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How can shared leadership in self-organizing teams act as a catalyst for individual knowledge sharing behaviour?

MASTER THESIS

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Abstract

Individual knowledge sharing behaviour is considered critical in today's competitive world in order to achieve competitive advantage. This study examines the relationship between shared leadership and individual knowledge sharing behaviour in self-organizing teams. We argue that employees' basic psychological need satisfaction (PNS) in terms of autonomy, competence and relatedness mediate this relationship. Additionally, we investigate the moderating role of task interdependence on the shared leadership and PNS relationship. The research model was tested with survey data collected from 86 employees from a Dutch consultancy firm in the knowledge-based industry. In this organization, self-organizing teams were implemented in 2017 based on shared leadership principles. The results show that shared leadership is an important factor for enhancing individual knowledge sharing behaviour, both directly and indirectly through employees' PNS for relatedness. No explanatory effects were found regarding the PNS for autonomy and competence. Additionally, no significant moderating effect was found regarding task interdependence. We conclude by discussing the implications of these findings.

1 Introduction

In order to anticipate the increasing need for knowledge sharing behaviour and facing complex market conditions, organizations introduce new workplace designs, such as self-organizing teams (Bligh, Pearce, & Kohles, 2006; Sangeetha & Kumaran, 2018). Self-organizing teams are considered to be of great importance, especially in knowledge-based industries. As they are considered to enhance team creativity, innovative behaviour and enable teams to solve complex problems, these new workplace team designs are seen as promising (Bligh et al., 2006; Sarin & McDermott, 2003). To meet a team's full potential for innovative and competitive advantage, knowledge sharing behaviour between its members is crucial (Bligh, Pearce, & Kohles, 2006; Carson, Tesluk, & Marrone, 2007; Llopis & Foss, 2015). As the complexity of work in knowledge-based industries increases, by its very nature, inputs from multiple, highly specialized (i.e. experts) individuals is generally required for teams to be successful (Carson et al., 2007; Coun, Peters, & Blomme, 2019; Pearce, 2004). The more complex the tasks to be done, the lower the likelihood that any individual has the expertise needed for all task components required. Thus, knowledge sharing behaviour between experts in self-organizing teams is crucial for organizations to create, transfer and use knowledge for innovative output (Liu, Lin, Joe, & Chen, 2018; Llopis & Foss, 2015).

It is commonly agreed that individual motivation is a key determinant for knowledge sharing behaviour to occur (Hau, Kim, Lee, & Kim, 2013; Llopis & Foss, 2015). Team members tend to be more willing to exchange knowledge, when the benefits of sharing knowledge outweigh the disadvantages (Cropanzano & Mitchell, 2005). Especially in work contexts where employee autonomy is high, creating a conducive environment for knowledge sharing behaviour is vital. Therefore, over the last decades, the interest in how knowledge sharing behaviour can be stimulated, organized and managed, has increased (Llopis & Foss, 2015; Staples & Webster, 2008; Yi, 2009). Self-determination theory (Deci, Olafsen, & Ryan, 2017) provides us with a useful lens to shed light on the possible underlying mechanisms and explain which conditions may foster the willingness for knowledge sharing behaviour between team members in these contemporary workplace team designs. Self-determination theory is a widely accepted theory of human

motivation, suggesting that an employee's motivation to share knowledge is influenced by the satisfaction of three basic psychological needs: the need for autonomy, the need for competence and the need for relatedness (Deci et al., 2017; Gagné, 2009).

However, knowledge sharing behaviour is not a given, because of threats to this self-determination. The nature of self-organizing teams might be a risk for knowledge sharing behaviour to occur. Work in knowledge-based industries is often dispersed and temporary organized. Besides, collaboration takes place more and more virtually between employees from various backgrounds and multiple disciplines. Moreover, due to ever-shorter cycle times and rapidly changing market demands, team compositions change frequently. This can lead to lower levels of trust and shared understanding among the team members (Fong, Men, Luo, & Jia, 2018; Pinjani & Palvia, 2013). Due to the nature of this work-context, these risks may lead to knowledge hiding and fragmentation of information. Scholars found several negative effects of knowledge hiding. Varying from lower individual creativity to severe negative effects on organizational outcomes (Fong et al., 2018). Therefore, these work contexts can be a potential threat for non-productive conflict or to the individual that may stifle employees' motivation to share knowledge.

Shared leadership is often considered appropriate to overcome this problem. Especially for implementing new workplace designs such as self-organizing teams, shared leadership is argued to offer promising conditions to foster knowledge sharing behaviour (Hoch, 2014; Sangeetha & Kumaran, 2018). The concept of shared leadership refers to a situation in which team members voluntarily share leadership roles and responsibilities among each other, create a shared vision, collaborate in decision-making processes and commonly set the team goals. From a social exchange theory perspective, shared leadership strengthens social ties, reciprocity and trust, because it implies vivid interaction, interdependence and mutual influencing among team members. Therefore, shared leadership will foster an environment in which the benefits of sharing knowledge outweigh the costs. As a result, employees' motivation to share knowledge will increase (Carson et al., 2007).

There is extensive literature available regarding the relationship between shared leadership and knowledge sharing behaviour. However, recent studies show inconclusive findings regarding the effect of shared leadership on individual knowledge sharing behaviour. Some studies show a positive effect arguing that shared leadership leads to a climate of trust, collaboration and a shared commitment based on common goals (Coun et al., 2019; Sangeetha & Kumaran, 2018). Other findings show less optimistic results and report lower levels of knowledge sharing behaviour to be found, particularly in knowledge-based industries (Fong et al., 2018; Mabey, Zhao, & Burroughs, 2017). Additionally, these studies mostly focus on discussing motivation in terms of level or amount (Wang & Hou, 2015). The underlying mechanism, which leads to increased employees' motivation for knowledge sharing behaviour through employees' self-determination, has been largely ignored in literature. To address this void in literature, the present study will elaborate the research of Coun et al. (2019) and examine whether satisfaction of the basic psychological needs for autonomy, competence and relatedness, as defined within self-determination theory (Ryan & Deci, 2000), serves as a mediator in the relationships between shared leadership and individual knowledge sharing behaviour. We hypothesize shared leadership to have a positive effect on employees' PNS, resulting in higher levels of individual knowledge sharing behaviour.

Because empirical evidence is scarce and prior research found inconclusive findings regarding this specific mediating effect of employees' PNS, we extended this study by looking for additional factors that might strengthen this mediating effect. Based on social exchange theory, in which reciprocity and strong social ties are seen as key determinants for employees' motivation to share their knowledge, we added task independence as moderator that enhances the relationship between shared leadership and individual knowledge sharing behaviour.

Our study contributes to literature in several ways. First, the study of the management of knowledge sharing behaviour has grown rapidly, as evidenced by special issues in leading journals

(Coun et al., 2019; Staples & Webster, 2008). Especially as new workplace team designs such as self-organizing teams are increasingly implemented to meet today's market demands, the question rises to what extent existing models are appropriate to understand knowledge sharing processes within these new work place contexts. Do the mechanisms, explaining individual knowledge sharing processes to occur, work in the same way as within settings that are more traditional? This study contributes to the debate answering that question. Second, theoretical and empirical work is just beginning to explore the antecedents and consequences of shared leadership principles on individual knowledge sharing behaviour within new workplace team designs. Limited research available shows inclusive findings regarding our main topics studied. By extending existing literature, this study offers new insights regarding this increasingly studied topic and fill this gap in literature (Bligh et al., 2006). Additionally, our study tries to deepen the understanding of underlying mechanisms of how shared leadership influences team outcomes. These insights can be used to develop models that are more predictive of successful outcomes such as individual knowledge sharing behaviour and productivity (Bligh et al., 2006; Llopis & Foss, 2015). Our third contribution lies in offering an important contribution to the academic debate on how knowledge sharing behaviour can be promoted in knowledge-based industries. By these insights, the understanding of both scholars and practitioners will be deepened in how individual knowledge sharing behaviour within teams can be enhanced and thereby helping teams being more successful. This answers the call from academics to further investigate the yet relatively unexplored gap in literature about the effect of employees' PNS through autonomy, competence and relatedness on the relationship between shared leadership and individual knowledge sharing behaviour (Coun et al., 2019) and especially the role of task interdependence in this relationship.

This paper is organized as follows: chapter 2 presents a literature review and provides a comprehensive summary of alternative views of individual knowledge sharing behaviour, shared leadership and self-determination through the satisfaction of the three basic psychological needs (autonomy, competence and relatedness). Chapter 3 focuses on our hypotheses development and research model. The research methodology is presented in chapter 4, including used measures. The analyses and results are described and illustrated in chapter 5. We end this paper with the conclusions and discussion, including limitations of our study and recommendations for further research.

2 Literature review

The relationship between shared leadership and knowledge sharing behaviour

Knowledge-based industries are characterized by rapid changing market conditions, high complexity and a strong need for innovative and creative problem-solving skills (Bligh et al., 2006; Sarin & McDermott, 2003). New workplace team designs, such as self-organizing teams are seen as promising concepts enabling organizations to enhance their competitiveness and be successful. These team designs are supposed to enhance collective capabilities regarding problem solving, innovative skills and creative thinking, because of its specific characteristics. New workplace team designs are characterised by a decentralisation of decision-making authority and shared leadership principles. These principles include sharing responsibilities among team members, multi-disciplinary and intensive cooperation among team members (Sangeetha & Kumaran, 2018; Bligh, Pearce, & Kohles, 2006).

The study of knowledge sharing behaviour has grown rapidly as evidenced by special issues in leading journals (Staples & Webster, 2008). Especially in knowledge-based industries, where employees often work in distributed teams, knowledge sharing behaviour among employees is seen as a key determinant for enhancing innovative behaviour, creativity and competitive advantage (Coun et al., 2019; Llopis & Foss, 2015; Sangeetha & Kumaran, 2018). Because of the rapidly

changing market conditions, knowledge work is increasingly becoming dependent on teams in which the knowledge of several individuals must be integrated to create true innovation (Cox et al., 2003). Several studies show that new workplace team designs, such as self-organizing teams, offer interesting opportunities for this to happen as it fosters a positive climate for knowledge sharing behaviour to occur (Carson et al., 2007; Coun et al., 2019; Wu, Cormican, & Chen, 2018).

Knowledge sharing behaviour is defined as the process where individuals mutually exchange their (implicit and explicit) knowledge (Cummings & Teng, 2006; Gagné, 2009; Staples & Webster, 2008). Knowledge is often highly personal and not easily expressed. As a result, knowledge is difficult to share with others (Foss, Minbaeva, Pedersen & Reinholt, 2009). Knowledge sharing behaviour implies a process that consists of both bringing and getting knowledge (e.g. information) between individuals. Synergistic collaboration, connectedness and working towards a common goal are seen as important preconditions for effective knowledge sharing behaviour to occur (Gagné, 2009).

Recent studies show that knowledge sharing in new workplace team designs, such as self-organizing teams, can be difficult. This can be explained by multiple reasons. First, for experts, it can be hard to put their knowledge into words that are understandable for non-experts. This can inhibit knowledge sharing processes (Gagné, 2009). Especially in teams where expertise from multiple discipline is needed, this can be a risk. Second, experts might see sharing their knowledge as a risk for losing authority, as their knowledge might be “stolen” and used by potential competitors (Hooff, Elving, Meeuwsen, & Dumoulin, 2003; Staples & Webster, 2008). Third, the nature of self-organizing teams can be a potential risk inhibiting knowledge sharing behaviour (Pinjani & Palvia, 2013). Especially in knowledge-based industries, new workplace team designs are often dispersed and temporary. Collaboration increasingly takes place virtually, leading to a physical barrier between team members (Fong et al., 2018; Staples & Webster, 2008). Besides, the rapidly changing market demands often lead to frequent changes in team compositions. As a result, this can negatively influence team processes resulting in lower team effectiveness, fragmentation of knowledge, less innovative behaviour and less knowledge sharing behaviour (Bligh et al., 2006; Fong et al., 2018).

