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# Corporate Social Responsibility Knowledge Transfer in Interfirm Networks

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## ABSTRACT

This study investigates the effects of the alliance network structural properties on corporate social responsibility (CSR) knowledge transfer in the interfirm network context. Alliances and partnerships allow firms to access valuable CSR knowledge. While most research investigating knowledge transfer focuses on the dyadic level, the current research investigates CSR knowledge transfer within the interfirm network context. By integrating data from multiple datasets, this study investigates how a firm centrality and brokerage in its interfirm network influence its acquisition of CSR knowledge. The findings of 298 firms show that firm betweenness centrality and network brokerage enhance CSR knowledge transfer from its alliance partners. To the contrary, the greater the number of alliance partners (i.e., degree centrality), the weaker is the firm's ability to acquire CSR knowledge.

## KEYWORDS

Corporate Social Responsibility, CSR Knowledge Transfer, Firm Reputation, Interfirm Networks, Knowledge Transfer, Network Analysis, Organization Knowledge, Strategic Alliances

## INTRODUCTION

Recent years have witnessed even more movements to support various social justice causes. For companies, it is now more important than ever to increase their investments in corporate social responsibility (CSR) activities. Up to 70% of consumers are interested in knowing what companies are doing to address environmental and social issues (Schaeffer, 2019). Consequently, in 2021, more than 90% of S&P 500 companies have published social responsibility reports (Perez et al. 2022). CSR is defined as “actions that appear to further some social good, beyond the interests of the firm and that which is required by law.” (McWilliams & Siegel, 2001, p.117). Traditionally most CSR activities focused on diversity, sustainability, and climate change (Burns, 2021). Some research has argued that such efforts are expected from firms and they can be considered as just a cost of doing business (Barnett & Hoffman, 2008; Hoffman & Woody, 2008). However, the various stakeholders now expect companies to support a more diverse set of causes such as social equality and justice initiatives. Estimates suggest that up to 91% of consumers are willing to switch brands to one supporting a cause in some markets (Cone Communications, 2015; Cosley et al., 2021). Together, this means companies are not only under immense pressure to pursue CSR activities, but also under the pressure to pursue them using a non-traditional approach. Therefore, for companies, the question

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shifts from whether they should engage in CSR activities to how they should engage such activities. Thus, although many companies pursue various CSR activities, there could be a huge discrepancy in the effectiveness of such pursuits.

In addition, engaging in socially responsible activities can be expensive and require substantial investments from companies (Klassen & Whybark, 1999). Such costs are leading more companies to view CSR efforts as investments that are expected to yield indirect returns, further underscoring the importance of CSR knowledge and know-how. Tang et al., (2012) described CSR as “a process of accumulating knowledge and experience” (p.1298). This description highlights the value of CSR knowledge in helping companies to effectively and profitably engage in socially responsible activities. In this view, CSR activities are investments that require specific knowledge in order to maximize their returns. A firm can develop CSR knowledge internally, however, it can also gain this knowledge from other firms. Alliances and partnerships provide access to firms for various types of knowledge transfer (Nguyen & Islam, 2018).

Previous research investigating CSR knowledge transfer has mostly focused on the dyadic level of interfirm knowledge transfer. Yet, very little research has gone beyond the dyadic level to investigate the effect of the collective set of alliance partner firms on the CSR knowledge transfer process. It is important to investigate beyond the CSR knowledge transfer at the dyadic level because organizations are embedded in an interfirm network (Achrol & Kotler, 2022). The simplified view of interfirm relationships at the dyadic level limits our ability to examine the extent of knowledge transfer. Further, at any given time, a firm can be in an alliance with multiple partners.

This research attempts to investigate how CSR knowledge is transferred between alliance partners within the interfirm network context. This enables us to investigate how the interfirm network’s structural properties influence the CSR knowledge transfer between firms. Thus, this research aims to test how a firm’s position within its alliance network (i.e., centrality) influences such knowledge transfer. This can be accomplished by constructing an interfirm network composed of firms with their alliance partners and testing the effects of the network structural properties on knowledge transfer. The rest of the paper is organized as follows: The next section reviews the interfirm networks and knowledge transfers literature. The following section outlines the theoretical development and proposes the hypotheses. This is then followed by presenting the methodological approach. The penultimate section describes the results. The last section provides the discussion, implications, and conclusions.

