

Knowledge sharing quality on an enterprise social network: social capital and the moderating effect of being a broker

Bas Reus, Christine Moser and Peter Groenewegen

Abstract

Purpose – The purpose of this study is to show that an important antecedent of perceived knowledge quality is an employee's position in the organizational network due to their participation in different interest groups. In particular, this study theorizes that brokers establish a network of groups, which increases perceived knowledge quality vis-a-vis the social capital that employees draw on.

Design/methodology/approach – To test this study's hypotheses on the influence of the structural position of knowledge brokers on the positive effects of social capital on perceived knowledge quality, this study combines data from an online survey with longitudinal archival data from a youth-care organization who used an enterprise social network (ESN) for knowledge sharing.

Findings – This study found a mitigating effect of being a broker on the relationship between trust and perceived knowledge quality, and also between inter-team interaction and perceived knowledge quality for lower levels of both trust and inter-team interaction on perceived knowledge quality.

Research limitations/implications – Although the hypotheses are supported, in light of prior research, the authors would have expected stronger and positive effects.

Practical implications – This research is particularly interesting because it emphasizes the important role of social capital. For organizations that deal with trust issues, it might help to stimulate employees to broaden their activity on ESNs by becoming active in multiple groups.

Originality/value – While knowledge sharing on ESNs is generally conducive for creating organizational value, there is a lack of understanding of what drives employees' perception of the quality of shared knowledge, and how this perception may depend on their position in the social network. To investigate this question, the authors turn to social capital theory.

Keywords Social capital, Knowledge sharing, Brokerage, Enterprise social networks

Paper type Research paper

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Introduction

Sharing and integrating knowledge is critical for organizations to create value through innovation (Tortoriello *et al.*, 2015) and creativity (Mannucci and Yong, 2018), and it has often been described as the most important strategic resource (Ipe, 2003; Nahapiet and Ghoshal, 1998; Zhuge, 2002). One way to help employees to share knowledge and thus boost an organization's strategic resource is to implement an enterprise social network (ESN). An ESN is an online social network situated within an enterprise. Such an online platform focuses on social relations amongst employees within an organization, sharing content in the form of messages and finding answers to specific questions. These ESNs should foster organizational knowledge sharing (Ellison *et al.*, 2015), expansion (Reus *et al.*, 2020) and integration (Zahra *et al.*, 2020). Knowledge integration refers to the ability to bring

together different perspectives, experiences and ideas to create new insights and generate innovative solutions through social interactions (Prieto-Pastor *et al.*, 2018). ESNs are software tools that allow the creation of organizational online communities, where knowledge can not only be searched and retrieved but also actively refined and shared (Mäntymäki and Riemer, 2016), as such facilitating knowledge integration.

Despite the high expectations for knowledge sharing that organizations often have when implementing an ESN, there are numerous obstacles to overcome to stimulate employees to actually use ESNs and share their knowledge (Leonardi *et al.*, 2013). This is because employees may be selective in what and with whom they share knowledge with, or they may protect their knowledge and not share knowledge at all (Gibbs *et al.*, 2013; Kankanhalli *et al.*, 2005). Another obstacle to successful ESN use is that sharing knowledge not necessarily leads to the creation of new or valuable knowledge nor does it always add to its usefulness and quality (Oostervink *et al.*, 2016); and knowledge integration is not necessarily a goal in itself (Barley *et al.*, 2018). Also, how employees perceive the quality of shared knowledge is often contextually (Yoo, 2014) or culturally (Moser and Deichmann, 2020) determined; not all knowledge that is shared is being perceived to be of high quality. Finally, the structural position of people in the network influences how people share knowledge (Zhang and Wang, 2012) and how they perceive knowledge quality (Yoo *et al.*, 2011). To summarize, while knowledge sharing on ESNs is generally conducive for creating organizational value there is a lack of understanding of what drives employees' perception of the quality of the shared knowledge, and how this perception may depend on their position in the social network of employees.

To investigate this lack of understanding, we first turn to social capital theory (Nahapiet and Ghoshal, 1998). Prior work on knowledge sharing in online communities has identified three dimensions of social capital that are important drivers of how knowledge quality is perceived: these dimensions are relational (Chiu *et al.*, 2006), structural (Santos *et al.*, 2015) and cognitive (Yu *et al.*, 2010). These three dimensions are captured by different facets (Nahapiet and Ghoshal, 1998). First, the facet trust pertains to the relational dimension of social capital. Prior research shows that trust is a crucial aspect in determining how people perceive knowledge quality. This is because trust fosters the level of participation and knowledge sharing in online communities (Chiu *et al.*, 2006). The second dimension of social capital is the structural dimension, of which inter-team interaction is a facet. In recent years, inter-team interaction has become more important in organizations. For example, effective inter-team knowledge sharing is highly important in agile software development (Santos *et al.*, 2015) where teams have a high degree of self-organization and benefit from interacting with other teams. The third dimension of social capital is the cognitive dimension, which is about shared language and narratives (Nahapiet and Ghoshal, 1998). Knowledge sharing behavior is an important facet of this cognitive dimension, because it is about fairness, openness and identification in knowledge sharing (Yu *et al.*, 2010).

