

# Reciprocal intention in knowledge seeking: Examining social exchange theory in an online professional community

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## ABSTRACT

The free-rider problem in an online professional community could, over time, undermine the wealth of the community and deplete the knowledge inventory to unacceptable levels. A knowledge seeker's intention to reciprocate is motivated by perceived social benefits. An interpretation of intention to reciprocate cannot be fully addressed without investigating how knowledge seekers define the community support received in their knowledge-seeking process. This study suggests that perceived community support is the degree to which knowledge seekers perceive a supportive climate created by linking actors. An empirical study involving 471 knowledge seekers was conducted in an online professional community that seekers used to search for and acquire programming knowledge. The results indicated that knowledge seekers take perceived social benefits and perceived community support into account when forming an intention to reciprocate. In addition, perceived community support positively moderated the effect of knowledge-seeking effort on perceived social benefits. These findings contribute to the existing literature on knowledge-seeking by using social exchange theory to integrate perceived community support and better explain the intention of knowledge seekers to reciprocate in an online professional community. Theoretical and practical implications derived from the findings are further discussed.

## 1. Introduction

Participation in an online professional community allows professionals from diverse backgrounds and with unique perspectives to connect with each other and this leads to a deeper understanding of current practices through the exchange of knowledge. (Alalwan, Rana, Dwivedi, & Algharabat, 2017; Chan & Li, 2010; Dwivedi et al., 2018; Khansa, Ma, Liginlal, & Kim, 2015; Park, Gu, Leung, & Konana, 2014; Shiau, Dwivedi, & Yang, 2017). Reciprocity is essential for such communities in order to sustain the increase of knowledge and to support the professional development of the members (Chen & Hung, 2010; Dwivedi, Kapoor, & Chen, 2015; Hung, Lai, & Chou, 2015; Ngai, Tao, & Moon, 2015). Reciprocal interdependence in a social network supports professional learning as it enables community members who share similar interests and specialties to accumulate valuable information and facilitates collaborative problem solving (Yan & Davison, 2013). Extant studies have drawn on social exchange theory (SET) to understand the behavior of knowledge contributors and knowledge seekers (Chen & Hung, 2010; Kapoor et al., 2018; Phang, Kankanhalli, & Sabherwal, 2009; Yan & Jian, 2017; Ye, Feng, & Choi, 2015). SET theorists have

concluded that the acts of knowledge seeking and contributing follow the principles of economics (Aswani, Kar, Ilavarasan, & Dwivedi, 2018; Bock, Zmud, Kim, & Lee, 2005; Chiu, Hsu, & Wang, 2006; Yan & Jian, 2017). Knowledge seekers sacrifice time and effort in order to gain knowledge they could use to their own benefit, while knowledge contributors provide valuable knowledge which builds up their reputations and leads to self-fulfillment (Lai, Chen, & Chang, 2014; Singh, Chandwani, & Kumar, 2017).

Knowledge contributors aim to provide quality user-generated content and, in return, expect to receive help from others in the future (Kang, Lee, & Kim, 2017; Kapoor et al., 2018; Yan & Jian, 2017). Knowledge seekers, on the other hand, are generally not involved in content-creation efforts, at least not initially, and thus the marginal cost of obtaining knowledge could be considered negligible in an online professional community (He & Wei, 2009). In fact, knowledge seekers regularly have the option of exerting little effort to reap the benefits of other contributors' efforts (Borgatti & Cross, 2003). This phenomenon is characterized as the free-rider problem in knowledge-sharing dilemmas (Cabrera & Cabrera, 2002; Cress, Kimmerle, & Hesse, 2006; Kimmerle, Cress, & Hesse, 2007). A single free-rider is, of course, unlikely to

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bankrupt the wealth of the whole community (Von Krogh, 2002), but it is impossible for the community to ensure that the absolute number of contributors will always be adequate to provide knowledge for seekers to freely use. In the long term, the online professional community needs some knowledge seekers to reciprocate by contributing their knowledge in order to increase the number of contributors and sustain the available knowledge flow for everyone to use (Chen & Hung, 2010).

SET draws on the logic of transaction cost economics (Cropanzano & Mitchell, 2005; Emerson, 1976; Wasko & Faraj, 2005). As members receive tangible and intangible benefits from the subject, they develop and embrace a norm of reciprocity toward the subject (Gouldner, 1960). Knowledge seekers obtain the knowledge desired by exerting a seeking effort, which is the cost involved, with the expectation that this knowledge will be worth more than the cost. The total benefits, both tangible and intangible, and total costs are then determined in order to obtain an estimate of the social benefits. The underlying mechanics of SET models show that reciprocal behavior is driven by *perceived social benefits* (PSB) which is jointly determined by all benefits and costs from knowledge seeking. PSB refers to the extent to which the net benefits obtained by an individual have been offset by the corresponding costs in the knowledge-seeking process (Kankanhalli, Tan, & Wei, 2005). Knowledge seekers recognize the presence of social benefits when the amount of quality knowledge and intangible benefits gathered through necessary social participation is *greater* than the total effort exerted (Cropanzano & Mitchell, 2005; Emerson, 1976). Seekers may take an unreasonable amount of effort to obtain the desired knowledge, and thus rationalize that no social benefit was achieved due to the high levels of effort required. This phenomenon requires an investigation into how knowledge seekers leverage benefits and costs in the process of developing reciprocity. In accordance with SET, this study proposes that *knowledge growth* and *knowledge-seeking effort* jointly determine how an individual views social benefits and thus determines whether they will behave reciprocally (Bock, Kankanhalli, & Sharma, 2006).

No community can guarantee that every seeker will obtain the desired knowledge even when they have exerted a high level of effort in searching and acquiring knowledge (Wasko & Faraj, 2005). This is due to the fact that participation in an online community is usually an uncertain situation for seekers (Bock et al., 2006). A further interpretation of reciprocal behavior should consider the role of “linking actors” who connect seekers with knowledge sources (Beck, Pahlke, & Seebach, 2014; Cropanzano & Mitchell, 2005; Emerson, 1976; Gouldner, 1960; Shiau, Dwivedi, & Lai, 2018). For example, if Person A has particular knowledge relating to a certain subject (whether it be personal, from experience, or from knowledge exchanged in posts) they could offer this specific knowledge to Person B during the knowledge-seeking process by providing a detailed answer or by identifying another potential source of the relevant information. Knowledge seekers, such as Person B, could find the required knowledge through searching multiple posts or files distributed in the online professional community by themselves, or they could obtain the knowledge from their interaction with a single person providing generous, unselfish support, such as Person A. In each case of knowledge seeking, there is the possibility for the knowledge seeker to engage in dyadic interactions with linking actors like Person A. Different linking actors may provide different levels of social support and assistance. Reciprocity is incentivized when the seeker perceives the linking actors as beneficial, and may not occur if the seeker perceives the linking actors behave selfishly or in a manner that violates trust (He, Fang, & Wei, 2009; Singh et al., 2017). A supportive climate is a key factor in explaining the reasons seekers engage in reciprocal relationships within the community (Beck et al., 2014; Yan & Jian, 2017). Unfortunately, the current trend in knowledge-seeking studies sheds little light on explaining this issue. In this study, *perceived community support* (PCS) is conceptualized as a shared belief that linking actors act for the benefit of the community and care about the common good. The presence of community support conveys to seekers that there are many actors willing to provide knowledge to help them.

The level of PCS can help the seeker recognize the efforts of others, adjust their knowledge-seeking efforts to an appropriate level, and appreciate the knowledge they receive.

This study aims to address these related issues by investigating the following research questions: First, what is the relationship between knowledge growth, knowledge-seeking effort and reciprocity in light of SET when considering the role of PSB? Explanations of PSB can deepen our understanding of the reasons social exchange is able to induce reciprocity in online professional communities. Second, how do the contingent effects of PCS facilitate reciprocity? Social exchange not only involves a series of transactions with benefits and costs, but also relies on the supportive climate created by linking actors in a series of exchanges. It is argued that a supportive climate is able to reduce the uncertainty in an exchange relationship by enhancing the seeker's appreciation for the knowledge received and the recognition of the efforts of others, as well as by adjusting their expectations of the knowledge-seeking effort to a more favorable level. Ultimately, this study aims to increase understanding of knowledge seeking and reciprocity in an online professional community by examining the reasons for reciprocity as well as the ways in which a supportive climate is created through the use of linking actors to foster reciprocity. The empirical evidence offers important implications for management practices and future research.

## 2. Theoretical background

Knowledge-sharing literature has fallen short when it comes to understanding reciprocal behavior and this is due to the fact that the contributing behavior itself is usually considered one of the reciprocal behaviors toward the online community (Chai & Kim, 2012; Ye et al., 2015). Knowledge contributors are very different from knowledge seekers in that they place less weight on the amount of social support they receive when obtaining the desired knowledge and place more weight on the social recognition they gain after sharing their knowledge. Knowledge seeking is a proactive behavior that needs a seeker to be an evolving and self-motivated learner (Hwang, Lin, & Shin, 2018) and the seeking process is usually characterized by uncertainty and the burden of time and effort (Kang et al., 2017). A successful social exchange is one in which knowledge seekers obtain knowledge they consider useful despite the time and effort they invested to do so (Rathore, Ilavarasan, & Dwivedi, 2016; Shiau et al., 2017; Wasko & Faraj, 2005). Yet, in a social exchange, a knowledge seeker may not necessarily receive reciprocal rewards for the costs invested because there is *no guarantee* that governs such an exchange.