## **LITERATURE REVIEW**

### **Knowledge Transfer**

The extant research suggests that organizational units learn from each other to enhance their performance (Al-Mawali & Al-Busaidi 2022; Adeyemi et al., 2022; Huber, 1991). Knowledge can be defined as “information that has been culturally understood such that it explains the how and the why about something or provides insight and understanding into something” (Jennex & Bartczak, 2013, p. 27). Alliance agreements provide opportunities for significant knowledge flow between organizations (Easterby-Smith et al., 2008; Hagedoorn & Narula, 1996). Alliances can be defined as “voluntary arrangements between firms involving exchange, sharing, or codevelopment of products, technologies, or services.” (Gulati, 1998, p. 293). Organizations gain valuable knowledge from their partners relating to many business activities such as sales force management (Chan et al., 2014), manufacturing (Argote & Epple, 1990), new product development (Fang et al., 2015), and innovation (Caner et al., 2017; van Oostrom 2019). This flow of knowledge is not bounded by organizations location or size. Local businesses gain valuable knowledge from collaborating with international partners (Nguyen & Islam, 2018; Nguyen & Pham 2021). Small businesses also rely on their networks for access to knowledge through formal and informal interactions (Al-Jabri & Al-Busaidi, 2020; Hall et al., 2022).

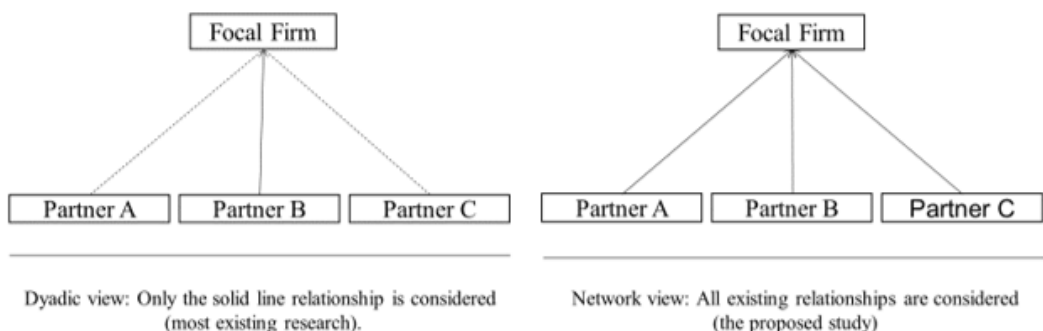
While most research focuses on the dyadic relationship between two partners, in reality, a firm can have multiple partners constituting its alliance network within a large interfirm network. Figure 1 represents the difference between the dyadic view and the network view of alliances. The following section reviews interfirm networks and how the properties of such networks can influence knowledge transfer.

### Interfirm Networks and Knowledge Transfer

Individual firms do not work in isolation, instead organizations are embedded in interorganizational networks (Achrol & Kotler, 1999). Research on interorganizational relations have long established the complexity of such structures where organizations are embedded in an environment of other organizations (Evan, 1965). Despite the complexity, these relations enable companies to engage in various collaborations that provide mutual benefits for all parties involved (Castañer & Oliveira, 2020). They allow companies to access their partner’s technology, resources, and/or markets (Dey & Mukhopadhyay, 2018; Inkpen & Tsang, 2005; Lui et al., 2022; Noerlina et al., 2022). More specifically, interorganizational relations allow for knowledge transfer between organizations. A firm can gain valuable knowledge from its partners, allowing it to develop learning capabilities and acquire a competitive advantage (Grant, 1996).

