

## **Reconsidering network embeddedness: Effects on different forms of opportunism**

### **Abstract**

Whether a focal firm's network embeddedness is capable of curtailing its partner firm's opportunism is described as questionable in interfirm relationship literatures. Drawing on theories of business networks and opportunism governance, we examine the distinct effects of the focal firm's network embeddedness on its partner's strong and weak form opportunism. We argue that network embeddedness can curtail a partner's weak form opportunism but cannot deter strong form opportunism due to the substantial benefits obtained from breaking contractual terms and the network's lack of formal enforceability. Moreover, we draw from institutional theory to explore how network embeddedness, as an external informal institution, interacts with the formalization of the interfirm relationship and the focal firm's government relations. Survey data on 227 firms' interfirm relationship experience verify most of our hypotheses. Our findings provide implications regarding the role of network embeddedness and its synergistic effects with formalization and government relations in interfirm relationships.

**Keywords:** Network embeddedness, Opportunism, Formalization, Government relations

## 1. Introduction

Inhibiting partner opportunism in interfirm relationships has been a primary topic of interest in the literature of marketing channels and strategic alliances (Lumineau & Oliveira, 2020; Wang, Gu, & Dong, 2013). Because traditional governance approaches (e.g., contracts and relational norms) limit their theoretical focus to the dyad and have clear weaknesses (Cao & Lumineau, 2015; Sheng, Zhou, Li, & Guo, 2018), there has been a shift of attention to network embeddedness, which is defined as the extent to which a dyadic relationship is embedded in the broader network of firms and institutional entities (Dong, Zeng, & Su, 2019; Granovetter, 1985; Uzzi, 1997). Based on embeddedness theory, previous research suggests that a dense business network can promote knowledge transfers (Ghobadi & D'Ambra, 2012), value creation (Swaminathan & Moorman, 2009), and resource acquisition among network members (De Clercq, Thongpapanl, & Voronov, 2018), thus enhancing its members' risk avoidance capabilities (Thomaz & Swaminathan, 2015). Moreover, a firm with high network embeddedness can call on other network members to retaliate against a partner that has conducted opportunistic behaviors (Polidoro, Ahuja, & Mitchell, 2011; Tse, Wang, & Zhang, 2019). Considering the features of the business network, a question worth investigating is, can the focal firm proactively build up ties with its focal partner's partners to strengthen its network embeddedness as a strategy to inhibit its partner's opportunism? If so, what is the underlying mechanism behind this, and how are its effects influenced by other governance factors?

Previous research has drawn mixed conclusions on the effects of network embeddedness. Most of the literature views network embeddedness as social control that regulates network members' behavior to curb opportunism (e.g., Dong, Liu, Yu, & Zheng, 2015; Lin, Huang, Lin, & Hsu, 2012; Powell, 1990). The rapid flow of information in the network reduces the information asymmetry among members so that any member's

opportunistic behaviors will be quickly known by the whole network, which can potentially damage its business reputation and future profits (Dong et al., 2015; Wang et al., 2013). However, other studies posit that, due to uncertainty and its lack of formal authority, network-based governance does not always mitigate opportunism (Ahrne & Brunsson, 2011; Moretti & Zirpoli, 2016). We argue that the literature's mixed results are partly due to an insufficient classification of opportunism. Although all forms of opportunism are destructive to interfirm relationships (Williamson, 1985), opportunism's different manifestations may affect the effectiveness of governance mechanisms (Lumineau & Quélin, 2012). One widely accepted classification of opportunism is determining whether the behavior violates a formal contract (Luo, 2006; Wathne & Heide, 2000). For example, Luo (2006) defines strong form opportunism as a violation of contractual terms that is more detectable, and weak form opportunism is a violation of relational norms that is subtler. However, previous research has failed to uncover whether the effectiveness of network embeddedness in curbing partner opportunism will vary regarding the type of opportunism the partner commits. We argue that the differentiation of the two types of opportunism provides us with an opportunity to reconcile mixed findings in the extant literature of network embeddedness.

Moreover, although network embeddedness represents external network-based governance, its effects can also hinge on how internal contract-based governance is deployed within the dyad and how other types of external ties have been developed by the focal firm. According to institutional theory, a firm's behaviors are regulated by a bundle of institutions from internal and external environments (DiMaggio & Powell, 1983; Scott, 1995). The effectiveness of network embeddedness as an external informal institution generated from the values and norms shared among business network members can be influenced by other formal and informal institutions the firm faces. Specifically, in emerging markets where great importance is attached to interpersonal relationships and government power, prior studies on

network embeddedness suggest that the focal dyad's internal contractual arrangement and external political environment should be considered simultaneously (Dong et al., 2019; Sheng et al., 2018). How will these institutional factors influence the governance effectiveness of network embeddedness on partner opportunism? In this study, we draw from institutional theory to integrate formalization, a manifestation of a firm's internal formal institution (Walter, Walter, & Müller, 2015), and government relations, which act as a firm's external informal institution (Sheng, Zhou, & Li, 2011), to examine whether they moderate the network embeddedness–partner opportunism relationship.

Overall, this study examines the effectiveness of network embeddedness on different forms of opportunism and its interactions with formalization and government relations. By employing survey data from 227 firms in China, we make three contributions to the extant literature. First, by differentiating strong vs. weak form opportunism, we contribute to the academic debate about the nuanced governance effect of network embeddedness. We provide empirical evidence to support the use of network embeddedness to control weak form opportunism and, at the same time, show its inability to control strong form opportunism. Second, by investigating the interactive effect between network embeddedness and formalization, our study affirms their complementary role in curbing strong form opportunism. Third, our results show that network embeddedness and government relations complement each other in curtailing partner's both forms of opportunism, which extends our understanding of the role of government in emerging markets.

## **2. Literature review and conceptual development**

### ***2.1. Opportunism***

Opportunism, defined as “self-interest seeking with guile”, can manifest as “lying, stealing, deception, misleading, distorting, and confusing” (Williamson, 1985, p. 47). In the interfirm relationship literature, most of the research on opportunism follows Williamson's

definition to investigate how partner opportunism jeopardizes interfirm relationships. Scholars have also realized the classification of opportunism according to these different manifestations, such as active form and passive form (Wathne & Heide, 2000), and strong form and weak form (Luo, 2006). Although differently named, the above classifications have similar logic in their natures; that is, opportunism can be classified as the destruction of contractual terms and a violation of cooperation ethics, and both forms will hurt the stabilization of the interfirm relationship and even lead to cooperation dissolution (Chai, Clauss, & Tangpong, 2019; Lumineau & Quélin, 2012; Polidoro et al., 2011). This study follows Luo's (2006) terminology to investigate partners' strong form and weak form opportunism. Strong form opportunism consists of actions that directly violate contractual terms and supplemental clauses, while weak form opportunism refers to negatively avoiding responsibilities and refusing to adjust according to cooperation requirements that are not spelled out in the formal contract (Luo, 2006; Wathnes & Heide, 2000).

To control partner opportunism in interfirm relationships, a large body of research investigates the governance mechanisms on opportunism, which mainly include contractual governance (Aulakh & Gençtürk, 2008; Carson & Ghosh, 2019) and relational governance (Faems, Janssens, Madhok, & Looy, 2008; Zhou, Zhang, Shen, & Zhou, 2020). Although previous research provides insightful implications for controlling opportunism in interfirm relationships, they mostly focus on strong form opportunism, leaving the governance of weak form opportunism mostly unaddressed. Compared to strong form opportunism, which is more observable and easier to correct using contractual terms (Luo, 2006), weak form opportunism is more challenging to detect and punish because it violates the unwritten rules involving shared values, trust, sympathy, and reciprocity (Lumineau & Quélin, 2012; Luo, Liu, Yang, Maksimov, & Hou, 2015). Some research has suggested that weak form opportunism needs to be tolerated in interfirm relationships because the strict control of weak form opportunism

may negatively affect interfirm cooperation (Chowdhury, Gruber, & Zolkiewski, 2016). However, weak form opportunism does not equal minimal damage. In contrast, it can also cause severe damage to cooperation performance (Luo, 2006), leading to persistent calls for more research efforts to investigate the different forms of opportunism (Lumineau & Oliveira, 2020; Lumineau & Quélin, 2012). To respond to this call, in this study, we incorporate both strong and weak form opportunism into a conceptual model to explore their governance mechanisms.

