Psychosocial Antecedents of Knowledge Sharing in Healthcare Research Centers: A Mixed Methods Approach.

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Abstract

Background Knowledge sharing is a complex psychosocial phenomenon related to organizational performance and innovation. While considered knowledge intensive environments, healthcare organizations rely heavily on knowledge as a resource. However, effective knowledge management policies and research in healthcare organizations is still scarce, being of extreme shortage in specific environments, such as healthcare research centers. This study addresses this gap by using the Theory of Reasoned Action to investigate the impact of psychosocial factors as antecedents of knowledge sharing between healthcare research peers in such environments.

Methods We follow a mixed-methods design using a sample of 150 healthcare researchers to study the relation between perceptions of social network, shared goals, social trust, and knowledge sharing. A quantitative approach uses a structural equation modeling (SEM) to test the links in an original model and the mediation effect of the intention to share knowledge on knowledge sharing behavior. A fuzzy-set qualitative comparative analysis (fsQCA) identifies alternative configurations that lead knowledge sharing intention and its absence as well as the knowledge sharing behavior and its absence considering additional sample characteristics.

Results Findings show evidence of the proposed antecedents of the effect on knowledge sharing, namely social network and social trust ($p<0.001$). Shared Goals, while addressed in the literature, seem to be unrelated to knowledge sharing intention and behavioral output in research centers. While knowledge sharing intention is directly related to knowledge sharing behavior, additional configurations of causal conditions that lead to the presence or absence of the intention and knowledge sharing behavior are discussed, with emphasis on both psychosocial antecedent configuration and sample characteristics to enlarge potential theoretical and practical outcomes.

Conclusions This study identifies the influence of both psychosocial and team characteristic aspects leading to knowledge sharing behavior between healthcare researchers. The importance of a rich social network lying on trust is vital for a sharing environment inside research environments. Given the complex nature of behavioral intentionality, additional findings allow an articulation between individual characteristics based on gender, age, experience and seniority and the psychosocial antecedents – therefore substantiating the proposition of complex configurations between antecedents that hints for team configuration strategies and managerial practices in healthcare research teams.

Background

Knowledge sharing in knowledge intensive environments: The healthcare industry

The literature regarding the focus of Knowledge Management (KM) in the healthcare industry is shifting from managerial processes to the practical reality of healthcare services (Nicolini et al., 2008). Nowadays, information sciences, management and business studies, and medical and health sciences are directly related to the nature of the healthcare industry. This is not surprising considering the continuous learning nature of healthcare (Keeling and Lambert, 2000) and the focus given to knowledge mobilization in these organizations (Ferlie et al. 2012). Healthcare organizations are knowledge intensive environments, thus a focus on KM and its interactions with people, processes, and technologies is described in detail in the literature (Nicolini et al., 2008). Nonetheless, some old-fashioned practices persist, and a lack of focus on KM (Karamitri et al., 2017) still lingers in healthcare organizations. And while the healthcare industry seems to have absorbed some generic concepts and practices of the KM literature, it is still lacking an approach towards the resource-based view of the firm (Ferlie et al., 2012). Thus, sharing difficulties persist within

the healthcare industry, resulting in research topics focused on barriers and enablers of KM, social learning initiatives, and the fragmented nature of knowledge (Nicolini et al., 2008). Similarly, such concerns apply to the research centers (Park and Gabbard, 2018), with main topics of investigation ranging from learning processes to knowledge sharing enablers and knowledge networks (Zhang et al., 2017).

Psychosocial enablers of knowledge sharing

Considering the discussed continuous focus in communication between stakeholders, social network and trust that is given when addressing conceptual models for healthcare research communities found in recent literature (Zhang et al., 2017; Park and Gabbard, 2018), the following psychosocial enablers are identified:

Social Network. A social network regards the relationships between organizational members that occur along with the formal ties (Inkpen & Tsang, 2005). The perceived quality of relationships, the relationship between peers, the number of relationships inside the organization, and the perceptions of identification between members are factors to consider while measuring the knowledge sharing inside the organization (Nahapiet & Ghoshal, 1998; Huysman & De Witt, 2004; McFayden & Cannela, 2004; Chiu et al. 2009; Behringer et al., 2017). The enlargement of the social networks is an enabler for the frequency of knowledge sharing in the organization(Razmerita et al., 2016). The feelings of respect and caring behind the frequency and quality of interactions lead to a common goal of egalitarianism and reciprocal benefits that fosters an environment of cooperation and sharing (Cabrera and Cabrera, 2005; Park & Gabbard, 2018). Academic research communities consider a similar focus towards the importance of the internal ties as part of the effects of social capital on knowledge sharing (García-Sanchez et al., 2017), especially considering the constant pressure to improve their services while creating new demands on the most important assets they work with: the researchers' knowledge (cf. Ramírez et al., 2015).

Shared Goals. Shared goals, comprise a sum of objectives and aspirations shared between the members of the organization (Tsai & Ghoshal, 1998). The compatibility among the individual and the organizational views relate to the relational and cognitive dimensions of the organizational social capital, the shared vision (Tsai & Ghoshal, 1998). By fostering communication inside the company, individuals can identify other members with whom they share a vision, increasing their sharing or the exchange of mutual resources. Shared goals are part of the cognitive dimension, interacting with the anticipation of value in knowledge sharing (Nahapiet & Ghoshal, 1998). Shared goals impact knowledge sharing (Huysman & De Wit, 2004) through shared narratives, languages, and visions as social capital dimensions across organizational networks (Inkpen & Tsang, 2005). Research groups follow common goals, thus shared goals are enablers of knowledge sharing in academic research work (Yu et al., 2018). The standardization of language that ensures cooperation and reinforces the stream of communication is vital to avoid language and cultural barriers to knowledge sharing (Huysman & De Wit, 2004).

Social Trust. Trust is the cognitive process that focuses on the individual and is related to the perception of sincerity in the commonality of goals and purposes found in another (Tanis & Postmes, 2005). It involves the social constructs of perceived trustworthiness, perceived support and endorsement interacting with knowledge sharing (Chow & Chang, 2008). Trust is also pivotal in the perception that individuals have on the quality of the information being shared and distributed between peers (Nifadkar et al., 2018), either considering organizations (Razmerita et al., 2016), academic research communities (García-Sanchez et al., 2017; Fullwood et al., 2018; Yu et al., 2018), or in particular healthcare research communities (Zhang et al., 2017; Park & Gabbard, 2018).

Knowledge sharing intention and behavior

Knowledge sharing intention (KSI) consists of the personal perception that one has towards engaging in knowledge sharing (Bock et al., 2005). Knowledge sharing behavior (KSB) regards a predisposition or willingness to share valuable

expertise and information between peers (Hwang et al., 2018; Leal et al., 2018). The literature argues that a group of factors comprising social, psychological, cognitive, and structural dimensions (Andrews & Delahaye, 2000; Bock et al. 2005; Chiu et al. 2006) have an effect on knowledge sharing. The relations between such antecedents and knowledge sharing follows an approach from social psychology: the Theory of Reasoned Action (TRA) (Ajzen, 1992). Despite the literature's focus on the TRA (Ho et al., 2009), there is a gap regarding the relation between behavioral intention and actual behavior (Hwang et al., 2018).

