INVISIBLE FOUNDATIONS OF COLLABORATION IN THE WORKPLACE: A MULTIPLEX NETWORK APPROACH TO ADVICE SEEKING AND KNOWLEDGE SHARING

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Abstract

The revolutionary advancement of technology in the past decade brought the attention of academics and management practitioners to ways of improving innovative capabilities of organizations. Advice-seeking relationships have an essential role in the knowledge production of modern-day organizations as they enable actors to acquire information, professional support and knowledge elements that they can recombine to form new knowledge. This paper conceptualizes advice-seeking behaviour as part of an inherently complex social world that can best be captured by a multiplex approach to organizational network research. It investigates how different layers of interpersonal relationships in the workplace may contribute to the appearance of advice-seeking interactions. This study examines the cases of three knowledge-intensive organizations and applies binary logistic regression to shed light on the yet invisible relational foundations of workplace collaboration.

Implications for Central European audience: Central European countries attempt to improve their economic competitiveness by attracting knowledge-intensive companies as well as incentivizing innovation and digital transformation. Knowledge-intensive firms, such as business service centres or information and communication technology companies, are significant contributors to the economic output of countries such as the Czech Republic, Hungary and Poland. Recommendations derived from the results of this paper provide insights into the leadership of knowledge-intensive companies regarding creation of organizational environments that foster knowledge sharing and innovation. Measures that promote interpersonal trust, visibility of expertise and boundary-spanning behaviour are recommended.

Introduction

Stimulating and fostering knowledge sharing and collaboration is often considered one of the primary challenges for managers in modern organizations, particularly in knowledge-intensive companies (Alvesson, 2004). According to the knowledge-based view of the firm (Pereira & Bamel, 2021), the role of an organization is to integrate the knowledge of its members. The relationship between its capacity to do so and its innovation capability is well documented (Mendoza-Silva, 2021; Odei & Stejskal, 2018; Škudienė et al., 2020) and understood by management scholars to contribute to the firm's competitive advantage. Some factors that support the innovation capability of an organization such as management support (Minbaeva, 2007), organizational culture (Ajmal & Koskinen, 2008), organizational structure (Ajmal et al., 2010), absorptive and disseminative capabilities (Szász et al., 2019; Whitehead et al., 2016), external relations (Csedő & Zavarkó, 2020) and the use of technology, have been extensively researched. Ultimately, however, it is individual employees who decide to ask for advice, share their knowledge or collaborate. As all the above phenomena depend on actual and factual individual behaviours, it is reasonable to investigate and analyse the individual-level behavioural patterns behind the actual outcomes.

Knowledge within the organization is rarely enough in itself: it should be transferred between actors to be present at the right place, at the right time. Although knowledge-intensive organizations use a multitude of technologies to externalize, store and share knowledge, in most cases, knowledge transfer still occurs in the process of one employee seeking advice from another (Bessenyei, 2005; Mirc & Parker, 2020). In recent years, there has been increasing academic interest (Brennecke & Rank, 2016; Lazega et al., 2016; Treglown & Furnham, 2020) in studying organizational knowledge networks, that is, a set of interrelated actors whose purpose is to share knowledge possessed by other actors and create new knowledge (Škerlavaj et al., 2010). Most research efforts in the field have focused on organizational factors influencing the dynamics of knowledge networks (Mendoza-Silva, 2021) or tested already established social network mechanisms (such as social status theory and social capital theory) (Agneessens & Wittek, 2012), while the relational antecedents of advice seeking remain understudied.

As Hortoványi and Szabó (2006) and Mattar et al. (2022) established, for knowledge transfer to occur, structural, cognitive and social conditions must be met. That is, there should be an opportunity, an ability and an intention to share. In contrast to structural and cognitive factors, preconditional interpersonal relationships are less visible to managers and are more often misunderstood (Marineau et al., 2018; Marineau & Labianca, 2021) and, therefore, less considered when planning actions. Thus, this study seeks to shed light on the relational foundations of advice-seeking behaviour by investigating the multidimensional social relationships of actors in a knowledge network. Furthermore, the study examines how positional distances in the hierarchy and across departments impact the willingness of employees to ask for knowledge. This approach is achieved by analysing the social network data of three knowledge-intensive organizations (a business services centre, a higher education institution and an ICT company) in Hungary and the United States. Binary logistic regression was used to identify the most significant relational factors. This study concludes that perceived trustworthiness, expertise and helpfulness, as well as regular interactions of informal communication, are all substantial for the occurrence of advice-seeking behaviour –

but with a notable difference between the relative explanatory power of variables across samples.