SET has been widely adopted and extended to develop integrative models for explaining knowledge seeking between a recipient and a knowledge source (Kapoor et al., 2018; Yan & Jian, 2017; Zhang, Hahn, & De, 2013). This study rested on three key strategies for advancing SET and integrating PCS into SET to explain the complex behavior of knowledge seeking. First, it is argued that a net benefit, represented by PSB, is determined by the extent to which seekers retrieve and absorb useful knowledge compared to the costs associated with the effort invested in obtaining this knowledge. Typically, when people receive benefits from others, they compare these benefits with the cost involved. When benefits exceed costs in a social exchange, it results in an obligation to repay benefits which can incentivize recipients to reciprocate toward their benefactors (Feng & Ye, 2016). Prior knowledge-seeking studies based on equity theory used the concept of obligation to repay indebtedness to explain reciprocity (Feng & Ye, 2016; Pai & Tsai, 2016). Although the literature addresses benefits and costs in the knowledge-seeking process (He & Wei, 2009; He et al., 2009; Singh et al., 2017; Su & Contractor, 2011; Xu, Kim, & Kankanhalli, 2010; Xu, Kim et al., 2010), studies have seldom considered the net-benefit concept alongside reciprocity. The net benefit, PSB, as a mediator of reciprocity can further explain why knowledge growth and knowledge-seeking effort encourage reciprocity in online professional communities.

**Table 1**  
Knowledge sharing and seeking studies in prior empirical IS studies.

Study	Research focus	Factors motivating knowledge exchange for knowledge sharers and seekers		Type
		Facilitators	Inhibitors	
Kankanhalli et al. (2005a)	Contribution	Extrinsic benefits; Intrinsic benefits		Organization
Liu and Liu (2008)	Contribution	Internal/External codified sources; Internal/External non-codified sources		Organization
Hau et al. (2013)	Contribution	Organizational rewards; Reciprocity; Enjoyment; Social capital		Organization
Kang and Hau (2014)	Contribution	Centrality; Trust; Tenure; Expertise; Strength of ties		Organization
Hwang et al. (2018)	Contribution	Affective commitment; Calculative commitment; Normative commitment		Organization
Chan and Li (2010)	Contribution	Structural-based features; Social bond; Enjoyment		HFC (Beauty product)
Chai and Kim (2012)	Contribution	Ethical culture; Social tie; Sense of belonging; Structure assurance		HFC (Social network sites)
Yan and Davison (2013)	Contribution	Enjoyment in helping others; Sense of self-worth; Flow		HFC (Life)
Jin, Zhou, Lee, and Cheung, (2013)	Contribution	Knowledge self-efficacy; Satisfaction		HFC (Online Q&A forum)
Ye et al. (2015)	Contribution	Perceived community support; Perceived leader support		HFC (Life)
Hau and Kang (2016)	Contribution	Social capital; Lead users; Behavioral control of sharing		HFC (Game)
Liu, Cheung, and Lee, (2016)	Contribution	Reputation; Enjoyment of helping; Post; Feedback; Tenure; Expertise; Reciprocity		HFC (Life)
Pai and Tsai (2016)	Contribution	Norm of reciprocity		HFC (Restaurant)
Chiu et al. (2006)	Contribution	Social interaction ties; Trust; Norm of reciprocity; Identification; Shared language; Shared vision		OPC (Programming)
Zhao, Dettlor, and Connelly, (2016)	Contribution	Virtual organization reward; Reciprocity		OPC (Programming)
Kankanhalli et al. (2005b)	Seeking	Incentive availability*Task interdependence	Resource availability*Task tactness	Organization
Bock et al. (2006)	Seeking	Resource facilitating condition; Self-efficacy; knowledge growth; Collaborative norm; Future obligation * Collaborative norm;	Usefulness * Collaborative norm	Organization
He et al. (2009)	Seeking	Trust; Usefulness	Seeking effort	Organization
Xu, Zhang, and Zhang, (2010)	Seeking	Supervisory relationships	Physical distance	Organization
Xu, Kim et al. (2010)	Seeking	Information relevance; Relational benefit		Organization
Su and Contractor (2011)	Seeking	Expertise recognition; source accessibility; peer information-seeking behavior	Knowledge complexity to execute a practice	Organization
Lai et al. (2014)	Seeking	Knowledge growth; Knowledge quality; Community identification; Resource availability		Organization
He and Wei (2009)	Seeking & contribution	Social relationship; Perceived usefulness; Seeking attitude	Seeking effort	Organization
Beck et al. (2014)	Seeking & contribution	Social Status; Channel Variety; Social Presence		Organization
Sutanto and Jiang (2013)	Seeking & contribution	Average rating scores		Organization
Kang et al. (2017)	Seeking & contribution	User empowerment; Knowledge contribution		Organization
Phang et al. (2009)	Seeking & contribution	Usability; Sociability		HFC (General education)
Zhao et al. (2012)	Seeking & contribution	Sense of belonging; Familiarity; Trust; Perceived similarity		HFC (Shopping)
Yang et al. (2017)	Seeking & contribution	Support for member communication; Recognition for contribution		HFC (General education)
Phang, Kankanhalli, and Tan, (2015)	Seeking & contribution	Collective benefits; Persuasion benefit; Civic skills; Mobilization; Perceived communality		OPC (Policy deliberation forums)
Chen and Hung (2010)	Seeking & contribution	Norm of reciprocity; Interpersonal trust; Knowledge sharing self-efficacy; Relative advantage		OPC (Programming)
Nevo et al. (2012)	Seeking & contribution	Expertise; Network ties; Personal characteristics		OPC (IT knowledge)
Park et al. (2014)	Seeking & contribution	Sense of belonging; Perceived usefulness; Entertainment value;	Perceived knowledge	OPC (Stock)
Hung et al. (2015)	Seeking & contribution	Attitude toward knowledge sharing; Subjective norm; Perceived behavioral control		OPC (Programming)
Khansa et al. (2015)	Seeking & contribution	Nonmonetary incentives (such as points, levels); Level of membership; Habits	Tenure of membership	OPC (English learning)
Feng and Ye (2016)	Seeking & contribution	Indebtedness; Community norm; Anonymity		OPC (English learning)
Singh et al. (2017)	Seeking & contribution	Perceived usefulness; Trust	Perceived seeking effort	OPC (Healthcare)
Yan and Jian (2017)	Seeking & contribution	Knowledge response; Social response		OPC (Programming)

OPC: online professional community, HFC: hedonic-focused community.

Second, a higher degree of PSB is not sufficient to ensure that seekers will behave reciprocally because seekers may attribute their success in acquiring social benefits to their personal efforts. Indeed, there is a lack of explicit rules and regulations in a social exchange (Bock et al., 2005, 2006). The only observable expectation in a social exchange is the assumed supportive intentions of the linking actors (Cropanzano & Mitchell, 2005). Therefore, PCS is essential in a social exchange as no explicit agreements exist for people to rely on, and the expectation of a supportive climate helps justify their expected social benefits and can contribute to a mutually beneficial exchange (Sanchez-Franco & Roldán, 2010). Previous studies have acknowledged that PCS can fulfill seekers' emotional needs, which produces a feeling of indebtedness to the community (Pai & Tsai, 2016). Alternatively, PCS can provide social resources for seekers to obtain the knowledge required in a more effective way (Chang & Chuang, 2011), which in turn may make them feel indebted to the community after receiving useful assistance (Feng & Ye, 2016). Theoretically, PCS provides an opportunity for knowledge seekers to develop social bonds and engage in reciprocal relationships. Such community support should thus be perceived as beneficial and it would indeed be worthwhile for seekers to expand their reciprocal relationships with the community. In this paper it is argued that PCS has a direct effect on reciprocity as well as an indirect effect on reciprocity through PSB. Understanding the direct and indirect effects of PCS can help practitioners to more effectively leverage community support in order to encourage reciprocity.

Third, the construction of PSB does not merely rely on the cognitive calculative approach. In fact, seekers' response to cost-benefit beliefs will differ based on how much social support they received in the specific knowledge-seeking context. Empirical investigations based on social-technology theory (Chai & Kim, 2012), social capital theory (Hau & Kang, 2016; Hau, Kim, Lee, & Kim, 2013; Zhao, Lu, Wang, Chau, & Zhang, 2012), SET (Ye et al., 2015), and organizational support theory (Yang, Li, & Huang, 2017) have generally not considered social support a context-specific moderator. Instead, it has been treated as a direct antecedent of knowledge sharing (Hau & Kang, 2016; Hau et al., 2013; Zhao et al., 2012) or knowledge contribution (Chai & Kim, 2012; Ye et al., 2015). Reciprocity is more likely to occur in a more supportive climate (Ye et al., 2015) since cost-benefit analysis will be favorably adjusted to reflect social interactions in a supportive climate which provides channels that reduce the time and energy required to gather knowledge (Chang & Chuang, 2011). Thus, this study argues that PCS changes the weights of cost and benefit attached to the construction of PSB. It also sheds light on the boundaries of SET for knowledge seekers by highlighting the importance of social support for knowledge seekers.

