronado, and Krishnan (2010) that performance measurement noise causes contracting problems, which can deter firms from outsourcing in the first place.<sup>5</sup> These studies suggest that one source of collaborative competencies resides within firms' internal MAI, where firms with "better" information are also able to more effectively govern exchange relations (Dekker 2016). MAI may affect firms' proficiency in selecting partners and in forming and managing relationships with these partners, including planning, target setting, performance measurement, conflict resolution, and termination. These arguments fit the more general idea that firms' internal competencies and resources affect their ability to govern interfirm relations, and can explain why firms design different governance arrangements for transactions with similar characteristics (Mayer and Salomon 2006; Parmigiani and Mitchell 2010).

Interfirm contracts are often incomplete, with the degree of incompleteness depending on the costs and benefits of contracting (Anderson et al. 2017). Luo (2002) developed the notion of "term specificity" to examine how detailed contractual terms about rights and obligations are specified. Luo and Tan (2003) subsequently divided this notion into two complementary dimensions that relate directly to contract (in)completeness; namely "issue inclusiveness" and "clause specificity."<sup>6</sup> Issue inclusiveness describes the extent to which a contract includes important terms, clauses, and issues. Clause specificity describes the degree and detail of specification and codification of clauses and terms such as the allocation of partners' rights and responsibilities, distribution of outcomes, conflict resolution, and contract termination. Transaction cost economics (TCE) theorizes that the extent to which these dimensions reflect more complete contracts depends on the exchange hazards they are meant to address. For given exchange hazards, contracts that are more inclusive and more specific are relatively more complete. Importantly, it is the combination of these dimensions that determines contract completeness, which depends on the "breadth" and "depth" of contract agreements (e.g., contracts with many unspecific terms, or a few very detailed terms, may be very incomplete when facing significant exchange hazards). We adopt the dimensions of Luo and Tan (2003) for our analysis, as they enable examination of how MAI contributes to enhancing contract completeness, given the exchange hazards that collaborating firms face.

We expect that the interfirm contracting value of firms' internal MAI increases with its comprehensiveness. MAI encompasses financial and nonfinancial information, which can both be informative in contract design. More comprehensive MAI enhances the firm's knowledge base that it can rely upon in negotiations and interactions with exchange partners. This can reduce information asymmetry with exchange partners (e.g., about suppliers' production costs), and provide insights otherwise unavailable to each (e.g., about supply chain inefficiencies). Parmigiani and Mitchell (2010), for instance, argue that buyers with greater internal knowledge and expertise can create more meaningful and complete contract specifications with suppliers, which they can also monitor and enforce better. In line with this, we argue that comprehensive MAI enables buyers to identify relevant contract issues and specify clauses in greater detail.

As our empirical setting involves relations between manufacturing firms and their suppliers, in our analysis we particularly focus on MAI in the form of cost, quality, and technical information as important information elements. When buyers possess

<sup>4</sup> In a similar vein, Costello (2013) found that reliance on financial covenants in supplier contracts is less when financial statement reliability is low. Schloetzer (2012) found that distributors' information system compatibility and sharing of information influence contract renewal through enhanced financial relationship performance.

<sup>5</sup> More generally, transaction cost economics predicts that transaction characteristics that cause measurement and monitoring problems inhibit efficient contracting (Anderson and Dekker 2005). However, studies rarely incorporate firms' internal information environment, which can influence measurement and contracting ability.

<sup>6</sup> Luo and Tan (2003) also distinguish a third dimension, contingency coverage, which is the extent to which unanticipated contingencies and relevant guidelines to handle them are accounted for. Contingency coverage includes not only the element of flexibility that we examine as a separate construct in H3, but also specifications of contingency principles and provision of alternatives that, if included in the contract, affect issue inclusiveness and clause specificity.

in-depth cost information about components, this increases their understanding of cost categories, cost behavior, and design trade-offs, enhancing their ability to specify agreements on costs and processes. Similarly, nonfinancial information about quality and operations can enhance buyers' understanding of suppliers' technical processes and quality levels, enabling specification of terms on technical and quality requirements, and monitoring procedures (Parmigiani and Mitchell 2010). For instance, comprehensive financial and nonfinancial information can support developing clauses about partners' rights and responsibilities that specify cost and quality targets, work and quality management procedures, and ownership of intellectual property. They also facilitate clauses on distribution of outcomes through specification of performance measures, evaluation procedures, and reward systems. And they enable development of conflict resolution and contract termination clauses by specifying how conflict can be resolved (e.g., agreements on adjustment, restoring of underperformance, and when to involve arbitration), under which conditions the contract can be terminated (e.g., failure to attain performance targets, nonadherence to procedures, or quality agreements), and how costs, benefits, and assets related to the relationship will be divided.

As an illustration, at Panasonic Ecology Systems Co., Ltd., good cost and technical information were described as critical in negotiations and contracting with suppliers.<sup>7</sup> The firm used cost tables for components that they had gained good understanding of to more accurately estimate "reasonable" prices as a basis for negotiation. These estimates were seen to speed up negotiations, reduce suppliers' scope to include unclear costs, and weaken the price effects of power differences and information asymmetries. In case of a gap between a supplier's price estimate and the desired price, a supplier could also be asked to submit value engineering proposals to reduce the gap.

In sum, we expect that firms with more comprehensive MAI will be able to develop more complete interfirm contracts with their suppliers. Particularly, a greater ability to measure, monitor, understand, and manage costs, quality, and processes will enable buyers to negotiate and draft more inclusive and more specific contract agreements with suppliers. We hypothesize that:

**H1:** The comprehensiveness of buyers' MAI is positively associated with issue inclusiveness of interfirm contracts.

**H2:** The comprehensiveness of buyers' MAI is positively associated with clause specificity of interfirm contracts.

A lack of relevant information can result in excessive contracting costs, and consequently a cost-benefit trade-off that favors greater contract incompleteness (Anderson et al. 2017). Incomplete formal contracts are often complemented with additional informal agreements about less-contractible issues (Dekker 2004; Krishnan, Miller, and Sedatole 2011). We focus particularly on informal agreements made between exchange partners to supplement the formal contract. Such agreements, for instance, can take the form of oral expressions of intentions and expectations, and how to act if certain (noncontractible) events or conditions emerge. By nature, such additional informal agreements are less well enforceable and are characterized by greater ambiguity.<sup>8</sup> When firms possess more comprehensive MAI, this should reduce the lack of relevant information, enhance contractibility of the information, and decrease contracting costs. Therefore, comprehensive MAI can enable buyers to avoid making informal agreements with suppliers as supplements to (incomplete) formal contracts, as this instead allows for making more explicit agreements. Accordingly, we hypothesize that:

**H3:** The comprehensiveness of buyers' MAI is negatively associated with informal agreements with suppliers to supplement the formal contract.