Consequently, this paper makes two contributions to the management, innovation and behavioural sciences literature. Firstly, it corroborates previous research by empirically demonstrating that informal relationships support the transfer of knowledge. It argues that relational preconditions of knowledge sharing are equally important as structural and cognitive factors. Regular communication between actors is proven to be crucial for making expertise visible and creating closure as well as an opportunity to share knowledge. Secondly, it extends existing knowledge by unfolding the individual impact of different relational dimensions in a multiplex social network on the generation of advice-seeking ties among actors. By employing a dyadic approach to knowledge networks, this study also contributes to the stream of organizational social network research where actor-based and structuralist approaches are predominant (Borgatti et al., 2014).

The structure of this paper proceeds as follows. After the introduction, Section 1 provides a review of the necessary concepts of knowledge networks and advice-seeking behaviour in organizations to lay out the theoretical framework for empirical analysis. In Section 2, information on data samples and research methods is presented. Section 3 includes the results and interpretations of the data analysis. Finally, in Section 4, connections and contributions to the existing literature are provided. Limitations and directions for future research are proposed as well as theoretical and practical implications.

1 Theoretical Framework

Despite recent advances in information and communication technology, people continue to prefer to converse with other people in person or through virtual platforms as the primary means of obtaining substantial knowledge for their work (Causholli et al., 2021). One reason online or offline discussions are more popular than reading documents is that knowledge is often tacit, complex or system-dependent, and thus not easily codified (Nebus, 2006). In their study of a consulting company, Cross et al. (2001a) found that 85% of the managers interviewed reported contacting fellow managers or employees for knowledge that was critical to their work. More recent studies have also corroborated these findings, particularly in knowledge-intensive organizations (Lazega et al., 2016; Mattar et al., 2022; Mirc & Parker, 2020). This makes advice seeking a promising area in research on intra-organizational knowledge sharing. Moreover, since advice seeking usually occurs embedded in a rich context of diverse interpersonal relationships (Nebus, 2006), a multiplex social network approach is to be taken.

## 1.1 Multiplex approach to intra-organizational knowledge networks

Network theory has been an increasingly powerful paradigm in organizational research (Borgatti et al., 2009). In knowledge sharing, the network perspective is particularly advantageous, as it provides a convenient framework that integrates knowledge acquisition and knowledge creation, as well as the individual's roles as a primary source and a destination of knowledge. A knowledge network is generally understood as "a set of nodes— individuals or higher-level collectives that serve as heterogeneously distributed repositories of knowledge and agents that search for, transmit and create knowledge—interconnected by

social relationships that enable and constrain nodes' efforts to acquire, transfer and create knowledge" (Phelps et al., 2012).

From this definition, multiple roles of network actors and functions of relationships unfold. Firstly, actors may appear in three distinct positions. They might be repositories of knowledge (knowledge owners), possessing a variety of knowledge elements; they might facilitate knowledge acquisition and transfer (knowledge brokers); or they might as well create new knowledge elements (inventors) through combination or discovery (Phelps et al., 2012). Secondly, relationships between actors are both channels through which information flows (Borgatti et al., 2014) and filters through which actors view, perceive and evaluate each other's knowledge (Borgatti & Cross, 2003). Relationships are also tools that help combine existing knowledge in order to create new knowledge (Škerlavaj et al., 2010).