## 2.1. Knowledge seeking

Knowledge is unlikely to be exchanged by utilizing basic elements of information processing alone; rather, it requires a series of exchange behaviors (Yan & Davison, 2013). Knowledge sharing is an exchange behavior that involves both knowledge contribution and knowledge seeking (Hwang et al., 2018; Kimmerle et al., 2007). With the development of Web technology, the online professional community has become a useful platform for knowledge sharing (Y. Yan & Davison, 2013). Knowledge sharing is a basic driver for participating as a registered member in an online professional community (Bouty, 2000). However, "many individuals participate in virtual communities... seeking knowledge to resolve problems at work" (Chiu et al., 2006, p. 1872). Knowledge contribution and knowledge seeking create a feedback loop in knowledge sharing (Kankanhalli, Tan, & Wei, 2005). If one element is absent, knowledge sharing becomes ineffective and unsustainable (Phang et al., 2009).

Knowledge contribution is a vital function of any professional community as it provides other members with explicit knowledge (i.e., manuals, documents, and procedures) as well as experiential knowledge (i.e., experiences and hands-on skills used by others) to help others

solve problems (Bock et al., 2006; Cummings, 2004; Lai et al., 2014). Knowledge contribution has received much attention because individuals tend to fear the potential loss of proprietary personal knowledge (Hwang et al., 2018; Kankanhalli et al., 2005b). Most studies have found that social factors (i.e., reputation, identification and social relationships), technological factors (i.e., KMS usefulness and perceived ease of KMS use), and individual factors (i.e., perceived enjoyment and self-efficacy) are critical for knowledge contribution in either an organizational or an online community context (Chai & Kim, 2012; Kang et al., 2017). Knowledge-seeking studies have mostly focused on examining and exploring the precursors of knowledge-seeking behavior (Table 1). For example, comprehensive studies have been done that focus on exploring the social, technological, and individual factors that foster knowledge-seeking behavior in either an organizational or an online community context (He & Wei, 2009; He et al., 2009; Kang & Hau, 2014; Khansa et al., 2015; Lai et al., 2014; Park et al., 2014; Xu, Kim et al., 2010; Xu, Kim et al., 2010; Yan & Jian, 2017). Review of the literature, however, shows that few studies examine knowledge-seeking behavior in an online professional community context (Chen & Hung, 2010; Lai et al., 2014; Phang et al., 2009; Su & Contractor, 2011; Xu, Kim et al., 2010; Xu, Kim et al., 2010).

Knowledge seeking involves a certain risk since the accuracy of distributed knowledge in an online professional community is hard to verify and validate. Consequently, factors that reduce the risk, such as trust in the community, usefulness of knowledge, expertise of the source, and user ratings of the knowledge are found to significantly influence knowledge-seeking behavior (Bock et al., 2006; Chen & Hung, 2010; He et al., 2009; Kang & Hau, 2014; Kankanhalli et al., 2005b; Nevo, Benbasat, & Wand, 2012; Singh et al., 2017; Su & Contractor, 2011; Sutanto & Jiang, 2013). In addition, knowledge seeking is cumbersome and time consuming to seekers and skill is required to identify which knowledge is deemed valuable (Gray & Meister, 2004; Quigley, Tesluk, Locke, & Bartol, 2007).

The accumulation of knowledge in an online professional community depends not only on current contributors, but also relies on reciprocity between seekers and the knowledge providers. A successful online professional community accumulates extensive knowledge from contributors in order to attract positive feedback and recognition from seekers in their searching process. In fact, the community expects seekers to eventually obtain benefits from their knowledge seeking and, therefore, be willing to repay the collective benefits they received back to the community (Beck et al., 2014). This ongoing virtuous cycle creates a system of knowledge sharing that ensures the survival of an effective online professional community (Beck et al., 2014).

## 2.2. Reciprocity

Knowledge sharing in an online professional community creates a potential dilemma since shared knowledge is a public resource, accessible to all members, regardless of whether or not they have contributed. This allows seekers to be free riders and use the shared knowledge without making a contribution (Yan & Davison, 2013). In the absence of managerial practices that incentivize responsibilities for compensating for value received (Albanese & Van Fleet, 1985; Gunthorsdottir & Rapoport, 2006), a free-riding strategy generates the least cost-effective use of shared knowledge for an individual seeker. The free-rider phenomenon could, over time, lead to less collective contribution. If existing contributors do not perceive that knowledge seekers contribute to the ongoing welfare of the community, existing contributors may feel no responsibility to engage in the desired knowledge creation behavior, resulting in a reduction in the social benefits.

Reciprocity offers a mutually gratifying pattern of exchange of various resources (Chan & Li, 2010; Gouldner, 1960). Knowledge seekers search for knowledge in order to solve task-related problems, and they reciprocate received favors by sharing knowledge or professional



comments themselves (Chen & Hung, 2010). Gouldner (1960) considers reciprocity to be a positive social norm in that reciprocity motivates and regulates the psychological expectation of a fair exchange for benefits received. Gouldner (1960) argues that if it were not for the norm of reciprocity, it would be impossible for the first person to be willing to provide help to a stranger. Theoretically, people who receive social benefits generally feel obligated to return good for the benefits they received or to those from which they expect to receive (Bock et al., 2006; Chan & Li, 2010; Sutanto & Jiang, 2013). Some researchers have suggested that people in an online professional community are more likely to help others because they receive a certain degree of social benefits (He & Wei, 2009). Therefore, if current circumstances fail to offer social benefits it could result in individuals no longer being willing to help others (Gouldner, 1960).

Drawing from Gouldner's seminal work, this study considered reciprocity to be a strong sense of duty and obligation that describes how an individual should behave in an online professional community. **Reciprocity** refers to the commitment knowledge seekers feel to helping other members in the community by being willing to provide assistance on request (Chan & Li, 2010). The underlying premise of this conceptualization states that recipients of positive social benefits experience a sense of indebtedness that they can repay only through reciprocation (Chan & Li, 2010). Many SET studies have established that people feel obliged to reciprocate "social benefits or mutual assistance" received from others and that it arouses negative feelings of guilt if they fail to reciprocate (Cropanzano & Mitchell, 2005). Furthermore, from a utility-maximizing perspective, individual personal benefit is the primary factor that motivates reciprocity (Gunnthorsdottir & Rapoport, 2006).

### 2.3. Perceived community support

The linking actors in a knowledge-seeking context are depicted in Fig. 1. A knowledge seeker (S) can search knowledge from the online knowledge pool by reading through similar questions that have already been answered in previous posts. Moreover, having a discussion with linking actors could facilitate the finding of the required knowledge more quickly and easily. Linking actors (i.e., LA1, LA2 and LA3) can interact with the seeker in many different, supportive ways to provide assistance. For example, the linking actor (LA1) could clearly point (S) in a direction or provide a keyword for the seeker to use based on their knowledge from other parties; the linking actor (LA2) could post responses and join the discussion with answers based on personal knowledge, and the linking actor (LA3) could provide the seeker with a

potential information source to find relevant knowledge based on previous searches in the collective knowledge pool. In the knowledge-seeking process, no rules and agreements are able to guarantee that the search cost invested will yield a positive social benefit. The knowledge seeker could build up their interactive network with different linking actors who have contributed their efforts and practical knowledge to facilitate knowledge seeking and help ensure the expected benefits.

Knowledge seeking involves continuous interactions between a seeker and the linking actors, which is how a seeker's perception of a supportive climate is created. A supportive climate is viewed as an indicator of all members' intents rather than just one response from a particular member (Gross, Stary, & Totter, 2005; Kimmerle et al., 2007). The linking actors could be any member who provides assistance on request. Knowledge seekers personify the community, and they will view favorable or unfavorable social treatment as an indicator of the benevolent or malevolent orientation toward them (He & Wei, 2009; Tiwana & Bush, 2005). Therefore, a belief in the supportive intentions of the linking actors taking part in a social exchange is important. Without this belief that the linking actors will fairly share knowledge and provide unselfish support, seekers are less likely to voluntarily repay the debt. In this regard, **perceived community support** (PCS) is defined as a knowledge seeker's general belief that the linking actors value their searching effort, support their professional growth, and care about their needs.