## ***2.2. Network embeddedness as a governance mechanism of opportunism***

As stated above, previous research on contractual governance and relational governance is limited to the control of strong form opportunism at a dyadic level (Aulakh & Gençtürk, 2008; Faems et al., 2008; Zhou et al., 2020). The embeddedness theory suggests that a firm is embedded in business networks that consist of other relevant business participants (Uzzi, 1997). Network members frequently interact with one another. As a result, the network not only provides industry-related information and knowledge to its members (De Clercq et al., 2018), but also influences their behaviors (Gu & Lu, 2014). To better understand the firms' behaviors in a dyad, it is necessary to assess such behaviors at the network level and incorporate the impact of the external relationship network (Granovetter, 1985; Uzzi, 1997). In the existing literature on interfirm relationships, researchers have investigated network embeddedness, which reflects connections through which members in the network influence each other, as a governance mechanism to inhibit partner opportunism (e.g., Dong et al., 2015; El Akremi, Mignonac, & Perrigot, 2011; Liu, Liu, & Li, 2014; Wang et al., 2013; see Table 1 for a review of studies on network embeddedness and opportunism).

Insert Table 1 about here

In this study, we follow Liu et al. (2014) to focus on the business network that consists of the focal firm, its focal partner, and one or more partners of the focal partner, such as the

common suppliers, distributors, customers, financial agencies, and other common third parties shared by the focal firm and its focal partner (Liu et al., 2014; see Figure 1). As Figure 1 illustrates, a firm with a high level of network embeddedness has more relationships with its partner's partners (see A, B, C, and D in Figure 1); hence, it is easier to spread information about its partner's behavior than firms with a low level of network embeddedness. We take the perspective of relational embeddedness, which emphasizes reciprocity, trust, and commitment among network members, instead of the structural embeddedness perspective, which concerns network scale and position (Granovetter, 1985; Moran, 2005; Rowley, Behrens, & Krackhardt, 2000). This is because the relational embeddedness perspective aligns with our objective to examine whether and how common third parties in the network can affect the dyadic relationship between the focal firm and its partner in general, and the partner's opportunism in particular (Liu et al., 2014).

Insert Figure 1 about here

Most of the previous research (see Table 1) indicates that network embeddedness helps curtail partner opportunism for two reasons. First, intensive network relationships among network members promote effective communication, align values, and reduce collaborative frictions, which enhance competitive resilience to external risks (De Clercq et al., 2018; Retzer, Yoong, & Hooper, 2012). The dyadic relationship between the focal firm and the partner is affected by the shared values and relational norms built up in the network with common third parties (Morgan, Anokhin, & Wincent, 2016; Rowley et al., 2000). To gain advantages from the network and for the sake of long-term interest, firms are motivated to follow acquiescent cooperation rules of the network and refrain from opportunism (Lin et al., 2012; Liu et al., 2014).

Second, prior research shows that, although network members are not directly hurt by a partner firm's opportunistic behavior, they tend to punish the firm's opportunism out of a

sense of justice (Doorn & Brouwers, 2017; Fehr & Fischbacher, 2004). In fact, information concerning a firm's opportunistic behavior can be easily disseminated within a dense network, harming the firm's reputation and future collaboration opportunities (Polidoro et al., 2011). Hence, it is widely expected that, when a focal firm's network embeddedness is high, its partners' opportunism will be effectively reduced by the network-level social sanctioning (Dong et al., 2015; Liu et al., 2014; Wang et al., 2013).

Despite these critical insights, the previous literature did not differentiate strong vs. weak form opportunism or investigate the potentially differential impacts of network embeddedness on the two forms of partner opportunism. In this study, we argue that because the two forms of opportunism arise from different motivations (Luo, 2006), the effectiveness of using a close and dense network to govern them will significantly differ. In particular, we posit that the focal firm's network embeddedness can suppress its partner's weak form opportunism for the following reasons. First, the focal firm's high network embeddedness signals its strong influence on other network members' attitudes and behaviors (Wang et al., 2013). The information the focal firm spreads, such as its evaluation of its partner's behavior, is credible and spreads quickly among network members (Tse et al., 2019). Although a partner's weak form opportunism can be subtle, less observable, and difficult to judge by other network members, because of the focal firm's high credibility and influence, it can still spread the information quickly, make other network members believe, and gain their sympathy and support (Trada & Goyal, 2020). Hence, the focal firm can evoke network members' third-party punishment against the partner, such as repulsion and refusal to cooperate, causing substantial loss to the partner (Dong et al., 2019).

Second, because the partner's weak form opportunism breaks relational norms but not the most critical core interests as stipulated in the contract (Luo, 2006), therefore, even if the partner's weak form opportunism is corrected, it only returns to the original cooperation

track, such as treating the focal firm fairly and honestly according to the shared network values (Liu et al., 2014). These actions do not impose significant costs on the partner but can win back its reputation among network members, which results in potential future benefits (Chowdhury et al., 2016). Therefore, from the partner firm's perspective, it is more likely to comply and refrain from weak form opportunism, given the network pressure.

In contrast, we argue that the focal firm's network embeddedness has no significant effect on its partner's strong form opportunism. First, strong form opportunism breaks the most critical conditions to acquiring substantial benefits (Um & Kim, 2019). In other words, the profits obtained by destroying contractual terms (i.e., strong form opportunism) tend to be far more substantial than those obtained by passively evading responsibilities left unspecified in the contract (i.e., weak form opportunism). Although the focal firm can still spread information about the partner's behavior to network members, the reputational threats and third-party punishment tend to be uncertain and may not outweigh the benefits of committing to strong form opportunism. Second, because the business network that links the focal dyad and their common partners is informal, third-party punishment based on network embeddedness lacks formal authority (Abraham, 2009), and hence cannot enforce contracts (Ahrne & Brunsson, 2011; Moretti & Zirpoli, 2016). If the partner only bears reputational loss without incurring substantial legal costs, it is difficult for the focal firm to stop its partner's strong form opportunism. Thus, from a benefit-cost calculation, due to the substantial profits associated with strong form opportunism and the lack of legal power of network embeddedness, we expect that it cannot effectively curtail strong form opportunism. Taken together, we posit the following:

***H1: A focal firm's network embeddedness has no significant effect on its partner's strong form opportunism.***

***H2: A focal firm's network embeddedness negatively influences its partner's weak form***

*opportunism.*

### ***2.3. The interaction effects on opportunism***

According to institutional theory, firms are constrained by multiple institutions, including formal institutions (e.g., laws and regulations) and informal institutions (e.g., social customs, ethics, cultures, and economic and political conditions) (DiMaggio & Powell, 1983; Scott, 1995). From this institutional perspective, the focal firm's network embeddedness is an external informal institution built upon business network members' shared values and norms (Melo Brito, 2001; Peng, 2003). As the dyad of the focal firm and its partner are regulated by a group of institutional environments (Sheng et al., 2018), the effectiveness of network embeddedness is also likely to vary according to other formal and informal institutions faced by the firm and the dyad.

At the dyadic level, previous researchers have considered contractual governance a primary formal institutional arrangement (Carson & Ghosh, 2019; Zhou & Poppo, 2010). In our context, we define formalization as the extent to which the focal firm executes contractual terms to govern its relationship with the partner (Walter et al., 2015). For the external institutional environment, pressure from both business networks and government relations shapes firms' behaviors (Achrol, Reve, & Stern, 1983; DiMaggio & Powell, 1983; Dong et al., 2019). In our study, we consider government relations, which refers to relationships between the focal firm's top managers and government officials (Sheng et al., 2011). By integrating these two institutional moderators, we provide a more holistic assessment of the effects of network embeddedness on partner opportunism.

#### ***2.3.1. Interaction between network embeddedness and formalization***

As a representation of a firm's internal institutions, formalization refers to the extent to which the focal firm/partner dyad is coordinated and controlled by detailed contractual terms (Walter et al., 2015). Highly formalized cooperation requires both firms to be respectful of

contractual terms and behave according to established standard procedures (Antia & Frazier, 2001). Formalization acts as an enabler to promote reciprocity and mutual understanding in interfirm relationships and as a controller to deter partner opportunism (Vlaar, Van den Bosch, & Volberda, 2006). Previous research has mainly investigated how formalization interacts with internal informal institutions, such as relational governance within the dyad (Walter et al., 2015; Zhou & Xu, 2012). However, because interfirm relationships are also affected by the external institutional environment, and, in response to scholars' call for further investigation of mixed opportunism governance modes (Rindfleisch, Antia, Bercovitz, et al., 2010), it is worth investigating how network embeddedness (an external informal institution) and formalization (an internal formal institution) interact with one another to control partner opportunism.