Thus, the important role of social capital as a driver of knowledge quality perceptions is well established. However, it remains unclear how these perceptions may depend on the position employees have in the social network. While principally all online community participants have equal opportunities to participate, not all of them do so. Specifically online brokers, who have a distinct social network position, fulfill important roles in organizational online communities (Resch and Kock, 2021). The online broker is simultaneously active in multiple online groups. In this way, online brokers form bridges between groups and these groups become therefore connected. Occupying a brokerage position can influence how the quality of shared knowledge is perceived by the broker (Cvitanovic *et al.*, 2017). The broker is embedded within multiple groups, and therefore has access to multiple resources. This impacts the relational, the structural as well as the cognitive dimension of social capital of the broker (Matzler *et al.*, 2008).

We argue here that a broker position also shapes how knowledge quality is being perceived by the broker, for two reasons. First, on ESNs, employees share knowledge about common interests. Their relationships with others who are part of different groups enable employees to better estimate knowledge quality, because interactions with employees from these different groups increases the comprehension and understanding of the shared knowledge. Second, employees who are active in multiple ESN groups share their own knowledge with different groups. This networked environment of groups in which the broker is embedded, enables knowledge recombination, uptake and sharing (Tortoriello *et al.*, 2012) because peoples' structural position and their behavior occur simultaneously and are complementary (Brass and Burkhardt, 1993). As an example of structural influence, in a study of Wikipedia contributions, Zhang and Wang (2012) found a causal relationship between the structural network position of participants and their contribution behavior. The study shows that participants with a higher betweenness centrality (where participants connect different parts of the network) posted more articles and spent more effort across different articles, compared to participants with a lower betweenness centrality. This means that differences in structural network positions relate to different behaviors and outcomes. We add to this argument by investigating the brokerage position between groups in an inter-group network, and pose the following research question:

RQ1. How do brokers perceive the quality of shared knowledge on an ESN, compared to non-brokers?

To answer the research question, we developed hypotheses about how the structural position of brokers moderates the positive effects of social capital on perceived knowledge quality. To test our hypotheses, we collected survey data at a Dutch youth-care organization using an ESN, and we used archival data from the ESN to determine the structural position of the employees that were active on the ESN. We found that a brokerage position moderates the relationship between trust and inter-team interaction on how the quality of knowledge is perceived. Our study contributes to research on network brokerage. While prior studies on the important role of brokers and boundary spanners for the flow of organizational knowledge (Long *et al.*, 2013; Obstfeld *et al.*, 2014), studies on how these knowledge brokers actually experience the quality of knowledge are still scarce (Moser and Deichmann, 2020). We contribute to this debate by demonstrating how employees perceive the quality of the shared knowledge, and how this perception may depend on their position in the social network of employees.

The paper is organized as follows. The theoretical background introduces ENSs, organizational knowledge sharing and the brokerage position. In the section thereafter we provide the hypotheses. In the methods and analysis section we describe the research method and how we collected and analyzed the data. Subsequently we present the results, and conclude with a discussion of the empirical findings where we describe limitations and suggest future research.

Theoretical background

ESNs are digital platforms on which employees share knowledge with colleagues. In contrast to online social networks, such as Facebook or LinkedIn which have similar features, an ESN is only accessible for members of the organization. ESNs are designed for work-related use among employees and are often customized to meet the specific needs of an organization (Aboelmaged, 2018). The number of employees that are using online tools such as ESNs is growing, because of increasing technology skills as well as the fact that new employees are often digital natives. In fact, employees from younger generations already expects technologies such as ESNs to be present in any organization (Tajudeen *et al.*, 2018; Van Zyl, 2009). ESNs allow the creation of communities or groups for knowledge sharing. For many years now, technology plays an essential role in enabling knowledge sharing in organizations (Alavi and Leidner, 1999; Chin *et al.*, 2020;

[Phelps et al., 2012](#)). Since the end of the previous century this resulted in the increased use of knowledge management systems (KMSs; [Aksycyn et al., 1987](#)). These KMSs enabled the search and retrieval of documents. In the meantime, KMSs have in many organizations been replaced by ESNs.

Knowledge sharing is thought to be an essential prerequisite for effective knowledge management ([Wasko and Faraj, 2005](#)). It may lead knowledge creation and learning. Organizations that adopt an ESN are growing in numbers, however the ESN does not always fulfill their expectations and sometimes the investments in the ESN are questioned ([Figueroa and Cranefield, 2012](#); [Wehner et al., 2017](#)). Despite the high expectations organizations may have when implementing an ESN within their organization, there are numerous obstacles to overcome to stimulate employees to actually use it ([Leonardi et al., 2013](#)). Even when knowledge is abundantly shared within the organization, there are still factors that prevent knowledge sharing to be fruitful or effective ([Von Krogh, 2012](#)), as ESNs may fail to output new or useful knowledge ([Yoo et al., 2011](#)).