The TRA, explores the relation between attitudes and their behavioral outcomes based on the individual's expectations. According to the TRA, behavioral intention results from the individual's attitude towards the performance of a specific behavior and the subjective norm behind it. The higher the intention towards a specific behavior, the higher the probability for such behavior to be performed. The TRA is often used when predicting the intention to share knowledge in organizations (Ho et al., 2009). By considering the complex nature of individual knowledge that makes related studies very demanding (Cavaliere et al, 2015), the cognitive weight on behavioral output (Ajzen, 1992), and the interaction between knowledge sharing and other psychosocial antecedents (Michailova and Gupta, 2005), it comes as a suitable theory to underpin the development of behavioral phenomena, such as knowledge sharing under the proposed rationale.

Conceptual Model

To provide a larger framework to address the complex relation between psychosocial factors and knowledge sharing (Cavalieri, et al. 2015) while considering the complex nature of KSI (Ajzenk, 1985) and the differences between types of knowledge (Boisot, 2001), we propose the following research model:

Methods

Mixed method

This study uses a mixed-method approach (Bryman & Bell, 2003) based on a cross-sectional survey, combining a quantitative analysis and a qualitative analysis to gain a more insightful view of the phenomenon (Venkatesh et al., 2013). The study follows a quantitative method (Chow & Chang, 2008) to test Hypotheses 1 to 5, using a principal component analysis (PCA) and a structural equation model (SEM). To avoid some of the weaknesses behind the abstraction of the quantitative method, the study follows a qualitative approach to extract more detailed results in a direct context application (Johnson & Onwuegbuzie, 2004) by applying the fuzzy set qualitative comparative analysis (fsQCA) that follow recent organizational behavior (Frazier et al., 2016) and KS researches (Xie et al., 2016; Stejskal & Hajek, 2017; Curado et al., 2018; Oyemomi et al., 2018). Such an approach allows us to corroborate the results between methods (triangulation), answers the need to have a research strategy to further support other methods (facilitation), and responds to the need to access different aspects of an investigation to ensure they are merged (complementarity) (Hammersley, 2002). A quantitative and qualitative approach produces more knowledge and expands the discussion between theory and findings (Johnson & Onwuegbuzie, 2004; Creswell & Tashakkori, 2007; Morgan, 2007), posing as a need for the current call of such studies in organizational research (Wright & Sweeney, 2015). The complex nature of the knowledge sharing phenomenon (Cavaliere et al., 2015) justifies the decision for a mixed-methods approach to provide a better outcome.

Sample

The data comes from an online survey sent to 1,489 healthcare researchers working in healthcare research organizations and/or research centers based in Portugal. Ex-ante measures for the common-method variance in cross-sectional studies were considered (Reio Jr., 2010). Anonymity and confidentiality were ensured, and questions were

counterbalanced and randomized. The survey was sent on three dates and gathered 255 responses. Following Hair et al.'s (2009) cleaning procedures, the final sample comprises 150 responses (10.07% response rate).

Measures

We use previously validated scales for the constructs from different sources to minimize common-method variance (Reio Jr., 2010). The scales for social network (SN), shared goals (SG), and social trust (ST) come from Chow and Chang (2008). The attitude towards knowledge sharing (AKS) scale comes from Lin and Lee (2004). The subjective norm for knowledge sharing (SNK) scale comes from Bock et al. (2005) and Chow and Chang (2008). The KSI scale comes from Ryu, Ho and Han (2003) and the KSB scale comes from Oliveira, Maçada, Curado and Nodari (2015). All constructs are measured using 5-point Likert-type scales that range from 1 (strongly disagree) to 5 (strongly agree). Appendix A shows all the items for the corresponding constructs.

Quantitative analysis

The quantitative analysis tests the integration of SN, SG and ST into interactions with both the AKS and the SNK. The interaction between AKS and NSK follows the TRA (Ajzen, 1985; 1992) at the individual level (attitude) and collective level (social norm). Since both AKS and SNKS are empirical weights that act as enablers of behavioral intention (Ajzen, 1985; 1992), such relations are also addressed. Finally, we explore the relation between KSI and KSB (cf, Ajzen, 1992).

Factor analysis and reliability of constructs

Considering the exploratory use of the measures in the healthcare industry, a PCA is used to extract the main components and address their validity (Hair et al., 2009). The new extracted variables are then analyzed in a SEM to test the proposed hypothesis. After addressing the measures, an exploratory factor analysis is conducted using SPSS® software. This analysis is used to determine the nature and number of common factors correlated between the variables. A Kolmogorov-Smirnoff test confirms the normality of the data (Fuller & Hemmerley, 1966), validating the conditions for the procedure ($p < 0.001$). The PCA is then conducted and the components extracted. The initial analysis of the factor correlation matrix presents correlations for the factors that are higher than 0.32. This cutoff value states an overlap in the variances higher than 10% between factors. A Promax oblique rotation technique is conducted to extract the factors (Tabachnick & Fidell, 2007). Both the Bartlett's Test of Sphericity and Keiser-Meyer-Olkin (KMO) are significant, ensuring the procedure ($p < 0.001$; KMO = 0.857). The default value of kappa (4) is considered as procedure criteria to allow the factor correlation in the rotation (Costello & Osborne, 2005). All variables have sufficient extraction, with no communalities lower than 0.5 (Hair et al., 2009). As shown in Table 2, the rotation converges into seven factors, ensuring the recommended cutoff of > 0.32 (Tabachnick & Fidell, 2007). The solution is based on both the percentage of variance extracted criteria (cutoff value above 75%) and the ruling of nontrivial variation according to the theory supporting the analysis (Gorsuch, 1997). The Harman's single factor test is considered for addressing common-method variance threats, with no factor explaining more than 35% of total variance (Podsakoff et al., 2003). The Cronbach's alphas range from 0.75 to 0.92, which showed an internal consistency of the constructs above the cutoff value (0.7) (Hair et al., 2009). The composite reliability of the factors is calculated according to Fornell and Larcker's (1981) proposed equation model to provide a more robust measurement for the internal consistency of the extracted constructs (Sijtsma, 2009). The results also access the internal consistency of the constructs above the cutoff value (0.7) (Hair et al., 2009). All the constructs have an average variance extracted (AVE) greater than 0.5 that indicates the existence of convergent validity (Hair et al., 2009). According to the Fornell-Larcker criterion, the square root of the AVE for each construct should be higher than the construct's highest correlation with any other construct. The results in Table 3 confirm the discriminant validity.

Structural equation model

A SEM is used to test the hypotheses presented. The nature of the model (Hair et al., 2010) allows theory confirmation by accessing the covariance between variables in a multiple regression analysis (Hair et al., 2009). A skewness test is used to validate the normality of the data after the PCA. Results range from − 1.189 to 0.169, acceptable values within the thresholds of the literature (-2; +2) (Gravetter & Wallnau, 2014). All the relations addressed in the structural model are supported by both the conceptual framework found in the literature and by statistical procedures.

Results

Quantitative results

The results of the structural equation model are shown in Figure 2 and support Hypotheses 1a, 1b, 3a, 3b, 4a, 4b, and 5.