As mentioned, network embeddedness is insufficient for curtailing the partner's strong form opportunism due to the potential greater profits obtained by breaking contractual terms and the network's lack of formal enforceability (Ahrne & Brunsson, 2011; Moretti & Zirpoli, 2016). However, when the focal firm has high levels of both network embeddedness and formalization, the monitoring procedures and legal enforcement legitimized by the formalization can compensate for the limitations of network embeddedness (Vlaar et al., 2006). The combination of formal punishment and third-party social punishment generated by network members causes the costs of strong form opportunism to exceed the potential gains, thus decreasing the partner's motivation to do it. Therefore, we argue that the interaction between network embeddedness and formalization negatively influences the partner's strong form opportunism.

Conversely, the interaction between network embeddedness and formalization does not significantly influence the partner's weak form opportunism. Despite the damage to cooperative performance, weak form opportunism does not violate contractual terms (Luo,

2006). Contractual terms, which are the basis of formalization (Lumineau & Quélin, 2012), cannot curb weak form opportunism, even when used in combination with network embeddedness. That is, firms with strong network embeddedness are unlikely to utilize formal procedures to coordinate with their partners and control their weak form opportunism. Therefore, the combination of network embeddedness and formalization is not conducive to controlling the partner's weak form opportunism.

*H3: The interaction between network embeddedness and formalization (a) negatively influences a partner's strong form opportunism (b) but has no significant effect on a partner's weak form opportunism.*

### **2.3.2. Interaction between network embeddedness and government relations**

Government relations not only provide firms with resources as a kind of social capital, but also regulate firms' behaviors as an external informal institution, especially in emerging markets where the legal environment is not sound (Sheng et al., 2018; Zeng, Chi, Dong, & Huang, 2017). Strong government relations can provide a firm with preferential access to important information such as land, taxes, and bank loans (Shou, Zheng, & Zhou, 2016; Zhou & Xu, 2012), and also serve as political support to guide a firm in handling legal affairs with its partners efficiently and taking a favorable legal position in markets where the legal system is incomplete (Ang & Jia, 2014; Shou et al., 2016). Although previous research has extensively investigated the impact of government relations on firm performance and innovation (Sheng et al., 2011; Wang, Zhang, & Shou, 2019), few studies appear to have examined whether government relations can function as an informal institution to influence interfirm relationships (for an exception, see Su et al., 2009).

In this paper, we argue that the interaction between network embeddedness and government relations will negatively influence the partner's strong form opportunism. As mentioned above, network embeddedness has no significant effect on the partner's strong

form opportunism due to its lack of formal enforcement (Ahrne & Brunsson, 2011; Moretti & Zirpoli, 2016). In contrast, the consensus in the emerging marketing literature is that a firm with strong government relations enjoys not only advantageous access to resources and opportunities (Sheng et al., 2011; Wang et al., 2019) but also robust political backing, making it easier to obtain legal help and succeed in legal disputes (Ang & Jia, 2014). When the partner engages in strong form opportunism that violates the contractual terms and damages the focal firm's core profits, it may pay a hefty legal price for its opportunistic behaviors because of the focal firm's strong ties with government bodies. Although government relations are not formal legal institutions and cannot directly punish opportunistic behavior, they may help the focal firm exert an equivalent or even more significant deterrence effect, hence compensating for network embeddedness's lack of formal enforcement (Sheng et al., 2011).

We further argue that government relations also strengthen the effectiveness of network embeddedness on the partner's weak form opportunism. First, compared to formalization that only protects the contractual benefits within the dyad, the focal firm's government relations not only provide a broader range of benefits to the focal firm, but also mean an attractive cooperative derivative for its partner (Sheng et al., 2011; Wang et al., 2019; Zeng et al., 2017). The partner is motivated to maintain good relationships with firms with access to resources based on both network embeddedness and government relations (Dong et al., 2019; Sun, Mellahi, & Thun, 2010). Second, when the focal firm's network embeddedness and government relations are both high, the firm can spread information concerning the partner's opportunistic behaviors to both business network members and government officials. This leads to more severe damage to the partner's reputation in both business and political circles and generates greater threats to the partner's future business opportunities (Dong et al., 2019). Therefore, the combination of network embeddedness in the business network and

government relations can more efficiently reduce the partner's motivation and ability to engage in any form of opportunism.

*H4: The interaction between network embeddedness and government relations negatively influences a partner's (a) strong form and (b) weak form opportunism.*

Insert Figure 2 about here

### **3. Methods**

#### ***3.1. Sample and data collection***

Data used in this study were extracted from a large questionnaire data collection project, covering various topics, including knowledge protection and cocreation, governance strategy, business environments, business network, and government relations. The data collection team consisted of eight faculty members, doctoral students, and research assistants. Two authors from this study participated in the process of data collection.

We designed questionnaires based on the literature relevant to this study. We developed an English version questionnaire and translated it into Chinese. Then two independent translators translated the Chinese version questionnaire back into English to ensure validity. We then conducted a pilot study involving 20 firm managers in Shaanxi province and revised several questionnaire items based on their feedback.

We gained access to a firm directory with the contact information of top managers from local governments, an approach frequently used in previous studies in China (Li, Xie, Teo, & Peng, 2010; Shu, Zhou, Xiao, & Gao, 2016; Wei, Shen, Zhou, & Li, 2017). We randomly selected 500 firms from the above-mentioned directory. The sample firms were mainly from the manufacturing industries, including machinery manufacturing, electronic communication, and metal and nonmetal production, and they were located in four representative economic zones (i.e., Bo Hai Coastal Region, Yangtze River Delta, Pearl River Delta, and the central and western region) that represent the diverse geographic, economic, and demographic

conditions of subregions in China.

We adopted the key-informant approach and invited top managers from the directory to participate in our research. We emailed all 500 names and received back 317 replies of confirmation.

For the primary data collection, the research team paid visits to the 317 top managers who agreed to participate in our research project and collected questionnaire responses on-site from July 2016 to December 2016. During the face-to-face meetings, the research team firstly explained the academic purpose of the research and promised confidentiality and a project report after completing the project. The research team then provided the questionnaire to the informants and answered any clarification questions to ensure that participants correctly understood the questionnaire. A few minutes after they started to work on the questionnaire, the research team left the meeting room to provide sufficient autonomy and avoid potential social desirability bias (Li et al., 2010; Wei et al., 2017). Overall, 90 firms dropped out of the study because of respondent unavailability, insufficient knowledge, or excessive missing data. The final sample consisted of 227 complete responses, for a response rate of 45.4% (out of 500). Table 2 provides a detailed description of the sample. We tested for nonresponse bias by comparing the responding and nonresponding firms in terms of firm age, firm size, geography, and industry. Independent sample *t*-test results showed that all *p*-values were greater than 0.1, indicating no significant difference across these characteristics and that nonresponse bias is not a concern in our sample.

Our respondents held titles including CEO/general manager (30.9%), deputy general manager (33.2%), sales manager/purchasing director (26.9%), and others (9%). On average, they had 8.8 years of industry experience and 5.9 years of company tenure. On average, their working relationships with the key interfirm partners spanned 4.8 years. These statistics indicate that our respondents were knowledgeable and familiar with the interfirm

relationships of their firms.

Insert Table 2 about here

### **3.2. Measures**

We asked the key informants from each firm to evaluate their relationships with a main channel partner (a supplier or distributor), as well as the institutional and market environments. The items used in the questionnaire are measured on 5-point Likert scales (1 = “strongly disagree” and 5 = “strongly agree”), unless otherwise specified (see Table 3).

Insert Table 3 about here

*Network embeddedness* is a three-item scale adapted from Liu et al. (2014). Sample items include “we have business cooperation with one or more partners of this partner” and “we have a very close relationship with one or more partners of this partner.” The Cronbach’s  $\alpha$  is 0.916, and the factor loadings range from 0.833 to 0.967.

We adapted *Partner’s strong form opportunism* and *Partner’s weak form opportunism* from Liu et al. (2014) and Luo (2006, 2015). *Partner’s strong form opportunism* is a three-item scale that includes “partner fails to perform its duties and obligations as required by the contract,” “partners do not invest resources such as technology, capital, and manpower as required by the contract” and “partner invades the wealth and resources we create together without consent.” The Cronbach’s  $\alpha$  is 0.870, and the factor loadings range from 0.653 to 0.945. *Partner’s weak form opportunism* has three items, such as “partner stands by unconcerned when we are suffering.” The Cronbach’s  $\alpha$  is 0.850, and the factor loadings range from 0.719 to 0.904.