While knowledge sharing and integration in organizations is important, the perceived quality of knowledge is often contextually ([Yoo, 2014](#)) and culturally ([Moser and Deichmann, 2020](#)) determined. First, employees need some motivation to share their knowledge. Roughly, there are two types of motivations: organization-based and individual-based motivations ([Jin et al., 2015](#)). First, organization-based motivations refer to culture, norms, structure and management support. One example of organization-based cultural motivations is trust. A culture that emphasizes trust has been found to promote knowledge sharing ([Hsu, 2006](#)). Second, individual-based motivations refer to personal characteristics, perceived benefits and costs and interpersonal trust. They have a major impact on sharing on ESNs ([Aboelmaged, 2018](#)). People who are more confident in their ability to share knowledge are more likely to do so ([Cabrera and Cabrera, 2005](#)). Employees will also share more knowledge when doing so enhances their professional reputation ([Wasko and Faraj, 2005](#)) or strengthens their relationships. This facilitates requesting support or engaging in the exchange of resources and information ([Bock et al., 2011](#); [Matthews et al., 2012](#)).

Second, the context within which individuals are sharing knowledge is shaped by their role, function, location and tenure. However, on an ESN, the context of the individual is expanded or even transformed. For example, team leaders or managers are traditionally involved in many subgroups due to their function and role. They are brokers between organizational entities and have responsibilities in both facilitating collaboration and adjusting work to activities elsewhere in the organization. On an ESN, individual characteristics, often moderated by factors such as function or tenure ([Woods et al., 2018](#)), can play a substantial role due to the decentralized nature of the ESN ([Sigala and Chalkiti, 2015](#)). Characteristics such as openness, confidence and other psychological factors may make employees more comfortable in seeking and occupying brokerage positions between online groups ([Matzler et al., 2008](#)). Such brokerage positions have generally been theorized as important to integrating diverse knowledge sources from different groups ([Burt, 2000](#); [Obstfeld, 2005](#); [Reus et al., 2020](#)).

Brokerage positions can be important for employees as well as the organization. For example, employees can have bonding ties (i.e. strong ties resulting in cohesive networks) with other group members, giving preference to interpersonal relationships resulting in higher levels of closure within a group. Alternatively, employees can forge bridging ties (i.e. weak ties resulting in networks with structural holes) with others, giving preference to the usefulness of the content exchange through the ties with group members resulting in more structural holes. From a structural point of view, both bonding and bridging structures have their benefits for brokers and organizations ([Burt, 1992](#); [Coleman, 1988](#)). More recent research highlights that the benefits of broker positions depend on the intensity of collaborations ([Soda et al., 2019](#)), and that these benefits influence how brokers connect others ([Obstfeld et al., 2014](#)). Brokers are also beneficial for organizations as the brokers

increase the spread of knowledge sharing and promote knowledge integration, which is important for an organization's competitive advantage (Grant, 1996; Zahra *et al.*, 2020) and internal coordination (Kozlowski and Ilgen, 2006).

Thus, brokerage is important for an ESN because it enables the flow of knowledge between groups. On an ESN, many groups are connected by employees who are members of multiple groups (O'Leary *et al.*, 2011). Their multiple group memberships define the network of groups. How employees are embedded in the inter-group network influences how they can interact with these groups (Olabisi and Lewis, 2018). The number of connections to other groups changes the individual context of accessibility to knowledge, and thus may influence how employees perceive the quality of the shared knowledge (Yoo *et al.*, 2011).

Hypotheses

In this paper, we argue that a broker position on an ESN moderates the positive effect of social capital on perceived knowledge quality. Analogous to the three social capital perspectives identified by Nahapiet and Ghoshal (1998), relational, structural and cognitive capital, we focus on trust, inter-team interaction and knowledge sharing behavior.

Relational social capital

Building on the relational perspective on social capital (Nahapiet and Ghoshal, 1998) and prior research (Chiu *et al.*, 2006), we first focus on the role of trust in knowledge sharing. Trust is the belief that others' intentions are good and their actions are appropriate and facilitate cooperative behavior (Nahapiet and Ghoshal, 1998). In online environments, trust plays an essential role in the quality of knowledge sharing (Chiu *et al.*, 2006) because it creates an atmosphere of openness to engage with others and to share knowledge (Ridings *et al.*, 2002). Consequently, trust in online environments like ESNs has been positively associated with the quality of shared knowledge (Chiu *et al.*, 2006; Moser and Deichmann, 2020) resulting in the following hypothesis:

H1a. Trust is positively associated with perceived knowledge quality.

Brokers are familiar with many different groups and are familiar with the knowledge that is being shared in these groups. And because the goal of online groups on ESNs is often to share knowledge and answer each other's questions, brokers may gain the groups' trust. This is because brokers are able to answer many questions, drawing on their extensive knowledge gained from different groups. In addition, brokers are aware of multiple groups' social norms. This familiarity reduces uncertainty about how the group may share knowledge internally and externally. This may result in higher perceived knowledge quality for brokers. Finally, brokers may be seen as a "gateway" to other ESN members, because they are connected to multiple groups. This reduces brokers' own uncertainties, because from their connected position they can better evaluate the trustworthiness of others (Kim and Aldrich, 2005), and consequently forge new relationships from an informed perspective. Finally, trust is a relational construct that requires a trustor and a trustee (McEvily *et al.*, 2003). Brokers have on average more relationships because they are active in multiple groups. Brokers therefore may have more opportunities to be trusted, which may enhance their perceptions of the quality of the shared knowledge:

H1b. The positive effect of trust on perceived knowledge quality is higher for brokers than for non-brokers.