SN has a positive effect on both AKS (β=0.17; p <0.1) and SNKS (β=0.145; p<0.1). Individual and group perceptions of the advantages of fostering and enabling the existing social network while promoting the quality of interactions impacts the behavioral intention of knowledge sharing (Razmerita et al., 2016) between peers in healthcare research centers (Park & Gabbard, 2018). Given the natures of the items addressed in the construct, the frequency, quality, and common perception of approachability have a positive effect on both the individual cognitive evaluation and predisposition to share knowledge. Conversely, a positive norm behind group membership and personal networking between members has a positive effect towards the cognitive construction of collective subjective norms that support knowledge sharing, as the literature shows (Lang, 2004; Chow & Chang, 2008). Accordingly, the additional perception of approachability and trustworthiness behind ST that comes hand-in-hand with the SN is also found to have a positive effect with both the AKS (β=0.31; p<0.1) and SNK (β=0.37; p<0.1)

SG doesn't have a significant effect on both AKS and SNK. Considering these results, Hypotheses 2a (p>0.1) and 2b (p>0.1) are not supported, questioning previous literature (Nahapaet & Goshal, 1998; Inkpen & Tsang, 2005). Nonetheless, the specific and social complexities of knowledge, especially in its tacit form, focus more on the frequency and reciprocity of communication to improve knowledge performance in academic research teams, where the individual goals and the social motivation can be addressed as a barrier to knowledge sharing (Yu et al., 2018). Multi-team systems with interconnected teams, often common in healthcare research teams, whose design can lead to countervailing forces when diffusing broad goals, can slow the collaboration between peers who become progressively more distant from those goals (National Research Council, 2015), which can be a significant reason for these findings.

Both AKS (β=0.524; p<0.001) and SNKS (β=0.533; p<0.001) have a significantly positive effect on KSI, which confirms the TRA principles of behavioral intention mediated by the empirical weights of both the individual's attitude and the social norm present in the individual´s social environment (Ajzen, 1985; 1992). Thus, the higher the behavioral intention, the higher the behavior outcome (β=0.533; p<0.001).

Qualitative analysis

To better understand the behavioral outcome of knowledge sharing, we apply a method, valuable for exploring and examining complex causality (Fiss, 2011), that relies on Boolean algebra principles when considering the configurations of causal conditions. fsQCA accepts a variety of conditions and paths to reach a given outcome (equifinality) and it explores causal asymmetry by addressing the necessary conditions for the presence and for the absence of the outcome (Fiss, 2011), offering a holistic approach to understanding the interaction and independencies between the antecedents and other variables that are further understood when not in isolation. (Short et al., 2008). The fsQCA uses the same variables as the SEM to enlarge the results from the quantitative analysis. Other demographic variables are considered to compose the configurations for KSB (García-Sanchez et al., 2017), enlarging the analysis.

Calibration

Calibration transforms the data set into fuzzy-set membership scores. Following Ragin (2008), variables (conditions in fsQCA) are calibrated using the direct method into three anchors to allow classification of the conditions from full membership (1.00) to full non-membership (0.00) for each score, and threshold for the most ambiguity in the fuzzy set (0.5). The calibration technique rescales the condition data with the support of these anchors (Fiss, 2011). The transformation of the Likert scales data is done via a calculation of the average values of the construct for each latent variable (Woodside et al., 2011). To further expand the analysis, the KSB condition is also rescaled by considering the scores on two groups of items (tacit KSB and explicit KSB). Table 4 displays the statistics and calibrations of the causal conditions.

Sufficiency analyses

We develop the suggested inspection of both intermediate and parsimonious solutions (Fiss, 2011) and thus we identify the core conditions (present in both the parsimonious and intermediate solutions) and the peripheral ones (only present in the intermediate solution). Sufficiency analysis respects the threshold for raw consistency of the configurations (0.80) (Ragin, 2006). The coverage values presented in the solutions also respect the suggested range in the literature (0.25-0.90) (Ragin, 2008; Woodside & Zhang, 2013). Tables 5, 6, 7, and 8 report the intermediate solutions. The black circles (●) indicate the presence of a condition, and empty circles (○) indicate its absence. Larger circles indicate core conditions. Small ones, indicate peripheral conditions. Blank spaces indicate a condition that does not matter for the configuration.

Qualitative results

Results show different configurations for the presence and absence of KSI (three for the presence and two for the absence of the outcome). AKS (atitu) is a core condition in all three configurations leading to KSI (int). But, SNKS (norm) is not present in any of these configurations. Regarding the discussed antecedents, only one configuration presents the presence of both ST (trust) and AKS (atitu) in order to reach KSI (int). The other antecedents, however, are either absent or do not contribute to the configuration (Table 5). Hence, Hypothesis 6a is supported.

Regarding the absence of KSI (~int), we find different core conditions in the solution. The results show that ST (trust) leads both to the presence and the absence of the outcome in different configurations, while there are other conditions that remain absent in both the presence and the absence of the outcome. Conversely, AKS's absence (~atitu) accounts alone for one of the configurations as a core condition that leads to the absence of KSI (~int). Hence, Hypothesis 6b is supported.

Regarding the analysis for the configurations that lead to tacit KSB (tacit) and explicit KSB (explit), results show a difference in characteristics, such as work experience, seniority, and age in the configurations for the presence and absence of the outcomes (Tables 6 to 8). The absence of KSI (~int) in all configurations for the absence of KSB (~beh) (KSB, tacit KSB, and explicit KSB) confirms that using the TRA to address KSB is a valid approach (Ho et al., 2009). Additionally, the presence of young researchers (~age) also seems to inhibit knowledge sharing.

Although some configurations are common to the three KSB outcomes, some differences are addressed in the analysis. For example, more experienced and tenured male researchers with high KSI tend to share more knowledge in one configuration for overall KSB (beh) but not for explicit KSB (explit), where the absence of seniority seems to be a peripheral condition to explicit knowledge sharing (explit). Conversely, while the absence of seniority (~sen) is also present in some of the configurations that lead to explicit KSB (explit), its presence is relevant in different configurations that lead to the absence of explicit KSB (~explit). Therefore, seniority is a barrier to explicit knowledge sharing, which is consistent with García-Sanchez et al.´s (2017) findings of a negatively significant moderation of PhD

seniority on the trust of the research team in KSB that affects explicit knowledge sharing. On the other hand, tacit KSB (tacit) is an outcome for both the presence and absence of the seniority in the organization. While young (~age) and “junior” (~sen) researchers in the organization share tacit knowledge between themselves, there is a gender difference. A configuration for the outcome tacit KSB (tacit) shows that young female researchers with less experience and seniority in the organization are more likely to share knowledge.

On the other hand, more experienced male researchers with less seniority in the organization are more prone to engage in tacit KSB. While the presence of KSI (int) is found in configurations for both KSB (beh) and explicit KSB (explit), it is also absent for tacit KSB (tacit). The degree of high abstraction and the lack of its operationalization, at a conscious level, found in the literature regarding tacit knowledge can justify its ever-constant flow in the social life of the organization (Nonaka & Takeuchi, 1995; Boisot, 2002; Choo, 2006; van den Berg, 2013) even when individuals seem to lack a behavioral intention to share it. The richness of alternative configurations that lead to the presence and absence of KSB, explicit KSB, and tacit KSB support Hypotheses 7a, 7b, 8a, 8b, 9a, and 9b.

Discussion

Results seem to confirm that perception of social trust goes hand in hand with positive perceptions of social network when considering knowledge sharing behavior outputs (Lang, 2004; Cabrera & Cabrera, 2005; Chiu et al., 2006; Nifadkar et al., 2018). Nonetheless, shared goals do not have a significant effect on the KSB in healthcare research centers, which add to the contradictory results of previous researches (Yu et al., 2018). As mentioned, team design (Nation Research Council, 2015) can be related to a lack of common language and cultural barriers in research centers (Huysman & De Wit, 2004), especially those with a multinational scope.