*Formalization* is a three-item scale adapted from Walter et al. (2015). Sample items include “the processes of the cooperation are explicitly written down,” and “the responsibilities of the partners in the cooperation are explicitly written down.” The Cronbach’s  $\alpha$  reaches 0.798, and the factor loadings range from 0.657 to 0.862.

We adapted the measure of *Government relations* from Sheng et al. (2011). Three items include “government departments often seek our firm’s opinions on government policies,” “top managers of our firm often invite key government leaders to participate in our important events successfully,” and “our firm has spent substantial resources in building relationships with government officials.” The Cronbach’s  $\alpha$  reaches 0.766, and the factor loadings range from 0.600 to 0.961.

We included several control variables that frequently appear in previous research on opportunism. We controlled the *legal environment* because legal institutions affect a firm’s motivation for opportunism. We operationalized it using the sub-indices of the development of the legal environment and market intermediaries in *Marketization index of China’s provinces: NERI report 2018* (2019). We also controlled the *competitive intensity* of the business environment as it will affect how firms collaborate (Auh & Menguc, 2005). *Relationship length* was controlled, using the logarithm of the number of cooperation years between the focal firm and its partner. We measured *firm size* based on the focal firm’s number of employees. Moreover, we controlled for the effects of the focal firm’s *legal capability*, adapted from Zhou and Poppo (2010), its *relationship management ability*, adapted from Schreiner et al. (2009), and its *firm performance*, adapted from Zhou et al. (2005), because these abilities are likely to influence its partner’s opportunism. Finally, to mitigate the effect of industry variance, we controlled three main industries in the model.

### **3.3. Measurement model**

We summarized the constructs, measurement items, and model statistics in Table 3. As shown in Table 3, the Cronbach’s  $\alpha$  values of all variables were greater than 0.7, indicating that the study’s measurement had good reliability. We submitted all the constructs to confirmatory factor analysis (CFA) to evaluate the measures’ validity. We restricted each item’s loading to its priori factor and allowed all factors to correlate with one another. The fit

indices of the measurement model were satisfactory (Chi-square<sub>(306)</sub> = 458.754,  $p < 0.001$ , comparative fit index (CFI) = 0.952, incremental fit index (IFI) = 0.953, and root mean square error of approximation (RMSEA) = 0.047). All standardized factor loadings were significant ( $p < 0.001$ ), indicating that the model had good convergent validity. All the composite reliability (CR) values were greater than 0.70, and the average variances extracted (AVE) were greater than 0.5, again supporting the convergent validity (Bagozzi, Yi, & Phillips, 1991; Fornell & Larcker, 1981).

We used two approaches to assess the discriminant validity of the measures. First, we calculated the shared variance between all possible pairs of constructs. The variances were lower than the AVE for any individual construct (ranging from 0.515 to 0.798). For example, the highest shared variance between network embeddedness and any other construct is 0.330, which is lower than the AVE of network embeddedness (0.798), demonstrating good discriminant validity of this construct. Second, we ran pairwise chi-square difference tests for all multi-item scales to determine whether the restricted model (correlation fixed at 1.0) and the freely estimated model differed significantly. For example, in testing government relations and legal capability, which shared the highest correlation among all pairs (0.473), the chi-square difference test between the two models ( $\Delta\chi^2(1) = 135.751$ ,  $p < 0.001$ ) was significant. All the pairwise model comparisons resulted in significant differences, indicating good discriminant validity of the constructs. Table 4 provides descriptive statistics and correlations among all the variables.

Insert Table 4 about here

### **3.4. Common method bias**

Because our data were from the focal firm's side, we used two methods to check for potential common method bias. First, we followed Harmon's one-factor method to put all items into factor analysis and extracted eight factors. These factors accounted for 72.30% of

the total variance (larger than the threshold of 50%). The first among them only explained 11.53% (far less than the threshold of 40%), indicating no significant common method bias in our study (Podsakoff & Organ, 1986). Second, a marker variable (MV) was introduced into the model to test for the potential common method bias, following Lindell and Whitney (2011). Theoretically, the MV should not correlate to at least one variable in the regression model, and the nonnegative correlation coefficient should be as small as possible. We selected *green production* (Shu et al., 2016) as the MV; its minimum nonnegative correlation coefficient with other variables was 0.003. We used 0.003 to adjust the correlation coefficients between *green production* and other variables, and no correlation coefficient changed from significant to insignificant (see Table 4). Therefore, no common method bias problem was detected in this study.

## **4. Analysis and Results**

### **4.1. Regression analysis**

The hypotheses were tested via a hierarchical regression (see Table 5). The interaction terms in the model were all mean-centered, and all the variance inflation factors (VIFs) were lower than the threshold of 10. In Table 5, M1 tested the main effect of network embeddedness on a partner's strong form opportunism, the interaction effects between network embeddedness and formalization, and the interaction effects between network embeddedness and government relations. Meanwhile, M2 tested how network embeddedness influences a partner's weak form opportunism and its interaction effects with formalization and government relations, respectively.

#### **4.1.1. Main effects**

In H1 and H2, we proposed that network embeddedness has a null effect on a partner's strong form opportunism while it negatively influences a partner's weak form opportunism. As shown in M1 and M2, network embeddedness has no significant relationship with the

partner's strong form opportunism ( $\beta = 0.059, p > 0.05$ ), supporting H1. Network embeddedness has a significantly negative relationship with the partner's weak form opportunism ( $\beta = -0.106, p < 0.05$ ), thus supporting H2.

#### ***4.1.2. Moderating effects***

In H3a and H3b, we proposed the effects of interaction between network embeddedness and formalization on a partner's both forms of opportunism. As shown in Table 5, the interaction between network embeddedness and formalization negatively influences the partner's strong form opportunism ( $\beta = -0.103, p < 0.05$ ), but it has no significant influence on the partner's weak form opportunism ( $\beta = -0.032, p > 0.05$ ), supporting H3a and H3b.

H4a and H4b proposed the moderating effects of government relations. The interaction between network embeddedness and government relations negatively influences the partner's both forms of opportunism ( $\beta = -0.114, p < 0.05$ ;  $\beta = -0.077, p < 0.05$ ), supporting H4a and H4b.

Insert Table 5 about here

We plotted the moderating effects in Figure 3, Panels A–D, to further illustrate our results (Aiken & West, 1991). Figure 3, Panel A, shows that the effect of network embeddedness on the partner's strong form opportunism is more negative when formalization is high ( $b = -0.591, p = 0.006$ ) than when it is low ( $b = -0.125, p = 0.105$ ), supporting H3a. In Figure 3, Panel B, the negative relationship between network embeddedness and a partner's weak form opportunism is significant when formalization is low ( $b = -0.149, p = 0.016$ ), but it turns insignificant when the factor is high ( $b = -0.266, p = 0.107$ ), which supports H3b.

As shown in Figure 3, Panel C, the negative relationship between network embeddedness and a partner's strong form opportunism is stronger when government relations are high ( $b = -0.679, p = 0.011$ ) than low ( $b = -0.115, p = 0.139$ ), which supports

H4a. In Figure 3, Panel D, the network embeddedness exerts a stronger negative effect on a partner's weak form opportunism at a high level ( $b = -0.491, p = 0.003$ ) of government relations than it does at a low level ( $b = -0.183, p = 0.001$ ), supporting H4b.

Insert Figure 3 about here

#### **4.2. Robustness test**

In our model, *government relations, relationship length, firm size, relationship management capability, firm performance, and competitive intensity* theoretically influence *network embeddedness* directly. A firm's relationship management capability cannot only influence its partner's motivation and capability to conduct opportunism, but it also influences the firm's own capability to build up ties with other members in the business network (Schreiner et al., 2009). A firm with strong government relations and good firm performance is more able to attract network members because of its resource and information advantages, thus increasing its network embeddedness (Dong et al., 2019). The competitive intensity of the external marketplace can influence how these network members interact with one another (Jiang, Cannella, Xia, & Semadeni, 2017). Moreover, the relationship length also affects focal firms' opportunities to establish contact with its partner's partners. Finally, a larger firm tends to be more attractive in a network than smaller firms. Therefore, to correct the potential endogeneity of network embeddedness and verify the robustness of our results, we supplemented the results with a two-step least squares analysis (Hamilton & Nickerson, 2003; Zhang, Bai, & Gu, 2018).