Organizational behavior studies have shown that employees are more willing to pursue personal interests and achieve organizational goals when they receive positive support from the organization (Rhoades & Eisenberger, 2002). Research suggests that high levels of perceived organizational support create obligations and responsibilities that employees will feel they need to follow to repay the organization (Eisenberger, Armeli, Rexwinkel, Lynch, & Rhoades, 2001). The more organizational support perceived by the employees, the more obligation they feel, which in turn results in them engaging in reciprocal behaviors that support organizational goals (Eisenberger et al., 2001; Marler, Fisher, & Ke, 2009). Perceived organizational support is "a general belief that one's organization values employees' contributions and cares about their well-being" (Mahon, Taylor, & Boyatzis, 2014, p. 4). Perceived organizational support enhances employee belief and trust (Tremblay, Cloutier, Simard, Chênevert, & Vandenberghe, 2010), loyalty to the organization (Coyle-Shapiro & Conway, 2005), and promotes higher levels of work performance and commitment (Marique, Stinglhamber, Desmette, Caesens, & De Zanet, 2013). In addition, employees that perceive a higher level of organizational support will feel obligated to have fewer negative behaviors (Palmer, Komaraju, Carter,

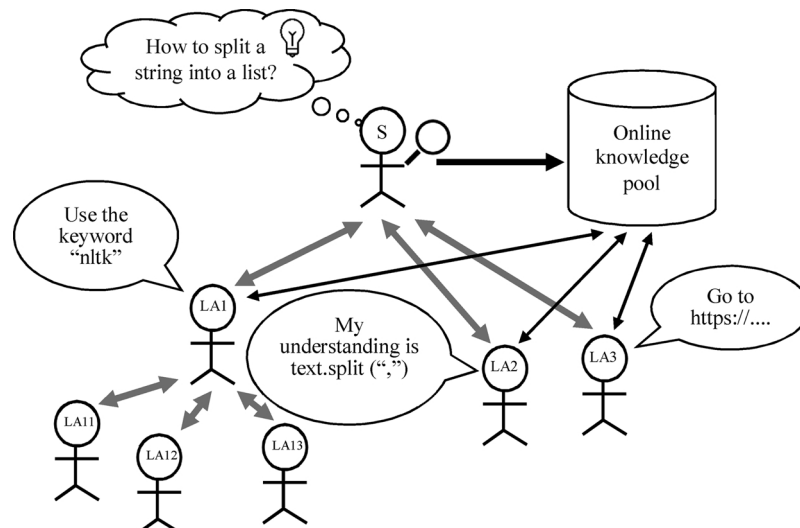


Fig. 1. The linking actors in a knowledge-seeking process.

& Karau, 2017).

Knowledge seekers conduct a cost-benefit analysis of the outcome of their knowledge seeking while understanding that there is no guarantee of obtaining benefits from each search. If a knowledge seeker obtains knowledge more efficiently and perceives that they have been treated well due to a supportive climate from the linking actors, they will feel obligated to reciprocate in order to create a balance that is beneficial to contributors to the community. PCS increases mutual obligation from specific interactions between seekers and contributors (Sanchez-Franco & Roldán, 2010). Knowledge seekers who experience positive community support generally treat other members well and try to avoid harming the common good. For example, knowledge seekers may decide to sponsor an idea when they find that their contributions are valued by the community and may help those who helped them before. This situation is similar to when employees who perceive higher organizational support believe that they are obligated to repay the organization for support received (Mahon et al., 2014; Rhoades & Eisenberger, 2002).

### 3. Research model and hypotheses

The research model depicted in Fig. 2 shows how a social exchange, based on a set of interactions that generates quality in both outcomes and social relationships, is able to create reciprocal interdependence. The value of a social exchange is a result of calculations involving benefits and costs (Cropanzano & Mitchell, 2005). The act of knowledge seeking entails costs to seekers from their expenditure of time and effort. The time required for searching for knowledge can be considered an opportunity cost (He & Wei, 2009; He et al., 2009). When seekers spend more time locating the distributed knowledge, all things being equal, they may perceive less social benefits. Furthermore, knowledge seeking implies the expectation of obtaining benefits (Bock et al., 2006; Chen & Hung, 2010; Lai et al., 2014). The reward of knowledge seeking is the growth of knowledge as well as the enhancement or reinforcement of personal knowledge. Knowledge growth rewards seekers who value the obtained knowledge and serves to increase their positive evaluation of the online social system. The following hypotheses were proposed in this paper:

**H1a.** Knowledge growth has a positive effect on perceived social benefits.

**H1b.** Knowledge-seeking efforts have a negative influence on perceived social benefits.

Knowledge seekers within a community always have to expend effort to find valuable knowledge and advice (Bock et al., 2006). Seekers face both potential benefits and certain costs in their knowledge-seeking process. The benefits and costs that form the basis of PSB are referred to as knowledge growth and knowledge-seeking effort. Knowledge growth is the increase in expertise and learning from the experience of others, while knowledge-seeking effort refers to the opportunity costs that were spent on searching for that knowledge. PSB are the net benefits in a cost-benefit transactional analysis in which seekers determine whether the online professional community provides them with valuable knowledge. PSB result from the overall evaluation of the knowledge seeking outcomes based on the psychological comparison between benefits and costs. When seekers receive PSB from the knowledge they acquired, it serves as an important driver in motivating seekers to engage in reciprocity. The higher the PSB, the more likely it is that seekers will experience a sense of indebtedness and an obligation to reciprocate.

Knowledge seekers in a social exchange involving benefits and costs eventually reach an equilibrium. According to SET, if one perceives positive consequences from an exchange, the exchange is more likely to be repeated and performed (Cropanzano & Mitchell, 2005). If one does not perceive (at least the potential for) positive consequences, one is more likely to leave the current relationship and look for a new relationship that can supply the desired benefits. Theoretically, reciprocity could require a positive outcome in each round of social exchange (Cropanzano & Mitchell, 2005). Blau (1964), however, indicated that individuals are more likely to commit to a continued social exchange relationship when there is a preponderance of previous exchanges that have been consummated successfully. If each exchange produces a positive outcome, each further positive outcome creates a self-reinforcing cycle that is able to sustain reciprocity (Cropanzano & Mitchell, 2005). If the outcome of social exchange is able to generate greater social benefits, there is a higher likelihood that seekers will build reciprocal interdependence. PSB mediate the relationship between knowledge growth and reciprocity as well as the relationship between knowledge-seeking effort and reciprocity. The following hypotheses are proposed:

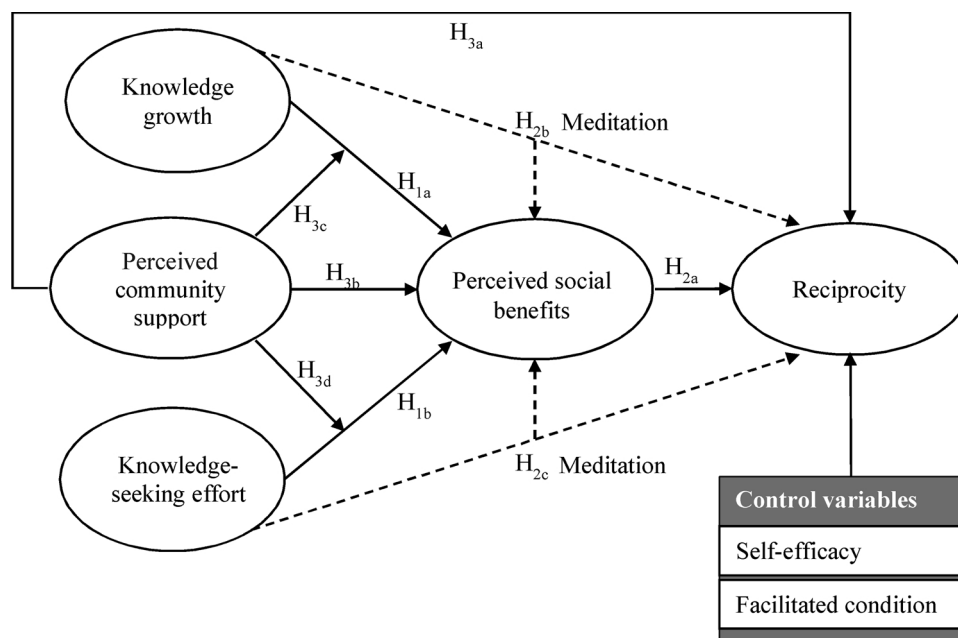


Fig. 2. Research Model.

**H2a.** Perceived social benefits will have a positive influence on reciprocity.

**H2b.** Perceived social benefits will **mediate** the effect of knowledge growth on reciprocity.

**H2c.** Perceived social benefits will **mediate** the effect of knowledge-seeking effort on reciprocity.

High levels of PCS can create a cooperative norm among members, especially for knowledge seekers, to harmoniously repay the online professional community for their support by engaging in behaviors that reciprocate value to the community. Previous studies have asserted that individuals involved in a cooperative climate are more likely to offer a good return than those in a climate of low cooperation (Cropanzano & Mitchell, 2005). Others suggest that perceived organizational support strengthens felt obligation (Eisenberger et al., 2001) and good citizenship behavior (Witt & Broach, 1993). Instead of a pure transaction focus, PCS is interpreted as a supportive climate that results from a series of interdependent social exchanges and is associated with the social relationship between knowledge seekers and linking actors. The outcomes of PCS are considered in reciprocal terms; for example, a knowledge seeker who views the linking actors as sympathetic is likely to respond kindly and engage in desirable organizational citizenship behavior. SET theorists have proposed that perceived organizational support generates greater commitment from individuals, which positively influences their future engagement toward organizational goals (Rhoades & Eisenberger, 2002).