We also use a fsQCA to provide an original contribution. The analysis of the conditions that lead to the presence and absence of the outcomes expand on the quantitative findings. Attitude towards KSB is a sufficient condition present in all the configurations for the KSB outcome. However, the absence of attitude (~ atitu) is a sufficient condition that leads to the absence of the intention to share knowledge (~ int), which alerts managers to pay extra attention to employees. Regarding the solutions in Tables 6 to 8; the absence of KSI (~ int) is present in all configurations that lead to the absence of KSB (~ beh), the absence of explicit KSB (~ explit), and the absence of tacit KSB (~ tacit). Drawing mangers’ attention to the KSI, despite the type of knowledge involved. The lack of conditions common to all configurations in the models (Tables 6 to 8) reinforce the complex nature of knowledge sharing and suggest a careful approach when formulating strategies to engage in KSB.

As discussed previously, we also consider individual’s characteristics that contribute to different paths to KSB. Overall, the results show a uniformity in some configurations for KSB (overall, tacit, and explicit knowledge). Age and experience are core conditions for explicit knowledge sharing. Seniority is also a core condition for tacit knowledge sharing. On the other hand, the configurations for explicit knowledge sharing show seniority as a barrier to the outcome. Regarding the overall number of configurations, there are more configurations for tacit KSB (4) than for explicit KSB (3) (Tables 7 and 8). Therefore, tacit knowledge seems easier to share. Consistently, there are more configurations for the absence of explicit KSB (4) than for tacit KSB (3), which indicates that considering the causal conditions used, there are more ways that lead to the absence of explicit knowledge sharing than to the presence of tacit knowledge sharing. Additionally, the solutions for the absence of the outcomes share the same core conditions. The same is not true regarding the solutions for the presence of the outcomes, which gives motivation to adopting practices aimed to explore new configurations to reach equifinality. However, the two common configurations leading to the three KSB outcomes are worth noticing: the individuals that share knowledge in the healthcare research centers are:

a) older researchers with more seniority in the organization and intention to share knowledge;

b) young female researchers with less experience and less seniority.

Considering the similarities between the two approaches (SEM and fsQCA), there is a solid convergence of results. Although two configurations that lead to KSB include the absence of a social network (~ net) and the absence of shared goals (~ goals), the results do not pose a contradiction but an integration of each other. The mixed-methods approach provides an in-depth analysis of certain behavioral outcomes provided by the juxtaposition between the SEM and fsQCA. The addressed antecedents of knowledge sharing have a more complex relation in the configurations provided by the fsQCA than the results of the SEM. However, the structural equation model uncovers the relations between the latent variables of interest and their manifestations in both direct and indirect effects—exploring causal and mediation effects suitable for abstract constructs like the ones addressed in this study. Nonetheless, the absence of the antecedents (~ trust, ~goals, and ~ net) are core conditions leading to the absence of KSI (~ int), which reinstates the multitude of factors and the complexities in the psychosocial phenomena behind KSB (beh) not directly observed by using the SEM alone. The results of the mixed-methods approach show both a convergence and corroboration in the findings from the data (Bryman & Bell, 2003; Venkatesh et al., 2013), hence providing a framework that hints possible team configuration schemata from a managerial point of view.

This work presents limitations. Although we use a mixed-methods approach, we also follow a cross-sectional approach. As a result, we cannot establish causality. The small sample size (150) is also a limitation of the study. Further studies should replicate our research in other cultural and geographical scopes. We recognize that additional research center information is missing, such as team configuration, considering the increase of multi-level mediation in learning behavior (Van Mierlo et al., 2010) with some research aiming also for controversies over the quality of innovation (Fay et al., 2010), and other relevant demographic data, which might be included in subsequent studies. Expanding the current research while aiming for more data and more psychosocial antecedents is a goal worth pursuing due to the richness and pending KM development in the healthcare industry. We acknowledge the influence of national cultural values on the psychological antecedents in this study, as well as their possible effect on the attitude and subjective norm towards KSI and, consequently, on KSB. We also accept the idiosyncratic nature of the research on healthcare, thus we invite colleagues to address the knowledge sharing phenomenon and its psychological antecedents in different settings covering organizations in other fields of research. Although the psychosocial antecedents we use in the study are based on the literature, further assessment of other factors should be considered. Additional research using a longitudinal approach could be used to identify the developments of mechanisms of KSB and patterns of behavioral evolution. Furthermore, future research ought to explore the relation between tacit and explicit KSB to provide a larger discussion of mutual and different antecedents.

Conclusions

This study extends the empirical research on knowledge sharing by presenting a mixed-method approach as a suitable design to address the psychosocial antecedents that impact KSI and KSB within healthcare research centers. The healthcare industry still demonstrates difficulties in expanding their KM practices (Ferlie et al., 2012). We expand on Chow & Chang's (2008) model and focus on the psychosocial factors that contribute to knowledge sharing in healthcare research organizations. Similar studies have focused on healthcare, especially in recent years (Zhang et al., 2017; Park & Gabbard, 2018), yet no other applies a mixed-method approach.

Thus, this study contributes to the research in several ways. We use a quantitative analysis to provide evidence in support of the perception of a positive social network that individuals and their peers perceive as related to a better

attitude towards knowledge sharing in this particular setting. We also examine the group subjective norms that affect knowledge sharing, its intention, and its subsequent behavioral outcome.

The theoretical contribution of this work is possible due to the combination of the methods used that adds to the literature in a unique and original way. We integrate two complementary approaches to address psychosocial antecedents of knowledge sharing in a knowledge intensive setting. Following the TRA, we propose and test a sequential analysis of knowledge sharing.

This study also delivers practical contributions that allow us to suggest the use of managerial practices that foster an active environment allowing for social interactions between researchers (Zhang et al., 2017).

We recommend that managers should deploy a clear, broad, and engaging policy to avoid a sense of fadedness in the shared goals between research teams and members. Managerial practices should focus on trust and communication channels when addressing knowledge sharing between healthcare research professionals (Park & Gabbard, 2018). Additional attention should be given to the importance of team demographics to provide tools that improve team design models and practices (cf. García-Sanchez et al., 2017). Therefore, managers should encourage a strong and rich communication environment that is focused on approachability, trust, and proximity while considering team and individual characteristics. Such attention should promote the policies and practices by joining Human Resources Management (HRM) and KM topics on communication, goal reinforcement, and the development of positive bounds and trust between organizational members. Additionally, our results suggest some possible HRM interventions aimed to increase knowledge sharing: to promote KSI in the careers of advanced researchers, or to recruit and select young female researchers to join healthcare research centers.