Despite its many advantages, the network perspective also has some shortcomings. As Nebus (2006) points out, the network literature has a bias towards examining whole-network structures and characteristics when predicting outcomes, while it often overlooks individual or dyad-level dynamics. Moreover, network researchers' notion of people as nodes or actors and relationships as ties, while convenient for capturing "big picture" patterns, seriously oversimplifies the complexity and differences of individuals (Leinhardt, 1977). In fact, single-network studies usually examine but one aspect of interpersonal relationships, such as trust, sympathy, communication or collaboration (Snow & Fjeldstad, 2015). As real-world relationships are complex, sometimes even controversial, this approach can only effectively capture one layer of social reality. That is a flaw in the theory that multidimensional (or multiplex) network studies, which examine multiple social layers simultaneously (see Figure 1) and signed graph studies, which combine the analysis of positive and negative relationships, seek to rectify (Harrigan et al., 2020).

Figure 1 | Multiple layers of interpersonal relationships in a social network
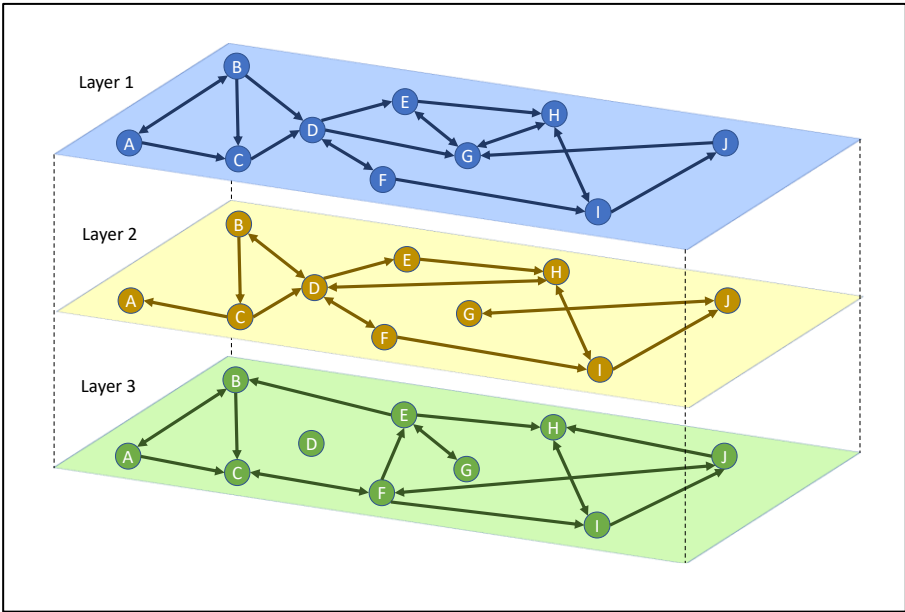
Source: authors

As Figure 1 demonstrates, actors who are connected in one layer of social space might not be in another. Moreover, actors may occupy a central position in one case and remain on the periphery in another. Actor D, for instance, can leverage brokerage positions in layer 1 and layer 2 that represent advice-seeking and collaboration networks, respectively, while missing any ties in the friendship network that is depicted in layer 3. He might be a senior expert who is professionally admired but perceived as aloof by his co-workers. Actor G also seems to be a hub in layer 1, while not so popular in the others: she may be a fountain of knowledge when it comes to seeking advice crucial for work but less invested in collaboration or fraternizing in the workplace. Human relationships are not only complex but also controversial. One might recognize a colleague's expertise while disagreeing with their values or avoiding direct collaboration due to their notorious lateness.

A multiplex approach in knowledge network research seems particularly lucrative as it may help identify layers of interpersonal relationships that affects knowledge flows. Furthermore, it serves as the theoretical foundation for the analysis of interplay (i.e., correlation and regression) between different types of relationships (Gondal, 2022). In recent years, various studies investigated the influence of specific relationship types on interactions related to knowledge sharing, such as advice seeking. These demonstrated the importance and positive effects of trust (Bencsik & Juhász, 2020; Cross et al., 2001b; Swift & Hwang, 2013), friendship (Mendoza-Silva, 2021), emotional and fluid intelligence and homophily (Treglown & Furnham, 2020), formal (Brennecke & Rank, 2016) and informal status (Agneessens & Wittek, 2012), and even competition (Lazega et al., 2016). However, a more comprehensive model of relevant relational antecedents of advice-seeking behaviour is yet to be established.