### III. DATA AND METHODS

To collect data for hypothesis testing, in 2013 we sent a questionnaire to all 354 companies listed on the first section of the Tokyo Stock Exchange active in processing and assembly industries, which includes the largest listed Japanese firms. Japanese firms are suitable for our study as they are well known for developing extensive sourcing relationships with suppliers. Prior research also finds that formal contracting by Japanese firms is associated with transaction characteristics that proxy for exchange hazards (Dekker, Sakaguchi, and Kawai 2013).

We obtained contact information about appropriate respondents from the Kaisha Shikiho database. We sampled and sent the questionnaire to managers in charge of purchasing departments, instructing them to focus on relationships with suppliers

<sup>7</sup> These insights were provided in an interview with a former president of Panasonic Ecology Systems Guangdong Co., Ltd., Mr. Tadafumi Kita.

<sup>8</sup> While informal agreements between parties may also be made in the presence of more complete contracts, we focus specifically on informal agreements made to *supplement* (incomplete) formal contracts. Informal agreements may be supported by relational contracts that can substitute or complement incomplete formal contracts, but may also be made by necessity due to the inability or excessive costs to develop formal agreements. A large literature has examined the interplay between formal contracts and relational or trust-based governance (e.g., Cao and Lumineau 2015). Even if trust is high, firms may prefer making clear agreements if they can, as these increase transparency (Das and Teng 1998), enhance coordination (Dekker 2004), and avoid ambiguity and misunderstanding that over time can undermine trust (Malhotra and Lumineau 2011). As our firm-level data allow us to only limitedly address the role of relational contracts as proxied by prior experience (see Section IV), we do not incorporate these in the analysis, leaving the question how in the presence of relational contracts MAI influences formal and informal agreements for future study.



involved in their supply chain management efforts.<sup>9</sup> We selected these respondents as they were expected to be the most knowledgeable about the questions we ask (cf. [Speklé and Widener 2018](#)). Respondents completed the questionnaire for two types of relations with suppliers, as the nature of transactions and contracting practices may differ for these suppliers: (1) relationships with new suppliers that they have had no experiences with before, and (2) relationships with existing suppliers. Specifically, they answered firm-level questions (e.g., about MAI and environmental variability) once, and all questions relating to new and existing supplier relations (e.g., contract design, information exchange, transaction characteristics) twice. We obtained 81 responses reflecting a 22.9 percent response rate and providing 162 observations across supplier types.<sup>10</sup> In one case, a respondent failed to provide responses on questions about new suppliers, which we dropped. Six cases had one missing value each (i.e., two missing values for three variables), which we imputed using the expectation-maximization method. Thus, the available sample size for analysis is 161 observations at the level of supplier type.

We conducted two tests of nonresponse bias. First, we compared responding and nonresponding firms in terms of (log-transformed) total sales. Responding firms are on average larger ( $p < 0.05$ ). These firms may more often have structured supply chain management practices, making their representatives more inclined to respond. This implies that our results that follow from the sampling procedure and actual responses are particularly descriptive of contract design by larger firms (cf. [Speklé and Widener 2018](#)). Second, we compared the first and last ten responses, assuming late respondents are more similar to nonrespondents. Comparisons on firm size, industry, and all model constructs provide no indication of structural response bias.<sup>11</sup>

### Variable Measurement

Our predictor variable of interest (MAI) is a firm-level variable, and the research model aims to explain how MAI influences firms' contracting choices for their relationships with suppliers. Given that we examine the general influence of firms' internal MAI on their contracting choices, we measured all variables of interest at the firm level by capturing contract design, information exchange, and transaction characteristics for the firm's sets of suppliers.<sup>12</sup> Respondents were requested to indicate what best described the firm's situation concerning transactions with existing and with new suppliers. This measurement level precludes examining relations with specific suppliers and factors (e.g., trust, supplier power) that affect contract design at the dyadic level. The primary benefit, however, is that this firm-level measurement fits the theoretical model well, as the theorized influence of MAI is not confined to specific interfirm relations.<sup>13</sup>

Construct measures were based on existing scales when available and used a five-point Likert scale with 1 indicating a "low degree" and 5 a "high degree." All constructs are based on a reflective measurement model in which observed item values are a function of the latent construct. For each multi-item construct, Cronbach's alpha (reported between parentheses in Table 1) indicates adequate reliability. Given that we use both existing and newly developed or adapted constructs, we employ both confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) to assess the measurement quality of the constructs ([Bedford and Speklé 2018](#)). We use CFA to assess the measurement quality of constructs regarding supplier relationships that are based on prior studies (i.e., contracting choices and transaction characteristics). We use EFA for constructs developed or adapted for this study and for firm-level constructs that do not vary between new and existing supplier relationships (i.e., MAI and environmental variability). After establishing measurement validity, we compute mean item scores for each construct to be used for the hypothesis tests. Table 1 reports the measurement items and their loadings, as discussed hereafter.

### Dependent Variables

Following [Luo \(2002\)](#), [Luo and Tan \(2003\)](#), and [Ding, Dekker, and Groot \(2013\)](#), *Issue inclusiveness* describes to what extent supplier contracts include important terms, clauses, and issues. Two items capture the extent to which contracts with suppliers (1) cover a wide range of contract items, and (2) include many clauses and agreements ( $\alpha = 0.85$ ).

<sup>9</sup> Supply chain management was defined to respondents as "a cooperative approach with transaction counterparties to plan and manage a synchronous flow of goods and information, from raw materials to the final product." Thus, the types of relationships or transactions sampled exclude short-term and market-type relations or transactions.

<sup>10</sup> As we show later, significant differences exist between existing and new suppliers on several model variables, reducing the potential concern that respondents may have provided similar responses to reduce completion time.

<sup>11</sup> Because of the one dropped case, this provides 20 early and 19 late observations relating to new and existing relationships. Using a 90 percent confidence interval, only one of all variables (*Technology information*, used in an additional analysis) differs significantly between the two groups. Given the number of variables tested, this likely results from chance.