List Of Abbreviations

SEM – Structural Equation Model

fsQCA – Fuzzy-set Qualitative Comparative Analysis

KSB – Knowledge Sharing Behavior

KSI – Knowledge Sharing Intention

HRM – Human Resources Management

KM – Knowledge Management

TRA – Theory of Reasoned Action

AKS – Attitude towards Knowledge Sharing

SNKS – Subjective Norm towards Knowledge Sharing

Coding variables in the qualitative analysis

gen – Gender

age – Presence of age (older researchers)

~age – Absence of age (younger researchers)

exp – Experience

~exp – Absence of experience

sen – Seniority in the position

~sen – Absence of seniority in the position

fsnet – Social Network

~fsnet – Absence of social network

fsgoals – Shared Goals

~fsgoals – Absence of Shared Goals

fstrust – Social Trust

~fstrust – Absence of Social Trust

fsatitu – Attitude towards knowledge sharing

~fsatitu – Absence of Attitude towards knowledge sharing

fsnorm – Subjective norm towards knowledge sharing

~fsnorm – Absence of Subjective norm towards knowledge sharing

fsint – Knowledge sharing intention

~fsint – Absence of knowledge sharing intention

fsbeh – Knowledge sharing behavior

~fsbeh – Absence of Knowledge sharing behavior

fstacit – Tacit knowledge sharing behavior

~fstacit – Absence of tacit knowledge sharing behavior

fsexplit – Explicit knowledge sharing behavior

~fsexplit – Absence of explicit knowledge sharing behavior

Declarations

Statement on ethics approval and consent

Not applicable

Consent for Publication

Not applicable

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

TG analyzed, interpreted the data regarding the self-reported data in both the quantitative and qualitative analysis and was the main contributor in writing the manuscript. CC and AB supervised the data analysis, research methodology and ethical compliance, and were major contributors in writing the manuscript. All authors read and approved the final manuscript.

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References

1. Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. J. Kuhl, & J. Beckman (Eds.), Action-control: From cognition to behavior (pp. 11-39). *Heidelberg: Springer*. DOI:10.1007/978-3-642-69746-3_2
2. Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and Social Psychology Bulletin, 18,* 3–9. DOI:10.5771/9783845260341_109
3. Andrews, K. M., & Delahaye, B.L. (2000). Influences on knowledge processes in organizational learning: The psychosocial filter. *Journal of Management Studies*, *37*(6), 797–810. DOI:10.1111/1467-6486.00204
4. Bock, G.W., Zmud, R.W., Kim, Y.G., & Lee, J.N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS Quarterly*, 87–111. DOI:10.2307/25148669
5. Boisot, M. (2002). The creation and sharing of knowledge. *The Strategic Management of Intellectual Capital and Organizational Knowledge*, 65–77.
6. Bryman, A., & Bell, E. (2003). *Business research methods*. Oxford: Oxford University Press.
7. Cabrera, E.F., & Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *The International Journal of Human Resource Management*, *16*(5), 720–735. DOI:10.1080/09585190500083020
8. Cavaliere, V., Lombardi, S., & Giustiniano, L. (2015). Knowledge sharing in knowledge-intensive manufacturing firms. An empirical study of its enablers. *Journal of Knowledge Management*, *19*(6), 1124–1145. DOI:10.1108/jkm-12-2014-0538
9. Chiu, C.M., Hsu, M.H., & Wang, E.T. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems*, *42*(3), 1872–1888.

DOI:10.1016/j.dss.2006.04.001

10. Choo, C.W. (2006) *The knowing organization: How organizations use information to construct meaning, create knowledge, and make decisions*. Oxford: Oxford University Press.
11. Chow, W.S., & Chan, L.S. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management*, *45*(7), 458–465. DOI:10.1016/j.im.2008.06.007
12. Costello, A.B., & Osborne, J.W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, *10*(7), 1–9. DOI:10.4135/9781412995627.d8
13. Creswell, J., & Tashakkori, A. (2007). Developing publishable mixed methods manuscripts. *Journal of Mixed Methods Research*, *1,* 107–111. DOI:10.1177/1558689806298644
14. Curado, C., Muñoz-Pascual, L., & Galende, J. (2018). Antecedents to innovation performance in SMEs: A mixed methods approach. *Journal of Business Research*, *89*(1), 206-215. DOI:10.1016/j.jbusres.2017.12.056
15. Fay, D., Borrill, C., Amir, Z., Haward, R., & West, M. A. (2006). Getting the most out of multidisciplinary teams: A multi-sample study of team innovation in health care. *Journal of Occupational and Organizational Psychology*, *79*(4), 553-567.
16. Ferlie, E., Crilly, T., Jashapara, A., & Peckham, A.(2012). Knowledge mobilisation in healthcare: a critical review of health sector and generic management literature. *Social Science & Medicine*, *74*(8), 1297–1304. DOI:10.1016/j.socscimed.2011.11.042
17. Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal*, *54*(2), 393–420. DOI:10.5465/amj.2011.60263120
18. Fornell, C., & Larcker, D.F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 382–388. DOI:10.2307/3150980
19. Frazier, M. L., Tupper, C., & Fainshmidt, S. (2016). The path (s) to employee trust in direct supervisor in nascent and established relationships: A fuzzy set analysis. *Journal of Organizational Behavior*, *37*(7), 1023-1043. DOI:10.1002/job.2091
20. Fuller, E.L., & Hemmerle, W.J. (1966). Robustness of the maximum-likelihood estimation procedure in factor analysis. *Psychometrika*, *31*(2), 255–266. DOI:10.1007/bf02289512
21. Fullwood, R., Rowley, J., & McLean, J. (2018). Exploring the factors that influence knowledge sharing between academics. *Journal of Further and Higher Education*, 1–13. DOI:10.1080/0309877x.2018.1448928
22. García-Sánchez, P., Díaz-Díaz, N.L., & De Saá-Pérez, P. (2017). Social capital and knowledge sharing in academic research teams. *International Review of Administrative Sciences*, *0*(0), 1–17. DOI:10.1177/0020852316689140
23. Gravetter, F.J., & Wallnau, L.B. (2014). Essentials of statistics for the behavioral sciences. *Belmont, CA: Thomson.*
24. Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment*, 68(3), 532-560. DOI:10.1207/s15327752jpa6803_5
25. Hair, J., Anderson, R., Tatham, R., & Black, W. (2007). *Multivariate data analysis*. Upper
26. Saddle River, USA: Pearson Education.
27. Hammersley, M. (2002). The relationship between qualitative and quantitative research: paradigm loyalty versus methodological eclecticism. J. Richardson (ed.), Handbook of Qualitative Research Methods for Psychology and the Social Sciences (pp.159-174). *Leicester: Wiley.*
28. Ho, C. T. B., Hsu, S. F., & Oh, K. B. (2009). Knowledge sharing: Game and reasoned action perspectives. *Industrial Management & Data Systems*, *109*(9), 1211–1230. DOI:10.1108/02635570911002289