## 1.2 Meaning and formation of advice-seeking ties in knowledge networks

To better understand intra-organizational knowledge transfer from a network perspective, a more systematic approach is needed to distinguish between different types of dyadic phenomena. According to Borgatti et al. (2014), four kinds of dyadic phenomena are evidenced in network research. Similarities and social relations are state-like phenomena as these are relatively enduring and considered given at a specific moment. Interactions and flows, on the other hand, are dynamic occurrences and thus regarded as event-like. Similarities consist of shared identities and values, joint group memberships or shared work locations. Although often used as a proxy, similarities are not, in fact, social ties but rather the context that provides opportunities and conditions for relationships to form (Borgatti et al., 2009). Actual social relations are relatively stable mental images of other actors that are occasionally recalled and sometimes rewritten. Alternatively, Labianca (2014) suggests that relationships are relatively enduring combinations of feelings (affects), judgments (cognitions) and behavioural intents towards others. Social relations are sometimes products of kinship or social/organizational roles (Borgatti et al., 2014).

In contrast, interactions are transactions or exchanges between network actors. For instance, these exchanges include talking with, sending emails to, asking for information from, or collaborating on a task with others. As opposed to social relations, interactions are discrete events that happen once or more over time. Frequently occurring interactions may signal the existence of a relationship between two actors, as prior studies established that the regularity of interactions and the amount of time spent together tend to increase the probability of relationship formation (King, 2021). On the other hand, a lack of interactions does not

necessarily mean the end of a relationship. You can imagine two friends who did not speak for two years after one of them moved to another town but still considered themselves friends and could pick up the conversation anytime where it ended. Finally, flows are elements transferred through interactions (Borgatti et al., 2014). Flows include emotions, money, and even germs in times of a pandemic, but more importantly, in a knowledge network, knowledge and information.

Within a knowledge network, advice seeking and knowledge sharing in this sense are not relationships but rather interactions that occur. Social relations are either judgments of others (e.g., perceived expertise, trustworthiness), behavioural intentions towards them (e.g., the willingness to ask for or provide information), or determined by formal roles (e.g., supervisor, subordinate, team member). Throughout the process of knowledge transfer, information flows between the actors: when one reveals their inability to solve a problem independently (an act that requires trust) and when the other provides the information necessary for the solution. Similarities provide the context for interactions to happen (e.g., comembership in a project or working in the same office). According to Borgatti and Cross (2003), advice-seeking interactions should be conceptualized as part of a dynamic learning model (see Figure 2) in which asking for information, and especially the success of this interaction, has repercussions on its relational conditions. For instance, if actor A perceives actor B as knowledgeable and helpful and thus seeks them out to solve a problem, but they fail to do so either due to incompetence or negligence, actor A will probably adjust their perception. Consistently, if B does prove knowledgeable and helpful, A's impressions will be reinforced.

Figure 2 | Dynamic model of advice seeking and learning
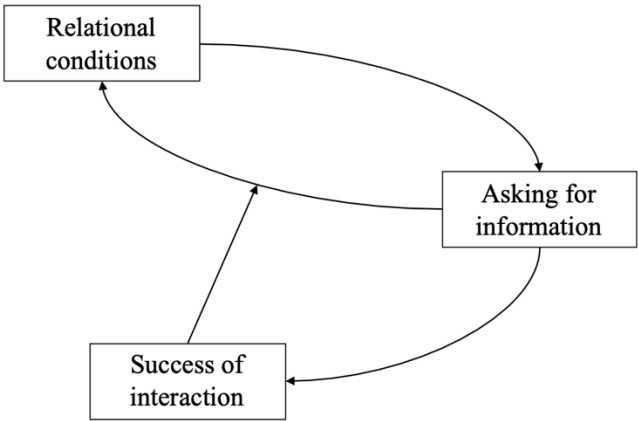
Source: Borgatti and Cross (2003)