Shared leadership is seen as a promising concept how organizations can face these dynamic conditions and create an environment in which teams can reach up to their full potential and be successful (Carson et al., 2007; Coun et al., 2019; D’Innocenzo et al., 2014; Hoch, 2014; Sangeetha & Kumaran, 2018). Especially because scholars consider shared leadership principles to be one of the key determinants fostering knowledge sharing behaviour in teams (Coun et al., 2019). Shared leadership is defined as “a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both” (Pearce and Conger, 2003, p.1). The concept of shared leadership refers to a situation in which team members share leadership functions voluntarily among each other in order to pursue collective goals. The concept of shared leadership is characterized by collaborative decision-making and shared responsibility for team performance. It implies vivid interaction, interdependence and mutual influencing among team members (Carson et al., 2007; Pearce, 2004). This influence process is fluid and often reciprocal.

Shared leadership focuses on the ability to connect with others and to share responsibilities, in order to achieve common team objectives (Lee, Lee, Seo, & Choi, 2015; Coun et al., 2019). Teams working based on shared leadership principles, jointly take responsibility for activities that used to be undertaken by formal leaders, by influencing other team members, through interaction and sharing leadership responsibilities among each other (Carson et al., 2019; Pearce, 2004). Based on social exchange theory (Blau, 1964), team members tend to be more willing to exchange knowledge, when the benefits of sharing knowledge outweigh the disadvantages (Coun et al., 2019). Teams who perceive having successfully implemented shared leadership principles foster a climate of cooperation and mutual effort, towards achieving collective goals. In this climate,

individual knowledge sharing behaviour is beneficial, as employees can rely on encouragement, help and mutual inspiration from their team members.

The effect of individual employees' self-determination on the relationship between shared leadership and individual knowledge sharing behaviour

Individual knowledge sharing behaviour can be seen to be ultimately rooted in employees' behaviour and individual drivers (Foss et al., 2009). Prior research recognizes the importance of examining personal motivational factors that facilitate or restrain knowledge sharing behaviour. Many studies have intensively investigated these issues in various contexts (Foss et al., 2009). Self-determination theory (SDT) (Ryan & Deci, 2000) offers a widely accepted motivation theory that has proven to be useful in predicting such behaviour. SDT proposes that two types of motivation encourage human behaviour: externally induced incentives, called controlled motivation and internally evoked incentives, known as autonomous motivation (Deci et al., 2017). Research shows that especially autonomous motivation, enhances positive behavioural outcomes, such as information seeking, goal attaining and knowledge sharing behaviour (Gagné, 2009; Llopis & Foss, 2015).

Prior studies underline the importance of examining individual employees' self-determination through the psychological need satisfaction (PNS) for autonomy, competence and relatedness. As rationale, scholars argue that when people feel satisfied in those three basic psychological needs, they will value and enjoy knowledge sharing more (Gagné, 2009). SDT indicates that autonomous motivations are more likely to result in more positive outcomes regarding individual knowledge sharing behaviour than controlled motivations, as they tend to be more positively related to higher satisfaction levels of the need for autonomy, competence and relatedness (Coun et al., 2019; Gagné, 2009; Wang & Hou, 2015).

To look closer at this mechanism, the basic need for autonomy refers to being self-regulating regarding performing a behaviour. Key in this matter is the extent to which an individual endorses an action as his own, not whether an individual can choose or act independently from the desires of others (Coun et al., 2019; Deci et al., 2017). As such, knowledge sharing behaviour may be viewed as a potential activity through which individuals may show a natural interest. Some people tend to like it better than others. Thus, employees may experience increased autonomy need satisfaction when deciding to engage in such behaviour (Llopis & Foss, 2015).

The basic need for competence refers to individuals' natural need to feel being effective in what they do (Wang & Hou, 2015). In work settings, employees feel competent when they are capable and effective to influence the environment. For example to search for challenges they would like to meet, and to make a significant contribution to team performance (Coun et al., 2019; Gagné, 2009). By actively participating in knowledge sharing behaviour, team members may feel endorsed and supported to commit to challenges matching their competences. This enables them to make a positive contribution to the team goals. Knowledge sharing also positively contributes to learning and self-development, resulting in higher satisfaction of the need for competence.

Finally, the basic need for relatedness refers to the need to feeling connected and in sympathy with significant others. For example this need is satisfied when an individual sees itself as a member of a team (Coun et al., 2019; Wang & Hou, 2015). Research shows that a culture that encourages autonomy, teamwork and social support, positively influences knowledge sharing behaviour. It enhances trust and reciprocity among team members and a feeling of belonging (Gagné, 2009; Wang & Hou, 2015). As a result, knowledge sharing behaviour may be increased, simply because employees feel pleased in helping their team members and seeing the shared efforts and achievements towards the common team goals.

Shared leadership is considered appropriate for creating an environment that endorses employees' self-determination through increased autonomy, competence and relatedness. Shared leadership focuses on the ability to connect with others within the team (relatedness) by sharing

and dividing responsibilities (autonomy and competence) and pursuing collective team objectives (autonomy, relatedness) (Bligh et al., 2006; Carson et al., 2007; Coun et al., 2019). In teams who implemented shared leadership principles, influence is often strong and reciprocal. This contributes to the satisfaction of the three basic psychological needs.

As mentioned, recent studies show inconclusive findings regarding the relationship between shared leadership and individual knowledge sharing behaviour. The effect of shared leadership on employees' feelings of self-determination might offer new insights explaining the underlying mechanisms that cause whether or not individual knowledge sharing behaviour to occur. Coun et al. (2019) performed an empirical study in which they investigated the mediating role of employees' self-determination on the relationship between shared leadership and knowledge sharing behaviour. Their findings showed a weak relationship between shared leadership and the psychological need satisfaction for to autonomy. Additionally, regarding the relationship between employees' satisfaction of the three basis psychological needs and knowledge sharing, only the satisfaction regarding the need for autonomy was found to have a relationship with knowledge sharing but a partial effects size. Significant indirect effects were found to support mediation of employees' self-determination in the relationship between shared leadership and knowledge sharing, suggesting mediating through satisfaction of the PNS for autonomy. These results indicate a weak pattern that higher levels of shared leadership lead to an increase in only employees' PNS for autonomy, which increases knowledge sharing behaviour. Support for an effect of the PNS for competence or relatedness was not found.

However, based on social exchange theory (Blau, 1964) and prior research regarding the relationship between knowledge sharing behaviour and employees' self-determination, we expected different results to be found. To be more specific, we expect employees' self-determination through the need for relatedness, to be the strongest. Reciprocity is a determining factor for employees in deciding to participate in knowledge sharing behaviour based on their expectations regarding the costs and benefits of sharing their knowledge. The used measures by Coun et al. (2019) might give an alternative explanation, as it might have not been appropriate enough for the context studied. For example, shared leadership was measured by an adapted scale developed by Hiller, Day, & Vance (2006), meant for the context of top management teams of churches. Additionally, their measure used focused on the extent to which team members perceive leadership tasks are shared within their team, not to what extend they perceive each individual to share in leadership tasks within the team. This raises the question if alternative measures might give different results. Additionally, the knowledge workers studied, often worked in virtual teams with high levels of temporality of work teams and flexibility regarding when and where to work. By nature, these conditions might not be representative for studying in organisations in the knowledge-based industry, which work in more continuous team compositions and interact on a rather physical than virtual base. Finally, another explanation might be given by adding an additional factor that might influence the mediating role of employees' self-determination on the relationship between shared leadership and individual knowledge staring behaviour, such as task interdependence. The more team members rely on each other's work, the stronger the satisfaction for the psychological need for relatedness might be. Therefore, the purpose of our study is to design an empirical study to further investigate how the relationship between shared leadership and individual knowledge sharing behaviour is explained by employees' self-determination and especially how task interdependence influences this relationship.

3 Research model and hypotheses

There is an increasing attention for individual knowledge sharing behaviour. It is found to be essential for self-organizing teams to uplift their creativity, solve complex problems and be

successful. Therefore, the focus of our study is individual knowledge sharing behaviour among team members. As shared leadership is widely seen as a promising concept, to enhance knowledge sharing behaviour within teams, our research model adopts this basic assumption, stating that shared leadership is positively related to employees' individual knowledge sharing behaviour. Additionally, for individual knowledge sharing behaviour to occur and based on self-determination theory, we propose that the satisfaction of employees' basis needs for autonomy, competence and relatedness, is an important mechanism that underlies the relationship between shared leadership and individual knowledge sharing behaviour and may be enforced by task interdependence. In this section, we will present our main arguments leading to our hypotheses and research model.

The effect of shared leadership on employees' self-determination and individual knowledge sharing behaviour

Shared leadership is widely seen as a promising concept for managing especially knowledge workers, as it is argued to empower individuals within teams (Coun et al., 2019; Hoch, 2014). By stimulating team members to share responsibilities and divide tasks, a climate of trust, reciprocity, belonging and social support can be developed, enhancing knowledge sharing behaviour (Gagné, 2009; Liu et al., 2018; Staples & Webster, 2008). From a social exchange theory perspective (Blau, 1964), these conditions enhance exchange behaviour among team members, as they are more likely to consider the costs of sharing their knowledge outweigh the benefits. Consistent with Coun et al. (2019) we formulate the following basic Hypothesis:

- *H1: Perceived shared leadership is positively related to employees' individual knowledge sharing behaviour.*

Self-determination theory offers a useful lens to study the underlying mechanism of employees' self-determination. It explains which conditions lead to higher levels of SDT and how this fosters employees' willingness to share their knowledge with team members. SDT indicates that employees with higher levels of satisfaction of the basic psychological need for autonomy, competence and relatedness, tend to have higher autonomous motivations and, as a result, are more likely to have positive outcomes regarding individual knowledge sharing behaviour (Coun et al., 2019; Gagné, 2009; Wang & Hou, 2015). From a SDT perspective, it is likely that fulfilling the satisfaction of one need goes hand in hand with the satisfaction of the other two needs as well. Therefore, in previous studies these three needs have been grouped to form a composite score of general need satisfaction (Van Den Broeck, Vansteenkiste, De Witte, & Lens, 2008). Although scholars argue that shared leadership is positively related to higher levels of PNS, existing research, in which the separate psychological needs were studied, showed inconclusive findings.

In teams working based on shared leadership principles, team members collectively have to share in leadership roles and –responsibilities. This gives team members the opportunity to experience high levels of ownership of their behaviour and a sense of volition (Van Den Broeck et al., 2008). As a result, individual team members might feel strengthened in their basic need for autonomy. Additionally, from SDT literature we know that the need for autonomy is considered to be than important element for determining the degree of intrinsic motivation achieved (Deci et al., 2017). Therefore, we propose the following Hypothesis:

- *H2a: Perceived shared leadership is positively related to employees' PNS for autonomy.*

Shared leadership is widely argued to have a positive effect on employees' satisfaction of the basic need for competence. Sharing responsibilities and dividing tasks could enhance employees' feelings of competence, because it offers team members opportunities to take on tasks for which they feel best suited for or most motivated to accomplish (Gagné, 2009). Hence, when employees feel competent and skilled in what they do, also can learn from each other and help their peers, the basic psychological need satisfaction for competence will be met. This leads to our proposition that

high levels of perceived shared leadership will lead to higher levels of employees' satisfaction regarding the need for competence, resulting in the following Hypothesis.