Thus, at any given time, a firm can be involved in multiple alliances or an alliance network, in which each of its partners could also be involved in multiple alliances creating a large interfirm network (Bae & Gargiulo, 2004; Lavie, 2007). An interfirm network is the collection of ties between a firm and its alliance partners (i.e., egocentric network) (Burt & Soda, 2021; Lavie, 2007; Karjalainen et al., 2021; Wasserman & Faust, 1994). Instead of focusing on a single alliance, the structural network approach focuses on the network’s relational and structural properties. It investigates how the network’s relational properties (e.g., density and strength of ties) and the focal firm’s position in the network (e.g., centrality and brokerage) can affect the various outcomes of the firms. The extant research has examined how such network properties affect a firm’s innovation output and transferred knowledge. For example, Lui et al. (2022) found that foreign supply linkages positively influence firm internationalization. Noerlina et al. (2022) showed that interfirm network positively and significantly affects the firm’s performance. Through reciprocity, firms in these networks exchange valuable resources increasing their knowledge stock (Martin-Rios et al., 2022). Ahuja (2000) found that innovation output is enhanced by the number of ties (direct and indirect) of the focal firm. However, innovation output for firms that span structural holes (i.e., acting like a network broker) is higher than the output of other focal firms. Similarly, when investigating joint ventures in emerging economies, Sun and Lee (2013) found that a firm’s innovation improves when the focal firm spans structural holes, however, innovation decreases when network centrality increases. Efficient interfirm networks allow firms to access diverse information and capabilities while minimizing complexity and conflict

Figure 1. Dyadic versus network perspective of interfirm relationships



(Baum et al., 2000). McEvily and Zaheer (1999) found that firms that maintain and sustain networks rich in bridging ties are positioned to access ideas, opportunities, and new information. Van Wijk et al. (2008) found that in interfirm networks knowledge transfer to the focal firm is positively associated by its centrality and the number of relationships it formed. Table 1 summarizes a sample research on the effect of selected network constructs on innovation and knowledge transfer.

Overall, these studies demonstrate how the structural properties and a focal firm's position within the network have important implications on knowledge transfer. The current research attempts to integrate CSR and the interfirm network's streams of research to investigate how the structural properties of the alliance network influence interfirm CSR knowledge transfer.

Table 1. Definitions, operationalizations, and finding of selected network constructs

Construct	Definition	Operationalizations	Empirical Findings	References
Betweenness centrality	The extent to which firms sit astride network pathways between other organizations.	The frequency with which a point falls between pairs of other points on the shortest or geodesic paths connecting them.	There is a positive relationship between betweenness centrality and innovation	(Owen-Smith & Powell, 2004)
	The extent to which the firm can mediate flows of information in a global network	The proportion of information flows between other organizations that pass through that firm	Centrality enhances the firm's incremental new product its launches but hurts its breakthrough new product launches.	(Fang et al., 2016)
	A measure of the influence a focal firm has over the information through the alliance network	The ratio of shortest paths between other companies that pass through the focal firm	There is a positive relationship between betweenness centrality and exploration success.	(Gilsing et al., 2008)
Degree centrality	Degree centrality is a measure of how well connected, a firm is in the overall network	The number of other firms connected to that firm, regardless of how well connected those partners.	Network centrality has a positive impact on RandD alliances, collaborations, and investment ties.	(Powell et al., 1996)
	The social power of a firm, that is, how well it connects its joint venture portfolio to gain resources and information	The number of firms to which a firm has direct connection	Firm's innovation improves when network centrality decreases	(Sun & Lee, 2013)
	The size of the startup network.	The number of alliances a startup had at the time of its founding	Network size of a startup at the time of its founding positively influence its initial performance.	(Baum et al., 2000)
	A central position within network relationships.	The number of interlock ties a firm has with the other firms (Freeman 1979)	The relationship between the firm performance and degree centrality is dependent on the level of uncertainty.	(Martin et al., 2015)
Network brokerage	Access to a structural hole; a relationship of nonredundancy between two contacts.	NA	NA	(Burt, 1992)
	Gaps in information flows between alters linked to the same ego but not linked to each other	The ratio of nonredundant contacts to total contacts for the firm	Structural holes have a negative effect on innovation	(Ahuja, 2000)
	A firm's brokerage locations between two disconnected firms in a given portfolio.	The efficiency of an ego's portfolio divided by the number of alters in the ego's portfolio	firm's innovation improves when access to bridging structural holes increases	(Sun & Lee, 2013)
	The gaps between firms otherwise disconnected in the network.	One minus the firm's constraint score measured by UCINET (Burt 1992, p. 54).	Firms bridging structural holes gain an innovation performance boost	(Zaheer & Bell, 2005)
	The lack of ties between different parts of a network, reflecting the degree of redundancy in social networks.	One minus the constrain measure for the lack of access to structural holes (Burt 1992).	The relationship between the firm performance and structural holes is dependent on the level of uncertainty.	(Martin et al., 2015)