Information needs for problem solving are not the only reason why network actors choose to seek advice from each other. In their study, Cross et al. (2001a) found that based on 120 reported advice-seeking interactions among managers in a global company, only 57% served the purpose of solution generation for problems. Besides, 45% of interactions yielded meta-knowledge, that is, knowledge of who knows whom and who knows what (Leonardi, 2015), required for effective advice seeking in the future. Problem reformulation, which enables the actor to broaden their understanding of the problem and give more accurate solutions, also

made up 45% of all interactions. Furthermore, advice seeking was reported as a means of validation (49%) and legitimation (36%). While the affirmation that comes from validation is used to bolster the advice seeker's confidence, legitimation gives credibility to the solution based on the social status of respected sources endorsing the solution (Cross et al., 2001a). Given these points, an ideal target of advice-seeking interactions is either an actor who is a renowned expert (solution generation, problem reformulation and validation), is well-informed and has profound local knowledge (meta-knowledge) or has high formal or informal status (legitimation). This is also in line with the findings of Agneessens and Wittek (2012) and Mattar et al. (2022).

In the sense of Borgatti et al. (2014), perceived expertise or local knowledge are directed (not inherently mutual) social relations where a tie *ij* means that the actor *i* considers the actor *j* an expert of a subject. These social relationships that foster advice seeking develop through several network mechanisms and together form the multi-layered social foundations of the knowledge network presented in section 2.1. According to Harrigan and Yap (2017), six mechanisms are primarily responsible for tie formation in networks. (1) Closure is a tendency of partners to form a tie. That is, in an open triad ABC, where A and B are friends, A and C also tend to become friends over time. (2) Reciprocity is the tendency of the recipient to return the given tie (also documented as the norm of reciprocity by social psychologists). For instance, if A shares a juicy piece of gossip with B, B might feel compelled to return the favour with another piece (Szvetelszky & Bodor-Eranus, 2020). (3) Homophily is a tendency of actors to develop relationships with those with whom they share similarities (essential attributes). In a knowledge network, it may be more probable that somebody who works in a specific department will develop relationships with others in the same department. (4) Popularity, in turn, means that actors with many (incoming) relationships are more likely to form new ones—a mechanism responsible for the so-called Matthew effect ("the rich get rich") of natural networks. An already renowned expert in the organization is likely to be discovered by other colleagues. (5) Activity refers to a tendency of those who initiate ties to send additional ties. Differences in activity are rooted in internal traits such as introversion versus extroversion. (6) Entrainment is the tendency of ties in a particular social layer to predict ties in another layer. For instance, colleagues who have been collaborating on a project task become friends. The study of entrainment is noticeably limited in the social network literature as it requires multiplex data on different types of ties (Harrigan & Yap, 2017).

1.3 Conclusions for empirical analysis

Based on the presented theoretical framework, it is posited that reported advice-seeking interactions are suitable markers for actual knowledge transfer processes occurring in a knowledge network. This is in line with recent findings showing that individuals tend to respond positively to direct requests for help (Flynn & Lake, 2008). Advice seeking may happen for a variety of reasons, but in all cases, it seems reasonable that its targets are perceived to have substantial expertise, be well-informed, or possess high formal or informal status in the organization. The works of both Swift and Hwang (2013) and Cross et al. (2001b) verified the significance of interpersonal trust (a perception of trustworthiness and helpfulness) in asking for help or information and sharing knowledge. Thus, in this study, it is posited that social relations, including perceived expertise, local knowledge, helpfulness and trustworthiness, will have a positive effect on the initiation of reported advice-seeking interactions. It is hypothesized that the receiver's higher position in the hierarchy (i.e., higher

formal status) will result in more incoming requests for advice. Based on research results corroborating the homophily and closure mechanisms, it is posited that advice seeking is more likely to occur among members of the same organizational unit. Finally, based on the entrainment effect, all relational conditions of advice seeking are supposed to have a medium to high correlation with other layers of the multiplex social network.

2 Data and Methods

Network data of three knowledge-intensive organizations were analysed to test the above-detailed assumptions. The sample organizations included a business services centre (390 employees), a higher education institution (583 employees) and an ICT company (1970 employees). The first two sample organizations are located in Hungary, while the ICT company operates in the United States (see Table 1). Data were collected by Maven Seven Network Research, Inc., a Budapest-based management consultancy specializing in organizational network analysis. Respondents filled in a self-administered survey questionnaire through a purposefully designed online platform entitled OrgMapper®, developed by Maven Seven. The questionnaire included 18 relational questions, of which 8 items were used for this study (see Table 2). The OrgMapper® questionnaire had been previously validated by Maven Seven through expert judgment, tested for internal and cross-sample consistency and has been used for years in consultancy practice. Data were collected in 2017 as part of three different consultation assignments, anonymized and later provided for research purposes. The use of public or private datasets issued from previous corporate data collections is in line with the general practice of organizational researchers in the network paradigm, as pointed out by Borgatti and Halgin (2011) and Robins (2015). Due to the leadership support in the sample organizations, the response rate was over 90% in all the cases—a threshold generally accepted as a validity requirement in social network research (Borgatti et al., 2014).