<sup>12</sup> We recognize that this approach may involve aggregation error as it focuses on firms' average situation, ignoring differences between a firm's suppliers and specific contracting choices. In addition, our buyer perspective neglects the influence of suppliers on contract design. However, the benefit of this approach is that it allows examining general influences of MAI across the set of relationships that firms maintain.

<sup>13</sup> Specific features of a relationship (e.g., trust, joint routines, power differences) may, however, influence how a firm uses its MAI during negotiations and planning with suppliers, and thus moderate the effects of MAI.

**TABLE 1**  
**Descriptive Statistics**

	<u>Min.</u>	<u>Max.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u><math>\lambda^s</math></u>
Dependent Variables							
<i>Issue inclusiveness</i> ( $\alpha = 0.85$ ) <sup>a</sup>	1	5	3.82	0.79	-0.85	1.15	—
Wide range of contract items	1	5	3.71	0.92	-0.73	0.15	0.68
Include many clauses/agreements	1	5	3.93	0.78	-1.00	1.58	0.79
<i>Clause specificity</i> ( $\alpha = 0.79$ ) <sup>a</sup>	1.6	5	3.36	0.66	-0.03	0.20	—
Right and obligations	1	5	3.68	0.86	-0.68	0.38	0.66
Resolution of disputes	2	5	3.73	0.87	-0.43	-0.37	0.65
Termination of the relationship	1	5	3.61	0.94	-0.62	-0.21	0.71
Distribution of cost/benefits	1	5	2.45	0.87	0.81	0.94	0.39
Managing cooperative relationship	2	5	3.33	0.93	-0.15	-1.04	0.50
<i>Informal agreements</i> <sup>a</sup>	1	5	2.22	1.08	0.62	-0.55	0.97
Independent Variables							
<i>COMPMAI</i> ( $\alpha = 0.80$ ) <sup>b</sup>	2.2	5	3.64	0.71	0.27	-0.57	—
Cost tables	1	5	3.67	0.96	-0.58	-0.25	0.71
Evaluating cost levels	1	5	3.93	0.85	-0.97	1.56	0.64
Collecting VE examples	2	5	3.72	0.94	-0.32	-0.76	0.66
Evaluating quality levels	2	5	3.63	0.95	-0.26	-0.83	0.79
<i>Transaction size</i> <sup>c</sup>	1	5	3.44	1.07	-0.23	-0.69	0.95
<i>Asset specificity</i> ( $\alpha = 0.81$ ) <sup>c</sup>	1	5	3.87	0.95	-0.94	0.10	—
Large losses if delivery stops	1	5	4.14	1.08	-1.17	0.52	0.97
Difficulty switching	1	5	3.60	0.98	-0.47	-0.35	0.73
<i>Environmental variability</i> ( $\alpha = 0.79$ ) <sup>b</sup>	2	5	3.20	0.68	-0.02	-1.07	—
Changing customer needs	2	5	3.27	0.86	-0.02	-0.83	0.48
Technological changes	2	5	3.15	0.89	0.08	-1.06	0.90
Technological obsolescence	1	5	2.94	0.87	0.18	-0.94	0.79
Technological innovation	2	5	3.45	0.89	-0.30	-0.79	0.58
<i>Competition</i> ( $\alpha = 0.79$ ) <sup>c</sup>	1	4.67	3.01	0.74	-0.12	-0.31	—
Size of supplier base	1	5	3.09	0.90	-0.17	-0.54	0.51
Number of potential suppliers	1	5	2.88	0.86	-0.13	-0.41	0.81
Number of alternative suppliers	1	5	3.05	0.90	-0.20	-0.56	0.68
<i>Partner experience</i>	0	1	0.50	0.50	-0.01	-2.03	—
<i>Firm size (log sales)</i>	3.95	6.97	5.15	0.68	0.67	0.07	—

<sup>a</sup> Estimated using ML CFA ( $n = 161$ ). GOF:  $df = 18$ ,  $\chi^2 = 33.70$  ( $p < 0.01$ ), RMSEA = 0.072, SRMR = 0.051, GFI = 0.95, CFI = 0.97, NNFI = 0.95. The error variance of *Informal agreements* is fixed by 0.20 times the item variance (cf. Anderson and Dekker 2005).

<sup>b</sup> Estimated using ML EFA ( $n = 81$ ). Variance explained 63.49 percent ( $EV_1 = 3.18$ ,  $EV_2 = 1.90$ ).

<sup>c</sup> Estimated using ML CFA ( $n = 161$ ). GOF:  $df = 8$ ,  $\chi^2 = 24.89$  ( $p < 0.01$ ), RMSEA = 0.115, SRMR = 0.066, GFI = 0.96, CFI = 0.95, NNFI = 0.90. The error variance of *Transaction size* is fixed by 0.20 times the item variance, and to resolve a convergence problem, the error variance of the first item of *Asset specificity* is fixed at 0.20 times the item variance.

*Clause specificity* is measured using five items derived from Luo (2002), Luo and Tan (2003), and Ding et al. (2013). These items capture the extent to which contracts with suppliers include detailed agreements concerning (1) rights and obligations, (2) resolution of disputes, (3) relationship termination, (4) distribution between partners of costs and benefits, and (5) management of the relationship ( $\alpha = 0.79$ ). While this measurement also captures the “breadth” of the contract by capturing the inclusion of these different dimensions, this is also captured by *Issue inclusiveness*. The covariance that we specify between the constructs in the structural model to be estimated controls for this overlap, and the unique part of the measurement of *Clause specificity* relates to the detail of agreements made.

To measure *Informal agreements*, one item captures the extent to which contracts with suppliers are supplemented with informal agreements between the exchange partners (Ding et al. 2013). The question includes an example of communication between persons in charge in order to indicate that informal agreements include oral, unwritten agreements. The item explicitly asks about the extent to which the formal contract is *supplemented with* informal agreements in order to capture the use of informal agreements aimed at filling the gaps in incomplete contracts.