- *H2b: Perceived shared leadership is positively related to employees' PNS for competence.*

Finally, high perception of shared leadership within the team may increase the satisfaction of the need for relatedness, by conducting an environment, which stimulates collaboration. With the absence of a central leader, clear regulations and guidelines for decision-making processes, shared leadership teams have to establish their own team goals. They have to create a collective vision and design how they want to arrange work- and deciding processes to go within their team. In order to do so, inputs from all team members are needed. This enhances the emergence of mutual interactions and communication between team members. Additionally, because of this, relationships between team members will evolve, leading to stronger social ties (Han, Lee, Beyerlein, & Kolb, 2018). Thus, working based on shared leadership principles fosters an environment of shared purpose, reciprocity, interaction and trust. Based on these conditions, we expect shared leadership to have a strong and positive relationship with employees' satisfaction regarding the need for relatedness. We therefore hypothesize:

- *H2c: Perceived shared leadership is positively related to employees' PNS for relatedness.*

The mediating effect of employees' self-determination on the relationship between shared leadership and individual knowledge sharing behaviour

From a social exchange theory perspective, trust and reciprocity are expected to be of great importance for increasing employees' motivation for participating in knowledge sharing behaviour (Gagné, 2009). Shared leadership is considered to offer promising conditions for teams, by enhancing employees' self-determination. It fosters creating an environment in which teams can be more creative and effective (Carson et al., 2007; Coun et al., 2019). This leads to the argumentation that shared leadership has a positive effect on employees' self-determination, which as a result has a positive effect on individual knowledge sharing behaviour.

A closer look at literature shows different explanations possible regarding this mediating effect. First, a sense of belongingness activates inclusion, fosters interdependent connections and hence stimulates team members to exchange knowledge and collaborate in order to achieve the common goals (Ellemers, Sleebos, Stam, & de Gilder, 2013). Shared leadership fosters conditions in which individual team members collectively divide responsibilities and rely on each other in order to achieve the common goals. Therefore, high levels of employees' PNS for relatedness will lead to higher levels of individual knowledge sharing behaviour. Therefore, we argue that employees PNS for relatedness mediates the relationship between shared leadership and individual knowledge sharing behaviour. Second, shared leadership may also lead to increased levels of PNS for autonomy. It stimulates team members to take ownership for their actions and responsibilities within the team. However, this does not automatically lead to higher levels of individual knowledge sharing behaviour. Especially as sharing knowledge can be seen as a risk for losing personal position and authority (Hooff et al., 2003), something else is needed for individuals to be willing to share their knowledge. Based on social exchange theory(Blau, 1964), we state that shared leadership enhances employees PNS for autonomy and under conditions of high levels of employees' PNS for relatedness, it leads to higher levels of individual knowledge sharing behaviour (Vansteenkiste & Ryan, 2013). Finally, shared leadership may lead to higher satisfaction regarding the need for competence. As team members can choose tasks they feel most fitted for, employees PNS for competence will be enhanced under conditions of shared leadership. Additionally, shared leadership is considered to stimulate a climate of trust and safely and therefore offer conditions in which autonomous learning can take place. Actively participating in knowledge sharing processes will contribute to higher feelings of being effective within the team. It will contribute to realize the

team goals. Therefore, we expect employees' PNS for competence to be a mediator and lead to higher levels of individual knowledge sharing behaviour.

As stated before, employees' self-determination may be seen as important factor for creating an environment in which teams can be successful. Because trust, reciprocity and connectedness are vital elements for knowledge sharing processes to occur (Carson et al., 2007; Gagné, 2009; Pearce, 2004), we expect employees' PNS for relatedness to be most important in explaining the relationship between shared leadership and individual knowledge sharing behaviour as it fosters trust and strengthen social ties between team members. As a result, we expect higher motivation and willingness to actively participate in individual knowledge sharing behaviour. To conclude, we offer the following Hypotheses regarding the mediating effect of employees' self-determination on the relationship between shared leadership and individual knowledge sharing behaviour.

- *H3: The relationship between perceived shared leadership and individual knowledge sharing behaviour is positively mediated by employees' PNS for autonomy (a), competence (b) and relatedness (c).*
- *H4: This mediating effect will be most strong through employees' PNS for relatedness.*

The moderating effect of task interdependence on the relationship between shared leadership and employees' self-determination.

As mentioned, the results regarding the relationship between perceived shared leadership and individual knowledge sharing behaviour are inconclusive. The research model presented by Coun et al. (2019) showed weak and inconclusive findings regarding the mediating effect of basic psychological need satisfaction regarding autonomy, competence and relatedness. As mentioned, one of the reasons might lie in the measures used. Another reason for this effect not to be found might lie in the nature of the context in which team members operate. Social aspects of exchanging are considered to be rapidly changing from a more physical interaction, into a more virtual interaction (Fong et al., 2018). Especially in knowledge-based industries, where teams work often dispersed and remotely, the interdependence within teams might be low. As a result social exchange processes might be lowered (Pinjani & Palvia, 2013). Even though it seems that shared leadership might contribute to creating an atmosphere of trust that enhances employees' individual feelings of belongingness, something else might be needed to establish the social ties necessary for social exchange processes to occur (Hooff et al., 2003). Task interdependence might offer an alternative explanation, as it has been highlighted as important contextual moderator in knowledge behaviour literature (Fong et al., 2018; Pearce & Gregersen, 1991; Staples & Webster, 2008). Task interdependence refers to the degree to which the interaction and coordination of team members is required to complete tasks (Langfred, 2007). Several scholars argue that the degree of task interdependence has a substantial effect on team performance. Task interdependence influences team members cooperation and leads to an increase of communication (Pinjani & Palvia, 2013). It also promotes supportive behaviour whereby team members look out for the interests of their team members in addition to their own (Fong et al., 2018). Employees with high task interdependence ought to develop a greater sense of felt responsibility for the group they are part of, as they see the direct effects of their own actions reflected on the collective results (Pearce & Gregersen, 1991; Staples & Webster, 2008). As an effect of this felt group responsibility, employees' perception of personal autonomy may lower, resulting in lower levels of PNS for autonomy. However, we expect task interdependence to have a positive effect on employees' PNS for competence and relatedness. It strengthens social ties between team members and stimulate learning conditions in which team members can develop themselves in order to be more effective in contributing to meeting the team goals. Therefore, we propose that task interdependence moderates the effect of shared leadership on employees' PNS in such a way that it strengthens this relationship. To summarize, we propose the following hypotheses regarding the moderating effect

of task interdependence on the relationship between shared leadership and employees' basic psychological need satisfaction.

- H5a: The relationship between perceived shared leadership and employees' PNS for autonomy is negatively moderated by task interdependence.
- H5b: The relationship between perceived shared leadership and employees' PNS for competence is positively moderated by task interdependence.
- H5c: The relationship between perceived shared leadership and employees' PNS for relatedness is positively moderated by task interdependence.

In sum, the conceptual model proposed in this study is shown in figure 1.

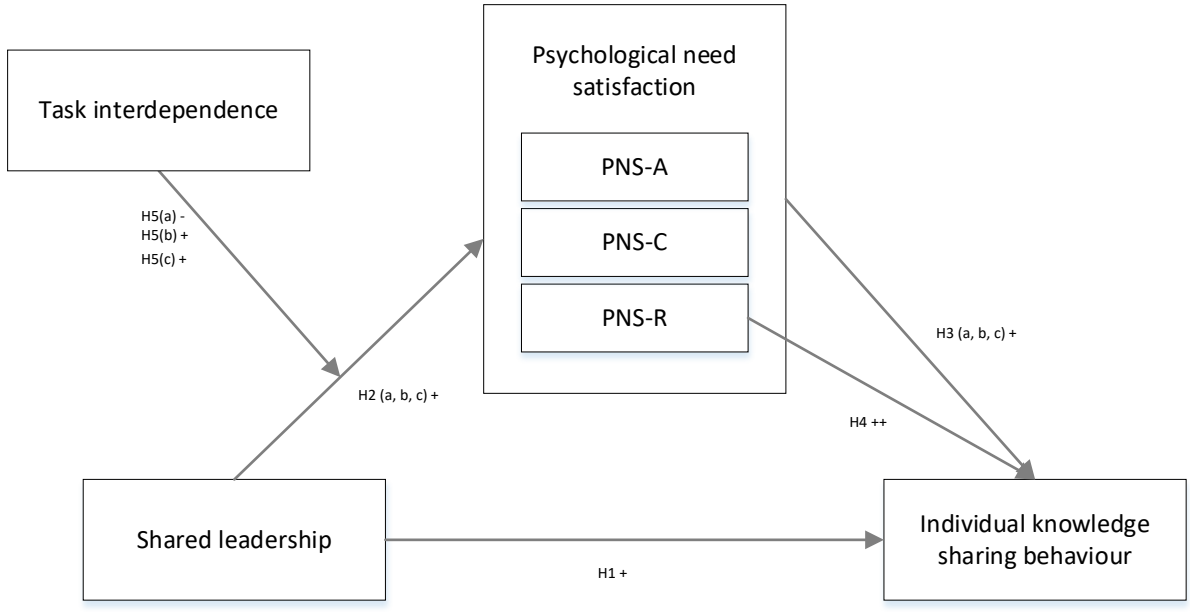

Figure 1: Research model

4 Method

Sample

Data for assessing the proposed model were collected from a Dutch consultancy company in the Learning & Development industry, a highly knowledge based industry. In this firm, employees are organized in both functional team structures, focusing on long-term development around specific themes, as well as in project teams, which are focussed on short-term, customer-oriented goals. This workplace team design allows the organization to create maximum flexibility in order to combine available knowledge and experiences and find optimal solutions for customer demands. In this organization, self-organizing teams were implemented in 2017 based on shared leadership principles. The professionals within each organizational (thematic) team are collectively responsible for setting and realising their team goals, their performance and the quality of their propositions.

In this study, we focus on knowledge sharing behaviour in relationship to shared leadership at an individual level. Chan (2009) argues that individual scales, measured by self-reports, are especially appropriate to measure private events, such as perception- and satisfaction variables like PNS (Podsakoff & Organ, 1986). The total response rate was 83%. Out of 121 employees that were invited to participate in this study, 100 employees responded. From this sample group, data of 14 respondents showed missing values. Therefore, the final sample for analysis comprises 86 respondents. Data of the excluded group was tested for significant differences with the total

response group. Due to missing data, only the control variables organizational tenure and team tenure could be tested for significant differences. A t-test showed significant differences for organizational tenure (t = 2.306, p = 0.0396) and team tenure (t = 5.034, p = 0.000). The mean score of the excluded group for organizational tenure (in years) is 14.17 compared to 6.07 of the final sample group. For team tenure, the mean score of the excluded group is 1.83 compared to 1.63. Based on these results, due to significant differences, selection bias could be a risk.

The sample group consists of 14 consultancy teams. Table 1 summarizes demographic information about the sample group. Overall, the vast majority of the respondents were female (74.4%) and most respondents held a master's degree (64%). The employees' mean age was 41.8 years (minimum 24 years, maximum 64 years, *SD* = 10.97). For an overview of the distribution of employees' age, in Table 1 we present a categorical overview of this numeric measured variable. For tenure, we looked at both organizational tenure (*mean* = 6.07, *SD* = 6.97*)* and team tenure (*mean* = 1.63*, SD* = 0.96).

	Frequency	***Percentage***	***Cumulative percentage***
Gender			
Female	64	74.4	74.4
Male	22	25.6	100
Age			
<30 years	17	19.8	19.8
31 – 40 years	26	30.2	50.0
41 – 50 years	20	23.3	73.3
51 – 60 years	21	24.4	97.7
>61 years	2	2.3	100
Education			
PhD degree	7	8.1	8.1
Master's degree	55	64.0	72.1
Bachelor's degree	2	2.3	74.4
HBO degree	16	18.6	93.0
MBO degree	6	7.0	100

Table 1: Overview sample demographics (N=86)

Data collection

To collect data, a web-based questionnaire was developed in Qualtrics. The questionnaire was pretested with a test-panel to check for problems with wording, content and question ambiguity. Based on their feedback, the survey was finalized. Furthermore, the reliability of the measures was assessed with a Cronbach alpha test. In consultation with the Human Resource department, we selected our sample group. As shared leadership is a relational phenomenon, involving the existence of social ties and commitment towards achieving a common goal, we focused our study on employees that were assigned to be part of a specific team. Therefore, work students that were only contemporary involved in specific project teams and employees with short term contracts, e.g. substitution for maternity leave, were excluded to participate in this research (Carson et al., 2007).