Table 1 | Description of sample datasets

Attributes	Sample organization 1	Sample organization 2	Sample organization 3
Industry	Business services	Higher education	Telecommunication
Location	Hungary	Hungary	United States
No. of employees	390	583	1970
No. of hierarchy levels	3	4	5
No. of departments	13	12	10

Source: authors

Datasets from the sample organizations included demographic data of the network actors (i.e., hierarchy level, departmental affiliation) and relational data reflecting the existence of ties between actors in different layers of interpersonal relationships (see Table 2). In line with Labianca's (2014) tripartite model of social relations, some questions measured relationships as behavioural intents (questions 1, 2 and 3), while others focused on judgments (questions 4, 5, 6 and 7) or affections (question 8). The survey questions analysed in the study were selected from all 18 questionnaire items based on previous research findings as presented in the theoretical framework.

For the purpose of this study, dyads were chosen as units of the analysis. All possible ($n*(n-1)$) directed dyads were investigated in thenine selected dimensions. In this approach, an observation is a directed dyad *ij*, and variables indicate whether the actor *i* chose the actor *j* in a specific relational layer (dimension). As suggested by Robins (2015), respondents were limited to four answers per question to avoid the collection of potentially weak, less significant ties. Thus, even though the theoretical maximum of ties was $n*(n-1)$ in all the dimensions, the actual maximum was *4n*. Table 3 demonstrates the number, density and reciprocity of ties in all the relational dimensions. Density (*d*) refers to the fraction of reported ties (*e*) over all possible ties (*4n*), while reciprocity (*r*) indicates the fraction of cases in which an *ij* dyad (A_{ij}) was matched by a *ji* dyad (A_{ji}) over all reported ties (*e*).

$$d = \frac{e}{4n} \tag{1}$$

$$r = \frac{\sum_{i \neq j} A_{ij} A_{ji}}{e} \tag{2}$$

As expected, relational dimensions that presume symmetry (e.g., informal communication, trustworthiness and personal support) were generally more reciprocal than those that presume asymmetry of power, knowledge or ability (e.g., formal communication, informedness and problem solving). Networks of all relational dimensions could be analysed to identify key players, examine the structure and compute meaningful measures (e.g., average path length, modularity, clustering). Of these indicators, density and reciprocity are listed in Table 3. As the primary contribution of this paper is not the analysis of specific networks (i.e., layers of the social reality) but rather the examination of their interplay, it is only the dependant variable, advice-seeking, that is depicted in a graph form. Figure 3 demonstrates the differences of structure and composition across the three sample organizations.

**Table 2 | Social relation types with corresponding survey questions**

Relation types	Survey questions
1. Advice seeking	Whom do you feel comfortable asking for help if you find your work difficult?
2. Formal communication	From whom do you formally receive information and messages in relation to changes in the organization and processes?
3. Informal communication	With whom do you have informal conversations about changes in the organization and processes?
4. Trustworthiness	Which of your colleague do you consider trustworthy and dependable?
5. Helpfulness	Which of your colleagues is always ready or willing to help others?
6. Informedness	Whom do you consider to be well-informed with access to the latest news and updates?
7. Problem solving	Which of your colleagues is good at solving problems in critical situations?
8. Personal support	To whom do you turn if you need to discuss personal problems?

Source: authors

Demographic data on the network actors were recoded into the dyadic level to indicate whether the actors *i* and *j* are at the same level of hierarchy or in the same department. This way, all the variables in the analysis were binary (0, 1) and represented the existence

of ties in each relational dimension. To avoid misleading high correlations between variables due to a large number of non-existing ties in the networks, only those dyads were included in the analysis that had at least one existing tie in either layer. That is, an *ij* dyad was only included if the actor *i* chose the actor *j* in at least one of the nine relational dimensions demonstrated in Table 2. This is also in line with the purpose of this study to identify the relational antecedents of advice-seeking behaviour in existing relationships of knowledge networks.