If linking actors care about knowledge seekers, they value their efforts and provide them with help and support. In return, seekers repay these benefits via contributions of high quality knowledge or other behaviors that may benefit the whole community (Beck et al., 2014). Generally, the main purpose of knowledge seekers is to absorb shared knowledge for problem resolution or personal knowledge growth. They then feel obligated to contribute knowledge to the community if they have received support from others. For example, Jawahar and Carr (2007) found that when employees perceived high levels of support from their organization, they felt obligated to the organization and showed better work performance. The following hypothesis is proposed:

**H3a.** PCS will have a positive influence on reciprocity

It is possible for the knowledge-seeking process to be considered inefficient and a knowledge seeker to be left unsatisfied, however, a supportive climate can alleviate feelings of frustration if seekers feel others are giving assistance and providing positive feedback (Erdogan & Enders, 2007; Sanchez-Franco & Roldán, 2010). Knowledge seekers can interact with linking actors who help them structure their questions more precisely, change their keywords to get closer to the required knowledge, or even skip the searching effort by getting answers directly from members (Erdogan & Enders, 2007). Interactions connecting knowledge seekers with linking actors can build a mutually beneficial relationship which may, in turn, increase social benefits. In an effort to obtain the desired knowledge, knowledge seekers receive social benefits more frequently in the presence of a high PCS than in a low PCS.

Knowledge seekers invest time and effort with the expectation of learning new knowledge. Given that communities are likely to differ in terms of the information they provide to knowledge seekers in each search, the differential PCS perceived by seekers should be considered when examining social exchange. The level of PCS demonstrates to seekers the way in which they will be treated by the community. High PCS heightens outcome expectations regarding the rewards of exchange because there is an expectation that the linking actors are supportive of the seeker's endeavors. Individuals able to successfully improve their competencies through an exchange are more satisfied with the outcome when they receive resources and support from the community (Chan & Li, 2010; Chen & Hung, 2010). Therefore, if knowledge seekers achieve

their goals, PCS will encourage seekers to respond with a higher level of appreciation in recognition of the social benefits they received. They will be less satisfied with the outcome if they experience less help and support in the exchange even though they may have obtained the desired knowledge.

SET assumes that individuals feel more indebted toward a community when they receive greater benefits (Beck et al., 2014). The obligations of exchange are compromised when search costs in the exchange are too high - benefits are no longer attributed to collective contribution but are more likely to be viewed as the result of individual effort. Knowledge-seeking effort would be negatively correlated to PSB contingent on PCS. With high PCS, seekers tend to place less weight on their personal efforts, since they perceive the linking actors as willing and able to provide help and support. However, if they perceive that the specific topics and queries they raised are not being addressed by linking actors, they will tend to exaggerate their personal efforts in knowledge seeking and conclude that dealing with the community was a waste of time. Overall, the negative influence of knowledge-seeking effort on social benefits will be alleviated if they perceive high PCS, as opposed to low PCS. The following hypotheses are proposed:

**H3b.** PCS will have a positive influence on perceived social benefits

**H3c.** PCS will positively **moderate** the relationship between seeker knowledge growth and perceived social benefits

**H3d.** PCS will positively **moderate** the relationship between knowledge-seeking effort and perceived social benefits

This study considered two control variables toward reciprocity in order to reduce alternative effects. An implicit assumption of reciprocity is that debtors have the capabilities to return favors by creating knowledge content and sharing personal knowledge in response to questions posted by others. To successfully carry out a knowledge exchange, they must have confidence in their ability to provide valuable knowledge to others. In addition, if they are able to contribute resources that help them repay favors, they will be more likely to treat others fairly and reciprocally. For example, seekers could use rich media and various other devices to provide cues and immediate feedback which would enable convenient reciprocal behavior. Thus, knowledge sharing self-efficacy and facilitating conditions were added as control variables of reciprocity.

## 4. Methodology and data analysis

### 4.1. Measures

Social benefits are based on benefits and costs involved in personal experiences of knowledge seeking and so this study examined individual knowledge seekers. Quantitative methods were employed using survey data to empirically test SET with the role of PCS in an online professional community context. Other measurement items previously referred to in literature were also adopted, namely reciprocity (Chan & Li, 2010), PSB (Kuo & Feng, 2013; Zhao, Zhang, Wagner, & Chen, 2013), knowledge growth (He & Wei, 2009; Kankanhalli, Lee, & Lim, 2011), and knowledge-seeking effort (He & Wei, 2009). Measurement items from Chen and Hung (2010) and Lai et al. (2014) were used to measure self-efficacy and facilitated conditions, respectively. Perceived organizational support has been widely studied in management literature (Coyle-Shapiro & Conway, 2005; Erdogan & Enders, 2007; Jawahar & Carr, 2007; Kurtessis et al., 2017; Mahon et al., 2014; Marique et al., 2013; Palmer et al., 2017; Rhoades & Eisenberger, 2002; Tremblay et al., 2010), and measurement items relating to perceived organizational support were adapted to fit the context of this study.

A Chinese version of the survey, based on survey examples found in the literature, was developed. A professional translator then back-translated the draft survey into English in order to ensure that the

**Table 2**  
Sample characteristics.

Demographic attribute		Count	Percentage
Gender	Male	323	68.6
	Female	148	31.4
Age	< 20	30	6.4
	21–30	385	81.7
	31–40	52	11.0
	> 41	4	0.8
Education	Senior high school	15	3.2
	Undergraduate	268	56.9
	Graduate	188	39.9
Professional background	Computer science	199	42.3
	Nature science	104	22.1
	Business	100	21.2
	Social science	68	14.4

translation still retained its original meaning. The survey was then pre-tested with three academics and their feedback was used to make modifications to any unclear measurement items. Using the refined survey instrument, 35 students majoring in computer science were invited to participate in a pilot test to determine validity and reliability. All of the participants were required to have knowledge-seeking experience with regards to computer programming questions in an online professional community. Their comments and suggestions on the clarity and relevance of the measurement items were collected and these were used to further revise and refine the final measurement items. All measurement items were measured on a 7 point Likert scale and are shown in Appendix A.

#### 4.2. Data collection

Survey data was collected from the Blueshop community, Taiwan's largest and most widely used online professional programming community. Blueshop currently has more than 350,000 registered members and the site gets 525,864 visits a month. This is significantly more than the next two largest, namely 457,344 for Programmer Club and 105,353 for JWorld@TW (SimilarWeb, 2018), respectively. Blueshop provides a wide spectrum of forums that discuss different programming languages such as Java, JavaScript, C#, PHP, Android, Python, and HTML. It has amassed more than 190,000 posts on different topics. Generally, the community has more than 1000 members making concurrent online searches.

Blueshop is a valuable resource of programming and software development information for members. It is an ideal professional community for programmers to increase their programming knowledge and to post queries about questions they may need help with. Blueshop's large relevant programming knowledge pool has led to it being recognized as the most useful community for most programmers. All registered members have free access to a variety of knowledge resources, are able to ask and answer questions, and can follow and connect with other members to obtain social support. The focus of this study was to understand the role of PSB and PCS on reciprocity from a knowledge seeker's perspective. The community characteristics of Blueshop ensured that an appropriate representative sample of the population was obtained for this study.

An introduction page explaining the purpose of the survey was designed. The survey was released to the community and members were able to access a hyperlink to complete the survey. Only knowledge seekers looking for answers and assistance regarding programming questions were asked to participate in the survey. Knowledge seekers had to be registered members of the Blueshop community that were using the system functionality to access and search for the knowledge they required. Their primary goal had to be obtaining the required knowledge. The IP addresses, domain names, and personal email addresses of the participants were recorded in order to avoid the potential

dangers associated with duplicate responses in an online survey. Furthermore, responses were screened and checked to eliminate duplicate respondents.

Respondents were asked to recall one knowledge-seeking experience which had occurred within the past 3 months using the Blueshop community. The survey was divided into three distinct sections. The first section inquired into their perceptions about the benefits and costs in their knowledge-seeking experience, and whether they had been willing to reciprocate toward the community. The second section inquired into their perceptions of PSB and PCS. The third section related to control variables and the demographic profile of the respondents. To improve the response rate, free entry into a prize draw was offered to the respondents as an incentive. As a result, a total of 513 responses were received during the one-month data collection period. Of the 513 responses received, 42 were returned incomplete, leaving 471 valid responses.

Non-response bias was tested by verifying that early and late respondents were not significantly different (Armstrong & Overton, 1977). The early and late respondents were separated according to a mean time point which categorized early respondents as those who had submitted their responses within the first two weeks and the late respondents as those who had submitted their responses within the last two weeks. The two groups were compared in terms of age, gender and educational background. All tests indicated no statistically significant differences between the two groups. Sample characteristics are depicted in Table 2. The majority of the sample respondents were male (68.6%). The age distribution of the respondents ranged from 21 to 30 years of age. Results showed that nearly all of the respondents had undergraduate (56.9%) and graduate degrees (39.9%). The proportion of respondents who had a background in computer science was 42.3% followed by natural science (22.1%) and business (21.2%) backgrounds.