We conduct maximum likelihood (ML) CFA to test how well the set of contract items reflects their underlying constructs. Results reported in Table 1 show that the items load well on their respective constructs and that fit of the measurement model of

contract dimensions is adequate ( $df = 18$ ;  $\chi^2 = 33.70$ ; RMSEA = 0.072; SRMR = 0.051; GFI = 0.95; CFI = 0.97; NNFI = 0.95).<sup>14,15</sup> We use other items captured in the questionnaire for validity testing. First, correlations with an item that asks about the importance of the contract for managing the relationship ( $r = 0.24$ ,  $p < 0.01$ ;  $r = 0.50$ ,  $p < 0.01$ ;  $r = -0.04$ ,  $p > 0.10$ ) confirm that more inclusive and specific contracts are more important for managing the relationship, while informal agreements do not discount this importance. Second, correlations with an item that asks about the use of the contract for reaching consensus between the partners ( $r = 0.39$ ,  $p < 0.01$ ;  $r = 0.51$ ,  $p < 0.01$ ;  $r = -0.18$ ,  $p < 0.05$ ) confirm that more inclusive and specific contracts support reaching consensus, while informal agreements reduce their value to do so. Third, a four-item construct in the survey captures the extent of supplier evaluation during the relationship regarding cost and quality of suppliers' parts and materials ( $\alpha = 0.63$ ). The correlations with the three contract dimensions ( $r = 0.15$ ,  $p < 0.10$ ;  $r = 0.26$ ,  $p < 0.01$ ;  $r = -0.21$ ,  $p < 0.01$ ) confirm that more inclusive and specific contracts associate with more *ex post* evaluation, while informal agreements are associated with less *ex post* supplier evaluation.<sup>16</sup>

We also estimate an alternative measurement model in which all contract items load on the same factor. If common method bias is present in the survey data, this model should also provide good fit. The fit statistics are significantly weaker (not tabulated;  $df = 20$ ;  $\chi^2 = 140.88$ ; RMSEA = 0.194; SRMR = 0.106; GFI = 0.85; CFI = 0.69; NNFI = 0.57) and standardized factor loadings (unreported) are lower, alleviating concerns about common method bias. Additionally, this test supports discriminant validity of the three contract dimensions.

### Independent Variable

As we conduct our tests in the setting of Japanese manufacturer-supplier relationships, we derive relevant MAI dimensions from prior studies on cost management in Japanese manufacturing firms (Cooper and Slagmulder 2004; Kato 1993; Tani et al. 1994). These studies show that often-used practices include the development of cost tables, evaluation of costs and quality of sourced parts and materials, and value engineering that enhances understanding of processes and trade-offs between costs, quality, and functionality. We measure the comprehensiveness of MAI (*COMPMAI*) by four items about the extent to which the buyer actively (1) develops cost tables, (2) evaluates how cost levels of procured parts and materials affect the firm financially, (3) collects value engineering examples, and (4) evaluates how the quality levels of procured parts and materials affect the firm financially ( $\alpha = 0.80$ ).<sup>17</sup>

Because the firm-level construct is developed for this study, we use ML EFA to examine its construct validity.<sup>18</sup> As Table 1 shows, the items load significantly on one factor. We use other items to conduct validity tests of the key independent variable. First, a three-item construct indicates the extent to which the firm actively collects and learns from cost information about its products and services ( $\alpha = 0.89$ ). The correlation with *COMPMAI* ( $r = 0.52$ ;  $p < 0.01$ ) confirms the idea that comprehensive MAI facilitates learning (Fayard et al., 2012). Second, a two-item construct captures the frequency and scope of cost information sharing with suppliers ( $\alpha = 0.73$ ). The correlation with *COMPMAI* ( $r = 0.55$ ;  $p < 0.01$ ) confirms that comprehensive MAI supports such information sharing. Third, two items capture monitoring problems regarding partners' cost and quality of products/services ( $\alpha = 0.60$ ), which complicate the development of agreements and can lead to risk taking over developing controls that are too costly (Anderson and Dekker 2005). The correlation with *COMPMAI* confirms that firms with more comprehensive MAI face fewer monitoring problems ( $r = -0.30$ ;  $p < 0.01$ ). Finally, we employ the supplier evaluation construct used previously. The positive correlation with *COMPMAI* ( $r = 0.38$ ;  $p < 0.01$ ) confirms the idea that comprehensive MAI enables *ex post* supplier evaluation on cost and quality performance.

### Control Variables

In the analyses, we control for heterogeneity across observations in exchange hazards that affect the demand for contracting. To do so, we follow the approach of prior TCE studies to capture critical transaction and partner characteristics that

<sup>14</sup> The goodness-of-fit index (GFI), standardized root mean residual (SRMR), and root mean squared error of approximation (RMSEA) indicate how well the model reproduces the sample data. The comparative fit index (CFI) and non-normed fit index (NNFI) compare the discrepancies from a "null-model" with those from the fitted model to evaluate improvement in fit. Recommended cutoff values are 0.08 for SRMR, 0.06 for RMSEA and 0.95 for GFI, CFI, and NNFI, with "loosened" values for combinations of measures (Hu and Bentler 1999).

<sup>15</sup> ML EFA on the items for the subsamples with new and existing suppliers provide a similar factor structure with items loading significantly on their predicted construct, without cross-loadings.

<sup>16</sup> Two additional validity tests show positive correlations between (1) issue inclusiveness and the need to make arrangements with suppliers before the transaction about different matters and activities ( $r = 0.45$ ;  $p < 0.01$ ), and (2) informal agreements and the degree to which the contract is subject to interpretation ( $r = 0.17$ ;  $p < 0.05$ ).

<sup>17</sup> In the questionnaire, value engineering is defined as "analyzing functions of products and services."

<sup>18</sup> The EFA also includes environmental variability, which is similarly measured at the firm level. Conducting separate factor analyses for these constructs provides similar results.



proxy for exchange hazards in interfirm relationships. Particularly, we derive construct measures from prior studies on the control of supplier and outsourcing relations (Anderson and Dekker 2005; Dekker et al. 2013).

First, *Transaction size* indicates exposure to potential opportunism and the need for interfirm coordination, and is measured by an item concerning the financial value of transactions with suppliers. Second, *Asset specificity* refers to significant investments in human or physical assets that have less value outside of the relation, creating exposure to opportunistic holdup and a need for coordination across firm boundaries. Two items capture (1) the losses suffered by the firm if a supplier were to stop delivery of their products or services, and (2) the difficulty of switching suppliers immediately ( $\alpha = 0.81$ ). Third, *Environmental variability* is captured at the firm level and reflects changes in market conditions and technology over time and can induce the design of more complex contracts that anticipate and help manage fluctuations, and also to increase flexibility to adjust to fluctuations (Ding et al. 2013). Four items (adapted from Jaworski and Kohli [1993]) capture the frequency of changes in the firm's environment due to (1) changing customer needs, (2) technological changes in the industry, (3) pace of technological obsolescence, and (4) technological innovation that facilitates new product ideas ( $\alpha = 0.79$ ). Fourth, *Competition* alleviates concerns about exchange hazards as firms can switch to alternative suppliers in case of suboptimal performance, and also provides better information for contracting (Anderson and Dekker 2005). Three items capture the extent to which the buyer can search among potential partners and other suppliers can deliver similar (potentially adjusted) parts and materials ( $\alpha = 0.79$ ). Fifth, *Partner experience* can affect contract design through trust and learning, and the development of "relational contracts" (Dekker and Van den Abbeele 2010). An indicator takes the value of 1 for transactions with existing suppliers, and 0 for new suppliers.