Structural social capital

The structural perspective on social capital highlights the important role of linkages between organizational units (Nahapiet and Ghoshal, 1998) such as teams. Inter-team

interaction is a consequence of how organizational culture supports communication and cooperation between teams, and higher levels of such interactions drive long-term team success (Ancona and Caldwell, 1992). In organizations where knowledge is an important asset, the organization might benefit from high levels of interaction between teams (Santos *et al.*, 2015). Existing literature also points out that inter-team interactions increase team member satisfaction, team effectiveness and performance (Doolen *et al.*, 2003). This leads us to the following hypothesis:

H2a. Inter-team interaction is positively associated with perceived knowledge quality.

Inter-team interaction hinges on brokers, because brokers connect different teams (or groups, as we argued above). On an ESN, their brokering activities are further facilitated by the ESNs technological affordances: anybody can join and participate regardless of space and time (as long as there is an active internet connection) which makes the broker's role easier. In connecting teams, brokers can either close structural holes or strengthen existing connections between groups. Closing structural holes and strengthening existing connections may affect how brokers perceive knowledge quality. This is because brokers' activities provide them with access to knowledge from different groups, which in turn enables them to evaluate the shared knowledge. Previous research demonstrated that interaction between individuals of different teams increases the exchange of important information which contributed to individuals' and collaborative success (Marsteller *et al.*, 2007). Thus, we propose that a broker position moderates the relationship of inter-team interaction on perceived knowledge quality:

H2b. The positive effect of inter-team interaction on perceived knowledge quality is higher for brokers than for non-brokers.

Cognitive social capital

Finally, we turn to the cognitive perspective on social capital which pertains to the "resources providing shared representations, interpretations, and systems of meaning among parties" (Nahapiet and Ghoshal, 1998, p. 244). In the context of the current study, this suggests that knowledge needs to be shared with others for knowledge quality to be assessed. Hence, knowledge sharing behavior is an important instantiation of cognitive social capital and can be defined as the willingness of individuals in a virtual community to share with others the knowledge they have acquired or created (Yu *et al.*, 2010). In electronic environments such as an ESN, people share knowledge for various reasons. Some people share knowledge because they want to develop interpersonal relationships (Matzler *et al.*, 2008), others share knowledge to gain credibility in the community (Reinholt *et al.*, 2011), while yet others actively share knowledge to set an example accepting knowledge sharing as part of their responsibilities (Yu *et al.*, 2010). These employees are typically intrinsically motivated; they are convinced of the quality of the shared knowledge, and they have confidence in the technology they use (Kumi and Sabherwal, 2018). Such motivated employees are generally more curious and open (Wasko and Faraj, 2005) and they firmly believe that knowledge needs to be shared between groups (Matzler *et al.*, 2008). These arguments allow us to formulate the following hypothesis:

H3a. Knowledge sharing behavior is positively associated with perceived knowledge quality.

Brokers frequently participate in knowledge sharing by actively bridging different groups. Therefore, brokers are more likely to perceive the quality of the shared knowledge as higher when compared to other employees. Thus, brokers are not only more active on ESNs, they are also more experienced and advanced in sharing knowledge using technology:

H3b. The positive effect of knowledge sharing behavior on perceived knowledge quality is higher for brokers than for non-brokers.

The proposed theoretical model is depicted in [Figure 1](#).

Method and analysis

Setting

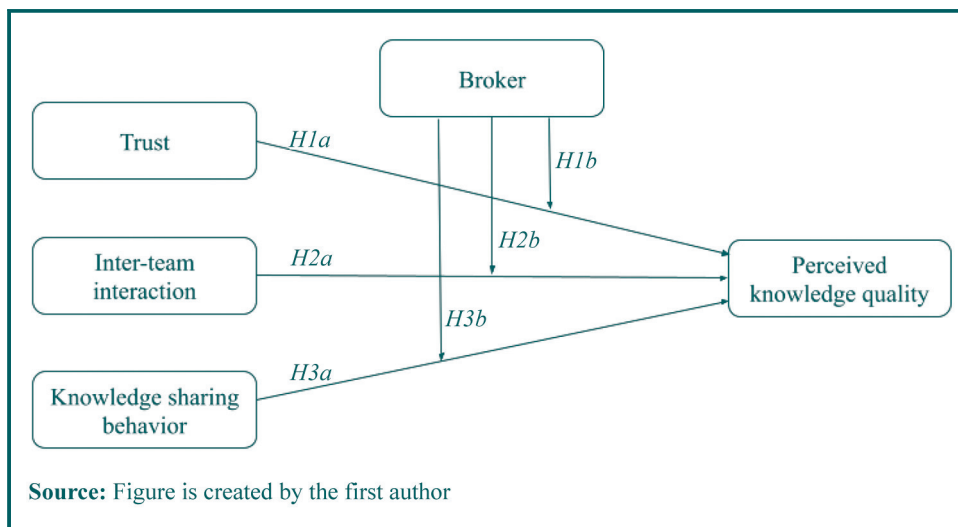
We conducted a survey within a Dutch youth-care organization with approximately 2,500 employees. This organization helps families and foster homes with parenting. These activities take place at many different locations, resulting in a very decentralized and geographically dispersed organization. This organization started to use an ESN in 2013 as part of an organizational change project, where most managerial roles were abolished. The ESN was deployed to facilitate a decentralized form of organizing. Within this new organizational form, more than 1,500 employees made use of the ESN. The ESN was presented as a new intranet: a social intranet that replaced the old, static intranet. This organization was therefore very suitable for investigating our research question, as the brokers and non-brokers on the ESN were to shape the development of the new organizational form.