## THEORETICAL DEVELOPMENT

### CSR Knowledge Transfer

Firms may engage in CSR activities for different motives, including profit-driven behavior (McWilliams & Siegel, 2001), managerial cognition (Muller & Kolk, 2010), or external pressure (Campbell, 2007). Engaging in CSR activities improves a firm's relationship with its customers, shareholders, and employees (Korschun et al., 2014). The different motives and the different types of audiences targeted by CSR activities make engaging in such activities a complicated pursuit. Barnett (2007) introduced the construct of stakeholder influence capacity, defined as "the ability of a firm to identify, act on, and profit from opportunities to improve stakeholder relationships through CSR" (p. 803). It implies that a firm's success in pursuing CSR activities relies on stakeholder perceptions and knowledge of the firm, adding another layer of complexity and underscoring the importance of CSR knowledge required when pursuing CSR activities. The term CSR knowledge is used to refer to knowledge related to the "why," "when," and "how" firms pursue CSR activities. Knowledge is one of the most valuable resources for a firm and the process of knowledge transfer is central to developing learning capabilities that plays a significant role in enhancing the firm competitive advantage (Grant, 1996). Companies must first possess CSR knowledge to pursue such activities effectively to eventually impact stakeholders positively. Engaging in CSR activities requires tacit knowledge that is often only transmitted by face-to-face contact between the parties. Employee mobility and interaction between firms can help in transmitting CSR knowledge from one firm to another (Husted et al., 2016). Companies establishing new subsidiaries in different countries can also influence the CSR knowledge of local companies and vice versa (Nyuur et al., 2016; Reus et al., 2016). Overall, interfirm relationships provide an optimum context for such knowledge transfer, providing a firm with access to CSR knowledge and thus enhancing the focal firm's CSR engagement. Therefore:

**H<sub>1</sub>:** CSR knowledge of a firm is positively associated with the CSR knowledge of its network partners.

### Effects of Interfirm Network's Structural Properties

The extant research (e.g., Gilsing et al., 2008; Owen-Smith & Powell, 2004; Wiedmer & Griffis, 2021) found that a focal firm's position in its network can influence the knowledge gained and its innovation output. Similarly, a focal firm's position in its interfirm network could influence CSR knowledge transfer. This research focuses on two aspects of network centrality (i.e., betweenness and degree) and network brokerage (i.e., access to structural holes). Centrality reflects the extent to which an actor (e.g., firm) is central to a network (Freeman, 1979), that is, its position in the interfirm network, which plays a major role in its access to external resources and information (Freeman, 1979; Tsai, 2001). Specifically, betweenness centrality reflects the extent to which the firm can mediate flow of information in a network, whereas degree centrality measures how well connected a firm is in the network (Freeman, 1979; Gilsing et al., 2008; Powell et al., 1996). Betweenness centrality and degree centrality capture different aspects of information access and cooperative support in networks (Gonzalez et al., 2014). Network brokerage captures the firm access to structural holes. A structural hole is a non-redundant relationship between two contacts (Burt, 1992). A firm connecting structural holes act as network brokers (Burt & Soda, 2021). This study focuses on betweenness centrality, degree centrality, and network brokerage because they are related to knowledge access and transfer within interfirm networks.

First, a firm occupying a central position gains some advantages that enable it to acquire relevant information and exchange it within its network (Burt, 1992). Betweenness centrality is concerned with the flow of information. Previous research has demonstrated how a firm's betweenness centrality can affect the focal firm's access to knowledge and innovation. For example, Owen-Smith and Powell (2004) found a firm's betweenness centrality has a positive impact on its innovation output. Bellamy

et al, (2020) found a positive association between centrality and network learning, and innovation. Similarly, Gilsing et al. (2008) examined how different network positions produce different payoffs of exploration success and the quantity of explorative patents. Fang et al. (2016) found that betweenness centrality improves a firm's new product launches. As a central position can positively influence the flow of information to the focal firm, a firm with a central position is expected to gain more CSR knowledge from its partners. A central position in the network can enable the focal firm to access CSR knowledge possessed by its partners more efficiently. Therefore, a firm occupying a central position (in terms of betweenness) is likely to gain more CSR knowledge transfer than firms with less central positions. Therefore:

**H<sub>2</sub>:** CSR knowledge transfer from alliance partners to the focal firm is positively moderated by the focal firm's betweenness centrality in the network.