Procedure

First, a short video was launched in the newsletter of the organization studied. The main objects of this study were introduced, including what was expected from employees' participation. Second, the survey was distributed by email. We reduced the threat of common method variance by following the suggestions of Podsakoff, Mackenzie, Lee, & Podsakoff (2003). We started our survey with an introduction page, in which we explained the main purpose of this study and how much time it would take for respondents to participate. Additionally, we informed the respondents that all answers would be treated strictly anonymous and confidential, in order to reduce the potential influence of social desirability. Before entering the survey, the respondents had to opt whether they

agreed on participating in this study. They could opt for sharing their data for only research purposes, or if they additional agreed on sharing their answers regarding added open questions for internal quality purposes.

The survey started with questions about organizational information; the respondents' team, work tenure and team tenure. Items regarding our main constructs followed, starting with the items for the dependent variable individual knowledge sharing behaviour. Thereafter, the items for the independent variables were presented. Each section in the survey focussed on one construct and ended with an open question in which respondents were able to give their feedback regarding that specific construct in the context of the organisation or their team. The answers to the open questions did not fit in the scope of this study. They were only used for internal purposes, based on respondents' consent for use for internal quality purposes. Finally, questions regarding to gender, age and education were asked.

One week after distributing the survey, an update of the response rate was posted in an internal newsletter. Again, the purpose and importance of this study was explained in order to increase the response rate. A second and final update was given after two weeks, including the deadline for closing the survey. Finally, an update was posted with the final response rate and information about the follow up regarding both finalizing this research project and what would be done with the information collected from the open questions regarding employees' feedback concerning their team or the organization.

Measures

Where possible, we used validated measures in this study. The items were translated in Dutch and back translated in English by different individuals. Thereby, content validity across languages was ensured (Welch & Piekkari, 2006). All constructs used were based on reflective items measured at a 5-point Likert scale. An open question was added to each construct in order to create a possibility for employees to give feedback regarding the main topics studied. By doing so, employees were able to share their experience, discomforts and tips concerning their team and/or the organization. Below, we describe the measures used to study our main variables. Detailed information about the survey items are attached in Appendix A.

To measure *individual knowledge sharing behaviour*, we used two measures. First, as our research model measures individual knowledge sharing behaviour at an individual level, we asked the respondents to fill in a team roster. In this roster, the respondents were asked to score their own knowledge sharing behaviour and the knowledge sharing behaviour of their team members. They were asked to answer the following question: "To what extent does each team member share their knowledge within the team?" (5-point scale; 1:"not at all" 5: "to a very great extent"). To avoid misinterpretation and ensure the validity of this measure, our definition used of individual knowledge sharing behaviour was given. This definition was based on the widely used definition of knowledge sharing, e.g. Gagné (2009). Besides, five questions were added regarding knowledge sharing behaviour within the team. Hereby, we tried to create more clarity in the meaning of the used construct for the respondents.

The use of self-reporting involves the potential concern of common source bias (Conway & Lance, 2010). Using a team roster gave us the opportunity to collect data from self-scores and a second source, the team member's perception of individual knowledge sharing behaviour of each individual team member. This gave us more reliable data about employees' individual knowledge sharing behaviour. We assessed the within-group agreement of each team by using *rwg* (James, Demaree, & Wolf, 1984) and found a median of 0.63. Additionally, the intra-class coefficient was measured for average random raters (ICC2k) as each team was measured by the same set of team members. Based on the guideline for selecting and reporting ICC (Koo & Li, 2016), we used ICC2k-

convention and found values of 0.47. Based on the guidelines for interpretation for ICC (Cicchetti, 1994), the inter-rater agreement of the roster measure could be described as fair.

To test the validity of our individual roster measure, we added a second measure for individual knowledge sharing behaviour. A validated questionnaire was used, developed by Connelly et al. (2003). This measure is frequently used to measure knowledge sharing behaviour within teams and the validity has been demonstrated in the context of knowledge intensive industries (Coun et al., 2019; Lee et al., 2015). The five-item scale (Cronbach's alpha = 0.81) includes questions regarding more tacit types of knowledge, such as ideas and expertise. We assessed the within-group agreement by using *rwg.j* (James et al., 1984). The median *rwg.j*-score was 0.93. According to the LeBreton & Senter (2008), this suggests that there exists a strong agreement among the team respondents. The intra-class coefficient was measured for average random raters (ICC2k). The ICC2k value was 0.92, indicating high intra-class correlations. Based on these results, and in order to demonstrate the validity of the roster measure, we performed a Pearson correlation test. We found a significant correlation coefficient of 0.4 ($p < 0.001$), indicating a strong correlation between the individual roster measure and the team measure. Based on these results, we conclude the validity of our measures for individual knowledge sharing behaviour to be appropriate.

One common way to measure *shared leadership* focuses on the influence of each individual team member (Carson et al., 2007). This method allows examining the extent to which individuals are perceived to be involved in sharing and distributing leadership and influence within the team. In this study, we used the measure of Carson et. al (2007). The respondents were asked to rate themselves and each team member in a team roster based on the following question: "To what degree does your team rely on this individual for leadership?" (5-point scale; 1:"not at all" 5: "to a very great extent"). Similar to the measure of individual knowledge sharing behaviour, the use of a team roster allows the use of both a primary and second source to measure shared leadership. This gives more reliable data about how employees perceive their team members to share in leadership within the team. The within-group agreement across the respondent's ratings were tested by using the *rwg* index and interclass correlation coefficient (ICC) (James et al., 1984). With a *rwg*-score of 0.63 as well as an ICC2*k*-value of 0.47, we conclude the validity of our measures for shared leadership to be acceptable (Biemann, Cole, & Voelpel, 2012; Cicchetti, 1994).

To measure *psychological need satisfaction regarding autonomy (PNS-A), competence-C (PNS) and relatedness (PNS-R)*, we used the validated Basic Need Satisfaction at Work Scale (BNS-W (Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010)). In total, 18 items (6 items for each of the three needs) were used to assess autonomy satisfaction (e.g., 'I feel like I can be myself at my job''), competence satisfaction (e.g., ''I don't feel very competent at my job, reversed coded'') and relatedness satisfaction (e.g., ''At work, I feel part of the team"). All items were to be answered on a 5-point scale ranging from 1 (''totally disagree'') to 5 (''totally agree''). The reliability of the autonomy, competence, and relatedness satisfaction scales were tested with Cronbach's alpha and respectively 0.82 (PNS-A), 0.89 (PNS-C) and 0.81 (PNS-R). These reliability scores are in line with the study of Broeck et al. (2010).

In earlier research regarding *task interdependence*, the measure of Pearce & Gregersen (1991) have been prominent. Benefit of this measure in comparison to other measures is that is can easily be adapted to analyse at the individual employee level. Consistent with prior research from Chiniara & Bentein (2018) and in line with our social exchange theory perspective, we selected five items from the adapted scale of Staples & Webster (2008) to measure task interdependence. These items focus on reciprocal aspects of task interdependence. The items were to be answered on a 5-point scale ranging from 1 (''totally disagree'') to 5 (''totally agree'') and measured task interdependence at an individual level. A Cronbach's alpha test confirmed the reliability (0.74).

Control variables. Consistent with previous research on knowledge sharing behaviour, our analyses include a number of control variables, which are considered factors that may have an effect on individual knowledge sharing behaviour. Some of the control variables relate to socio-demographical factors, such as education, age and gender, while others relate to the employees' job, such as organizational tenure and team tenure (Llopis & Foss, 2015).

We controlled for education, age and organizational tenure as they are considered to contribute to the development of employees' knowledge, skills and their level of expertise in general. People mature and develop their knowledge and skills by means of formal or non-formal learning. As a result, their involvement in complex work situations increases. These situations often require inputs from multiple experts. Therefore, the need for individual knowledge sharing behaviour will be elevated in order to solve these complex problems (Carson et al., 2007; Coun et al., 2019; Pearce, 2004).

Additional, when employees' organizational and team tenure increase, it may lead to higher levels of involvement and belongingness. It may therefore also influence the willingness to participate in sharing in leadership within their team and sharing their knowledge (Ellemers et al., 2013). As individual knowledge sharing behaviour is found to be stronger when there exists strong ties between employees, we added team tenure as control variable (Cummings & Teng, 2006).

Education was operationalized by asking the respondents to score their highest level of education achieved. Age was measured by asking the respondents for their year of birth and team was measured in years. As shared leadership was studied in the context of self-organizing teams, we added team tenure as control variable with a maximum of three years, as the concept of self-organizing teams was implemented in 2017.

In Table 2, we present the descriptive statistics of our main constructs. Task interdependence was evaluated highest scores amongst the respondents (*mean* = 4.08, *SD* = 0.58) and shared leadership was evaluated lowest with a mean score of 3.20 (*SD* = 0.70). All main constructs skewed to the right. To test if the assumptions of normal distribution, a Shapiro-Wilk test was conducted. Additionally, the values were assessed for skewness and kurtosis. Detailed information including histograms of the variables studied are provided in Appendix B (1). The results of the Shapiro-Wilk test show abnormality in distribution. However, the values for skewness and kurtosis are between the acceptable range of values. Therefore, we conclude that our data meets the assumptions of a normal distribution.

Construct	Minimum scores	Maximum scores	Mean	Median	SD
IKSB	1.75	5.00	3.61	3.69	0.61
Shared leadership	1.29	4.63	3.20	3.10	0.70
PNS-A	1.67	5.00	3.88	4.00	0.69
PNS-C	1.67	5.00	4.25	4.33	0.61
PNS-R	1.67	5.00	3.96	4.00	0.70
Task interdependence	2.50	5.00	4.08	4.00	0.58

Note: IKSB = individual knowledge sharing behaviour, PNS-A = psychological need satisfaction for autonomy, PNS-C = psychological need satisfaction for competence, PNS-R = psychological need satisfaction for relatedness

Table 2: Overview descriptive statistics main constructs

Table 3 presents the Pearson correlations.

		1	2	3	4	5	6	7	8	9	10
1	IKSB										
2	SL	0.59***									
3	PNS-A	0.18	0.25**								
4	PNS-C	0.16	0.21**	0.47***							
5	PNS-R	0.50***	0.46***	0.35***	0.30***						
6	TI	0.18	0.18	0.09	0.06	0.42***					
7	O.tenure	-0.08	-0.07	0.21	0.18	0.07	0.14				
8	T. tenure	0.04	0.25**	0.12	0.32***	0.22**	0.13	0.48***			
9	Age	0.00	-0.02	0.19	0.26**	0.12	0.23**	0.55***	0.37***		
10	Gender	-0.17	-0.19	0.00	-0.04	-0.13	-0.04	0.13	0.04	-0.17	
11	Education	0.16	0.21	0.17	-0.12	-0.06	-0.08	-0.17	-0.07	0.20	-0.01

*** p<0.05*
**** p<0.01*

Note: IKSB = individual knowledge sharing behaviour, SL = shared leadership, PNS-A = psychological need satisfaction for autonomy, PNS-C = psychological need satisfaction for competence, PNS-R = psychological need satisfaction for relatedness, TI = task interdependence, O.tenure = organizational tenure, T.tenure = team tenure

Table 3: Overview Pearson correlation coefficient among studied variables

5 Results

First, we report Pearson correlation coefficients as model-free evidence. Based on the results shown in Table 3, highest and significant correlation with our dependent variable individual knowledge sharing behaviour was found with shared leadership (r = 0.59, p = 0.000). When we look at the correlations with our three PNS-factors, we found strongest correlation with the psychological need satisfaction for relatedness (r = 0.50, p = 0.005). Unexpectedly, no significant correlations were found between the need for autonomy and competence, and our dependent variable. The absence of significant correlations for these variables, even though the respondents' scores can be classified as high as the mean scores were above the average score of the scale, is not in line with previous studies, e.g. performed by (Coun et al. (2019).