We designed an online survey[1] that consisted of 5-point Likert scales. The survey questions were translated to Dutch and validated by native speakers with professional English language skills to ensure correct translation. The survey was sent out to 1,586 employees with an active account on the ESN by means of a personalized email. After one reminder three weeks later, 337 employees had completed the survey, resulting in a response rate of 21.2%. In addition, we collected archival data (2013–2018) from the same ESN. The archival data include messages. These messages contain metadata on which employee posted the message, at what date and time and in which group. The dependent and independent variables use survey data, and we used the archival data from the ESN to compute the moderating variable (who is a broker) and the control variables.

Dependent variable

Perceived knowledge quality (six items, $\alpha = 0.92$) measured the perceived quality of knowledge that is shared online. The construct was adapted from [Chiu et al. \(2006\)](#) to fit the research context. A sample item is “The knowledge shared by community members is accurate.”

Figure 1 Research model



Independent variables

The measure of *trust* (three items, $\alpha = 0.87$) was adapted from He and Wei (2009) to fit the context of this research. We measured trust with items such as “I have faith in other community members and trust them.” Trust was defined as the belief that others’ intentions are good and their actions are appropriate (Nahapiet and Ghoshal, 1998). *Inter-team interaction* (seven items, $\alpha = 0.77$) measured the extent to which the organizational culture supports communications and cooperation between teams in the organization. This construct was adapted from Doolen (2001) and Campion *et al.* (1993) and was assessed with items such as “Members of my team frequently talk to other people in the organization besides the people on my team.” *Knowledge sharing behavior* (four items, $\alpha = 0.86$) was adapted from Yu *et al.* (2010) and measured the willingness of individuals in a virtual community to share with others the knowledge they have acquired or created. A sample question is “I have contributed knowledge to this community.”

Moderating variables

Broker is a binary value that receives a value of 1 when the employee was active in (at least) two ESN groups during a period of 30 days, otherwise 0.

Control variables

Betweenness is the employee’s betweenness score, calculated based on their activity in various groups. Members with high betweenness in a social network will forge more relationships with others, which results in a central and trustworthy position (Abbasi *et al.*, 2012) and more awareness of who knows whom (Kozłowski and Ilgen, 2006; Leonardi, 2014). *Days active* is the number of days between an employee’s first and last contribution. Employees who are active on the ESN for a long time may be more aware of knowledge that has been shared in the past, and by whom, allowing them to better judge knowledge quality (Chiu *et al.*, 2006). *Bridges count* is the number of connections that an employee has between groups as a broker, which increases the knowledge expansion between groups (Reus *et al.*, 2020).

Analysis

A *t-test* revealed that about half of the answers of respondents identified as brokers were significantly different from other respondents, contributing to our conviction that the broker variable is relevant in the context of our research. To examine the factorability of the data, we created a correlation matrix of all items from the scales Perceived knowledge quality, Trust, Inter-team interaction and Knowledge sharing behavior. All items except one correlated at least 0.5 with at least one other item, while most items correlated above 0.7. The Kaiser–Meyer–Olkin test (0.86) suggests good sampling adequacy. Bartlett’s test of sphericity was significant [$\chi^2(325) = 4298, p < 0.001$], indicating strong relations among the variables. Initial Eigenvalues showed that the first four factors had Eigenvalues over 1 and explained 28.9%, 13.9%, 11.2% and 8.9% of the variance. Principal component analysis with Varimax rotation and Kaiser Normalization reveals four factors, which explained 63% of the variance. Primary factor loadings were 0.58 or higher (except for Inter1 and Inter2), see Table 1. Inter1 and Inter2 did not load high on one component exclusively, therefore we dropped these from further analysis.

We then calculated the Cronbach’s alphas for the constructs, which were all above 0.76. A Cronbach’s alpha greater than 0.7 is often the criterion used to evaluate whether a scale possesses an acceptable level of internal reliability.

Table 1 Rotated component matrix

Item	Rotated component matrix			
	1	2	3	4
PKQ1	0.58			
PKQ2	0.66			
PKQ3	0.80			
PKQ4	0.80			
PKQ5	0.68			
PKQ6	0.62			
Trust1		0.80		
Trust2		0.82		
Trust3		0.88		
Inter1			0.52	0.36
Inter2		0.52	0.11	
Inter3			0.70	
Inter4			0.79	
Inter5			0.80	
Inter6			0.82	
Inter7			0.74	
KSB1				0.85
KSB2				0.88
KSB3				0.87
KSB4				0.76

Source: Table is created by the first author

Results

In Table 2, we report the means, standard deviations and correlations of the measures. Correlations are generally low (< 0.5), except for the two control variables betweenness and bridging count (0.79), a relation that is well established in the social network literature (Everett and Valente, 2016). Although some of the measures are correlated, multicollinearity proved not to be problematic. The maximum VIF in our model is 3.21 (mean of 1.78), which is far below the generally accepted cut-off of 10 for regression models (Field, 2009). For the regression analyses, the control, independent and moderator variables were mean-centered to avoid multicollinearity issues.