Second, to the contrary of betweenness centrality, a firm's degree centrality increases as it forms new alliances. Some researchers argue that the flow of information is quicker among firms in closely connected networks with limited number of partners (Powell et al., 1996). Thus, different from betweenness centrality, a high degree centrality can induce more harm than benefits in the CSR knowledge transfer context. For example, Dong et al., (2020) found that the number of suppliers negatively moderates the network positive impact on firm financial performance. A large number of partners can dilute the CSR knowledge transfer process. The more alliance-partners a firm has, the more knowledge can be transferred. However, the larger the number of partners, the more difficult it is for a firm to absorb and disseminate knowledge (Cohen & Levinthal, 1990). Moreover, the firm might receive redundant or contradictory CSR information, which further hinders its ability to learn from its partners. Such obstacles might limit the firm ability to engage in CSR activities. On the contrary, when the focal firm has a limited number of alliance partners, the CSR knowledge can be efficiently transferred and absorbed by the focal firm. Therefore:

**H<sub>3</sub>:** CSR knowledge transfer from alliance partners to the focal firm is negatively moderated by the focal firm's betweenness centrality in the network.

In sum, betweenness centrality and degree centrality are expected to have opposite interaction effects on the CSR knowledge transfer between the alliance partners and the focal firm. Previous studies have also found conflicting roles of betweenness and degree centrality (Mallapragada et al., 2012).

Third, within networks contexts, network brokerage describes the firm ability to bridge structural holes and gaps in information flows between actors linked to the same ego but not linked with each other. In interfirm networks, a firm bridging structural holes is a network broker that connects other alliance firms otherwise not connected. It accesses unique information opportunities between otherwise disconnected firms (McEvily & Zaheer, 1999) and reflect a firm's access to nonredundant contacts (Ahuja, 2000; Burt, 1992). Similar to betweenness centrality, the extant research has found that network brokerage gives a firm access to unique knowledge (Martin et al., 2015; Sun & Lee, 2013; Zaheer & Bell, 2005). It helps businesses develop internal capabilities; they may otherwise lack (Goduscheit et al., 2021). Thus, network brokers can also derive greater benefits from CSR knowledge possessed by their partners. Such firms can access diverse CSR knowledge from their nonredundant contacts, which in turn enables the focal firms to enhance their own CSR engagement. Therefore:

**H<sub>4</sub>:** CSR knowledge transfer from alliance partners to the focal firm is positively moderated by the focal firm's network brokerage in the network.

## METHOD

### Sample and Data

To examine the proposed relationships, an interfirm network should be constructed first. The network analysis allows us to test our hypothesized effects while accounting for the whole set of a focal firm's partners that the focal firm had at a time and allows us to test the network structure. The network should include firms connected with each other with their ongoing alliances. Therefore, three different databases were used to collect the data needed for this study. First, alliance data were obtained from the SDC platinum database to construct the interfirm network. Second, CSR data were obtained from Thomson Reuters' Asset4 dataset. Third, firm's financial performance and other firm-specific data were obtained using Compustat. For any given firm, an alliance network should consist of all ongoing alliances. However, a major limitation when constructing alliance networks is that firms rarely announce alliance termination. Thus, some of the alliances collected could have been terminated. To overcome this limitation, this study followed similar research and used a five-year period of alliances to create each firm's alliance network (Fang et al., 2016; Stuart, 2000). Thus, for any given firm, the alliance network constructed for year 2017 includes all alliances established from 2012 to 2017. The initial sample was composed of 1473 alliances pertaining to 1711 different firms. At this stage, the alliance matrix was created, and the network measures were extracted using UCINET software (Borgatti et al., 2002). The resulting network characteristics values were subsequently merged with the CSR data obtained from Asset4 and the data obtained from Compustat to create an ordinary least squares (OLS) regression model. Due to the matching process and missing data, the final sample decreased to 298 firms with an average of 2.6 partners for each firm. The sample consists of North American firms from various industries such as high-tech, financial services, and manufacturing.