Finally, we control for firm size and the specific sector the firm is active in. *Firm size* is captured by the logarithm of firm sales, as included in the sampling database. Larger firms typically have greater resources that can influence negotiation and contracting. We further add two indicators to denote if firms produce machinery or transportation equipment, while firms producing electrical appliances or precision instruments form the reference group.<sup>19</sup>

We conduct ML CFA of the transaction and partner characteristics (except for *Partner experience*). The fit statistics in combination show that the measurement model fits the data reasonably well ( $df = 8$ ;  $\chi^2 = 24.89$ ;  $p < 0.01$ ; RMSEA = 0.115; SRMR = 0.066; GFI = 0.96; CFI = 0.95; NNFI = 0.90) and all items load significantly on their theorized construct.<sup>20</sup> An alternative model in which we specify all items to load on the same factor fits the data significantly worse (not tabulated;  $df = 10$ ;  $\chi^2 = 190.01$ ;  $p < 0.01$ ; RMSEA = 0.334; SRMR = 0.221; GFI = 0.73; CFI = 0.46; NNFI = 0.19) and has lower standardized item loadings on the common factor (unreported). This alleviates concerns about common method bias and supports discriminant validity of the transaction and partner characteristics.

We also performed Harman's one factor test by subjecting all perceptual items (i.e., all items except for experience, firm size, and industry) to an exploratory factor analysis. This provided eight factors with an eigenvalue greater than 1 that jointly explain 68 percent of the variance. The first factor explains only 18 percent of the variance and except for *Transaction size* (which loads on *Asset specificity*), all items load on their theorized construct. Thus, common method bias is not a significant concern in our dataset. Table 2 reports Pearson correlations between the model variables, which cause no concerns about multicollinearity.

#### IV. MODEL ESTIMATION AND RESULTS

We use structural equation modeling for hypothesis testing as this allows us to simultaneously estimate the effects of the independent variables on all three contract dimensions, while controlling for the expected interrelations between these dimensions. The covariances that we specify between the three dimensions for this purpose also provide a test of the conditional interrelations between these choices (Arora and Gambardella 1990; Brynjolfsson and Milgrom 2013; Dekker 2016). We compute mean item scores for each construct to obtain construct scores for the structural model to be estimated (i.e., not jointly estimating a measurement model). We use ML estimation with clustered-robust standard errors in Stata (Version 14) to account for the interdependence between observations of the same firm. We do not report fit statistics since the model is saturated and fit statistics are not informative (i.e., the degrees of freedom equals 0).<sup>21</sup>

<sup>19</sup> We also captured whether the relationships involve international suppliers. This measure had many missing values (45), likely due to respondents' interpretation that they only had to indicate if relations were international. Reported international relations primarily involved new suppliers. We imputed all missing values as domestic relations. We obtain similar results and inferences regarding the hypotheses if we add this measure as additional control variable, and it has no significant effects on the contract design or information exchange dimensions.

<sup>20</sup> ML EFA for the subsamples with new and with existing suppliers provides similar factor structures with the items loading significantly on the predicted construct, without cross-loadings.

<sup>21</sup> Estimating the model using seemingly unrelated regression (SUR) with a bootstrapping procedure to estimate the indirect and total effects (Preacher and Hayes 2008) provides similar results and inferences as those reported. The significance estimates are less conservative, however, given the inability to cluster standard errors in SUR.

**TABLE 2**  
Correlations among the Model Variables

	1	2	3	4	5	6	7	8	9	10
1. <i>Issue inclusiveness</i>	1.00									
2. <i>Clause specificity</i>	0.36***	1.00								
3. <i>Informal agreements</i>	-0.00	-0.08	1.00							
4. <i>COMPMAI</i>	0.00	0.31***	-0.26***	1.00						
5. <i>Transaction size</i>	-0.01	-0.03	-0.04	0.13*	1.00					
6. <i>Asset specificity</i>	0.16**	-0.01	0.08	-0.01	0.48***	1.00				
7. <i>Environmental variability</i>	-0.03	-0.05	-0.16**	0.28***	0.15*	0.07	1.00			
8. <i>Competition</i>	-0.02	0.06	-0.07	0.05	0.00	-0.03	0.04	1.00		
9. <i>Partner experience</i>	-0.19**	-0.10	0.03	-0.01	0.54***	0.36***	0.02	0.08	1.00	
10. <i>Firm size</i>	0.22***	0.03	-0.04	0.15*	0.02	0.14*	0.10	0.14*	0.00	1.00

\*\*\*, \*\*, \* Indicate significance at the 1, 5, and 10 percent levels (two-tailed), respectively.

n = 161.

Table 3, Panel A reports the estimates of *COMPMAI* on the three contracting dimensions. Contrary to H1, *COMPMAI* is not significantly related to *Issue inclusiveness*. The significant positive effect of *COMPMAI* on *Clause specificity* ( $p < 0.01$ ) does provide support for H2. Support is also found for H3, evidenced by the significant negative coefficient of *COMPMAI* on *Informal agreements* ( $p < 0.05$ ).<sup>22</sup>

Regarding the control variables, *Issue inclusiveness* increases with *Asset specificity* ( $p < 0.05$ ), which creates a need for contracting, and with *Firm size* ( $p < 0.10$ ). *Issue inclusiveness* and *Clause specificity* decrease with *Partner experience* ( $p < 0.01$  and  $p < 0.10$ , respectively), which through the development of trust and relational contracts can reduce the need for formal contracting (Cao and Lumineau 2015). The lack of significance of the other control variables on *Clause specificity* and *Informal agreements* suggests that these factors, which proxy for exchange hazards, relate primarily to issue inclusiveness (i.e., contract size), while firms' MAI affects the detail with which firms can write clauses as well as avoid informal agreements to supplement the contract.<sup>23</sup>

The conditional covariance estimates in Panel B show that after controlling for the independent variables, *Issue inclusiveness* and *Clause specificity* are positively related ( $p < 0.01$ ). These estimates are consistent with the idea that more inclusive contracts typically entail greater specificity and that these design dimensions are complements. Nevertheless, as potentially omitted variables (that are associated with both dimensions) can also be a source of correlation (e.g., Speklé and Widener 2018), we consider this interpretation as tentative. The insignificant covariances with *Informal agreements* suggests that use of informal agreements is primarily driven by the comprehensiveness of MAI that affects its contractibility and the consequent need to make such additional agreements.