#### 4.3. Validation

This study used a variance-based technique, Partial Least Square (PLS), to estimate the causal relationship between research constructs. Smart PLS software was used to test the validity and reliability of the constructs, followed by a test of the research hypothesis and the overall quality of the proposed model (Ringle, 2005). Following this two-stage analytical procedure, the measurement model was analyzed and the structural model was tested (Chin, 1998; Garson, 2016).

The analysis of the measurement model consisted of construct reliability, convergent validity and discriminant validity. The results are presented in Table 3. First, the values of Cronbach's alpha and composite reliability were all above the threshold level of 0.7 (Fornell & Larcker, 1981). Second, all of the measurement items loaded significantly on the constructs they were intended to measure above the threshold level of 0.7, and stronger than on other constructs in the proposed model (Fornell & Larcker, 1981; Hair, Black, Babin, Anderson, & Tatham, 2006). The estimation of average variance extracted (AVE) of each construct, reflected that more than half the amount of variance in the items accounted for the construct as the values of AVE were all above the threshold level of 0.5 (Fornell & Larcker, 1981). All of the above results illustrated the acceptable construct reliability and convergent validity.

Last, to demonstrate discriminant validity, the Pearson correlations between constructs should be smaller than the corresponding square roots of AVE (Fornell & Larcker, 1981). Table 4 indicates that all the values of the square root of AVE in diagonal were greater than the values of correlations in off-diagonal. An alternative method to assess discriminant validity is to evaluate the Heterotrait-monotrait ratio (HTMT). If an HTMT value is below 0.85, it provides sufficient discriminant validity of a pair of reflective constructs (Henseler, Ringle, & Sarstedt, 2015). As seen in Table 4, the HTMT values of any pair of constructs, as presented in parentheses, showed no results greater than



**Table 3**  
Reliability and validity.

Constructs		KG	KSE	PCS	PSB	REC	SE	FC
Knowledge growth (KG)	KG1	0.80**	−0.35	0.33	0.52	0.50	0.45	0.32
	KG2	0.85**	−0.20	0.40	0.47	0.38	0.45	0.31
	KG3	0.79**	−0.09	0.38	0.41	0.38	0.43	0.28
Knowledge-seeking effort (KSE)	KSE1	−0.36	0.81**	−0.13	−0.37	−0.32	−0.28	−0.20
	KSE2	−0.04	0.73**	0.00	−0.15	−0.06	−0.02	−0.02
	KSE3	−0.10	0.79**	−0.04	−0.20	−0.15	−0.09	−0.07
	KSE4	−0.19	0.84**	0.02	−0.25	−0.18	−0.16	−0.08
Perceived community support (PCS)	PCS1	0.39	−0.01	0.86**	0.37	0.41	0.36	0.34
	PCS2	0.33	−0.05	0.84**	0.32	0.42	0.32	0.33
	PCS3	0.24	0.14	0.75**	0.19	0.27	0.24	0.29
	PCS4	0.40	−0.16	0.72**	0.43	0.61	0.40	0.51
Perceived social benefits (PSB)	PSB1	0.49	−0.24	0.35	0.83**	0.48	0.52	0.40
	PSB2	0.50	−0.31	0.40	0.91**	0.56	0.53	0.43
	PSB3	0.54	−0.35	0.42	0.90**	0.61	0.56	0.44
Reciprocity (REC)	REC1	0.47	−0.19	0.62	0.51	0.84**	0.54	0.56
	REC2	0.46	−0.24	0.47	0.56	0.90**	0.51	0.53
	REC3	0.46	−0.27	0.47	0.57	0.90**	0.48	0.52
	REC4	0.46	−0.26	0.48	0.58	0.89**	0.48	0.54
Self-efficacy (SE)	SE1	0.45	−0.21	0.38	0.56	0.50	0.85**	0.49
	SE2	0.40	−0.12	0.34	0.38	0.41	0.84**	0.43
	SE3	0.54	−0.23	0.41	0.61	0.54	0.90**	0.50
Facilitated conditions (FC)	FC1	0.40	−0.21	0.47	0.52	0.62	0.57	0.93**
	FC2	0.24	−0.02	0.39	0.29	0.42	0.37	0.83**
AVE		0.66	0.63	0.63	0.77	0.78	0.74	0.78
Cronbach's alpha		0.75	0.83	0.81	0.85	0.91	0.83	0.72
Composite reliability		0.85	0.87	0.87	0.91	0.94	0.90	0.87

0.85, which suggested discriminant validity.

#### 4.4. Hypotheses test

To test the proposed hypotheses, PLS estimation was performed by bootstrapping 2000 resamples to obtain the standard errors and t-values for assessment of the structural model. The hypothesis testing results were summarized in Table 5. First, knowledge growth had a positive influence on PSB ( $\beta = 0.411$ ,  $p < 0.01$ ) whereas knowledge-seeking effort had a negative influence on PSB ( $\beta = -0.215$ ,  $p < 0.01$ ). Therefore, both H1a and H1b were supported. In addition, the path of PSB to reciprocity was significant ( $\beta = 0.250$ ,  $p < 0.01$ ), thus supporting H2a. In testing H2b and H2c, Baron and Kenny (1986) concept was applied. The direct effects of both knowledge growth and knowledge-seeking effort diminished further when the mediator of PSB was entered into the model. Further testing of the mediation effects was done by calculating Sobel Z-tests. The Sobel Z-test for knowledge growth to reciprocity through PSB was significant (Z-statistic = 5.445,  $p < 0.01$ ), and the Sobel Z-test for knowledge-seeking effort to reciprocity through PSB was significant as well (Z-statistic = -4.676,  $p < 0.01$ ). To increase the power of the mediation analyses, Preacher and Hayes' (2008) bootstrapping approach was implemented in order to establish bias-corrected bootstrap confidence intervals (CIs) for the indirect effects. All of the CIs were computed with 2000 bootstrap resamples. According to Preacher and Hayes, a mediator is significant if

its indirect effect differs from zero in the CIs (Preacher & Hayes, 2008). As a result, all mediation effects proposed by this study were statistically significant as the 95% CIs did not include zero. Therefore, H2b and H2c were supported.

PCS had a positive effect on both reciprocity ( $\beta = 0.252$ ,  $p < 0.01$ ) and PSB ( $\beta = 0.246$ ,  $p < 0.01$ ). Therefore, H3a and H3b were supported. In examining H3c and H3d, two product terms were created for PSB. One was  $PCS \times KG$  to show the moderating effect of PCS on knowledge growth and PSB (H3c), while the other one was  $PCS \times KSE$  to show the moderating effect of PCS on knowledge-seeking effort and PSB (H3d). The relationship between  $PCS \times KG$  and PSB was positive but not statistically significant ( $\beta_{PCS \times KG} = 0.028$ ), thus H3c was not supported. The relationship between  $PCS \times KSE$  and PSB was positive and statistically significant ( $\beta_{PCS \times KSE} = 0.206$ ,  $p < 0.05$ ), thus H3d was supported. The R-squared was significantly increased when the product term  $PCS \times KSE$  was included (R-squared change = 0.03,  $F = 24.938$ ,  $p < 0.01$ ).

Furthermore, one standard deviation above and below the mean of PCS was used to represent high values of PCS and low values of PCS, respectively. The results in Fig. 3 (a) show that PCS did not significantly moderate the positive relationship between knowledge growth and PSB, whereas the results in Fig. 3 (b) show that PCS significantly moderated the negative relationship between knowledge-seeking effort and PSB. More specifically, Fig. 3 (a) shows that the slope of knowledge growth on PSB was identical even when knowledge seekers had perceived

**Table 4**  
Discriminant validity.

	KG	KSE	PCS	PSB	REC	SE	FC
KG	<b>0.81</b>						
KSE	−0.28(0.28)	<b>0.79</b>					
PCS	0.45(0.55)	−0.07(0.14)	<b>0.80</b>				
PSB	0.58(0.72)	−0.34(0.35)	0.45(0.49)	<b>0.88</b>			
REC	0.52(0.63)	−0.27(0.26)	0.58(0.62)	0.63(0.71)	<b>0.88</b>		
SE	0.55(0.69)	−0.22(0.22)	0.44(0.50)	0.61(0.71)	0.57(0.65)	<b>0.86</b>	
FC	0.38(0.49)	−0.15(0.16)	0.49(0.59)	0.48(0.59)	0.61(0.73)	0.55(0.69)	<b>0.88</b>

The bold values on the diagonal are square roots of AVE for the corresponding constructs. Off-diagonal values are the Person correlations and the Heterotrait–monotrait (HTMT) ratio of correlations among constructs. The HTMT ratio of correlations are depicted in parentheses.