In Step 1, we regressed *government relations, relationship length, firm size, relationship management capability, firm performance, and competitive intensity* against *network embeddedness* to obtain the residual. The results in Table 6 show that *government relations* ( $\beta = -0.110, p < 0.1$ ), *relationship management capability* ( $\beta = 0.562, p < 0.001$ ), and *firm size* ( $\beta = 0.097, p < 0.01$ ) were significantly related to *network embeddedness*, supporting the use of

the two-step least squares analysis to correct for potential endogeneity problems. In Step 2, we used the residual as the independent variable to test the conceptual model again (see Table 7). The results are consistent with those in Table 5, indicating the robustness of our framework.

Insert Tables 6 and 7 about here

## **5. Discussion**

Recent research on opportunism governance has shifted attention to the effectiveness of network embeddedness but rarely investigated whether network embeddedness has different influences on partners' strong and weak form opportunism and how the effects vary due to contextual factors (Dong et al., 2015; Lin et al., 2012). Using questionnaire survey data from 227 firms with interfirm relationship experience in China, in this study, we reveal that a focal firm's network embeddedness negatively influences its partner's weak form opportunism but has no significant effect on the partner's strong form opportunism, indicating network embeddedness's limited capacity to curtail opportunism in interfirm relationships. Moreover, we find that the effectiveness of the focal firm's network embeddedness is contingent on the focal firm's formalization and government relations.

### ***5.1. Theoretical implications***

This study offers three theoretical contributions to the literature. First, we enrich research on the relationship between network embeddedness and opportunism governance by illustrating the feasibility of using an external business network to curtail a partner's weak form opportunism and showing its limited capacity to control strong form opportunism. Predominantly based on the core view of embeddedness theory, previous research mainly provides empirical insights that network embeddedness can act as an informal institution to provide resources and risk-deterrence advantages to network members (Brass, Galaskiewicz, Greve, & Tsai, 2004; De Clercq et al., 2018). Additionally, common third parties can help

control partner opportunism and stabilize the interfirm relationship (Dong et al., 2015; Polidoro et al., 2011). However, because strong and weak form opportunism have different features, it is necessary to reconsider the effectiveness of network embeddedness on both forms of partner opportunism (Liu et al., 2014). In this study, we extend previous research by showing that, although network embeddedness can impose third-party punishment and reputational threats to deter weak form opportunism (El Akremi et al., 2011; Lin et al., 2012), it may not work on strong form opportunism because of the substantial benefits a partner can obtain through breaking contractual terms and the network's lack of formal enforcement (Ahrne & Brunsson, 2011; Moretti & Zirpoli, 2016). In doing so, we provide a more nuanced understanding of the relationship between network embeddedness and different forms of opportunism, thereby reconciling the mixed research findings and enriching them.

Second, we provide empirical evidence on how network embeddedness and formalization within the dyad, as a firm's external informal institution and internal formal institution, interact on opportunism governance. Previous research has thus far focused on the interaction between contractual governance (a formal institution) and relational governance (an informal institution) from a dyadic perspective and regarded them as complementary or substitutes (Cao & Lumineau, 2015; Poppo & Zenger, 2002). However, considering that interfirm relationships do not constitute dyads operating in a vacuum but instead are regulated by a bundle of institutions from the internal and external environments (Sheng et al., 2018), we draw from embeddedness theory and institutional theory to extend the analysis of the interaction between formal institutions and informal institutions to the network level. Our findings show that the focal firm's network embeddedness and formalization generate a negative influence on the partner's strong form opportunism but have no significant impact on the partner's weak form opportunism. The findings also echo the call for further investigation into mixed opportunism governance modes (Rindfleisch et al., 2010) and enrich

the literature on institutional theory by providing a new understanding of whether formal and informal institutions are complements or substitutes at the network level.

Third, this study reveals how a firm's two external informal institutions interact in controlling partner opportunism by showing that the focal firm's network embeddedness and government relations complement each other in curtailing both its partner's strong and weak form opportunism. Most of the previous research confines the roles of government relations to facilitating innovation and providing financial advantages to the firm (Sheng et al., 2011; Sun et al., 2010; Wang et al., 2019), and some studies investigate how the formal support or intervention of government as a common shared formal institution influences interfirm relationships (Sheng et al., 2018; Wang, Li, & Chang, 2016). However, these studies failed to investigate whether the focal firm's own government relations serve as an external informal institution to help control its partner opportunism. We thus expand the research on the role of government relations by showing that, similar to business networks, government relations act not only as social capital by bringing resource advantages to the firm, but also as an informal institution of opportunism governance that makes up for the lack of sound formal institutions in emerging markets.

## ***5.2. Managerial implications***

We provide two suggestions for managerial practice in interfirm relationships. First, our findings indicate that both formal and informal institutions should be used in opportunism governance, and neither can be replaced by the other. Strong and weak form of partner opportunism require different handling mechanisms. Firms can use the shared values and third-party punishment of the business network within which they coexist with their partner as an informal institution to restrain and punish partners' weak form opportunism, such as dishonesty, unfairness, selfishness, and uncooperative behaviors. Moreover, considering the bounded force of network embeddedness, firms should still adhere to the contract governance

mechanism represented by formal contracts to regulate and punish the partner's strong form opportunism.

Second, in addition to the business network, firms should also maintain close cooperation and establish good relationships with the government. Previous research has widely investigated the government's role in providing firms with resource advantages (Sheng et al., 2011; Wang et al., 2019), as the government and its agencies occupy a dominant position in policy making and the allocation of scarce resources (Sheng et al., 2018). Our study further reveals that a firm's government relations also serve as an external informal institution to influence its interfirm relationships by, for example, interacting with network embeddedness in business networks to control its partner opportunism, especially in emerging markets where there are more powerful governments.

### ***5.3. Limitations and future research***

This study has several limitations that call for further research. First, the network embeddedness this study discusses represents only relational embeddedness among network members at the firm level. According to Granovetter (1985), a firm's network position and centrality also affect the economic behavior of network members. Moreover, research has stated that a firm's relational embeddedness, positional embeddedness, and structural embeddedness have distinct effects on alliance risk-avoidance (Polidoro et al., 2011). At the individual level, firm executives' personal social capital also benefits the firm (Jiang et al., 2017). Further research should explore how these dimensions influence different forms of partner opportunism.

Second, because the business network is a complicated business link, the governance effect of a focal firm's network embeddedness on forms of opportunism may vary upon the different nature of links. For example, if the business network is linked by a formal cooperative agreement, the effect of network embeddedness may be more decisive.

Therefore, there are possibilities that a focal firm's network embeddedness may curtail its partner's strong form opportunism due to factors such as the network structure, strictness of business ethics within the network, and the focal partner's network power. We call for future research to test our conceptual model in context of different business networks to provide a more nuanced analysis of the effect of network embeddedness.

Third, we only examined the contingent effects of the focal firm's formalization and government relations, leaving several possible contextual factors uninvestigated. For example, the dependence structure of the interfirm relationship (Dong et al., 2019), transaction-specific assets (Liu et al., 2014), and legal enforceability of the institutions (Sheng et al., 2018) may also influence the partner's motivation and ability to engage in opportunism and the effectiveness of the governance mechanisms. Therefore, we suggest that further research could investigate how other contextual factors affect the effectiveness of network embeddedness on controlling partner opportunism.

Fourth, in this study, we used cross-sectional data and thus failed to investigate how the network's characteristics and the effectiveness of network embeddedness on partner opportunism may vary over time, which may influence our causal inferences' internal validity. Further research could use longitudinal data to test our framework again. Finally, our survey data were collected from the focal firm side, and from manufacturing industries only. We suggest that future research could draw data from both focal firms and their partners, or even from other network members, and in wider industry settings, to further examine the important topic of network embeddedness and opportunism.