### Additional Analyses

We conduct two additional analyses to provide a deeper understanding of our findings. First, we examine differences between new and existing suppliers, and particularly whether there are differences in how MAI relates to contract design for suppliers with which buyers have or do not have prior ties. Second, we extend the model by including dimensions of *ex ante* planning and information sharing with suppliers to explore the process through which MAI is implied in contract negotiations and design.

### The Effects of Prior Ties on Contract Design

The results reported in Table 3 indicate that buyers write less inclusive and less detailed contracts with suppliers with which they have prior ties. These findings are consistent with the broader literature on interfirm relationships that posits that the

<sup>22</sup> We also separated MAI into *Financial information* (i.e., cost information) and *Nonfinancial information* (i.e., quality and value engineering) to explore if these dimensions influence contract design differently. Results for these dimensions are similar, except that the negative effect of *Nonfinancial information* on *Informal agreements* is insignificant, indicating that in particular, financial information enables avoidance of additional informal agreements.

<sup>23</sup> *Transaction size* does not relate significantly to contract design, but correlates significantly with *Asset specificity* ( $r = 0.48$ ;  $p < 0.01$ ), indicating that the latter is more important for contract design than the financial value of transactions only. *Environmental variability* also shows no significant effects, but consistent with earlier studies on the influence of firms' external environment (Chenhall 2003) correlates positively with *COMPMAI* ( $r = 0.28$ ;  $p < 0.01$ ), suggesting that firms facing high variability have more comprehensive MAI, which facilitates interfirm contract design.

**TABLE 3**  
**The Influence of Management Accounting Information on Interfirm Contract Design**

**Panel A: Coefficient Estimates**

	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>
Constant	2.75*** (4.09)	2.38*** (3.70)	3.83*** (3.29)
<i>COMPMAI</i>	-0.01 (-0.12)	0.32*** (3.37)	-0.32** (-2.13)
<i>Transaction size</i>	0.05 (0.69)	-0.02 (-0.25)	-0.03 (-0.28)
<i>Asset specificity</i>	0.17** (2.07)	0.04 (0.61)	0.13 (1.23)
<i>Environmental variability</i>	-0.12 (-1.02)	-0.13 (-1.18)	-0.21 (-1.29)
<i>Competition</i>	-0.01 (-0.12)	0.05 (0.60)	-0.08 (-0.52)
<i>Partner experience</i>	-0.47*** (-4.34)	-0.14* (-1.65)	0.03 (0.28)
<i>Firm size</i>	0.21* (1.95)	-0.00 (-0.04)	0.06 (0.32)

**Panel B: Covariance Estimates**

	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>
<i>Clause specificity</i>	0.15*** (3.61)	—	—
<i>Informal agreements</i>	-0.04 (-0.64)	-0.00 (-0.05)	—
R <sup>2</sup>	0.19	0.24	0.12

\*\*\*, \*\*, \* Indicate significance at the 1, 5, and 10 percent levels (two-tailed), respectively.

n = 161.

Cell statistics are coefficient estimates and z-statistics based on clustered-robust standard errors, clustered by firm. Industry indicators are included in the model estimation, but are not reported for brevity.

development of trust and relational contracts, which emerge during prior ties, can reduce the need for formal contracting (Cao and Lumineau 2015). An additional possibility is that learning and relational dynamics result in different uses of MAI for setting up contracts with existing suppliers, as compared to new suppliers. To explore this possibility, we estimate the model separately for the subgroups with and without prior experience. Table 4 reports the results and shows that the influence of MAI is comparable across both types of relationships. Thus, while through the development of trust, learning, and relational contracts, experience can reduce the need for formal contracting, these findings indicate that the influence of MAI on contract design does not differ between relationships with and without prior experience. We note, however, that our measurement of experience (i.e., for groups of suppliers) does not allow more in-depth analyses that e.g., differentiate between types and length of experience, nor to assess its effects within specific relationships. The question of how experience influences the use of MAI in interfirm contracting and control could be addressed in more detail with more refined measures of partner experience at the level of specific relationships between buyers and suppliers.

**The Mediating Effects of Ex Ante Planning and Negotiation with Suppliers**

Prior research has found that the acquisition of supplier information facilitates the design of interfirm control structures. We obtain data on two types of information that can support contract design (cf. Dekker and Van den Abbeele 2010).

TABLE 4

## The Influence of Management Accounting Information on Interfirm Contract Design: New Suppliers versus Existing Suppliers

## Panel A: Coefficient Estimates

	Subsample with New Suppliers (n = 80)			Subsample with Existing Suppliers (n = 81)		
	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>
Constant	2.93*** (3.97)	2.46*** (3.29)	3.91*** (3.35)	1.52 (1.35)	1.96** (2.39)	3.65** (2.46)
COMPMAI	0.04 (0.44)	0.31*** (3.04)	-0.31** (-1.97)	-0.07 (-0.55)	0.32*** (3.38)	-0.33* (-1.95)
Transaction size	-0.00 (-0.04)	-0.07 (-0.86)	-0.04 (-0.28)	0.15 (1.20)	0.06 (0.66)	-0.03 (-0.20)
Asset specificity	0.16** (2.20)	0.05 (0.70)	0.13 (1.11)	0.28* (1.80)	0.05 (0.47)	0.16 (0.78)
Environmental variability	-0.23** (-1.98)	-0.12 (-1.01)	-0.23 (-1.28)	-0.03 (-0.19)	-0.13 (-1.33)	-0.18 (-1.00)
Competition	-0.02 (-0.26)	0.02 (0.24)	-0.15 (-0.99)	0.03 (0.22)	0.07 (0.78)	-0.00 (-0.03)
Firm size	0.24** (2.09)	0.01 (0.09)	0.10 (0.56)	0.16 (1.03)	-0.02 (-0.20)	0.01 (0.07)

## Panel B: Covariance Estimates

	Subsample with New Suppliers (n = 80)			Subsample with Existing Suppliers (n = 81)		
	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>
Clause specificity	0.20*** (4.20)	—	—	0.15*** (2.72)	—	—
Informal agreements	-0.04 (-0.56)	0.02 (0.30)	—	-0.04 (-0.41)	-0.02 (-0.30)	—
R <sup>2</sup>	0.20	0.13	0.14	0.13	0.16	0.10

\*\*\*, \*\*, \* Indicate significance at the 1, 5, and 10 percent levels (two-tailed), respectively.