Figure 3 | Advice-seeking networks in sample organizations

| Sample Organization 1 | Sample Organization 2 | Sample Organization 3 |
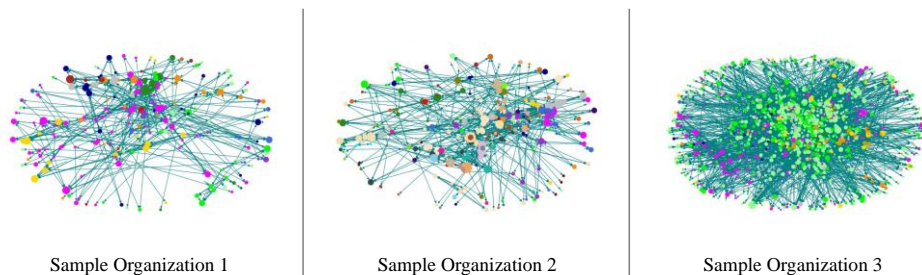
Note: Colours represent different departments; node size depends on the number of incoming ties.
Source: authors

Binary logistic regression was used to investigate the individual explanatory power of each relational dimension (i.e., layers measured by the independent variables) on the presence of advice-seeking behaviour in these relationships. Binary logistic regression is a variation of linear regression that is used when the response variable is dichotomous and the independent variables are continuous, categorical, or both. Unlike linear regression, however, logistic regression does not assume that the relationship between the independent variables and the dependent variable is linear (Midi et al., 2010). Not only does it allow to assess how well a set of variables predicts the categorical dependent variable and determines the goodness of fit of the model, but it also provides a summary of the accuracy of the classification of cases, which helps determine the percentage of predictions made from the model that will be correct. Instead of chance, binary logistic regression builds on the concept of odds, that is, it compares the probability that an event happens to the probability that it does not. It is generally considered a convenient tool for measuring how multiple variables affect the likelihood of a negative or positive outcome (Aldrich & Cunningham, 2016).

Table 3 | Descriptive statistics of social relations in samples

Relation types and metrics	Sample organization 1	Sample organization 2	Sample organization 3
Advice seeking			
Number of ties	641	956	4,772
Density (practical)	0.411	0.410	0.606
Reciprocity	0.172	0.184	0.109
Formal communication			
Number of ties	753	1,088	5,176
Density (practical)	0.483	0.467	0.657
Reciprocity	0.093	0.081	0.102
Informal communication			
Number of ties	833	1,181	5,282
Density (practical)	0.534	0.506	0.670
Reciprocity	0.367	0.335	0.295
Trustworthiness			
Number of ties	902	1,236	5,809
Density (practical)	0.578	0.530	0.737
Reciprocity	0.266	0.261	0.202
Helpfulness			
Number of ties	893	1,300	5,580
Density (practical)	0.572	0.557	0.708
Reciprocity	0.206	0.229	0.164
Informedness			
Number of ties	600	936	4,044
Density (practical)	0.385	0.401	0.513
Reciprocity	0.070	0.028	0.029
Problem solving			
Number of ties	503	777	4,370
Density (practical)	0.322	0.333	0.555
Reciprocity	0.095	0.067	0.088
Personal support			
Number of ties	517	797	3,625
Density (practical)	0.331	0.342	0.460
Reciprocity	0.236	0.163	0.243

Source: authors

3   Results

Binary logistic regression analyses were run in SPSS Statistics for all three sample organizations, including advice seeking as a dependent variable and all other relational dimensions in Table 2 as independent variables. Two other categorical variables (same department and same hierarchy level) were also introduced to reflect the effect of the horizontal and vertical distance between actors on the willingness to ask for work-related help or advice. Binary logistic regression assumes that (1) the dependent variable is dichotomous, (2) there are no outliers in continuous variables, and (3) there is no multicollinearity (high correlations between independent variables) in the model. In this setting, the outcome was binary (advice-seeking behaviour is/is not present), no continuous independent variables were included, and all correlations between variables were low to moderate (Cramer's V coefficients for categorical correlations were lower than 0.40 in all the cases). Thus, all the basic assumptions of the regression model are met.