Model 2 in Table 3 shows that all direct effects from hypotheses $H1a$ ($\beta = 0.13$, $SE = 0.03$, $p \leq 0.001$), $H2a$ ($\beta = 0.14$, $SE = 0.03$, $p \leq 0.001$) and $H3a$ ($\beta = 0.09$, $SE = 0.04$, $p \leq 0.01$) are supported ($R^2 = 0.23$, $F = 11.11$). Models 4 ($\beta = -0.08$, $SE = 0.03$, $p \leq 0.05$, $R^2 = 0.15$, $F = 6.20$) and 5 ($\beta = -0.07$, $SE = 0.03$, $p \leq 0.05$, $R^2 = 0.17$, $F = 7.68$) show the significant interaction effects hypothesized in $H1b$ and $H2b$, respectively. Model 6 shows no

Table 2 Descriptive statistics and correlation matrix

Variable	Descriptive statistics and correlation matrix											
	Mean	SD	Min.	Max.	1	2	3	4	5	6	7	
1. Perceived knowledge quality	3.70	0.53	1.67	5.00								
2. Trust	4.15	0.57	1.67	5.00	0.42***							
3. Inter-team interaction	3.10	0.56	1.00	5.00	0.31***	0.20***						
4. Knowledge sharing behavior	2.80	0.92	1.00	5.00	0.27*	0.12*	0.28***					
5. Broker	0.28	0.45	0.00	1.00	0.08	0.18***	0.10	0.32***				
6. Days active	1069.68	789.57	0.00	1877.00	-0.05	0.05	0.09	0.05	0.48***			
7. Betweenness	85.15	315.17	0.00	2146.28	0.11*	0.13*	0.09	0.35***	0.44***	0.25***		
8. Bridging count	13.93	70.21	0.00	619.00	0.08	0.09	0.06	0.24***	0.32***	0.18***	0.79***	

Notes: $N = 337$; *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$
Source: Table is created by the first author

Table 3 Results of linear regression on perceived knowledge quality

Variables	Results of regression analysis on perceived knowledge quality												
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8					
Constant	3.68***	0.04	3.68***	0.03	3.68***	0.03	3.70***	0.04	3.71***	0.04	4.02***	0.16	
Days active	-0.05	0.04	-0.05	0.03	-0.06†	0.04	-0.05	0.04	-0.07*	0.04	-0.04	0.03	0.03
Betweenness	0.11*	0.06	0.02	0.06	0.09	0.06	0.09	0.06	0.09	0.06	0.05	0.06	0.06
Bridges count	-0.03	0.06	-0.01	0.05	-0.03	0.06	-0.02	0.05	-0.02	0.05	-0.02	0.05	-0.01
Broker			0.05	0.04	0.05	0.04	0.02	0.04	0.04	0.04	-0.02	0.04	0.38†
Trust			0.13***	0.03		0.15***	0.03			0.13***	0.03	0.13***	0.04
Inter-team Interaction			0.14***	0.03					0.19***	0.03		0.14***	0.05
Knowledge Sharing Behavior			0.09**	0.04					0.14***	0.04	0.11**	0.04	0.11**
Trust × Broker													
Inter-team Interaction × Broker													
Knowledge Sharing Behavior × Broker													
Trust squared													
Inter-team Interaction squared													
Knowledge Sharing Behavior squared													
Trust squared × Broker													
Inter-team Interaction squared × Broker													
Knowledge Sharing Behavior sq. × Broker													
F	2.519†		11.11***		2.272†		6.20***		7.685***		7.735***		5.383***
R ²	0.03		0.23		0.04		0.15		0.17		0.27		0.29

Notes: N = 337 survey responses; *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$, † $p \leq 0.10$; Standard error in parentheses

Source: Table is created by the first author

significance for the interaction effect hypothesized in *H3b*. Model 7 ($R^2 = 0.27$, $F = 7.74$) and Model 8 ($R^2 = 0.29$, $F = 5.38$) contains all hypothesized interaction effects combined. Model 7 contains interaction effects on the predictor variables in line with our hypotheses. Interpreting Model 7, *H1b* is marginally supported ($\beta = -0.06$, $SE = 0.03$, $p \leq 0.10$), as the coefficient is only statistically significant at the 0.10 level (p -value is 0.098). Figure 2 shows this moderated relationship of being a broker on trust and perceived knowledge quality from Model 7. *H2b* is also marginally supported ($\beta = -0.06$, $SE = 0.03$, $p \leq 0.10$) as the coefficient is statistically significant at the 0.10 level (p -value is 0.070). Figure 3 shows this moderated relationship of being a broker on inter-team interaction and perceived knowledge quality from Model 7. *H3b* is not supported (Table 3, Model 7; $\beta = -0.03$, $SE = 0.04$).