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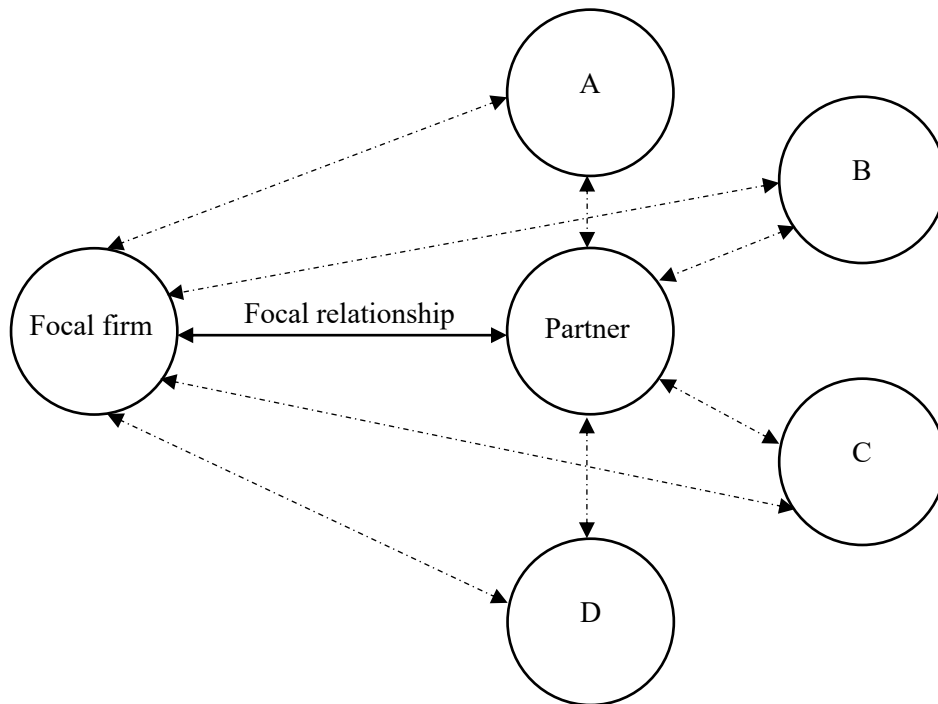
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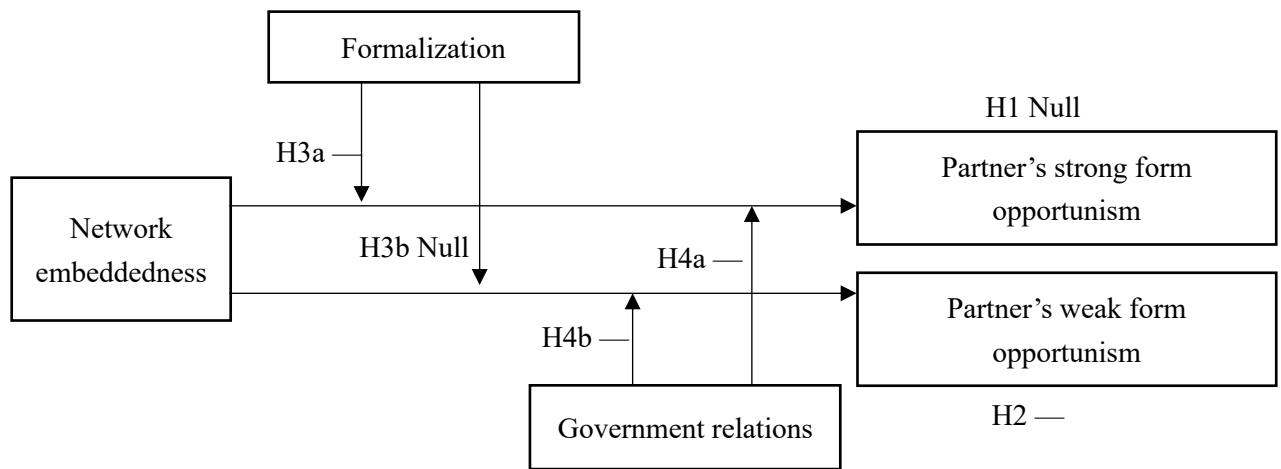
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**Figure 1. Network illustration of the focal firm (Liu et al. 2014)**



Note: The dotted lines represent the network of the focal firm, which serves a governance function for the focal relationship, represented in the solid line (Liu et al., 2014).

**Figure 2. Conceptual model**



**Control variables:**

- Relationship length
- Firm size
- Legal environment
- Legal capability
- Relationship management capability
- Firm performance
- Competitive intensity
- Industry 1
- Industry 2
- Industry 3

**Table 1. Selected key studies on the relationship between network embeddedness (NE) and opportunism (O)**

<b>Key studies</b>	<b>Research focus</b>	<b>Main findings</b>	<b>NE-O Relationship</b>	<b>NE dimensions</b>	<b>O classification</b>
Dong et al., 2015.	Examining how a focal distributor's relational and structural embeddedness in a distribution network influences its opportunism toward the dominant supplier.	A distributor's relational embeddedness negatively relates to its opportunism towards the dominant supplier, whereas its network centrality positively relates to its opportunism towards the dominant supplier.	Negative for relational NE and O; Positive for structural NE and O	Relational Structural	N/A
El Akremi et al., 2011.	Examining the relationship between the cohesion among franchisees and the opportunistic behaviours that are potentially harmful to the whole chain.	The cohesion among franchisees negatively relates to the opportunistic behaviours that are potentially harmful to the whole chain.	Negative	Relational	N/A
Lin et al., 2012.	How strategic alliances in original equipment manufacturer (OEM)-based industrial clusters can be effectively managed through formal governance mechanisms within embedded networks.	Relational embeddedness and structural embeddedness support the employment of formal governance mechanisms.	Negative	Relational Structural	N/A
Liu et al., 2014.	Investigating the moderating effects of a firm's network embeddedness and a partner's transactional specific investments (TSIs) on relationships between the firm's TSIs and its partner's strong- and weak-form opportunism, and compares the efficiency among these moderator variables.	A firm's TSIs are negatively related to partner's opportunism when network embeddedness and the partner's TSIs are relatively high. Moreover, as a moderator, network embeddedness is more effective in inhibiting partner's weak-form opportunism than in inhibiting strong-form opportunism resulting from the firm's TSIs.	Negative	Relational	√
Polidoro et al., 2011	Investigating how network embeddedness helps firms maintain order by mitigating partners' antagonistic competitive incentives.	The value of network embeddedness in promoting stability in interfirm relationships is highest when the edge of economic incentives to behave opportunistically is especially strong.	Negative	Relational Structural Positional	N/A
Wang et al., 2013.	Investigating how a punishment event towards disciplined distributor in a distribution network affects the observer's attitudes and behaviours, and how the disciplined distributor's relational embeddedness changes the above effect.	An observer's perceived severity of punishment negatively affects its ex-post opportunism, but the negative effect will be weakened when disciplined distributor's relational embeddedness in the distribution network is high.	Negative	Relational	N/A
Our study	Investigating whether network embeddedness can curtail partner's strong and weak form opportunism, and its synergistic effect with formalization and government relations.	Network embeddedness can curtail partner's weak form opportunism but cannot deter strong form opportunism due to its lack of coercive power and dependence on other network parties' attitudes and actions, which is different from previous studies.	Negative for weak form O; Null effect for strong form O.	Relational	√

**Table 2. Descriptive statistics of samples (N=227)**

<b>Firm feature</b>		<b>Percentage (%)</b>
Firm size (Number of employees)	≤50	21.8
	51—200	32.3
	201—500	16.8
	501—1000	10.9
	>1000	18.2
Industry	Machinery manufacturing	34.4
	Electronic communication	28.2
	Metal and nonmetal production	19.8
	Others	17.6
Location	the Bo Hai Coastal Region	18.9
	the Yangtze River Delta	7.9
	the Pearl River Delta	33.5
	the central and western regions	39.7
Types of ownership	State-owned or state-controlled	27.3
	Foreign-funded or Sino-foreign joint ventures	8.4
	Private	64.3

**Table 3. Reliability and validity of scales**

Multi-item construct measures	Std. loading
<b><i>Independent variable</i></b>	
<b>Network embeddedness</b> $\alpha = 0.916$ AVE = 0.798 CR = 0.922 (Liu et al., 2014)	
1. We have business cooperation with one or more partners of this partner.	0.875***
2. We have a very close relationship with one or more partners of this partner.	0.967***
3. We work very intensively with one or more partners of this partner.	0.833***
<b><i>Dependent variables</i></b>	
<b>Partner's strong form opportunism</b> $\alpha = 0.870$ AVE = 0.706 CR = 0.875 (Liu et al., 2014; Luo, 2006; Luo et al., 2015)	
1. Partner fails to perform its duties and obligations as required by the contract	0.893***
2. Partners do not invest resources such as technology, capital, and manpower as required by the contract.	0.945***
3. Partner invades the wealth and resources we create together without consent.	0.653***
<b>Partner's weak form opportunism</b> $\alpha = 0.850$ AVE = 0.669 CR = 0.857 (Liu et al., 2014; Luo, 2006; Luo et al., 2015)	
1. Partner stands by unconcerned when we are suffering.	0.719***
2. Partner treats us dishonestly in the cooperation.	0.904***
3. Partner treats us unfairly in the cooperation.	0.820***
<b><i>Moderating variables</i></b>	
<b>Formalization</b> $\alpha = 0.798$ AVE = 0.566 CR = 0.795 (Walter et al., 2015)	
1. The processes of the cooperation with the partner are explicitly written down.	0.657***
2. The responsibilities of the partner in the cooperation are explicitly written down.	0.862***
3. The cooperation with the partner is conducted strictly in accordance with the contract.	0.724***
<b>Government relations</b> $\alpha = 0.766$ AVE = 0.571 CR = 0.792 (Sheng et al., 2011)	
1. Government departments often seek our firm's opinions on government policies.	0.600***
2. Top managers of our firm often invite key government leaders to participate in our important events successfully.	0.961***
3. Our firm has spent substantial resources in building relationships with government officials.	0.655***
<b><i>Control variables</i></b>	
<b>Legal capability</b> $\alpha = 0.880$ AVE = 0.755 CR = 0.902 (Zhou & Poppo, 2010)	
1. Our firm has established a legal department.	0.824***
2. Our firm employs full-time legal counsel and legal staff.	0.945***
3. The legal department often participates in company rules and regulations review and conducts legal training.	0.833***
<b>Relationship management ability</b> $\alpha = 0.809$ AVE = 0.515 CR = 0.809 (Schreiner et al., 2009)	
1. We are good at constantly providing constructive opinions with our partners.	0.687***