As our study investigates a mediating effect of employees' PNS on the relationship between shared leadership and individual knowledge sharing behaviour, we observed the significant correlations found with all three basic psychological need factors. All PNS factors showed a significant and positive relationship with shared leadership (with PNS-A: r = 0.25, p = 0.020, with PNS-C: r = 0.21, p = 0.050, with PNS-R: r = 0.46, p = 0.000). This might indicate the existence of an indirect mediating effect. However, as the PNS for autonomy and competence did not show a significant correlation with individual knowledge sharing behaviour, Hypotheses 3a and 3b were rejected. Because of the lack of a significant correlation between these variables, a mediating effect could not possibly be demonstrated based on these findings.

To conclude our model-free evidence based on Pearson correlation coefficients, we looked for correlations that might hint to the existence of a moderating effect of task interdependence, as proposed in hypotheses 5a, 5b and 5c. As displayed in Table 2 and 3, task interdependence showed highest mean scores among the respondents, but only a significant correlation with psychological need satisfaction for relatedness was found (r = 0.42, p = 0.000). Further analyses are needed to clarify the nature and direction of this relationship.

Second, as some of the correlation coefficients exceeds the threshold of 0.3, we tested our model fit for concerns regarding to multicollinearity in the data (Llopis & Foss, 2015) by calculating the Variance Inflation Factor (VIF) scores. Details are provided in Appendix B (2), Table b. All VIF-scores were below the rule-of-thumb cut-off of 10 (Neter, Wasserman & Kutner, 1990). We used standardized Z-scores in all regression analyses performed. This enabled us to avoid the risk of

multicollinearity, which can occur specifically in calculations regarding individual predictors. By using standardized Z-scores, comparability of means of variables studied was increased (Aiken, West, & Reno, 1991).

Testing

Below we present the results of the tested models in order to provide evidence for our main Hypotheses. The results of the linear regression analyses for effects regarding the dependent variable, individual knowledge sharing behaviour, are shown in Table 4. The results of the regression analyses with PNS for relatedness as outcome variable are shown in Table 5. After presenting the results of our tested models, we highlight the main findings in order to answer whether or not support was found for our Hypotheses.

Outcome variable: Individual knowledge sharing behaviour	*Model 1 Estimate (S.E)*	*Model 2 Estimate (S.E)*	*Model 3 Estimate (S.E)*	*Model 4 Estimate (S.E)*
Step 1: Control variables				
Organizational tenure	-0.01	0.00	0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Team tenure	0.10	-0.14	-0.13	-0.19
	(0.13)	(0.12)	(0.11)	(0.12)
Age	-0.36	-0.12	-0.12	-0.09
	(0.25)	(0.21)	(0.21)	(0.20)
Gender	0.14	0.03	0.04	0.09
	(0.10)	(0.08)	(0.08)	(0.09)
Education	-0.01	0.00	0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Step 2: Main variables				
Shared leadership		0.61***	0.59***	0.47***
		(0.10)	(0.10)	(0.11)
Task interdependence			0.09	-0.03
			(0.09)	(0.10)
PNS-A				-0.10
				(0.11)
PNS-C				0.06
				(0.11)
PNS-R				0.35**
				(0.11)
Step 3: Moderator				
Shared Leadership x Task interdependence			0.01	0.03
			(0.09)	(0.09)
R-squared	0.06	0.37	0.37	0.45
F-statistic	1.30	9.21***	6.62***	6.08***
(df1/df2)	(4/81)	(5/80)	(7/78)	(10/75)
Wald F-test against competing models		38.43***	0.45	3.4*
(df.)		(1)	(2)	(3)

** $p<0.05$
*** $p<0.01$

Table 4: Regression Results IKSB

Outcome variable: PNS-R	*Model 5 Estimate (S.E)*	*Model 6 Estimate (S.E)*	*Model 7 Estimate (S.E)*
Step 1: Control variables			
Organizaton tenure	-0.01	0.01	0.00
	(0.02)	(0.02)	(0.02)
Team tenure	0.25*	0.08	0.09
	(0.13)	(0.12)	(0.12)
Age	0.00	0.01	0.00
	(0.01)	(0.01)	(0.01)
Gender	-0.29	-0.11	-0.09
	(0.25)	(0.23)	(0.22)
Education	-0.05	-0.13	-0.10
	(0.10)	(0.09)	(0.09)
Step 2: Independent variables			
Shared Leadership		0.46***	0.39***
		(0.11)	(0.10)
Task interdependence			0.33***
			(0.09)
Step 3: Moderating effect			
Shared Leadership x Task interdependence			-0.03
			(0.09)
R-squared	0.07	0.25	0.35
F-statistic	1.55	5.27***	6.03***
(df1/df2)	(4/81)	(5/80)	(7/78)
Wald F-test against competing models		18.76***	6.21**
(df.)		(1)	(2)

*** p<0.05*
****p<0.01*

Table 5: Regression Results PNS-R

To test the effect of shared leadership on individual knowledge sharing behaviour, we performed a regression analysis. Details are presented in Table 4. As our first step (Model 1), we entered the control variables (work tenure, team tenure, age, gender and education). The explanatory power of the control variables in this model is limited and no significant effect was found with the dependent variable, individual knowledge sharing behaviour (R^2= 0.06, $F(4/81)$ = 1.30). In the second step, we entered our independent variables to test for first order association. In Model 2, we added the independent variable shared leadership and found a positive main effect on individual knowledge sharing behaviour (β = 0.61, *S.E.* = 0.10, p <0.001). A Wald test against competing models showed a significant better fit compared to Model 1 (χ2 = 38.43, df = 0.1, p = <0.01). Thus, a positive relationship between shared leadership and individual knowledge sharing behaviour was found. Therefore, Hypothesis 1 is supported.

The second part of our research model studied the relationship between shared leadership and employees' self-determination. As presented in Table 3, significant correlations were found between shared leadership and the satisfaction of all psychological needs (PNS-A: r = 0.25, p = 0.020, with PNS-C: r = 0.21, p = 0.050, with PNS-R: r = 0.46, p = 0.000). To answer our Hypotheses regarding the positive effect of shared leadership on employees' PNS for autonomy, competence and relatedness, we performed three separate regression analyses, with the psychological needs as outcome variable. We now only present the significant findings regarding PNS-R, as can be found in Table 5. Detailed information about the effect of shared leadership on the PNS for autonomy and the PNS for competence are given in Appendix B (3), Table c and d.

As our first step (Model 5), we entered the control variables, which did not result in significant explanatory power found. Second, we entered shared leadership (Model 6) and found a significant

main effect (β = 0.46, *S.E.* = 0.11, p = 0.003). Based on these results, only Hypotheses 2c is supported and Hypotheses 2a and 2b are rejected.

In the third part of our research model proposed, we tested for a mediated moderating effect of employees' self-determination as explanatory mechanism causing the effect of shared leadership on individual knowledge sharing behaviour. First, we collected evidence for first order associations for all variables involved. As displayed in Model 4, we were only able to find a significant explanatory effect of the need for relatedness (β = 0.35, *S.E.* = 0.11, p <0.001). Therefore, we only performed further analyses for the psychological need satisfaction regarding the need for relatedness. Table 6 presents the results of the causal mediating analyse of PNS for relatedness on individual knowledge sharing behaviour, in which the moderating effect of task interdependence is included.

	Causal Mediating Analysis of PNS-R on IKSB		
Independent variable	Direct effect [95% conf. intervals]	Indirect effect [95% conf. intervals]	Total effect [95% conf. intervals]
Shared leadership – Average	0.47*** [0.17,0.65]	0.14** [0.04,0.31]	0.60*** [0.36,0.79]
Shared leadership * Task interdependence + 1	0.49* [0.05,0.74]	0.13** [0.04,0.38]	0.62*** [0.29,0.85]
Shared leadership * Task interdependence -1	0.44* [-0.01,0.65]	0.15* [0.02,0.34]	0.59** [0.13,0.83]
Nonparametric Bootstrap Confidence Intervals with the BCa Method Bootstraps	5000		

*** p<0.05*
****p<0.01*

Table 6: Mediating analysis of PNS-R on IKSB

We conducted nonparametric Bootstrap Confidence Intervals with the BCa method, testing for a two-tailed significance of 95%. Using the BCa interval allowed us to correct for bias and skewness in the distribution of bootstrap estimates (Diciccio & Efron, 1996; Zhao, Lynch, & Chen, 2010). We calculated the significance of indirect effects by bootstrapping 5,000 samples (Ozer, 2011). As our regression results show an interaction effect of the moderator task interdependence (Model 4), we additionally tested the mediating effect for both higher and lower task interdependence scores. As can be observed in Table 6, the average indirect effect of the need for relatedness (0.14) does not significantly change under conditions of both higher (0.13) and lower task interdependence (0.15). Therefore, we state that the results provide evidence for a mediating effect and explain that the positive effect of shared leadership on individual knowledge sharing behaviour goes through the mediator psychological need satisfaction for relatedness. Figure 2 summarizes our findings, including the significant mediating effect. Based on these results, Hypothesis 3c and Hypothesis 4 are supported.

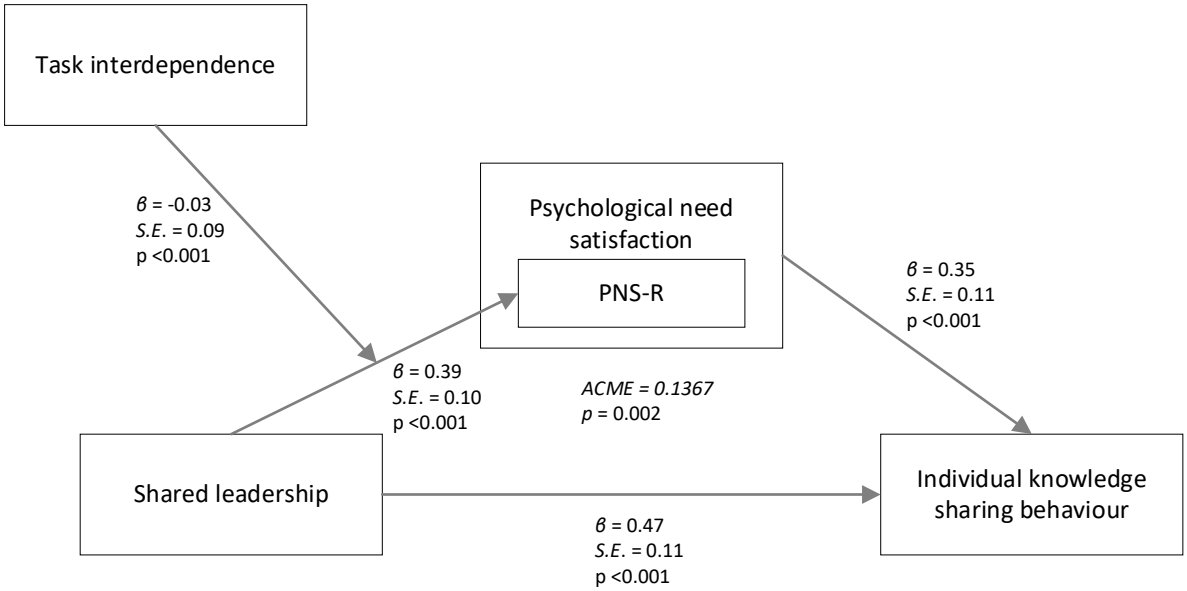

Figure 2: Mediating results

Finally, we tested for a moderating effect in order to study the last part of our research model. By means of a moderated regression analyses, we tested for a moderating effect of task interdependence on the relationship between shared leadership and (via the satisfaction of the three psychological needs) individual knowledge sharing behaviour. As can be observed in Model 4, no significant main and moderating effects were found for task interdependence on individual knowledge sharing behaviour (details are provided in Table 4). However, a significant main effect was found regarding employees' basic PNS for relatedness (Model 7). As presented in Table 5, we found a direct and significant effect of the explanatory power of both Model 6 (shared leadership) and Model 7 (task interdependence), supporting evidence that shared both variables partially explain psychological need satisfaction regarding relatedness (SL: β = 0.46, *S.E.* = 0.11, p = 0.003 and TI: β = 0.33, *S.E.* = 0.09, p < 0.001). The Wald test showed a significant better fit of Model 7 in comparison to Model 6 ($\chi 2$ = 6.21, df = 2, p = <0.05) with an R^2-value of 0.35 ($F(7/78)$ = 6.03, p <0.001). When testing for a moderating effect, no significant effects were found. Thus, Hypothesis 5a, 5b and 5c, stating that task interdependence moderates the relationship between shared leadership and employees' PNS for autonomy, competence and relatedness, are not supported.