**Table 5**  
Hypothetical results.

Hypothetical relationships	DV = PSB Path coefficient (t-value)	DV = REC Path coefficient (t-value)
H1a : KG → PSB	0.411 <sup>***</sup> (10.14)	
H1b : KSE → PSB	−0.215 <sup>***</sup> (5.92)	
H2a : PSB → REC		0.250 <sup>***</sup> (5.66)
KG → REC		0.157 <sup>***</sup> (3.613)
KG → REC (control the mediated effect of PSB)		0.092 <sup>**</sup> (2.063)
H2b : KG → PSB → REC		Indirect effect = 0.145 95% bootstrap CIs [0.095, 0.207]
KSE → REC		−0.127 <sup>***</sup> (3.892)
KSE → REC (control the mediated effect of PSB)		−0.084 <sup>***</sup> (2.760)
H2c : KSE → PSB → REC		Indirect effect = −0.086 95% bootstrap CIs [−0.135, −0.051]
H3a : PCS → REC		0.252 <sup>***</sup> (6.88)
H3b : PCS → PSB	0.246 <sup>***</sup> (4.88)	
H3c : PCS*KG → PSB		0.028 (0.431)
H3d : PCS*KSE → PSB		0.206 <sup>***</sup> (4.944)
FC → REC		0.269 <sup>***</sup> (5.60)
SE → REC		0.088 <sup>*</sup> (1.71)
The explained variance (R <sup>2</sup> )	45.8%	58.8%

\*\*\* p &lt; 0.01.

\*\* p &lt; 0.05.

\* p &lt; 0.1.

higher PCS. In other words, the effect on knowledge growth was not amplified even when the seekers perceived that they had received considerable support from linking actors. The two parallel lines in the interaction plot of PCS and knowledge growth imply that the quality of the knowledge received and recognized by seekers was critical to ensuring that they obtained the expected social benefits. Fig. 3 (b) shows that the slope of knowledge-seeking effort on PSB was suppressed when knowledge seekers received higher PCS. There was a strong negative effect of knowledge-seeking effort on PSB in the absence of PCS. Yet, this negative effect could be attenuated if seekers received support and help from the linking actors in their knowledge-seeking processes.

Common-method variance (CMV) posed a potential problem as the independent and dependent variables were measured from the same source using the systematic method. CMV has the potential to inflate path coefficients which can lead to inaccurate estimations. One latent marker variable with four items that assumed no expected theoretical relationship with the proposed model was implemented in order for the marker variable to detect and remove method variance from the

correlations. The marker variable was based on computer security and intentionally measured the extent to which social influence affects computer security actions. It was incorporated at the end of the survey and followed the same format and scale to capture method variance. A set of construct level correction (CLC) constructs was created and each CLC construct used the same marker variable items for each research construct. According to Abdi et al, the impact of CLC constructs on each research construct can account for method variance and thus remove the inflated correlations from PLS estimation (Abdi, Chin, Vinzi, Russolillo, & Trinchera, 2016). The test findings indicated that there were no significant changes after controlling CLC constructs in the proposed model. This provided evidence that CMV had not altered the magnitude of observed path coefficients.

Predictive relevance was assessed through construct cross-validated redundancy, also known as Stone-Geisser's Q<sup>2</sup>. Application of the blindfolding procedure in PLS analysis resulted in PSB and reciprocity Stone-Geisser's Q<sup>2</sup> values of 0.35 and 0.45, respectively, indicating a high effect size of the proposed model. Additionally, the model explained 45.8 percent of the variance in PSB and 58.8 percent of the variance in reciprocity, suggesting an acceptable explanatory power in the study.

## 5. Discussion and implications

Knowledge sharing is initiated when seekers obtain knowledge and contributors provide knowledge. The behavior of knowledge seekers needs to be given greater consideration even though contributors may be more involved in the knowledge-sharing process. The reason for this is that seekers eventually define the value of the knowledge received (Havakhor, Soror, & Sabherwal, 2018) and their feelings of indebtedness are based on the quantity and quality of the knowledge exchanged (Beck et al., 2014). Previous research shows that the facilitators and inhibitors of knowledge seeking have been well examined at the individual level in the context of organizational and online communities (Singh et al., 2017; Yan & Jian, 2017). However, a lack of explicit rules to incentivize knowledge seekers to behave reciprocally could possibly leave online professional communities vulnerable to the risk of a free rider problem. To tackle this important issue, this study investigated reciprocity in an online professional community from a knowledge seeker's perspective.

The online professional community facilitates knowledge sharing between a knowledge contributor and a knowledge seeker by matching the available knowledge resources with requests. This provides a channel for members to interact and also enables convenient and efficient knowledge sharing (Mathwick, Wiertz, & De Ruyter, 2007). Blau (1964) asserts that the feelings of obligation to repay are created only when people are the recipients of benefits, i.e., successful knowledge seekers feel obligated to reciprocate to maintain fairness in their exchanges with the online professional community. Furthermore, if a

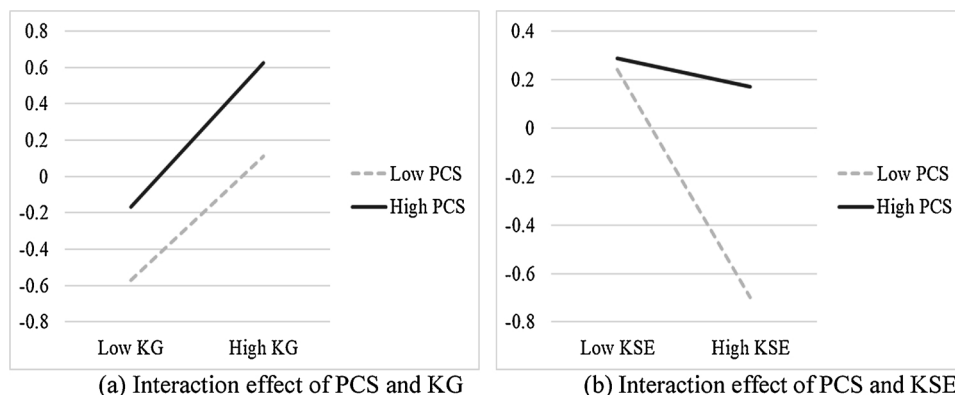


Fig. 3. Interaction plots for perceived social benefits. (a) Interaction effect of PCS and KG. (b) Interaction effect of PCS and KSE.

knowledge seeker perceives that they have been treated well by the community, the seeker is more likely to repay such social treatment by engaging in behavior beneficial to the community (Gouldner, 1960; Gunnthorsdottir & Rapoport, 2006). Through the integration and analysis of PCS and PSB within SET, this study provided empirical evidence to explain the role of PSB in SET, and also obtained new insights into the role of PCS. The results indicated that PSB, as well as an awareness of the social treatment received, were critical in establishing reciprocity.

The partial mediation results identified in this study enrich our understanding of the way PSB can leverage the benefits and costs in the knowledge-seeking process and, in turn, enhance a sense of obligation and commitment to future repayment. This empirical evidence is proof that knowledge seekers strive for a net positive value when it comes to the relationship between knowledge growth and the effort involved in knowledge seeking, i.e., when the knowledge acquired is considered more valuable than the effort invested. The findings indicate that if the outcome of knowledge seeking is not considered to be as valuable as the effort invested, a sense of indebtedness is not created and thus the reciprocal intention is terminated due to no social benefit being perceived.

In this study, the research showed that PCS not only increased the level of PSB directly, but also altered the negative effects of knowledge-seeking effort on PSB. There was no empirical evidence that PCS would positively moderate the effects of knowledge growth on PSB. Typically, in online programming communities, knowledge seekers have a strong motivation to learn about new technologies or the basics of programming language. In such cases, they tend to perform a careful evaluation to determine how much they have learned. This suggests that knowledge seekers intentionally perform an objective assessment of the knowledge received regardless of whether they received support from linking actors or not. Alternatively, empirical evidence showed that PCS positively moderated the effects of knowledge-seeking effort. This suggests that even in a supportive climate, the effects of knowledge quality would not be inflated with regards PSB as seekers would be inclined to objectively judge whether they could learn from the knowledge provided. However, a supportive climate would reduce the burden placed on seekers in searching for the desired knowledge. The findings and implications are summarized in Table 6.

Some communities use a reputation-based system to stratify the wealth of content they gather and use tiers of reputation to determine who is given the right to access valuable resources (Singh et al., 2017). This design requires seekers to provide explicit feedback to convert their participation into credit that can be exchanged for higher authorization levels that grant them access to valuable resources. Even so, behavior control in terms of seeker feedback and returns in a

reputation-based system is passive and difficult to maintain after sufficient credit has been earned. The findings of this study offer practical implications for an online professional community to help facilitate future repayment from knowledge seekers. First, PSB play an important role in generating reciprocity. It is important to know whether knowledge seekers are satisfied with their search results so that positive PSB can be developed and future reciprocation sustained. Approaches such as asking users to rate the obtained knowledge or to take a quick survey to measure how much they feel they have learned from the results could be used, but these evaluation methods need to take knowledge-seeking effort into account in order to accurately reflect a balanced outcome from a knowledge seeker's perspective.