- |   |          |
|---|----------|
| 2. We have established a shared cooperation process with our partners for efficient coordination.         | 0.679*** |
| 3. We are good at thinking from the perspective of partners when there are differences with our partners. | 0.733*** |
| 4. We are good at finding effective solutions to problems when there are differences with our partners.   | 0.768*** |

**Firm performance**  $\alpha = 0.809$  AVE = 0.590 CR = 0.812  
(Zhou et al., 2005)

Compared with your major competitors, your firm's performance in the following aspects is: 1=much lower than your major competitors and 5= much higher than your major competitors.

- |                         |          |
|-------------------------|----------|
| 1. Value to customers.  | 0.717*** |
| 2. Technical advantage. | 0.785*** |
| 3. Market share growth  | 0.800*** |

**Competitive intensity**  $\alpha = 0.753$  AVE = 0.586 CR = 0.806  
(Auh & Menguc, 2005)

- |   |          |
|---|----------|
| 1. Price competition is a hallmark of our industry.                 | 0.916*** |
| 2. Competition in our industry is cut-throat.                       | 0.669*** |
| 3. Anything that one competitor can offer, others can match easily. | 0.686*** |

**Overall model fit indices:**

Chi-square (306) = 458.754, CFI = 0.952, IFI = 0.953, RMSEA = 0.047

**Singe-item variables**

**Control variables**

- |  |     |
|--|-----|
| 1. <i>Relationship length</i> : The logarithm of cooperation years of focal firm and partner.  | N/A |
| 2. <i>Firm size</i> : The logarithm of the number of employees of focal firm.  | N/A |
| 3. <i>Legal environment</i> : The sub-indices of the development of the legal environment and market intermediaries in <i>Marketization index of China's provinces: NERI report 2018</i> . | N/A |

Notes: All the multi-item construct measure scales are five-point Likert scales (1 = "strongly disagree" and 5 = "strongly agree"), unless otherwise specified.

$\alpha$  = Cronbach's  $\alpha$ , AVE = average variance extracted, CR = composite reliability.

**Table 4. Means, standard deviations, and correlation coefficients**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Network embeddedness	<b>0.798</b>	-0.056	-0.296 <sup>b</sup>	0.288 <sup>b</sup>	-0.010	-0.014	0.074	0.123	0.178 <sup>b</sup>	0.326 <sup>b</sup>	0.104	-0.079	-0.060	0.165 <sup>a</sup>	-0.102
2. Partner's strong form opportunism	-0.054	<b>0.706</b>	0.246 <sup>b</sup>	-0.229 <sup>b</sup>	-0.049	-0.166 <sup>a</sup>	-0.093	0.043	-0.026	-0.070	-0.112	0.053	-0.166 <sup>a</sup>	0.132 <sup>a</sup>	-0.001
3. Partner's weak form opportunism	-0.294 <sup>b</sup>	0.250 <sup>b</sup>	<b>0.669</b>	-0.535 <sup>b</sup>	-0.241 <sup>b</sup>	-0.104	-0.026	0.101	-0.134 <sup>a</sup>	-0.368 <sup>b</sup>	-0.287 <sup>b</sup>	-0.027	-0.044	0.081	-0.099
4. Formalization	0.292 <sup>b</sup>	-0.227 <sup>b</sup>	-0.534 <sup>b</sup>	<b>0.566</b>	0.103	0.064	0.066	0.002	0.158 <sup>a</sup>	0.294 <sup>b</sup>	0.205 <sup>b</sup>	0.054	0.076	-0.068	0.080
5. Government relations	-0.007	-0.046	-0.239 <sup>b</sup>	0.106	<b>0.571</b>	0.114	0.293 <sup>b</sup>	-0.224 <sup>b</sup>	0.469 <sup>b</sup>	0.144 <sup>a</sup>	0.187 <sup>b</sup>	-0.094	0.166 <sup>a</sup>	-0.164 <sup>a</sup>	0.038
6. Relationship length	-0.011	-0.163 <sup>a</sup>	-0.101	0.067	0.118	N/A	0.378 <sup>b</sup>	-0.231 <sup>b</sup>	0.168 <sup>a</sup>	-0.018	-0.025	-0.016	0.085	-0.118	0.051
7. Firm size	0.078	-0.090	-0.023	0.069	0.297 <sup>b</sup>	0.382 <sup>b</sup>	N/A	-0.120	0.303 <sup>b</sup>	-0.179 <sup>b</sup>	0.020	-0.061	0.067	-0.092	0.059
8. Legal environment	0.126	0.046	0.104	0.005	-0.222 <sup>b</sup>	-0.229 <sup>b</sup>	-0.117	N/A	-0.193 <sup>b</sup>	0.090	-0.021	0.072	-0.221 <sup>b</sup>	0.335 <sup>b</sup>	-0.179 <sup>b</sup>
9. Legal capability	0.182 <sup>b</sup>	-0.023	-0.131 <sup>a</sup>	0.161 <sup>a</sup>	0.473 <sup>b</sup>	0.172 <sup>b</sup>	0.307 <sup>b</sup>	-0.191 <sup>b</sup>	<b>0.755</b>	0.175 <sup>b</sup>	0.222 <sup>b</sup>	-0.166 <sup>a</sup>	-0.099	-0.008	0.134 <sup>a</sup>
10. Relationship management capability	0.330 <sup>b</sup>	-0.068	-0.366 <sup>b</sup>	0.298 <sup>b</sup>	0.147 <sup>a</sup>	-0.015	-0.177 <sup>b</sup>	0.093	0.179 <sup>b</sup>	<b>0.515</b>	0.436 <sup>b</sup>	-0.004	0.005	0.121	0.008
11. Firm performance	0.107	-0.110	-0.285 <sup>b</sup>	0.209 <sup>b</sup>	0.191 <sup>b</sup>	-0.022	0.023	-0.018	0.226 <sup>b</sup>	0.440 <sup>b</sup>	<b>0.590</b>	0.053	0.044	0.042	-0.013
12. Competitive intensity	-0.077	0.056	-0.024	0.058	-0.091	-0.013	-0.058	0.076	-0.163 <sup>a</sup>	-0.001	0.056	<b>0.586</b>	-0.010	0.064	-0.016
13. Industry 1	-0.057	-0.163 <sup>a</sup>	-0.041	0.079	0.169 <sup>a</sup>	0.089	0.070	-0.219 <sup>b</sup>	-0.097	0.008	0.048	-0.007	N/A	-0.455 <sup>b</sup>	-0.362 <sup>b</sup>
14. Industry 2	0.168 <sup>a</sup>	0.135 <sup>a</sup>	0.084	-0.066	-0.161 <sup>a</sup>	-0.116	-0.089	0.339 <sup>b</sup>	-0.005	0.125	0.045	0.068	-0.453 <sup>b</sup>	N/A	-0.314 <sup>b</sup>
15. Industry 3	-0.099	0.002	-0.096	0.083	0.041	0.054	0.062	-0.177 <sup>b</sup>	0.137 <sup>a</sup>	0.011	-0.010	-0.013	-0.360 <sup>b</sup>	-0.312 <sup>b</sup>	N/A
16. Green production (MV)	0.223 <sup>b</sup>	-0.099	-0.308 <sup>b</sup>	0.281 <sup>b</sup>	0.103	0.009	-0.028	0.013	0.202 <sup>b</sup>	0.509 <sup>b</sup>	0.538 <sup>b</sup>	-0.043	0.047	0.041	0.003
<b>Means</b>	3.667	2.371	2.209	4.041	3.102	1.714	5.419	10.341	3.299	3.820	3.761	3.645	0.344	0.282	0.198
<b>Standard deviations</b>	0.817	0.794	0.658	0.644	0.863	0.776	1.765	3.618	1.061	0.589	0.652	0.900	0.476	0.451	0.400

Notes: a and b indicate significance at 0.05 and 0.01 level, respectively. The value on the diagonal is the AVE value.