### Measures

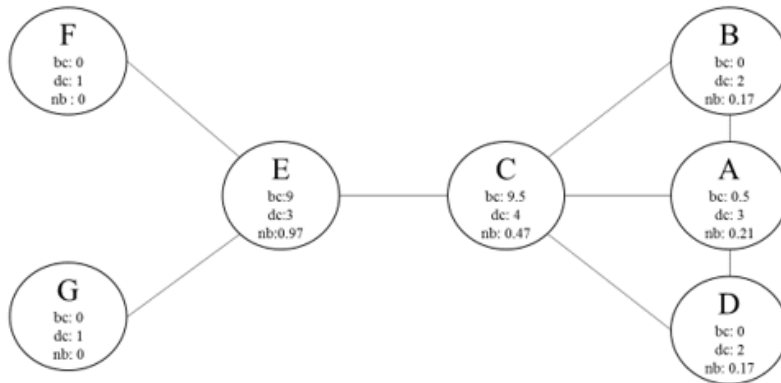
The dependent variable is the firm's CSR knowledge operationalized as its CSR rating as obtained from Thomson Reuters Asset4 at year  $t_{+1}$ . The firm's CSR rating is used as a proxy for the firm's CSR knowledge as their CSR ratings provide a reasonable reflection of the CSR knowledge possessed by the firm. Following similar studies (Dhaliwal et al., 2011; Luo et al., 2015) the social and environmental pillars were used to measure the firm's CSR rating. The environmental consists of indicators that relate to emission reduction, resources use reduction, and green products innovation. The social pillar consists of indicators that relate to community, human rights, product responsibility, employment quality, diversity, training and development, and health and safety.

The main independent variable is the firm's alliance network CSR rating calculated as the average CSR rating of all partners in the firm's alliance network at year  $t_0$ . Betweenness centrality was measured as the fraction of shortest paths between other alliance partners that pass through the focal firm derived using the centrality procedures in UCINET (Borgatti et al., 2002). Degree centrality was calculated as the total number of partners in the firm's alliance network. Network brokerage measure was derived using the structural holes procedure in UCINET and calculated as one minus the value of the network constraint measure (Borgatti et al., 2002; Lavie, 2007; Zaheer & Bell, 2005). Figure 2 presents a sample network and how these different structural properties measures vary depending on how the firm is connected to its partners.

Previous research has found a significant relationship between organization size and knowledge transfer (Laursen & Salter, 2006; Van Wijk et al., 2008) therefore a control variable for focal firm size was added. Similarly, young firms are more likely to enjoy more knowledge spillovers than aging firms. It has been suggested that aging firms become inert and have a limited capability to learn and adapt to changing environments (Cyert & March, 1963; Van Wijk et al., 2008). Thus, the focal firm's age was as a control variable. Moreover, a control variable was added to capture the ratio of vertical alliances to the horizontal alliances for each firm's network using the two-digit Standard Industrial Classification code depending on whether the alliance-partner operated within the same industry of



Figure 2. A sample network and its structural properties



The letters represent different actors  
 bc: Betweenness centrality  
 dc: Degree centrality  
 nb: Network brokerage  
 The numbers represent the values of these network properties in this sample

2

the firm or not. The two-digit SIC codes were used to control for industry type. Finally, focal firm marketing intensity and research and development intensity were added as control variables and operationalized as selling, general, administrative expenses, and R&D expenses divided by sales respectively. Using these measures, the hypotheses were tested using ordinary least squares (OLS) regression as:

$$\text{Firm CSR rating} = \beta_1 \text{ Network CSR rating} + \beta_2 \text{ Network CSR rating} \times \text{firm} \quad (1)$$

$$\text{betweenness centrality} + \beta_3 \text{ Network CSR rating} \times \text{firm degree centrality} + \beta_4 \text{ Network CSR rating} \times \text{firm network brokerage} + \beta_{5,9} \text{ Controls} + \text{industry type constant} + \varepsilon$$

All independent variables and controls are lagged by one year with respect to the dependent variable. Table 2 presents the correlation matrix of the variables in the study.