Second, to secure PSB, managers should take the appropriate course of action to eliminate barriers to knowledge seeking. The processes of keyword searching, information filtering, and question categorizing are widely implemented, but this does not always guarantee an effective knowledge-searching process, especially when the time and effort spent on a search is extremely high. Generally, at any given time there may be many seekers searching for the same solution or reading the same post. A technique known as social bookmarking allows seekers to apply “tags” to the content of a post, which enables them to effectively view tagged content that is automatically associated with the chosen tag and find, through the sharing of these bookmarks, a network of other seekers who have common interests (Kapoor et al., 2018). Displaying recently tagged posts and requests lets seekers keep up with current trends and helps them determine which members share the same interests or have similar questions. Personalized bookmarking requires less extra effort in terms of information management and makes knowledge seeking more effective as seekers are better able to collect and organize the information they need (Hwang, Kettinger, & Yi, 2015).

Third, knowledge growth can also strongly determine the level of PSB, which, in turn, increases reciprocal intention. The issues related to knowledge growth have not yet received much attention from management practices. Most communities value the quality of knowledge exchanged but ignore whether knowledge seekers were able to absorb and learn from the knowledge they obtained. Online learning tools such as glossaries and reference materials could be very useful resources to facilitate self-learning needs in programming. Other resources relevant to the search results, such as links to online tutorials or additional teaching materials, could help seekers continue their learning after they had obtained the immediate knowledge requested. Managers should be aware that social benefits would not be perceived as successful if the exchanged knowledge could not be internalized by the seekers.

Lastly, PSB and PCS are important to foster reciprocity. Generally, the total effect of PCS is more impactful than PSB when one considers the direct, indirect, and moderating effects. A supportive climate

**Table 6**  
Summary of findings and implications.

Findings	<ul style="list-style-type: none"> <li>Knowledge growth has a stronger effect on PSB than knowledge-seeking effort.</li> <li>PSB partially mediate the effect of knowledge growth and knowledge-seeking effort on reciprocity.</li> <li>PSB and PCS both have positive direct effects on reciprocity, while PCS has a positive indirect effect on reciprocity through PSB.</li> <li>PCS positively moderates the negative effect of knowledge-seeking effort on PSB.</li> </ul>
Theoretical Contributions	<ul style="list-style-type: none"> <li>Previous studies have applied SET to explain reciprocity but have not examined what the key elements are that constitute social exchange. This study utilized cost-benefit concepts from SET to characterize knowledge growth and knowledge-seeking effort, and to explain their collective effects on reciprocity through PSB. The findings highlight that the more knowledge learned and absorbed by seekers and the less their knowledge-seeking effort, the more they exhibit reciprocal intentions.</li> <li>Compared to previous studies conducted in hedonic-focused communities, findings extend SET into an online professional community context. The findings demonstrate that reciprocity is not just a voluntary concept, driven by altruistic motives, but also a discretionary concept, driven by evaluating the benefits and costs and that it is subject to change depending on the level of net benefits.</li> <li>The findings highlight the importance of studying PSB and PCS in the context of knowledge seeking and reciprocity. The positive effects of PCS cannot be fully understood by simply considering its direct effect on reciprocity. To incentivize knowledge seekers to build reciprocal relationships within the community, community support must be perceived as beneficial to increasing PSB because subsequent reciprocal behaviors are required for mutually beneficial exchanges.</li> <li>In addition to treating PCS as an antecedent of reciprocity, the results contribute to the SET and community support literature by identifying that knowledge seekers' perception of social benefits is not only developed by knowledge growth and effort, but is likely dependent on the interaction between knowledge-seeking effort and community support. This study demonstrates that community support sets a boundary condition on the negative effects of knowledge-seeking effort on PSB in SET.</li> </ul>

created by the linking actors can increase reciprocal intentions and PSB as well as reduce seekers' efforts. An online professional community should consider building relationships through a system of instant messaging that would allow seekers to communicate with potential experts. Social interaction by means of direct communication could help seekers expand their network and connect them with potential experts who share the same interests. With assistance from a group of linking actors, knowledge seekers could save unnecessary time and effort, which would allow them to find the answers to their questions more quickly and easily and thus obtain the benefits of collective work. It is important to consider that certain questions raised by seekers may be unable to be solved by a single contributor and thus require collaboration among experts. A feasible strategy would be using a virtual project that invited diverse linking actors to work on unsolved but related questions. Knowledge seekers could quickly start discussions with team members and keep all feedback from participants in their project.

Although most of the hypotheses were supported in the proposed SET model, the study was unable to include all the important factors from knowledge-seeking literature to explain reciprocal intentions. Further studies could extend this research by considering potential explanatory factors such as individual characteristics, intrinsic motivations, and other interpersonal factors to enrich the theoretical findings. This study collected cross-sectional data to explain reciprocal intentions. The magnitude of the effect of PSB and PCS on reciprocal intentions could vary with time. Future studies should aim to conduct a longitudinal study to assess the hypothesized causal relationships.

The generalizability of this study might be restricted because the focus was limited to a Chinese online professional community. It is possible that cultural issues should be taken into account before applying these findings in a broader context. Despite this, the professional programming community was large and diverse, and knowledge-seeking behaviors were very common in the community. Recent surveys conducted in western countries by [StackOverflow \(2018\)](#) and [Github \(2018\)](#) both show that there is an increasingly large Chinese population that has signed up as newcomers to create requests and contribute to the community. The role of social support such as PCS should play a more important role in explaining reciprocal behavior. Future studies could incrementally build on these findings and should consider culture as a contingency variable that influences the proposed model.

Another limitation was that the conceptualization of knowledge seeking was addressed within a specific domain knowledge level (programming languages) rather than in a specific knowledge category, e.g., Java, JavaScript, C#, PHP, Android, Python, HTML, etc. Blueshop offers a large number of specific knowledge categories and members often seek knowledge across multiple categories at the same time. The study data did not allow for a comparison regarding whether the proposed

model would result in different findings in different knowledge categories. This could be another possible area for further investigation.

## 6. Conclusion

Asking questions and searching for the relevant answers requires the efforts of others in social media in order to answer them ([Kapoor et al., 2018](#); [Khansa et al., 2015](#); [Shiau et al., 2018](#)). A selfish seeker might individually rationalize that other seekers can do the participatory work which could lead to a collectively irrational outcome, in which no singular seeker has the willingness to behave reciprocally. In an online professional community, the collective knowledge induces a social dilemma in which knowledge seekers can enjoy the benefit of others' contributions without any significant costs. One possible strategy to minimize this free-rider phenomenon is to encourage reciprocity. Consequently, this study examined the relationship between knowledge growth, knowledge-seeking effort, and reciprocity in light of SET from the knowledge seeker's perspective, and offered an explanation as to the reasons reciprocal intentions develop.

Knowledge seekers weighed benefits and costs to develop a perception of social benefits that could lead to reciprocal intentions. The proposed model was tested by highlighting the mediator of PSB and revealed its essential role in leveraging knowledge growth as well as the effect of knowledge-seeking effort on reciprocity. In knowledge seeking, the perception of net benefits after costs was critical to facilitate reciprocity. In addition, linking actors that form a bridge between knowledge seekers and the desired knowledge sources helped develop a supportive climate for the seekers. Knowledge seekers were more willing to engage in reciprocal interdependence with members if they received support to fulfill their needs and perceived the community in a positive light. The organizational climate was extended into SET and its contextual importance in an online professional community was examined. Favorable perceptions of the community from knowledge seekers played a strategic role in reducing knowledge-seeking effort and increasing reciprocity. This study recognized the value of the interaction between knowledge-seeking effort and a supportive climate by showing that a higher level of PCS could reduce the negative effects of knowledge-seeking effort. These results add meaningful information to existing knowledge-seeking research and provide meaningful implications for practice.

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## Appendix A

### Knowledge growth

Based on my knowledge-seeking experience, the obtained knowledge

KG1 .... increased my knowledge of programming

KG2 .... reinforced my programming competence

KG3 .... sharpened my programming skills

### Knowledge-seeking effort

Based on my knowledge-seeking experience, I found

KSE1 ....it took me too much time to find the required knowledge

KSE2 ....it required a lot of effort to locate the knowledge I needed

KSE3 ....it cost me extra effort to identify the required knowledge

KSE4 ....it took too much time and effort to search for the knowledge I needed

### Perceived community support

In my knowledge-seeking experience, I felt the linking actors

PCS1 .... fully cared for the welfare of others.

PCS2 .... cared about my requests and contributed their resources in all possible discussions.

PCS3 .... had a strong sense of responsibility to provide effective assistance.

PCS4 .... valued my efforts and showed concern for my questions.

### Perceived social benefits

Overall, taking into account benefits and costs in my knowledge-seeking experience, the net outcome



PSB1 .... improved my programming performance  
 PSB2 .... enlarged my programming productivity  
 PSB3 .... enhanced my programming quality

#### Reciprocity

In my future participation  
 REC1 ....., I am committed to providing a substantial amount of resources to assist the community members who previously helped me/need help/provided assistance on request.  
 REC2 ....., I will spend time and energy to respond to community members who previously helped me/need help/provided assistance on request.  
 REC3 ....., I will contribute my programming knowledge to the community members who previously helped me/need help/provided assistance on request.  
 REC4 ....., I will provide my programming expertise to support the community members who previously helped me/need help/provided assistance on request.

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