Cell statistics are coefficient estimates and z-statistics. Industry indicators are included in the model estimations, but are not reported for brevity.

“Cooperation information” involves where and how firms expect to cooperate (e.g., methods and scenarios) and the goals they expect to achieve (e.g., regarding cost and quality). “Technology information” includes the compatibility of supplier technology with the firm’s needs, supplier processes, and technology development plans.<sup>24</sup> MAI thus can enable buyers during the negotiation stage to develop plans, goals, and agreements with suppliers about their cooperation and technologies to be employed or developed. It can also reduce information asymmetry (e.g., about cost or quality problems), allow verification of information provided by suppliers, and offer insights otherwise unavailable to both firms (e.g., about supply chain inefficiencies). The up-front planning and negotiation with suppliers that MAI facilitates could enable firms to develop more elaborate and specific agreements about partners’ rights and obligations, management of the cooperation, division of costs and benefits, dispute resolution, and termination. This could also reduce the use of informal agreements. Thus, we examine if the hypothesized effects are mediated by the *ex ante* exchange of the two types of information.

<sup>24</sup> Particularly, nonfinancial information (e.g., based on value engineering and quality analysis) can enable buyers to develop analyses and understanding of suppliers’ work methods, processes, and technology offerings, and to create technology development plans.

**TABLE 5**  
**The Influence of Management Accounting Information on *Ex Ante* Information Exchange and Interfirm Contract Design**

	Information Exchange		Contract Design		
	<i>Cooperation information</i>	<i>Technology information</i>	<i>Issue inclusiveness</i>	<i>Clause specificity</i>	<i>Informal agreements</i>
Direct Effect Estimates					
Constant	0.47 (0.76)	1.01 (1.50)	2.69*** (3.99)	2.29*** (3.77)	3.74 (3.17)
<i>COMPMAI</i>	0.37*** (4.37)	0.08 (1.04)	-0.09 (-0.81)	0.20** (2.15)	-0.33** (-2.10)
<i>Transaction size</i>	0.01 (0.10)	-0.02 (-0.26)	0.05 (0.65)	-0.02 (-0.33)	-0.03 (-0.27)
<i>Asset specificity</i>	0.13 (1.53)	0.12* (1.75)	0.15* (1.75)	0.01 (0.11)	0.11 (1.07)
<i>Environmental variability</i>	-0.03 (-0.33)	0.17* (1.64)	-0.11 (-0.91)	-0.11 (-0.97)	-0.23 (-1.34)
<i>Competition</i>	0.09 (1.06)	0.16* (1.91)	-0.03 (-0.27)	0.03 (0.45)	-0.10 (-0.62)
<i>Partner experience</i>	0.04 (0.44)	0.13 (1.62)	-0.48*** (-4.38)	-0.14* (-1.74)	0.02 (0.18)
<i>Firm size</i>	0.20* (1.84)	0.09 (1.00)	0.17 (1.60)	-0.07 (-0.52)	0.05 (0.25)
<i>Cooperation information</i>	—	—	0.23** (2.29)	0.35*** (3.41)	0.02 (0.12)
<i>Technology information</i>	—	—	-0.04 (-0.38)	-0.08 (-0.92)	0.08 (0.42)
Indirect Effect Estimates					
<i>COMPMAI</i>	—	—	0.08** (2.10)	0.12*** (2.74)	0.01 (0.23)
Covariance Estimates					
<i>Technology information</i>	0.13*** (2.99)	—	—	—	—
<i>Clause specificity</i>	—	—	0.15*** (3.61)	—	—
<i>Informal agreements</i>	—	—	-0.04 (-0.64)	-0.00 (-0.05)	—
R <sup>2</sup>	0.27	0.21	0.19	0.24	0.12

\*\*\*, \*\*, \* Indicate significance at the 1, 5, and 10 percent levels (two-tailed), respectively.

n = 161.

Cell statistics are coefficient estimates and z-statistics based on clustered-robust standard errors, clustered by firm. Indirect effects are calculated as the multiplication of the effects of *COMPMAI* on the mediator variables with the effects of the mediator variables on the dependent variable. Industry indicators are included in the estimation of both the information exchange and the contract design dimensions, but are not reported for brevity. In addition, the indirect effect estimates of the control variables are not reported, as the primary interest is in the indirect effect of *COMPMAI*.

We measure the information exchange dimensions with seven items based on Dekker and Van den Abbeele (2010).<sup>25</sup> In specifying the path model, we also retained the direct effects of MAI, as this may influence contract design in more ways than only through up-front planning with suppliers (e.g., through supporting unilateral specification of clauses). Table 5

<sup>25</sup> As we adapt the scale to a supply chain setting, we use ML exploratory factor analysis. This extracted two factors (66.0 percent of total variance explained). The first, *Cooperation information*, reflects *ex ante* information exchange between the firm and its suppliers about (1) reliability regarding goal achievement in terms of cost and quality, (2) scenarios for cooperation and its directions, and (3) expected cooperation methods ( $\alpha = 0.83$ ). The second, *Technology information*, reflects *ex ante* information exchange about (1) compatibility of the firm's needs and suppliers' technologies, (2) technology development plans, and (3) mutual dependencies between the firm and supplier ( $\alpha = 0.74$ ). One item (suppliers' likelihood to continue to supply activities in a similar way) loaded weakly and was discarded.



reports the results of the estimated path model and shows that *COMPMAI* relates positively to the exchange of *Cooperation information* ( $p < 0.01$ ) but not of *Technology information*. While *Technology information* is also unrelated to the contract dimensions, *Cooperation information* relates positively to *Issue inclusiveness* ( $p < 0.05$ ) and *Clause specificity* ( $p < 0.01$ ). The resulting significant indirect effects of *COMPMAI* on these dimensions ( $p < 0.05$  and  $p < 0.01$ ) confirm the idea that comprehensive MAI enables firms to write more inclusive and detailed contracts through up-front development of plans and agreements with the supplier about the cooperation. *COMPMAI* also has an additional direct positive effect on *Clause specificity* ( $p < 0.05$ ), indicative of partial mediation and of buyers' additional unilateral use of MAI to develop more detailed clauses. The indirect effect of *COMPMAI* on *Informal agreements* is not significant. Its negative significant direct effect on *Informal agreements* ( $p < 0.05$ ) suggests it is not through enhanced up-front planning and negotiation with suppliers that firms make less noncontractual agreements, but instead through the greater contractibility of comprehensive MAI itself.