Table 2. Descriptive statistics and correlations

	Variable	M	SD	1	2	3	4	5	6	7	8	9
1	Firm CSR rating	64.57	27.47									
2	Network CSR rating	65.36	18.27	.17								
3	Firm betweenness centrality	0.31	0.94	.16	.01							
4	Firm degree centrality	2.6	3.64	.18	-.01	.86						
5	Firm network brokerage	2.01	36.09	.12	-.01	.43	.55					
6	Firm marketing intensity	-1.82	1.02	-.05	.08	.04	.06	.05				
7	Firm R&D intensity	8.33	30.77	-.28	.02	-.07	-.09	-.15	.04			
8	Firm size	1.71	13.22	.10	.08	.00	-.01	.00	-.03	-.03		
9	Firm age	31.76	17.67	.41	.03	.16	.22	.28	-.04	-.12	.03	
10	Alliance type	0.63	0.37	-.03	.10	.12	.16	.21	-.12	.09	.01	-.01

Note: Correlations that are greater than or equal to .12 in absolute value are significant at  $p < .05$ .

## RESULTS

### Main Model Results

The results of the OLS regression model are presented in Table 3. In support of H<sub>1</sub>, the results of Model 1 reveal that the firm's CSR knowledge is positively associated with the CSR knowledge of its network partners ( $\beta = .18, p < .05$ ). H<sub>2</sub> and H<sub>3</sub> examine the interacting effects of betweenness centrality and degree centrality on CSR knowledge transfer. A high correlation between the two constructs exists as expected because the two constructs are different measures of centrality. However, Kilduff and Tsai (2003) recommend simultaneously testing the different types of centralities as they act as controls for each other. Nevertheless, the VIF scores for the two variables are acceptable and below the conservative level of 5 (Obloj & Capron, 2011, p. 452). The results presented in Model 2 suggest that the impact of betweenness centrality on CSR knowledge transfer is positive and significant ( $\beta = .57, p < .05$ ), while the impact of degree centrality is negative and significant ( $\beta = -.15, p < .05$ ), supporting H<sub>2</sub> and H<sub>3</sub> respectively. Finally, the results also support H<sub>4</sub>, which suggests that firms network brokerage enhances the firm CSR knowledge transfer from its alliance partners ( $\beta = .01, p > .05$ ).

Table 3. The effect of interfirm network structural properties on CSR knowledge

Variables	Hypotheses	Main Effect Added			Interaction Effects Added		
		Model 1			Model 2		
		$\beta$		se	$\beta$		se
<i>Main effect</i>							
Network CSR rating	H <sub>1</sub> (+)	.180	**	(.077)	.239	***	(.087)
<i>Moderating effects</i>							
Network CSR rating x firm betweenness centrality	H <sub>2</sub> (+)				.572	**	(.288)
Network CSR rating x firm degree centrality	H <sub>3</sub> (-)				-.152	**	(.075)
Network CSR rating x firm network brokerage	H <sub>4</sub> (+)				.007	**	(.003)
<i>Control variables</i>							
Firm betweenness centrality		.893		(2.921)	-.561		(2.958)
Firm degree centrality		.904		(.803)	1.247		(.811)
Firm network brokerage		-.050		(.047)	-.060		(.047)
Firm marketing intensity		-1.805		(1.422)	-1.82		(1.405)
Firm R&D intensity		-.171	***	(.046)	-.174	***	(.045)
Firm size		.089		(.103)	.072		(.102)
Firm age		.453	***	(.084)	.454	***	(.083)
Alliance type		-1.502		(3.880)	-1.13		(3.840)
<i>Intercept</i>		29.36	***	(8.26)	25.41	***	(8.54)
N		298			298		
R <sup>2</sup>		.338			.362		

Note: For brevity, industry type dummies are omitted from the table. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Robustness Checks

The dependent variable in the main mode was measured as the firm’s CSR rating year  $t_{+1}$ . However, it could take time for the transfer and assimilation of knowledge. Therefore, for the first robustness check, an alternative time period for the dependent variable is used as the average firm CSR rating at year  $t_{+1}$  to year  $t_{+3}$ . The second robustness check was conducted by winsorizing all continuous variables to the 5th percentiles. For both robustness checks, the results remain consistent except for one effect where  $H_2$  becomes only marginally significant ( $\beta = .504$ ,  $p < .10$ ) when winsorizing all continuous variables (see Table 4).