Model 8 contains interaction effects of being a broker on the squared predictor variables. We added this model to explore possible non-linear effects, because the results from Model 7 are not fully in line with our hypotheses. By interpreting Model 8, *H1b* is not supported

Figure 2 Interaction between trust and perceived knowledge quality

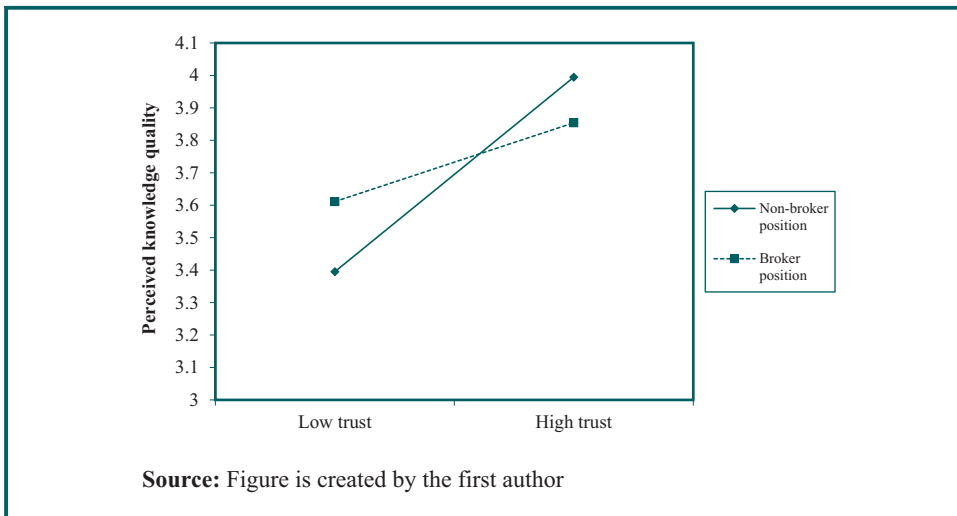
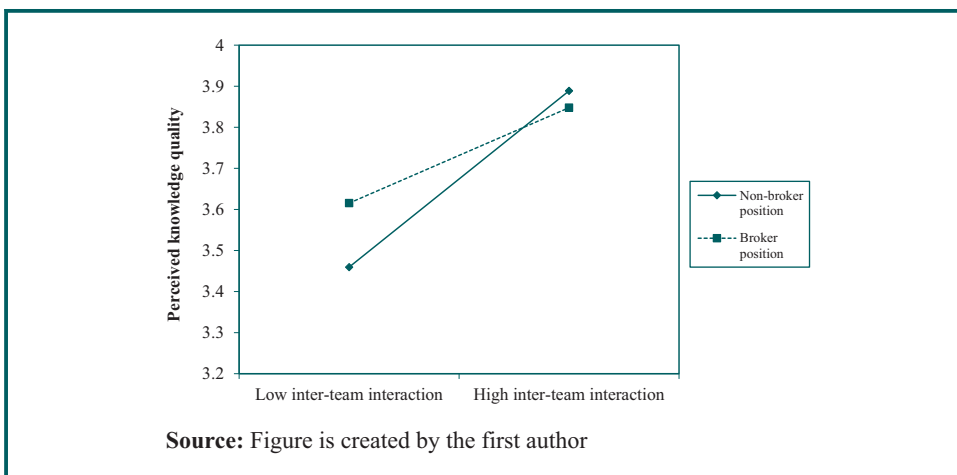


Figure 3 Interaction between inter-team interaction and perceived knowledge quality



($\beta = -0.01$, SE = 0.03). *H2b* is supported ($\beta = 0.03$, SE = 0.02) and *H3b* is also supported ($\beta = -0.06$, SE = 0.03). We will further explore Model 8 in the next section.

Discussion

In this study, we investigated the moderating effect of a broker position on the positive relationship between social capital and perceived knowledge quality. We tested our hypotheses using survey and archival data collected at a Dutch youth-care organization. The direct effects as hypothesized in *H1a*, *H2a* and *H3a* are all confirmed. Regarding the interaction effects, we found a marginally significant effect of being a broker on the relationship between trust and perceived knowledge quality, and also between inter-team interaction and perceived knowledge quality. Also, brokers and non-brokers perceive knowledge quality at roughly the same levels at high levels of trust and inter-team interaction, while being a broker mitigates the effect for lower levels of both trust and inter-team interaction on perceived knowledge quality, as depicted in [Figures 2 and 3](#).

Theoretical implications

Our findings add to the literature on brokerage in online communities. Brokering between groups shapes the effect of trust on perceived knowledge quality such that the perceived knowledge quality is higher for brokers when trust is low; and the perceived knowledge quality is almost equal for brokers as for non-brokers when trust is high. For inter-team interaction we found similar effects. In situations where trust and inter-team interaction is low, brokers experience higher levels of knowledge quality compared to non-brokers. However, when trust and inter-team interaction are at high levels as reported by employees, both brokers and non-brokers experience higher levels of knowledge quality. For knowledge sharing behavior we did not observe an interaction effect. While we hypothesized differently, this result may to some extent be explained by a study of [Brennecke and Rank \(2016\)](#). Here, the authors investigated advice networks where shared group membership created advice ties, but advice was not exchanged reciprocally. In our case, brokers might share knowledge, but might not necessarily exchange knowledge reciprocally (i.e. responding to others' knowledge sharing with their own shared knowledge).