## V. DISCUSSION, CONCLUSIONS, AND LIMITATIONS

We examine the idea that firms' internal MAI can provide benefits in the contractual governance of interfirm relationships. Prior studies show that firms' internal cost information can constrain or support collaborative initiatives such as interorganizational cost management. We extend this research by arguing that MAI also influences interfirm contract design by providing relevant information on which negotiations, planning, and contract agreements are based. Survey data about supply relationships from Japanese manufacturing firms support the expectation that comprehensive MAI enables firms to develop more inclusive and in particular more detailed contracts with suppliers that are less subject to additional informal agreements.

Our results also provide insight into the way in which firms use MAI to enhance contract completeness. Particularly, additional analyses show that comprehensive MAI supports up-front planning with suppliers during the negotiation phase, which in turn enables the design of more inclusive and detailed agreements. Thus, it appears that MAI helps buyers during contract negotiations to identify and specify a greater range of contract issues, and to enhance the specificity of agreements about how they will cooperate and what results they aim to achieve. Our estimates also show a direct effect of MAI on clause specificity, which indicates that besides supporting planning and negotiations, comprehensive MAI enables firms to unilaterally specify more detailed clauses, such as those related to pricing and performance targets. When supported by in-depth information about, e.g., cost behavior, these may be nonnegotiable standard clauses in "take or leave" contacts.

In sum, our study contributes to the literature on interfirm contracting by providing evidence on the contracting value of MAI. We show that more comprehensive MAI supports the design of more complete supplier contracts, and find in additional tests that this influence is mediated by the planning with suppliers of the exchange. This contribution should be viewed within the limitations of the study. First, our use of cross-sectional data limits the extent to which we can address potential concerns about causality and endogeneity by testing and ruling out alternative model specifications. For instance, while we posit that MAI enables contracting, the need for setting up—including planning and negotiating interfirm relations—may also induce firms to invest in better information. Although our results are unlikely to be driven by the information needs arising from a specific relationship (since we examine how firms' existing MAI affects their general contracting practices for the set of suppliers they source from), future research could more clearly separate between the MAI that was available before specific relations were initiated and the use of MAI to negotiate and set up those relations. This could also provide insight into the investments in and adjustments to the accounting information as a result of them.

Second, our focus on firms' general contracting approach toward their suppliers provides insight into "average behavior" and precludes examining how relationship-specific characteristics influence the use of MAI for contract design. For instance, relational dynamics, power differences, and supplier characteristics can affect contract design for specific relationships. Third, we relied on a key informant. While this approach is common in interfirm studies and fits our focus on buyer firms, it ignores the influence of suppliers. A key question is whether the contracting benefits that buyers derive from comprehensive MAI reduce when suppliers also have such information, or whether this enables firms to jointly identify better ways to cooperate.

Fourth, our measurement of MAI is limited to four types of information. A more comprehensive measurement could include more elements, as well as the way that firms use this information. Fifth, the generalizability of our findings is limited by our sampling of Japanese-listed manufacturing firms. The question remains if the role of MAI and interfirm contract design are different in smaller firms and across other industries and countries. Finally, we did not examine performance effects. The question whether more complete contracts also relate to superior supplier and relationship performance adds to the research agenda on how intrafirm management accounting supports interfirm control.

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## APPENDIX A

### Measurement Instruments

This appendix reports the measurement instruments as included in the survey. All items were measured on a Likert scale where respondents were asked to indicate the extent to which they agreed with the statement (1 = strongly disagree, and 5 = strongly agree). Survey items were measured for new and for existing suppliers, except for *COMPMAI* and *Environmental variability*, which were captured at the firm level, not differentiating between supplier type.

#### Dependent Variables

##### Issue Inclusiveness

- Items in the contract cover a wide range.
- The contract is composed of many articles and agreements.

**Clause Specificity**

- The contract includes detailed agreements concerning the rights and obligations of the supplier.
- The contract includes detailed agreements concerning the resolution of disputes with the supplier.
- The contract includes detailed agreements concerning termination of the cooperative relationship with the supplier.
- The contract includes detailed agreements concerning distribution of costs and deliverables.
- The contract includes detailed agreements to manage the cooperative relationship with the supplier.

**Informal Agreements**

- The contract is supplemented with informal agreements, such as communication between persons in charge.

**Independent Variable and Control Variables****Comprehensiveness of Management Accounting Information: COMPMAI**

- Actively develop cost tables (databases for cost estimates).
- Actively evaluate how cost levels of procured parts and materials financially influence our company.
- Actively collect and consolidate examples of VE (value engineering: analyzing functions of products and services).
- Actively evaluate how quality levels of procured parts and materials financially influence our company.

**Transaction Size**

- The transaction amount with each supplier is large.

**Asset Specificity**

- When a supplier stops delivery, our losses are large.
- When a supplier stops delivery, it is difficult to switch to other suppliers immediately.

**Environmental Variability**

- Our clients' need for products and services changes quickly.
- Technologies in our business field change quickly.
- Technologies in our business field soon become obsolete.
- Many ideas for new products and services are brought about through technological innovation in our business field.

**Competition**

- There are many suppliers that we can select as counterparties for transactions of parts and materials before starting the transactions.
- There are many suppliers that can deliver the same kinds of (interchangeable) parts and materials after starting the transactions.
- There are many suppliers that can deliver similar (interchangeable with some adjustments) parts and materials after starting the transactions.

**Additional Tests: Mediator Variables****Cooperation Information**

We share with suppliers:

- Information on reliability regarding goal achievement in terms of cost and quality.
- Information on scenarios for cooperation, and their directions.
- Information on expected cooperation methods.

**Technology Information**

We share with suppliers:

- Information on the compatibility of our company's needs and the supplier's technologies.
- Information on technology development plans.
- Information on the mutual dependence of our company and the supplier.

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