29. Huysman, M., & De Wit, D. (2004). Practices of managing knowledge sharing: Towards a second wave of knowledge management. *Knowledge and Process Management*, *11*(2), 81–92. DOI:10.1002/kpm.192
30. Hwang, Y., Lin, H., & Shin, D. (2018). Knowledge system commitment and knowledge sharing intention: The role of personal information management motivation. *International Journal of Information Management*, *39*, 220–227. DOI: 10.1016/j.ijinfomgt.2017.12.009
31. Inkpen, A. C., & Tsang, E. W. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review*, *30*(1), 146–165. DOI:10.5465/amr.2005.15281445
32. Johnson, R.B., & Onwuegbuzie, A.J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, *33*(7), 14–26. DOI:10.3102/0013189x033007014
33. Karamitri, I., Talias, M. A., & Bellali, T. (2017). Knowledge management practices in healthcare settings: a systematic review. *The International Journal of Health Planning and Management*, *32*(1), 4–18. DOI:10.1002/hpm.2303
34. Keeling, C., & Lambert, S. (2000). Knowledge management in the NHS: positioning the healthcare librarian at the knowledge intersection. *Health Libraries Review*, *17*(3), 136–143. DOI:10.1046/j.1365-2532.2000.00286.x
35. Lang, J. (2004). Social context and social capital as enablers of knowledge integration. *Journal of Knowledge Management*, *8*(3), 89–105. DOI:10.1108/13673270410541060
36. Leal, C.T., Marques, C.P., Marques, C.S., & Cruz, M. (2018). The influence of knowledge sharing on Portuguese healthcare organisations' performance. *International Journal of Knowledge-Based Development*, *9*(3), 279–293. DOI:10.1504/ijkbd.2018.10012271
37. Lin, H. F., & Lee, G. G. (2004). Perceptions of senior managers toward knowledge-sharing behaviour. *Management Decision*, *42*(1), 108–125. DOI:10.1108/00251740410510181
38. Michailova, S., & Gupta, A. (2005). Knowledge sharing in consulting companies: Opportunities and limitations of knowledge codification. *Journal of Information & Knowledge Management*, *4*(03), 201–212. DOI:10.1142/s0219649205001171
39. Morgan, D.L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, *1*(1), 48–76. DOI:10.1177/2345678906292462
40. Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *The Academy of Management Review, 23*(2)*,* 242-266. DOI:10.5465/amr.1998.533225
41. National Research Council. (2015). *Enhancing the effectiveness of team science*. Washington DC National Academies Press. DOI:10.17226/19007
42. Nicolini, D., Powell, J., Conville, P., & Martinez-Solano, L. (2008). Managing knowledge in the healthcare sector. A review. *International Journal of Management Reviews*, *10*(3), 245–263. DOI:j.1468-2370.2007.00219.x
43. Nifadkar, S.S., Wu, W., & Gu, Q. (2018). Supervisors' work-related and non-work information sharing: Integrating research on information sharing, information seeking, and trust using self-disclosure theory. *Personnel Psychology*, 1-29. DOI:10.1111/peps.12305
44. Nonaka, I. (1991). The Knowledge Creating Company. *Harvard Business Review, 69*, 96-104.
45. Nonaka, I. & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford, UK: Oxford Press.
46. Oliveira, M., Curado, C. M., Maçada, A. C., & Nodari, F. (2015). Using alternative scales to measure knowledge sharing behavior: Are there any differences? *Computers in Human Behavior*, *44*, 132–140. DOI:10.1016/j.chb.2014.11.042

47. Oyemomi, O., Liu, S., Neaga, I., Chen, H., & Nakpodia, F. (2018). How cultural impact on knowledge sharing contributes to organizational performance: Using the fsQCA approach. *Journal of Business Research*, *94*, 313-319. DOI:10.1016/j.jbusres.2018.02.027
48. Park, J., & Gabbard, J.L. (2018). Factors that affect scientists' knowledge sharing behavior in health and life sciences research communities: differences between explicit and implicit knowledge. *Computers in Human Behavior*, *78*, 326–335. DOI:10.1016/j.chb.2017.09.017
49. Podsakoff, P.M., MacKenzie, S. B., Lee, J. Y., & 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), 879-903. DOI:10.1037/0021-9010.88.5.879
50. Ragin, C.C. (2006). Set relations in social research: Evaluating their consistency and coverage. *Political Analysis*, *14*(3), 291–310. DOI:10.1093/pan/mpj019
51. Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago, US: University of Chicago Press.
52. Razmerita, L., Kirchner, K., & Nielsen, P. (2016). What factors influence knowledge sharing in organizations? A social dilemma perspective of social media communication. *Journal of Knowledge Management*, *20*(6), 1225–1246. DOI:10.1108/jkm-03-2016-0112
53. Reio Jr, T.G. (2010). The threat of common method variance bias to theory building. *Human Resource Development Review*, 9(4), 405-411. DOI:10.1177/1534484310380331
54. Rihoux, B., & Ragin, C.C. (2009). *Configurational comparative methods : Qualitative comparative analysis (QCA) and related techniques*. (Applied social research methods series.) Los Angeles: Sage.
55. Ryu, S., Ho, S.H., & Han, I. (2003). Knowledge sharing behavior of physicians in hospitals. *Expert Systems with Applications*, *25*(1), 113–122. DOI: 10.1016/s0957-4174(03)00011-3
56. Short, J.C., Payne, G.T., & Ketchen Jr, D.J. (2008). Research on organizational configurations: Past accomplishments and future challenges. *Journal of Management*, *34*(6), 1053–1079. DOI:10.1177/0149206308324324
57. Sijtsma, K. (2009). On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika*, *74*(1), 107–120. DOI:10.1007/s11336-008-9101-0
58. Stejskal, J., & Hajek, P. (2017). Modelling collaboration and innovation in creative industries using fuzzy set qualitative comparative analysis. *The Journal of Technology Transfer*, 1–26. DOI: 10.1007/s10961-017-9638-0
59. Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics*. New Jersey: Allyn & Bacon/Pearson Education.
60. Tanis, M., & Postmes, T. (2005). A social identity approach to trust: Interpersonal perception, group membership and trusting behaviour. *European Journal of Social Psychology*, *35*(3), 413–424. DOI:10.1002/ejsp.256
61. Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, *41*(4), 464–476. DOI:10.5465/257085
62. Van den Berg, H.A. (2013). Three shapes of organisational knowledge. *Journal of Knowledge Management*, *17*(2), 159–174. DOI:10.1108/13673271311315141
63. Van Mierlo, H., Rutte, C. G., Vermunt, J. K., Kompier, M. A. J., & Doorewaard, J. A. C. M. (2010). A multi-level mediation model of the relationships between team autonomy, individual task design and psychological well-being. *Journal of Occupational and Organizational Psychology*, *80*(4), 647-664.
64. Venkatesh, V., Brown, S.A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, *37*(1), 21–44. DOI:10.25300/misq/2013/37.1.02
65. Woodside, A. G., Hsu, S. Y., & Marshall, R. (2011). General theory of cultures' consequences on international tourism behavior. *Journal of Business Research*, *64*(8), 785–799. DOI:10.1016/j.jbusres.2010.10.008

66. Woodside, A.G., & Zhang, M. (2013). Cultural diversity and marketing transactions: Are market integration, large community size, and world religions necessary for fairness in ephemeral exchanges?. *Psychology & Marketing*, *30*(3), 263–276. DOI:10.1002/mar.20603
67. Wright, T. A., & Sweeney, D. A. (2016). The call for an increased role of replication, extension, and mixed-methods study designs in organizational research. *Journal of Organizational Behavior*, 37(3), 480-486. DOI:10.1002/job.2059
68. Xie, X., Fang, L., & Zeng, S. (2016). Collaborative innovation network and knowledge transfer performance: A fsQCA approach. *Journal of Business Research*, *69*(11), 5210–5215. DOI:10.1016/j.jbusres.2016.04.114
69. Yu, Y., Chen, Y., Shi, Q., Yu, Y., Chen, Y., & Shi, Q. (2018). Personality, Team Goals, Motivation, and Tacit Knowledge Sharing Performance Within a University Research Team. *Strategy and Performance of Knowledge Flow: University-Industry Collaborative Innovation in China*, 71–81. DOI:10.1007/978-3-319-77926-3_5
70. Zhang, X., Liu, S., Deng, Z., & Chen, X. (2017). Knowledge sharing motivations in online health communities: A comparative study of health professionals and normal users. *Computers in Human Behavior*, *75*, 797–810. DOI:10.1016/j.chb.2017.06.028