## CONCLUSION

Knowledge acquisition is an essential process for firms in today’s competitive markets (Agrawal & Mukti, 2020; Akram et al., 2019). The extant research on CSR knowledge predominantly examined the “what and why” questions regarding CSR engagement, while the “how” question of CSR engagement has been generally overlooked (Tang et al., 2012). This research helps our understanding of how a firm can access the CSR knowledge necessary to efficiently engage in CSR activities. Using the network

Table 4. Robustness checks

Variables	Hypotheses	Alternative Dependent Variable			Continuous Variables Winsorized		
		Model 1			Model 2		
		$\beta$		se	$\beta$		se
<i>Main effect</i>							
Network CSR rating	$H_1 (+)$	.145	**	(.066)	.213	**	(.090)
<i>Moderating effects</i>							
Network CSR rating x firm betweenness centrality	$H_2 (+)$	.433	**	(.219)	.504	*	(.288)
Network CSR rating x firm degree centrality	$H_3 (-)$	-.121	**	(.057)	-.152	**	(.076)
Network CSR rating x firm network brokerage	$H_4 (+)$	.006	**	(.002)	.008	**	(.003)
<i>Control variables</i>							
Firm betweenness centrality		.854		(2.252)	1.941		(5.722)
Firm degree centrality		.612		(.617)	1.866		(1.253)
Firm network brokerage		-.059	*	(.036)	-.068		(.058)
Firm marketing intensity		-.719		(1.069)	-2.15		(1.595)
Firm R&D intensity		-.146	***	(.035)	-.328	**	(.133)
Firm size		.041		(.077)	1.906	*	(1.019)
Firm age		.323	***	(.063)	.425	***	(.084)
Alliance type		-.443		(2.922)	-3.09		(3.849)
<i>Intercept</i>		38.00	***	(6.502)	26.70	***	(9.168)
N		298			298		
R <sup>2</sup>		.355			.344		

Note: For brevity, industry type dummies are omitted from the table. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

analysis technique and combining distinct data, this study provides evidence of CSR knowledge transfer between alliance partners. The study demonstrated that such transfer is influenced by the firm centrality and network brokerage within its alliance network. Most previous research on CSR knowledge focuses on the dyadic level of alliance and ignores the structural properties of the firm's network. Our findings suggest that the structural properties have various influences on the transfer of CSR knowledge.

In addition, the results reveal the contrasting roles of betweenness and degree centrality in affecting the transfer of CSR knowledge. Although both constructs measure different aspects of centrality, the underlining mechanisms of measuring the two constructs are different. Betweenness centrality mainly focuses on the flow of information whereas degree centrality focuses on the connectivity of the firm in the network. This difference has led the two measures to offer opposite impacts on the CSR knowledge transfer. More specifically, occupying a central position in terms of betweenness enables the focal firm to gain diverse CSR knowledge while the larger number of partners, i.e., degree centrality, hinders the firm from efficiently absorbing and disseminating CSR knowledge. Similar to betweenness centrality, network brokerage allows the firm to acquire unique knowledge that cannot be acquired by other alliance partners.

The current research seeks to provide managers with practical insights that might help in understanding how CSR knowledge can be acquired, absorbed, and disseminated within the context of the interfirm network. The results suggest that if managers want to maximize their CSR efforts efficiency, they must look beyond their own firm's borders. They need to recognize how their firms are connected within the overall interfirm network. Considering the costs associated with CSR engagement (Klassen & Whybark, 1999) and the positive association between CSR performance and financial performance (Wang et al., 2016), such knowledge can have a direct impact on the firm's bottom line.

The extant research suggests that some firms might be able to misrepresent, positively, their CSR efforts through public relations activities. This study relies on secondary data that might be subject to such misrepresentation. Primary data collection could help minimize such issue. Future research can also investigate other moderators that can influence the transfer of CSR knowledge between partners such as the structure of alliances or the firm network density. Moreover, future research might examine the transfer of certain types of CSR activity knowledge, such as philanthropy, cause sponsorship, or cause-related marketing.

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