Robustness checks

As stated before and included in Appendix B, the data did not meet all assumptions of normal distributions. This might have had an effect on the regression models. Therefore, we tested our models for a possible effect due to heteroscedasticity and abnormal distributions. For the correlation coefficient, we therefore used both Pearson and Spearman rho correlation method using R software. To test our regression models, we used log-functions to transform our variables and thereby correcting them to meet the conditions for normal distribution. This did not lead to significant changes in our main findings. To illustrate, the results regarding Model 2 using log-scores showed qualitative similar significance regarding to the direct effect of shared leadership on individual knowledge sharing behaviour (β = 0.67, *S.E.* = 0.1, R^2 = 0.41, $F(9/76)$ = 0.87, p <0.001). With these results, we provide evidence that prove the robustness of our used models.

6 Discussion

The goal of this present study was to contribute to literature regarding individual knowledge sharing behaviour of individuals in self-managing teams. Through social exchange theory and self-determination theory, we examined how shared leadership may, directly and indirectly, contribute to employees' individual knowledge sharing behaviour, through the satisfaction of basic psychological needs for autonomy, competence and relatedness. Additionally the moderating role of task interdependence on the relationship between shared leadership and employees' basic PNS was studied. Below, we summarize and discuss the main outcomes of this study, including limitations and managerial implications.

Theoretical implications

The effect of shared leadership on employees' self-determination and individual knowledge sharing behaviour.

Recent studies show inconclusive findings regarding the effect of shared leadership on individual knowledge sharing behaviour. Some scholars argue that shared leadership has a negative effect on individual knowledge sharing behaviour. Particular in knowledge based industries, experts might be less motivated to share their knowledge as they may see sharing knowledge as a risk to lose their authority (Hooff et al., 2003; Staples & Webster, 2008). However, in line with other studies and from a social exchange theory perspective (Blau, 1964), we argue that working based on shared leadership principles fosters a climate of trust. It stimulate employees' connectedness and interactions within their team. As a result, reciprocity is enhanced, which is essential for individual knowledge sharing behaviour to occur (Hoch, 2014; Sangeetha & Kumaran, 2018). A strong direct effect was found of shared leadership on individual knowledge sharing behaviour. This indicates that shared leadership explains a significant amount of the variance of individual knowledge sharing behaviour of employees within their team. To be more specific, employees who are perceived by their team members to be highly involved in sharing in leadership within the team, are also more likely to be perceived to show higher levels of individual knowledge sharing behaviour. Working based on shared leadership principles, enhances mutual interactions, shared purpose and social relations. These conditions are needed to ensure that team members take responsibility for actively sharing their knowledge in order to reach the common goals. Thus, shared leadership offers promising conditions for new workplace team designs to meet todays' rapidly changing market demands, as it acts as a catalyst for individual knowledge sharing behaviour. Our study offers support that existing models regarding individual knowledge sharing behaviour also can be applied in the context of knowledge-based industries. These results are in line with previous results shown by Coun et al. (2019) and add valuable insights to the emerging literature regarding antecedents and consequences of shared leadership. It specifically expands the gap regarding the effect of shared leadership on individual knowledge sharing behaviour within new workplace team designs (Bligh et al., 2006).

Individual knowledge sharing behaviour is ultimately rooted in individual drivers and motivational factors (Foss et al., 2009). Based on self-determination theory (Deci et al., 2017), we studied for positive effects of shared leadership on employees' self-determination by looking at the psychological need satisfaction (PNS) regarding autonomy, competence and relatedness. We were only able to find support for a direct effect of shared leadership on the PNS for relatedness. A low significant explanatory effect was found of shared leadership on the PNS for autonomy. In addition, a positive, but not significant, effect was found regarding the need for competence. This positive, but not significant trend could be explained by the argument that these three needs are interdependent. Scholars often form a composite score by grouping all three needs together. It is argued that, based on SDT assumptions, these three needs are highly correlated and the distinction between them is hard to make (Han et al., 2018). Our findings also indicate a strong

correlation between the three basic psychological needs, suggesting that the distinction between them is hard to make. Therefore, tested if an alternative composite score would have led us to find different results. A reliability test was performed to measure the internal consistency of this newly formed scale, in which all items were assembled. We found a Cronbach's alpha of 0.87, confirming a strong reliability. However, when we used this composite scale in the regression models, these models did not show a better performance. Detailed information is provided in Appendix B (4), Table e. Thus, based on these results, we conclude that there is a distinction to make between the satisfactions of the three psychological need. In addition, each need might be differently affected by conditions of perceived shared leadership. We call for further research to clarify how shared leadership leads to higher employees' self-determination through PNS for the three basic needs is. The positive trend found for all three needs, are consistent with existing SDT literature regarding the effect of shared leadership on individual knowledge sharing behaviour. Additional insights regarding the specific effects for the need for autonomy, competence and relatedness, can lead to more predictive models. These models will add valuable insights regarding the conditions in which shared leadership can lead to an increased level of employees' self-determination, and higher levels of individual knowledge sharing behaviour.

If we look more closely at the effects of shared leadership on employees' PNS for autonomy, competence and relatedness, we were only able to find a significant effect of shared leadership on the PNS for relatedness. These findings are consistent with existing literature regarding the importance of reciprocity and trust within teams. It enables teams to create a fostering climate for individual knowledge sharing behaviour to thrive (Ellemers et al., 2013; Gagné, 2009). However, a recent study performed by Coun et al. (2019) showed different findings. They only found significant effects of shared leadership on the PNS for autonomy and individual knowledge sharing behaviour. In their study, no significant effects were found regarding the need for competence and relatedness. So, their findings indicate that higher levels of perceived shared leadership primarily lead to higher levels of perceived satisfaction regarding the need for autonomy, rather than relatedness. We debate these findings. Based on social exchange theory (Blau, 1964), shared leadership enhances reciprocity, shared purpose and connectedness between team members. Therefore, it is expected to particularly enhance employees' PNS for relatedness, rather than the need for autonomy. A possible explanation for the differences in findings might lie in the different measures used. Coun et al. (2019) used measures that focus on a team level. As (motivation for) knowledge sharing behaviour is highly personal, we used measures that focus on an individual level. The widely used roster measure of Carson et al. (2007) was used to create a similar roster measure for measuring individual knowledge sharing behaviour. As we provide evidence for the reliability and validity of this measures used, we contributed to literature by offering a new measure, appropriate for the specific context studied. Possibly, the adaptation of the measures could be the rationale for our results to be more in line with existing literature regarding the relationship between shared leadership, SDT and individual knowledge sharing behaviour.

An additional explanation for the different results found, might be given by the differences in the context of the empirical setting. The study of Coun et al. (2019) was performed in of a medical food organization. In this organization, team members often work in virtual or distant settings, using technological tools for interacting with their colleagues. Our study was performed in the context of a consultancy firm in the educational sector, a social sector characterized by high levels of interacting with customers and colleagues in physical settings. Both settings showed similar descriptives regarding employees' education. This leads to the question what other factor might explain the differences in results found. There is an increasing attention to the effect of virtual work conditions on knowledge sharing behaviour. Especially the effect of virtual working conditions on trust, shared understanding and team members' interaction could be of risk for knowledge sharing behaviour (Fong et al., 2018; Pinjani & Palvia, 2013). Therefore, we suggest future research to study for effects of physical and virtual work conditions on our main variables studied.

The mediating effect of employees' self-determination on the relationship between shared leadership and individual knowledge sharing behaviour.

Our result demonstrate that shared leadership is positively associated with the PNS for relatedness, which act as mediator in enhancing employees' individual knowledge sharing behaviour. We were only able to find a mediating effect of employees' PNS for relatedness as mechanism explaining the positive effect of shared leadership on individual knowledge sharing behaviour. The more teams share in leadership roles and responsibilities, the better they communicate, act collectively and collaborate. This leads to conditions in which employees' psychological needs regarding relatedness are likely to be met. This is in line with self-determination theory literature. Our results offer support that employees' PNS for relatedness has highest effect on the relationship between shared leadership and individual knowledge sharing behaviour. With these findings, we contribute to deepening our understanding of underlying mechanisms of how shared leadership influences team outcomes. These insights can be used for developing more predictive models regarding individual knowledge sharing behaviour, helping teams to become more successful (Bligh et al., 2006; Foss, Pedersen, Reinholt Fosgaard, & Stea, 2015).

Unexpectedly, we were not able to find support for our Hypotheses regarding the mediating effect of the psychological needs for autonomy and competence. These findings were not in line with Coun et al. (2019). Besides the difference in measures used, other explanations might be given. Especially in team conditions where shared leadership principles are just being implemented, individual levels of perceived autonomy and competence might be lower. Often, implementing new workplace team designs imply a new organizational culture, accompanied by new or different behaviour. This might increase employees' feelings of incompetence and insecurity, as they have to adopt (Kotter, 1995). Additionally, this new situation is often imposed by the higher management. Therefore, employees' satisfaction regarding their need for autonomy might be lowered. Scholars point to the importance for employees to identify with their work (Foss et al., 2009). When employees perceive their work to be meaningful, they tend to be more motivated. Therefore, they are expected to be more involved and take more responsibilities and ownership (Foss et al., 2009). In conditions where teams are implementing new workplace team designs based on shared leadership principles, offering a rationale is essential. The more employees understand and accept the meaning and added value of these new team designs, the more likely they will endorse the new way of working as their own (Deci et al., 2017). Therefore, offering a rationale for extending employees' responsibilities with sharing in leadership roles is crucial. Additionally, facilitating the professional development of newly required competences and skills will enhance employees' satisfaction regarding their needs for autonomy and competence. As a result, this will increased employees' self-determination (Broeck et al., 2010).

The moderating effect of task interdependence on the relationship between shared leadership and employees' self-determination.

Based on social exchange theory, task interdependence is considered to be an important contextual moderator (Pearce & Gregersen, 1991). Task interdependence implies frequent communication, aligning regarding the common goals to be set, and promote supportive behaviour. Thereby, it fosters conditions where team members look out for each other's interests in order to achieve the common goals (Fong et al., 2018). Team members that perceive high levels of shared leadership will have higher levels of interaction and stronger social bonds, which enables them to reach the common goals. Under conditions of high task interdependence, team members have to interact even more. As a result, we expect the effect of shared leadership on employees' self-determination to be even stronger, leading to higher levels of individual knowledge sharing behaviour.

However, we were not able to provide evidence for task interdependence to have a significant moderating effect on these relations. No significant effect was found between shared leadership and task interdependence. On one hand, it seems that sharing in leadership within the team, does not affect employees' perception of being dependent on each other in their daily work. Based on the correlations found, these variables behave quite independent from each other. On the other hand, we did find a strong and significant correlation between task interdependence and employees' PNS for relatedness. Indirectly, we can assume that high levels of perceived task interdependence enhance individual knowledge sharing behaviour, as it positively influences employees' PNS for relatedness. But this interaction does not seem to involve sharing in leadership. An alternative explanation for this effect not to be found, might lie in the nature of the context in which team members operate. Especially in knowledge-based industries, employees are often part of multiple (types of) teams. On one hand, they are part of an organizational team, focusing on long-term development in line with the organizational goals. Usually, these organizational teams consist of multiple experts that are united around a specific proposition, theme or customer segment. On the other hand, employees also participate in project teams. These project teams can be characterized as short-term and single customer oriented. Usually, expertise from multiple disciplines are combined in order to meet customer demands. The effect of shared leadership and task interdependence might be different in both types of teams. Possibly, task interdependence has a stronger effect in team conditions where employees have tight and task related connections. They rely on each other for getting the job done, creating stronger relatedness and reciprocity amongst them. On the other hand, when employees collaborate more on a long-term and strategic level, perceived sharing in leadership might have a stronger effect on employees' self-determination and individual knowledge sharing behaviour. To void this gap in literature, we propose further research regarding the relations studied.