Tables

Table 1 ***Sample Characteristics***

Characteristics	Categories	Frequency (*N* = 150)	%
Gender	Female	108	72
	Male	42	28
Age	18-25	10	6.7
	26-35	49	32.7
	36-45	49	32.7
	46-55	26	17.2
	56-65	12	8
	>65	4	2.7
Experience (in years)	<1	7	4.7
	1-2	13	8.7
	3-4	10	6.7
	5-6	8	5.2
	7-10	22	14.7
	>10	90	6
Seniority in the organization (in years)	<1	14	9.3
	1-2	27	18
	3-4	13	8.7
	5-6	15	10
	7-10	19	12.7
	>10	62	41.3
Number of employees in the organization	1-20	7	4.7
	21-50	12	8
	51-100	13	8.7
	>100	118	78.6
Number of members in current team	1-5	47	31.3
	6-10	46	30.7
	>10	57	38
Work experience in the current team (in years)	<1	22	14.7
	1-2	26	17.3
	3-4	21	14
	5-6	19	12.7
	7-10	23	15.3

>10	39	26

Table 2 ***Factor loadings***

Constructs	Items	Average	Standard deviation	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
KSI	KSI1	4.33	0.728	0.514						
	KSI2	4.33	0.748	0.972						
	KSI3	4.35	0.743	1.018						
	KSI4	4.33	0.739	0.894						
KSB	KSB1	4.02	0.966		0.733					
	KSB2	4.17	0.814		0.953					
	KSB3	4.41	0.626		0.919					
	KSB4	4.39	0.663		0.669					
SNK	SNK1	3.83	0.903			0.823				
	SNK2	3.92	0.916			0.814				
	SNK3	3.77	0.868			0.670				
	SNK4	3.85	0.806			0.881				
ST	ST1	3.43	0.944				0.763			
	ST2	3.24	1.015				0.873			
	ST3	3.25	0.983				0.928			
AKS	AKS1	4.32	0.717					0.991		
	AKS2	4.49	0.610					0.808		
	AKS3	4.09	0.814					0.864		
SN	SN1	4.23	0.752						0.761	
	SN2	3.59	0.914						0.891	
	SN3	3.73	0.932						0.896	
SG	SG1	2.95	0.873							0.847
	SG2	2.80	0.882							0.888
	SG3	3.37	0.972							0.374

Table 3 Composite Reliability, AVE, Cronbach's Alpha, Squared Root of AVE, and Construct Correlations

Constructs	*Composite Reliability*	*AVE*	*Cronbach's alpha*	*1.*	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*
1. Social Trust	0.892	0.735	0.890	**0.857**						
2. Social Network	0.882	0.725	0.841	0.552	**0.851**					
3. Shared Goals	0.766	0.548	0.752	0.598	0.423	**0.740**				
4. Attitude towards Knowledge Sharing	0.919	0.793	0.885	0.459	0.416	0.298	**0.891**			
5. Subjective Norm towards Knowledge Sharing	0.876	0.641	0.832	0.495	0.382	0.376	0.399	**0.801**		
	0.923	0.761	0.924	0.349	0.305	0.227	0.619	0.458	**0.872**	
6. Knowledge Sharing Intention	0.894	0.684	0.822	0.232	0.169	0.028	0.412	0.266	0.538	**0.827**
7. Knowledge Sharing Behavior										

Note. The squared root of the AVE is along the diagonal in bold.

Table 4

Descriptive statistics and calibration of the casual conditions and outcomes		
Conditions	Descriptive Statistics	Calibration
Gender (gen)	M=28%	(M=0)
	F=72%	(F=1)
Age (age)	18-25=6.70%	(18-25=0)
	26-35=32.70%	(26-35=0.25)
	36-45=32.70%	(36-45=0.50)
	46-55=17.30%	(46-55=0.75)
	56-65=8%	(56-65=0.95)
	>65=2.70%	(>65=1)
Experience (exp) (in years)	<1=4.70%	
	1-2=8.70%	
	3-4=6.70%	(<10=0)
	5-6=5.30 %	(>10=1)
	7-10=14.70%	
	>10=60%	
Seniority (sen) (in years)	<1=9.30%	
	1-2=18%	
	3-4=8.70%	(<1-2=0)
	5-6=10%	(3-10=0.50)
	7-10 y = 12.70%	(>10=1)
	> 10 y = 41.30%	
Social Network (fsnet)	μ=3.85, σ=0.76, min=1, max=5	(5;3.9;3)[a]
Shared Goals (fsgoals)	μ=3.04, σ=0.75, min=1, max=5	(3.9;3.1;2)[a]
Social Trust (fstrust)	μ=3.31, σ=0.89, min=1, max=5	(4.1;3.5;2)[a]
Attitude towards KS (fsatitu)	μ=4.30, σ=0.65, min=1.6, max=5	(5;4.5;4)[a]
Subjective Norm regarding KS (fsnorm)	μ=3.84, σ=0.72, min=1, max=5	(5;3.9;2.8)[a]
Knowledge Sharing Intention (fsint)	μ = 4.34, σ = 0.67, min = 2.5, max = 5	(5;4.3;4)[a]
Knowledge Sharing Behavior (fsbeh)	μ=4.25, σ=0.63, min=2.5, max=5	(5;4.1;3.8)[a]
Tacit KSB (fstacit)	μ=4.09, σ=0.81, min=2, max=5	(5;4.1;3.1)[a]
Explicit KSB (fsexplit)	μ=4.40, σ=0.57, min=3, max=5	(5;4.1;3.9)[a]

Table 5 *Intermediate solutions for the presence (int) and absence of knowledge sharing intention(~int)*

Intermediate solution for int[a]								
Model: int = f (net, goals, trust, atitu, norm)[a]						Coverage		
Configurations	net	goals	trust	atitu	norm	Raw	Unique	Consistency
1	▯			▯		0.445716	0.018831	0.836843
2		▯		▯		0.453640	0.040216	0.836538
3			▯	▯		0.571644	0.167756	0.811520
[a] Overall solution coverage: 0.701481; Overall solution consistency: 0.816912								
Intermediate solution for ~int[b]								
Model: ~int = f (net, goals, trust, atitu, norm)						Coverage		Consistency
1				▯		0.854365	0.541792	0.795717
2	▯	▯	▯		▯	0.332983	0.020410	0.842610
[b] Overall solution coverage: 0.874775; Overall solution consistency: 0.775446								

Table 6 *Intermediate solutions for the presence (beh) and absence of knowledge sharing behavior (~beh)*

Intermediate solution for beh[a]								
Model: beh = f (gen, age, exp, sen, int)						Coverage		
Configurations	gen	age	exp	sen	int	Raw	Unique	Consistency
1		▯	▯		▯	0.367902	0.170154	0.903815
2	▯	▯	▯	▯		0.074892	0.074892	0.853394
3	▯		▯	▯	▯	0.244978	0.047231	0.855551
[a] Overall solution coverage: 0.490025 ; Overall solution consistency: 0.886099								
Intermediate solution for ~beh[b]								
Model: ~ beh = f (gen, age, exp, sen, int)						Coverage		Consistency
1			▯	▯	▯	0.414821	0.352964	0.790282
2	▯	▯	▯		▯	0.102966	0.041109	0.961947
3	▯	▯	▯	▯	▯	0.222999	0.222999	0.855078
[b] Overall solution coverage: 0.678929 ; Overall solution consistency: 0.818819								