Industry 1, 2, 3 refer to machinery manufacturing, electronic communication, metal and nonmetal production, respectively.

**Table 5. Regression results**

Variable	Hypotheses	Partner's	Partner's	VIF
		strong form opportunism	weak form opportunism	
		M1	M2	
<b>Control variable</b>				
Relationship length		-0.142 <sup>a</sup>	-.068	1.268
Firm size		-.016	.020	1.471
Legal environment		-.007	.018	1.298
Legal capability		.036	.088 <sup>b</sup>	1.587
Relationship management capability		-.017	-.176 <sup>b</sup>	1.668
Firm performance		-.099	-.118 <sup>a</sup>	1.344
Competitive intensity		.082	.001	1.074
Industry 1		-.198	.116	2.136
Industry 2		.078	.086	2.007
Industry 3		-.015	-.027	1.835
<b>Moderating variable</b>				
Formalization (FO)		-0.296 <sup>c</sup>	-0.449 <sup>d</sup>	1.277
Government relations (GR)		0.033	-0.150 <sup>c</sup>	1.511
<b>Main effect</b>				
Network embeddedness (NE)	<b>H1 (Null)/ H2 (-)</b>	<b>0.059</b>	<b>-0.106<sup>b</sup></b>	1.418
<b>Interaction effect</b>				
NE x FO	<b>H3a (-)/ H3b (Null)</b>	<b>-0.103<sup>b</sup></b>	<b>-0.032</b>	1.195
NE x GR	<b>H4a (-)/ H4b (-)</b>	<b>-0.114<sup>b</sup></b>	<b>-0.077<sup>b</sup></b>	1.153
<b>F</b>		2.531 <sup>c</sup>	10.559 <sup>d</sup>	
<b>F change</b>		3.779 <sup>b</sup>	4.831 <sup>c</sup>	
<b>R</b>		0.390	0.655	
<b>R<sup>2</sup></b>		0.152	0.429	
<b>Adjusted R<sup>2</sup></b>		0.092	0.388	

Notes: a, b, c, and d indicate significance at 0.1, 0.05, 0.01, and 0.001 levels, respectively. Industry 1, 2, 3 refer to machinery manufacturing, electronic communication, metal and non-metal production, respectively.

**Table 6. Stage 1 Regression results of supplementary analysis**

<b>Independent variables</b>	<b>Network embeddedness</b>
Government relations	-0.110 <sup>a</sup>
Relationship length	-0.077
Firm size	0.097 <sup>c</sup>
Relationship management capability	0.562 <sup>d</sup>
Firm performance	-0.064
Competitive intensity	-0.066
R <sup>2</sup>	0.151
Highest VIF	1.356

Note: a, b, c, and d indicate significance at 0.1, 0.05, 0.01, and 0.001 levels, respectively.

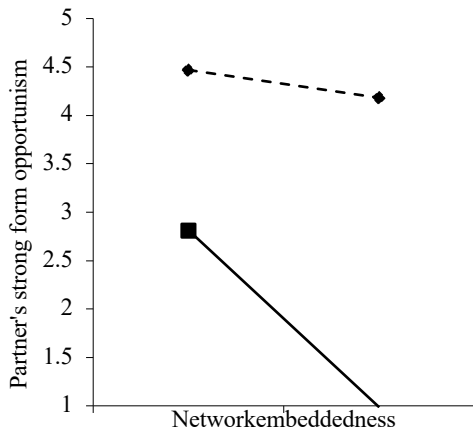
**Table 7. Stage 2 Regression results of supplementary analysis**

Variable	Hypotheses	Partner's	Partner's	VIF
		strong form opportunism	weak form opportunism	
		M1	M2	
<b>Control variable</b>				
Relationship length		-0.148 <sup>b</sup>	-0.061	1.251
Firm size		-0.010	0.010	1.438
Legal environment		-0.007	0.018	1.297
Legal capability		0.036	0.087 <sup>b</sup>	1.587
Relationship management capability		0.036	-0.229 <sup>c</sup>	1.537
Firm performance		-0.105	-0.114 <sup>a</sup>	1.325
Competitive intensity		0.071	0.007	1.062
Industry 1		-0.176	0.123	2.127
Industry 2		0.083	0.085	2.006
Industry 3		0.004	-0.023	1.833
<b>Moderating variable</b>				
Formalization (FO)		-0.298 <sup>c</sup>	-0.445 <sup>d</sup>	1.273
Government relations (GR)		0.009	-0.148 <sup>c</sup>	1.468
<b>Main effect</b>				
Network embeddedness (NE) (residual)	<b>H1 (Null)/ H2 (-)</b>	0.068	-0.106 <sup>b</sup>	1.213
<b>Interaction effect</b>				
NE residual x FO	<b>H3a (-)/ H3b (Null)</b>	-0.096 <sup>b</sup>	-0.006	1.166
NE residual x GR	<b>H4a (-)/ H4b (-)</b>	-0.138 <sup>b</sup>	-0.101 <sup>c</sup>	1.117
<b>F</b>		2.642 <sup>c</sup>	10.696 <sup>d</sup>	
<b>F change</b>		4.278 <sup>c</sup>	5.250 <sup>d</sup>	
<b>R</b>		0.398	0.657	
<b>R<sup>2</sup></b>		0.158	0.432	
<b>Adjusted R<sup>2</sup></b>		0.098	0.392	

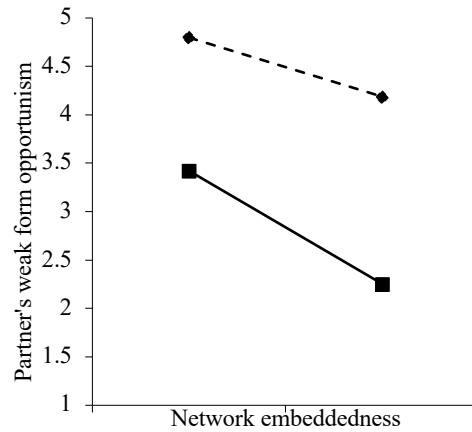
Notes: a, b, c, and d indicate significance at 0.1, 0.05, 0.01, and 0.001 levels, respectively. Industry 1, 2, 3 refer to machinery manufacturing, electronic communication, metal and nonmetal production, respectively.

### Figure 3. Interaction Effects

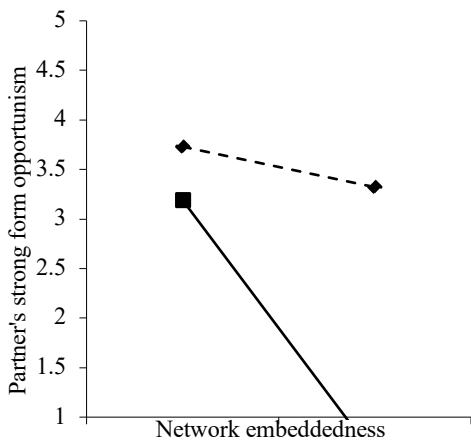
A (H3a) The effect of interaction between network embeddedness and formalization on partner's strong form opportunism



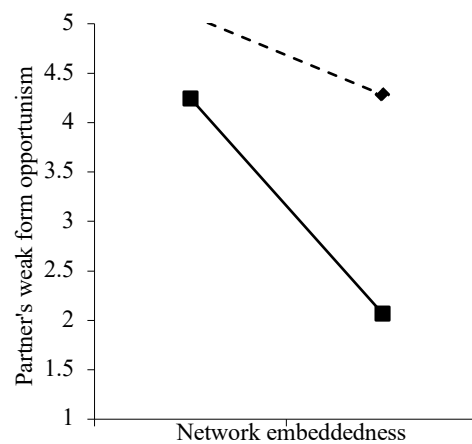
B (H3b) The effect of interaction between network embeddedness and formalization on partner's weak form opportunism (not significant)



C (H4a) The effect of interaction between network embeddedness and government relations on partner's strong form opportunism



D (H4b) The effect of interaction between network embeddedness and government relations on partner's weak form opportunism



----- Low formalization, low government relations  
 ————— High formalization, high government relations