Managerial implications

Our findings have several implications for organizations in knowledge-based industries. This study shows, that working based on shared leadership principles offers promising conditions for teams to be more successful. It works as a catalyst for individual knowledge sharing behaviour. Sharing in leadership and dividing responsibilities among employees within the team, helps teams to create an environment of trust and connectedness. These conditions are conducive to higher levels of individual knowledge sharing behaviour. Therefore, organizations should be aware of how they manage their organization. Flattening of the organizational structure and laying responsibilities low at a team level, can offer strategic advantages. These can lead organizations to higher levels of knowledge sharing behaviour, necessary for optimizing organizational performance.

Especially knowledge workers often work dispersed and participate in multiple project teams simultaneously. This can lead to situations in which knowledge sharing processes are hindered. Our findings offer a model that can help organizations to overcome this problem, as working based on shared leadership principles enhances employees' self-determination. This leads to higher levels of motivation to participate in knowledge sharing processes. We encourage organizations to extend these leadership principles to their employee assessment policy. By assessing performance on collective targets rather than individual targets, shared leadership within teams can be stimulated even further. This enables organizations to enhance employees' self-determination, leading to higher levels of individual knowledge sharing behaviour (Foss et al., 2015).

Finally, employees should be aware of their own impact on the self-determination of their colleagues. The higher team members perceive their colleagues to share in leadership, the higher their self-determination levels will be. In turn, this can create confidence and lead to increased motivation to engage in knowledge sharing behaviour. Therefore, we advise organizations to stimulate and facilitate employees to invest in professionalization of their employees. For these new workplace team designs to be successful, employees might need to expand their professional

knowledge and skills with competences that are needed to successfully participate in sharing in leadership within their team.

Limitations and direction for future research

Several things should be noted regarding limitations of this research. First, as we used a cross-sectional design, the results precludes determination of causality. Therefore, we encourage future researchers to conduct longitudinal studies of the relationships examined in this present study. Team composition is often considered an important factor influencing knowledge sharing processes. As team composition in knowledge based industries is often dispersed and changes frequently (Bligh et al., 2006), this could influence knowledge sharing processes within teams. Longitudinal research may shed more light on how this effects the relationship between shared leadership, employees' self-determination and individual knowledge sharing behaviour. This can add valuable insights to literature and lead to more predictive models how teams, working based on shared leadership principles can create an environment that fosters individual knowledge sharing behaviour.

Second, we had some limitations regarding our sample group. Out of the 100 respondents who participated, data from only 86 respondents could be used in our analysis, due to missing data. This limits the statistical power of our main findings. The excluded group significantly showed higher scores regarding the control variables for organizational tenure and team tenure. Excluding these respondents, could have led us to find different findings. Therefore, we recommend future research in other sectors in the knowledge based industry. This will improve the external validity and contribute to generalizability of main findings.

We know from the widely used model for stages of team development (Tuckman & Jensen, 1977), that teams should go through several stages of team development in order to be able to perform to their maximum potential. In our empirical setting, we did not distinguish between stages of team maturity. Thereby, we could not test for possible effects of different stages of team development. We call for future research to offer additional insights in the relationship between the stage of team development and our main variables studied. This will help to create a better understanding in how shared leadership effects employees' self-determination and individual knowledge sharing behaviour.

Fourth, our survey was conducted just in the beginning of the global COVID19-crisis. The measures that were taken by local government and the firm itself, including the impact this had on the respondents' personal lives, could have had an effect of their response behaviour. Especially regarding the perceived PNS for autonomy and competence. This situation led to vast impact on how, where and when employees were able to work, declining their autonomy. Additionally, the social and economic climate changed rapidly, and radical changes in competences were needed from all employees to adapt to the situation. This could have influenced our main findings regarding employees' PNS for competence.

Finally, the validity of the measures for shared leadership and individual knowledge sharing behaviour were fair but appropriate. However, as knowledge sharing behaviour is highly personal (Foss, Minbaeva, Pedersen, & Reinholt, 2009), we believed that measuring at an individual level was necessary in order to appropriately answer the research questions. We stand behind our choice of measures used and call for additional research to further investigate the validity and power of these measures, especially in the context of new workplace team designs in the knowledge-based industry.

References

Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.

Biemann, T., Cole, M. S., & Voelpel, S. (2012). Within-group agreement: On the use (and misuse) of rWG and rWG (J) in leadership research and some best practice guidelines. *The Leadership Quarterly*, *23*(1), 66–80.

Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.

Bligh, M. C., Pearce, C. L., & Kohles, J. C. (2006). The importance of self- and shared leadership in team based knowledge work: A meso-level model of leadership dynamics. *Journal of Managerial Psychology*, *21*(4), 296–318.

Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. *Academy of Management Journal*, *50*(5), 1217–1234.

Chiniara, M., & Bentein, K. (2018). The servant leadership advantage: When perceiving low differentiation in leader-member relationship quality influences team cohesion, team task performance and service OCB. *The Leadership Quarterly*, *29*(2), 333–345.

Cicchetti, D. V. (1994). Guidelines, Criteria, and Rules of Thumb for Evaluating Normed and Standardized Assessment Instruments in Psychology. *Psychological Assessment*, *6*(4), 284–290.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.

Connelly, C. E., Kelloway, E. K., Mary, S., & Scotia, N. (2003). Predictors of employees ' perceptions of knowledge sharing cultures. *Leadership & Organization Development Journal*, *24*(5), 294–301.

Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology*, *25*(3), 325–334.

Coun, M. J. H., Peters, C. P., & Blomme, R. J. (2019). 'Let's share!' The mediating role of employees' self-determination in the relationship between transformational and shared leadership and perceived knowledge sharing among peers. *European Management Journal*, *37*(4), 481–491.

Cropanzano, R., & Mitchell, M. S. (2005). Social Exchange Theory: An Interdisciplinary Review. *Journal of Management*, *31*(6).

Cummings, J. L., & Teng, B. S. (2006). The keys to successful knowledge-sharing. *Journal of General Management*, *31*(4), 1–18.

D'Innocenzo, L., Kukenberger, M. R., & Mathieu, J. E. (2014). A meta-analysis of different forms of shared leadership-team performance relations. *Journal of Management*, *42*(7), 1964-1991.

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 19–43.

Diciccio, T. J., & Efron, B. (1996). Bootstrap confidence intervals. *Statistical Science*, *11*(3), 189–228.

Ellemers, N., Sleebos, E., Stam, D., & de Gilder, D. (2013). Feeling included and valued: How perceived respect affects positive team identity and willingness to invest in the team. *British Journal of Management*, *24*(1), 21–37.

Fong, P. S., Men, C., Luo, J., & Jia, R. (2018). Knowledge hiding and team creativity: the contingent role of task interdependence. *Management Decision*, *56*(2), 329–343.

Foss, N. J., Minbaeva, D. B., Pedersen, T., & Reinholt, M. (2009). Sharing among employees: how job design matters. *Human Resource Management*, *48*(6), 871–893.

Foss, N., Pedersen, T., Reinholt Fosgaard, M., & Stea, D. (2015). Why complementary HRM practices impact performance: the case of rewards, job design, and work climate in knowledge-sharing context. *Human Resource Management*, *54*(6), 955–976.

Gagné, M. (2009). A model of knowledge-sharing motivation. *Human Resource Management*, *48(4)*, 571–589.

Han, S. J., Lee, Y., Beyerlein, M., & Kolb, J. (2018). Shared leadership in teams: The role of coordination, goal commitment, and knowledge sharing on perceived team performance. *Team Performance Management*, *24*(3), 150–168.

Hau, Y. S., Kim, B., Lee, H., & Kim, Y. G. (2013). The effects of individual motivations and social capital on employees' tacit and explicit knowledge sharing intentions. *International Journal of Information Management*, *33*(2), 356–366.

Hiller, N. J., Day, D. V, & Vance, R. J. (2006). Collective enactment of leadership roles and team effectiveness: A field study. *The Leadership Quarterly, 17(*4), 387–397.

Hoch, J. E. (2014). Shared leadership, diversity, and information sharing in teams. *Journal of Managerial Psychology*, *29*(5), 541–564.

Hooff, B. Van Den, Elving, W., Meeuwsen, J. M., & Dumoulin, C. (2003). Knowledge sharing in knowledge communities. In *Communities and technologies (*pp. 119-141). Springer, Dordrecht.

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, *69*(1), 85–98.

Kalinovich, A. V., & Marrone, J. A. (2017). Shared leadership: A primer and teaching recommendations for educators. *Journal of Leadership Education*, *16*(1), 205–215.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155–163.

Kotter, J. P. (1995). Leading change: Why transformation efforts fail. *Harvard Business Review*, *73*(2), 59–67.

Langfred, C. W. (2007). The downside of self-management: A longitudinal study of the effects of conflict on trust, autonomy, and task interdependence in self-managing teams. *Academy of Management Journal*, *50*(4), 885–900.

LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods*, *11*(4), 815–852.

Lee, D. S., Lee, K. C., Seo, Y. W., & Choi, D. Y. (2015). An analysis of shared leadership, diversity, and team creativity in an e-learning environment. *Computers in Human Behavior*, *42*, 47–56.

Liu, M., Lin, C., Joe, S., & Chen, K. (2018). Modeling knowledge sharing and team performance in technology industry: the main and moderating effects of happiness. *Review of Managerial Science*, 1-24

Llopis, O., & Foss, N. J. (2015). Understanding the climate-knowledge sharing relation: The moderating roles of intrinsic motivation and job autonomy. *European Management Journal*, *34*(2), 135–144.

Mabey, C., Zhao, S., & Burroughs, T. (2017). Managing five paradoxes of knowledge exchange in networked organizations: new priorities for HRM? *Human Resource Management Journal*, *27*(1), 39-57.

Neter, J., Wasserman, W. & Kutner, M. H. (1990). Applied statistical models. *Richard D. Irwin, Inc., Burr Ridge, IL*..

Ozer, M. (2011). A Moderated mediation model of the Rrlationship between organizational citizenship behaviors and job performance. *Journal of Applied Psychology*, *96*(6), 1328–1336.

Pearce, C. L. (2004). The future of leadership: Combining vertical and shared leadership to transform knowledge work. *Academy of Management Executive*, *18*(1), 47–57.

Pearce, J. L., & Gregersen, H. B. (1991). Task Interdependence and Extrarole Behavior : A Test of the Mediating Effects of Felt Responsibility. *Journal of applied psychology*, *76*(6), 838–844.

Pinjani, P., & Palvia, P. (2013). Information & Management Trust and knowledge sharing in diverse global virtual teams. *Information & Management*, *50*(4), 144–153.

Podsakoff, P. M., Mackenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, *88*(5), 879.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of management*, *12*(4), 531-544.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, *25*(1), 54-67.

Sangeetha, P., & Kumaran, S. (2018). Impact of shared leadership on cross functional team effectiveness and performance with respect to manufacturing companies. *Journal of Management Research*, *18*(1), 44–55.

Sarin, S., & McDermott, C. (2003). The effect of team leader characteristics on learning , knowledge application, and perforperformance of cross-functional new product development teams. *Decision sciences*, *34*(4), 707-739.

Staples, D. S., & Webster, J. (2008). Exploring the effects of trust, task interdependence and virtualness on knowledge sharing in teams. *Information Systems Journal*, *18*(6), 617–640.