Table 7 *Intermediate solutions for the presence (explit) and absence of explicit knowledge sharing behavior (~explit)*

Intermediate solution for explit[a]								
Model: explit = f (gen, age, exp, sen, int)						Coverage		
Configurations	gen	age	exp	sen	int	Raw	Unique	Consistency
1		▯	▯		▯	0.341391	0.158321	0.922714
2	▯	▯	▯	▯		0.072400	0.072400	0.907652
3	▯		▯	▯	▯	0.231121	0.048051	0.888023
[a] Overall solution coverage: 0.461842 ; Overall solution consistency: 0.918807								
Intermediate solution for ~explit[b]								
Model: ~ explit = f (gen, age, exp, sen, int)						Coverage		Consistency
1		▯	▯	▯	▯	0.243070	0.176210	0.872596
2	▯	▯	▯		▯	0.114196	0.047337	0.962605
3	▯		▯	▯	▯	0.147639	0.080780	0.832717
4	▯	▯	▯	▯	▯	0.240128	0.240128	0.830776
[b] Overall solution coverage: 0.611314 ; Overall solution consistency: 0.845995								

Table 8 *Intermediate solutions for the presence (tacit) and absence of tacit knowledge sharing behavior (~tacit)*

Intermediate solution for tacit[a]								
Model: tacit = f (gen, age, exp, sen, int)						Coverage		
Configurations	gen	age	exp	sen	int	Raw	Unique	Consistency
1		▯	▯		▯	0.347425	0.204699	0.907856
2	▯	▯	▯	▯		0.065536	0.065536	0.794326
3	▯	▯		▯	▯	0.225149	0.089861	0.898957
4	▯	▯	▯	▯	▯	0.056300	0.024178	0.842526
[a] Overall solution coverage: 0.528408 ; Overall solution consistency: 0.869987								
Intermediate solution for ~tacit[b]								
Model: ~ tacit = f (gen, age, exp, sen, int)						Coverage		Consistency
1		▯	▯	▯	▯	0.240027	0.174074	0.895688
2	▯	▯	▯		▯	0.106670	0.040716	0.934653
3	▯	▯	▯	▯	▯	0.227170	0.227170	0.816970
[b] Overall solution coverage: 0.507914 ; Overall solution consistency: 0.857408								

Figures

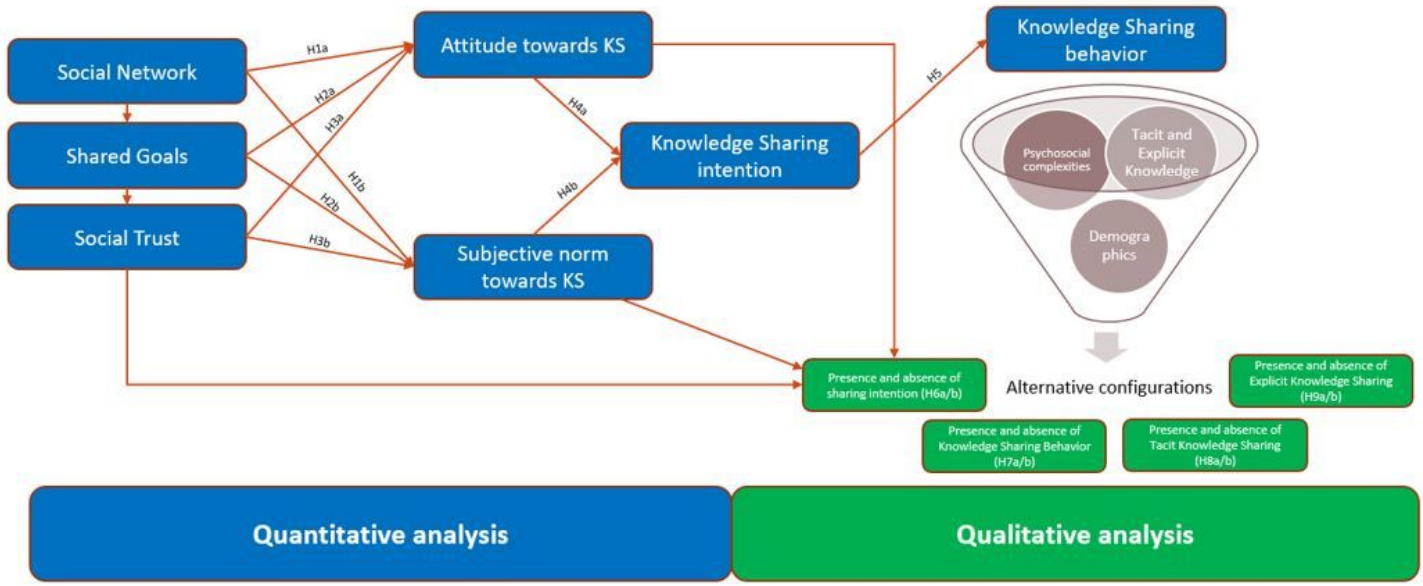
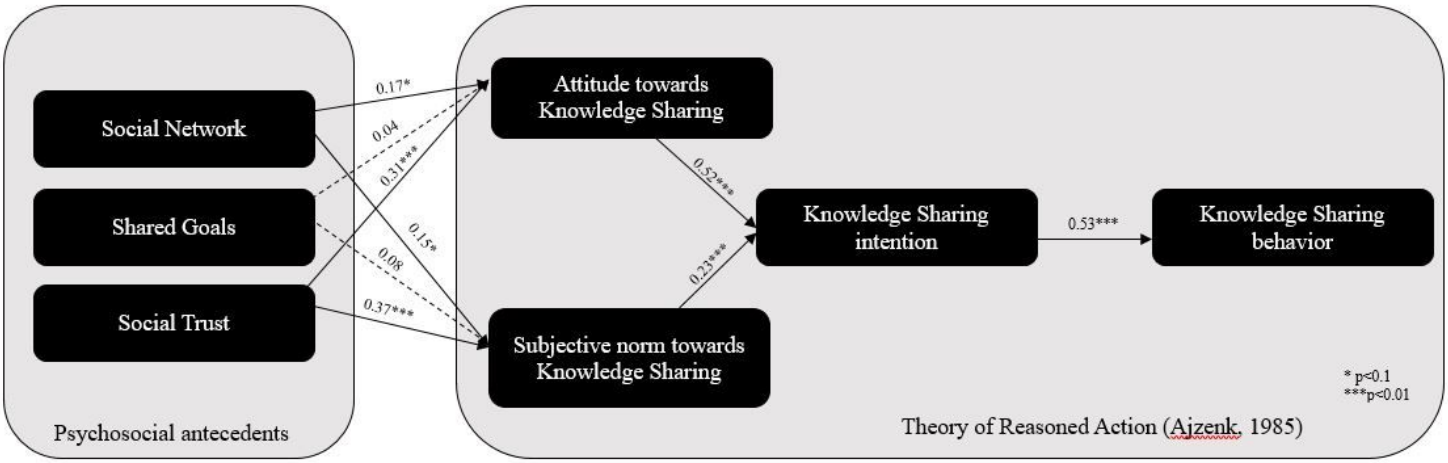


Figure 1

Research model and hypothesis



X² / df	GFI	RMR	NFI	AGFI	CFI	TLI	RMSEA
1,549	0,975	0,046	0,954	0,922	0,983	0,959	0,061

Figure 2

Results of the quantitative research model and model indexes

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- AdditionalfigureAppendixA.docx