The interaction effect of being a broker and both trust and inter-team interaction on perceived knowledge quality might be explained by the distinctive characteristic of brokers. By being active in multiple groups, brokers have better insights into what is being shared on the ESN and therefore might find that knowledge quality varies. Our study shows that the important structural position of brokers influences how they perceive the quality of the knowledge shared on ESNs. This is in line with prior research stating that structural position and behavior are simultaneous and complementary, and influence each other ([Brass and Burkhardt, 1993](#); [Zhang and Wang, 2012](#)). Not only do brokers perceive the quality of shared knowledge differently, they may also experience the effect of trust and inter-team interaction on perceived knowledge quality somewhat differently. This might be explained by organizational and individual affordances that shape how the ESN is used ([Ellison et al., 2015](#)). In general, according to our results brokers evaluate knowledge quality as less dependent on social capital as compared with non-brokers. One explanation might be that their structural position enables them to make more objective conclusions on the shared knowledge, and that the others who are not in broker positions experience higher knowledge quality when it coincides with higher levels of trust and inter-team interaction.

Practical implications

In the current setting, we were able to investigate the self-reported behavior of brokers and combine survey data with archival data. We show that social capital shapes brokers'

perceived knowledge quality, tapping into the potential value that exists within the social relations between employees on an ESN. For organizations that already use ESNs or plan to do so as the number of organization that introduce ESNs is growing (Wehner *et al.*, 2017), our research is particularly interesting because it emphasizes the important role of social capital. For example, for organizations that deal with trust issues, it might help to stimulate employees to broaden their activity on ESNs by becoming active in multiple groups. Having more employees that are active as brokers might then mitigate the effect that low values of trust have. For organizations that manufacture ESNs, this research provides arguments for visualizing brokers on the ESN. This is because such visualizations, for example using badges, can help to identify employees who are apparently better able to leverage their social capital with regard to how they perceive the quality of shared knowledge. Organizations might want to mobilize these employees for example in creative or leadership roles, given their brokerage position in general and ability to mobilize social capital in particular. Finally, our study shows that better connections between online groups are associated with a perceived higher quality of knowledge sharing. If organizations were to identify missing connections between groups, they could optimize these connections and thus boost knowledge integration.

Limitations and future research

A limitation that we need to address is the significance levels of the interaction effects in the full model (Table 3, Model 7). In the full model, the direct effects hypothesized in *H1a*, *H2a* and *H3a* hold, however the interaction effects of *H1b* and *H2b* have *p*-values between 0.05 and 0.10. These results, although suggestive of an association, did not achieve statistical significance at the 0.05 level (although a significant *F*-value). We reported these results as marginally significant, however, some scholars recommend against reporting these results that way (Olsson-Collentine *et al.*, 2019). The *t*-test we conducted still convinces us that the broker variable is relevant in the context of our research. A possible explanation of non-significance results at the 0.05 level might be the possibility of non-linearity in the predictor variables. As such, we added another full model (Table 3, Model 8) with quadratic interactions. The results reported in Model 8 strengthen our conviction of *H2b*, although we did not hypothesize moderation on a quadratic main effect.

The interaction effects of trust and inter-team interaction were marginally significant and negative. Although the hypotheses are still supported because a broker position indeed increases the effect of trust and inter-team interaction on perceived knowledge quality (Figures 2 and 3), in light of prior research we would have expected a stronger and positive effect. Future research should replicate these findings and identify possible boundary conditions or confounding variables that might help to address this issue.

Another limitation of our study is that we were unable to evaluate the actual content from messages that was shared on the ESN, therefore we could not evaluate the quality of the content. Future research might address this issue and investigate knowledge quality more objectively. Another limitation is that we did not control for attributes such as location, function or tenure. These attributes might possibly influence which people might be predetermined to become brokers, and hence how they might evaluate knowledge quality. In future, scholars might include more data points to address this shortcoming.

A suggestion for future research we would like to mention is to go beyond knowledge creation and relate our findings to open innovation. The relation between knowledge quality and innovation is barely touched upon in existing literature, with notable exceptions such as the study by Ganguly *et al.* (2019). While both innovation and knowledge creation involve generating new insights, innovation goes a step further by applying knowledge in a practical way to create value for the market (Popadiuk and Choo, 2006). Our study indicates that brokers experience the quality of shared knowledge differently compared to non-brokers. When internal factors as trust and inter-team interaction are relatively low, they

do not hinder the brokers in how they experience the knowledge quality, which makes brokers a particularly interesting group to involve in open innovation processes. For example, we would expect brokers to be better qualified to judge the quality of externally shared knowledge. This relates to a recent case study by Crupi *et al.* (2021), which focuses on lowering knowledge sharing barriers in favor of open innovation.

Note

1. Survey questions can be retrieved from the corresponding author.

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