Tuckman, B. W., & Jensen, M. A. N. N. C. (1977). Stages of Small-Group Development revisited. *Group & Organization Studies*, *2*(4), 419–427.

Van Den Broeck, A., Vansteenkiste, M., De Witte, H., & Lens, W. (2008). Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work and Stress*, *22*(3), 277–294.

Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology*, *83*(4), 981–1002.

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280.

Wang, W. T., & Hou, Y. P. (2015). Motivations of employees' knowledge sharing behaviors: A self-determination perspective. *Information and Organization*, *25*(1), 1–26.

Welch, C., & Piekkari, R. (2006). Crossing language boundries in qualitative interviewing. *Management International Review*, *46*(4), 417–437.

Wu, Q., Cormican, K., & Chen, G. (2018). A Meta-Analysis of Shared Leadership: Antecedents, Consequences, and Moderators. *Journal of Leadership and Organizational Studies*. *27(*1), 49-64.

Yi, J. (2009). A measure of knowledge sharing behavior: Scale development and validation. *Knowledge Management Research and Practice*, *7*(1), 65–81.

Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, *37*(2), 197–206.

Appendix A- Measures

1) Individual knowledge sharing behaviour

Measure 1: individual team roster.

"To what extent does each team member share their knowledge within the team?"
(5-point scale; 1:"not at all" 5: "to a very great extent").

Measure 2: questionnaire perceived knowledge sharing behaviour within the team

In welke mate ben je het eens bent met de volgende stellingen? **(1 = helemaal mee oneens, 5 = helemaal mee eens)**
1. Mensen in dit team houden de beste ideeën voor zichzelf.
2. Mensen in dit team zijn bereid om hun kennis/ideeën met anderen te delen.
3. Mensen in dit team delen hun ideeën openlijk in dit team.
4. Mensen in dit team met specifieke expertise zijn bereid om anderen in het team te helpen.
5. Dit team is goed in het gebruiken van de kennis/ideeën van haar teamleden.

2) Measure shared leadership

Measure: individual team roster.

"To what degree does your team rely on this individual for leadership?"
(5-point scale; 1:"not at all" 5: "to a very great extent").

3) Measure employees' self-determination

In welke mate ben je het eens bent met de volgende stellingen? **(1 = helemaal mee oneens, 5 = helemaal mee eens)**
PNS voor autonomie
1. Ik heb het gevoel dat ik mezelf kan zijn in mijn werkzaamheden.
2. Tijdens mijn werkzaamheden heb ik vaak het gevoel dat ik opdrachten/instructies van andere moet volgen.
3. Als ik zou kunnen kiezen, dan zou ik dingen anders doen in mijn werkzaamheden.
4. De dingen die ik in mijn werkzaamheden moet doen komen overeen met de dingen die ik graag zou willen doen in mijn werk.
5. Ik voel me vrij om mijn werkzaamheden te doen op de manier waarop ik denk dat dit het beste gedaan kan worden.
6. Op mijn werk voel ik me gedwongen om dingen te doen die ik niet wil doen.
PNS voor competentie
1. Ik voel me niet echt competent voor mijn baan/werkzaaheden.
2. Ik beheers de taken die nodig zijn voor mijn werkzaamheden goed.
3. Ik heb het gevoel geschikt/competent te zijn voor mijn baan/werkzaamheden.
4. Ik twijfel of ik in staat ben om mijn werkzaamheden naar behoren uit te voeren.
5. Ik ben goed in het werk dat ik doe.
6. Ik heb het gevoel dat ik zelfs de moeilijkste taken in mijn werkzaamheden kan volbrengen.
PNS voor betrokkenheid
1. Ik voel me niet echt verbonden met de andere mensen in mijn team.
2. Ik voel me onderdeel van het team.
3. Ik mix niet echt met andere mensen uit mijn team.
4. Op mijn werk, kan ik binnen mijn team praten over dingen die echt belangrijk voor mij zijn.
5. Ik voel me vaak alleen in het team.
6. Met sommige collega's uit mijn team heb ik een (hechte) vriendschap.

4) Task interdependence

In welke mate ben je het eens bent met de volgende stellingen? (1 = helemaal mee oneens, 5 = helemaal mee eens)
1. Ik moet vaak mijn werkzaamheden afstemmen met andere collega's uit het team.
2. Het bereiken van doelen voor het ene teamlid draagt bij aan het bereiken van de doelen van andere teamleden.
3. Om als team goed te functioneren, moeten teamleden goed communiceren.
4. Om als team goeden resultaten te behalen, is het belangrijk om op elkaar te vertrouwen.
5. Taken die door verschillende teamleden worden uitgevoerd, hangen met elkaar samen.
6. Het succes voor één teamlid betekent succes voor andere teamleden.

Appendix B: Additional results analyses

1) Results Shapiro- Wilk test

Construct	W-value	p-value	skewness	kurtosis
IKSB	0.964	0.0186	-0.5483	0.6431
Shared leadership	0.981	0.227	-0.1311	-0.0809
PNS-A	0.968	0.033	-0.7132	0.1818
PNS-C	0.952	0.003	-1.2671	2.7726
PNS-R	0.904	<0.001	-0.7559	0.2080
Task interdependence	0.947	0.001	-0.3144	-0.5012

Table a: Results tests for assessing normal distribution

For skewness, values between -3 and +2 are considered acceptable in order to prove normal distribution. The accepted values for kurtosis have to be between -7 and +7 (Kim, 2013). Based on these results, we can consider our data fitting the criteria for testing based on a normal distribution and no log-scores or RESET-tests are necessary.

Below, in Figure a, the histograms of our main constructs are presented.

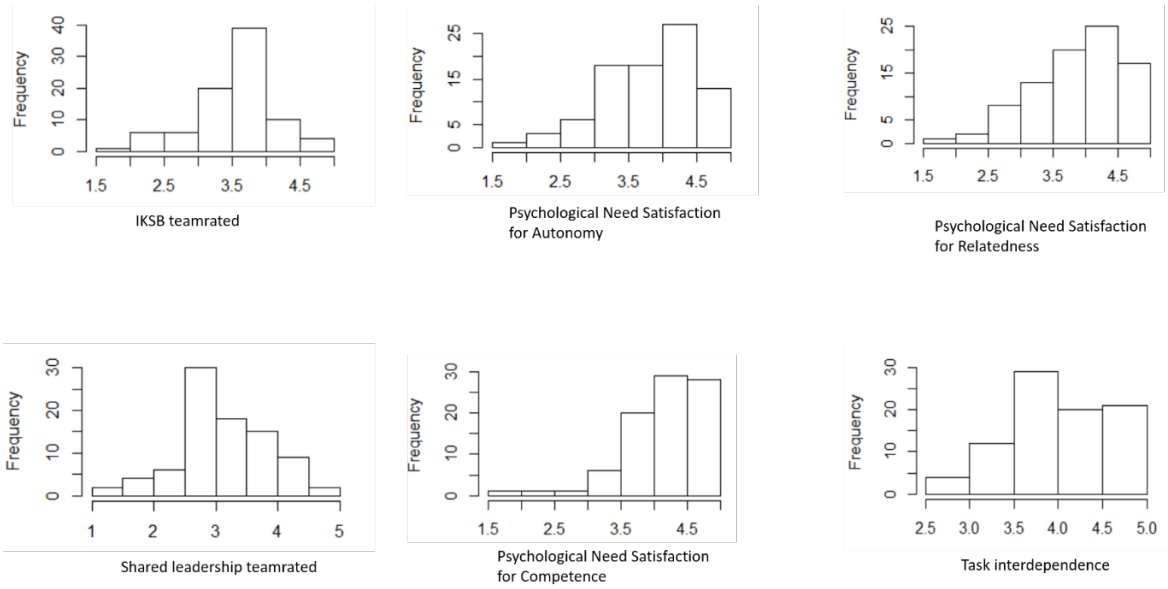

Figure a: histograms

2) VIF-scores

Table a presents the highest VIF-scores of our used models.

Model	Highest VIF-score
Model 2	SL: 1.279907
Model 3	TI: 1.117372
Model 4	PNS-R: 1.596427

Table b: Overview highest VIF-scores

3) Detailed results regression analyses regarding PNS-A and PNS-C as outcome variable

Outcome variable: PNS-A	*Model 8 Estimate (S.E)*	*Model 9 Estimate (S.E)*	*Model 10 Estimate (S.E)*
Step 1: Control variables			
Organizaton tenure	0.03	0.03	0.04
	(0.02)	(0.02)	(0.02)
Team tenure	0.01	-0.09	-0.12
	(0.13)	(0.13)	(0.13)
Age	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)
Gender	-0.01	0.10	0.07
	(0.26)	(0.25)	(0.26)
Education	0.21*	0.16	0.16
	(0.10)	(0.10)	(0.10)
Step 2: Independent variables			
Shared Leadership		0.26*	0.26*
		(0.11)	(0.12)
Task interdependence			0.01
			(0.11)
Step 3: Moderating effect			
			0.12
Shared Leadership x Task interdependence			(0.11)
R-squared	0.10	0.15	0.17
F-statistic	1.75	2.41*	1.96
(df1/df2)	(5/80)	(6/79)	(8/77)
Wald F-test against competing models		5.26*	0.67
(df.)		(1)	(2)

*** p<0.05*
**** p<0.01*

Table c: Regression results PNS-A

Outcome variable: PNS-C	*Model 11 Estimate (S.E)*	*Model 12 Estimate (S.E)*	*Model 13 Estimate (S.E)*
Step 1: Control variables			
Organizaton tenure	-0.01	-0.01	0.00
	(0.02)	(0.02)	(0.02)
Team tenure	0.30*	0.23	0.22
	(0.13)	(0.13)	(0.13)
Age	-0.02	-0.02	-0.02
	(0.01)	(0.01)	(0.01)
Gender	-0.03	0.05	0.04
	(0.25)	(0.25)	(0.26)
Education	-0.07	-0.10	-0.10
	(0.10)	(0.10)	(0.10)
Step 2: Independent variables			
Shared Leadership		0.19	0.20
		(0.11)	(0.12)
Task interdependence			-0.05
			(0.11)
Step 3: Moderating effect			
Shared Leadership x Task interdependence			0.04
			(0.11)
R-squared	0.14	0.17	0.17
F-statistic	2.53*	2.61*	1.96
(df1/df2)	(5/80)	(6/79)	(8/77)
Wald F-test against competing models		2.74	0.19
(df.)		(1)	(2)

*** p<0.05*
**** p<0.01*

Table d: Regression results PNS-C

4) Detailed results additional regression analyses with composite score for PNS

Alternative model composite score PNS *Outcome variable: individual knowledge sharing behaviour*	*Model 20* *Estimate (S.E)*	*Model 21* *Estimate (S.E)*	*Model 22* *Estimate (S.E)*	*Model 23* *Estimate (S.E)*
Step 1: Control variables				
Organizational tenure	-0.01	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Team tenure	0.06	-0.08	-0.08	-0.09
	(0.08)	(0.07)	(0.07)	(0.07)
Age	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Gender	-0.21	-0.06	-0.06	-0.06
	(0.16)	(0.13)	(0.14)	(0.13)
Education	0.08	0.02	0.02	0.02
	(0.06)	(0.05)	(0.05)	(0.05)
Step 2: Main variables				
Shared leadership		0.53***	0.46***	0.47
		(0.09)	(0.57)	(0.57)
Task interdependence			0.04	0.07
			(0.46)	(0.46)
PNS (A/C/R)				0.11
				(0.06)
Step 3: Moderator				
Shared Leadership x Task interdependence			0.01	0.00
			(0.14)	(0.14)
R-squared	0.06	0.37	0.37	0.40
F-statistic	1.03	7.64***	5.73***	5.55***
(df1/df2)	(5/80)	(6/79)	(8/77)	(9/76)
Wald F-test against competing models		38.24***	0.38	2.91
(df.)		(1)	(2)	(1)

*** p<0.05*
**** p<0.01*

Table e: Regression results composite score PNS