According to the omnibus tests of model coefficients, the regression models in all three datasets proved to be statistically significant with values of χ^2=66.655, p<0.001; χ^2=115.364, p<0.001; and χ^2=612.642, p<0.001 in sample organizations 1, 2 and 3, respectively. The p-values for the Hosmer and Lemeshow tests are higher than 0.05 (0.551, 0.674 and 0.562, respectively). The test's null hypothesis is thus rejected, which signifies a good model-data fit. Binary logistic regression models use the pseudo R^2 measures Nagelkerke R^2 and Cox & Snell R^2, which are both methods of calculating the explained variation. These measures usually have lower values than in multiple regression; however, they are interpreted in the same manner, but—with more caution—as an interval (Aldrich & Cunningham, 2016). In this case, the Nagelkerke R^2 and Cox & Snell R^2 values were 0.267 and 0.393 in sample organization 1, meaning that the explained variation in the dependent variable based on the regression model ranges from 26.7 per cent to 39.3 per cent. The Nagelkerke R^2 and Cox & Snell R^2 values ranged between 0.292 and 0.430 and between 0.242 and 0.399 in sample organizations 2 and 3, respectively. Classification tables of the regression models also suggest a strong explanatory power as overall percentages are higher than 80 per cent in all samples (82.6, 83.7 and 87.1), indicating generally correct predictions. Overall, these results suggest that relational antecedents explain a relatively large part of the variation in the formation of advice-seeking relationships. The remaining variation might be explained by external factors such as accessibility, organizational structure, culture, leadership style, etc.

Based on the Wald test results, most of the independent variables turned out to be significant in the regression models. Table 4 summarizes the explanatory values and significance of the included variables. Adjusted odds ratios (Exp(B) values) higher than 1.5 are emphasized in bold. According to the results, regular formal and informal communication between actors makes it 2 to 3 times more likely for advice seeking to happen across all three samples. Remarkably, the perceived helpfulness of another actor does not contribute significantly to the odds of asking for their help. It seems that is the other actor's overall perception of being well-informed, good at problem-solving and worthy of the trust that primarily explains one's willingness to seek them out. (Trustworthiness, in this sense, was measured as a general judgment of the other being dependable as well as one's readiness to ask for help in personal matters.) The horizontal or vertical distance between actors within dyads (as measured by differences in departments and hierarchy levels) seems, in most cases, less significant or less impactful on the odds of advice seeking happening. Still, in sample organization 3,

belonging to the same level of hierarchy makes employees three times more likely to seek out their peers.

Table 4 | Binary logistic regression model summaries for sample organizations

Sample organization 1							
Variables	B	S.E.	Wald	Sig.	Exp(B)	95% conf. interval	
Comm. (formal)	0.9288	0.1246	55.5631	**0.0000**	**2.5314**	1.9829	3.2316
Comm. (informal)	1.2394	0.1272	94.9870	**0.0000**	**3.4534**	2.6916	4.4309
Trustworthiness	0.3687	0.1314	7.8738	0.0050	1.4458	1.1176	1.8705
Helpfulness	-0.0423	0.1315	0.1036	0.7475	0.9586	0.7408	1.2403
Informedness	0.7554	0.1318	32.8687	**0.0000**	**2.1284**	1.6440	2.7556
Problem solving	1.1724	0.1368	73.4648	**0.0000**	**3.2296**	2.4702	4.2226
Personal support	0.9306	0.1258	46.9241	**0.0000**	**2.5359**	1.9431	3.3095
Same department	0.3196	0.1230	6.7526	0.0094	1.3765	1.0817	1.7517
Same hierarchy level	0.0102	0.1332	0.0059	0.9387	1.0103	0.7781	1.3117
Constant	-3.1837	0.1644	375.1675	0.0000	0.0414		
Sample organization 2							
Variables	B	S.E.	Wald	Sig.	Exp(B)	95% conf. interval	
Comm. (formal)	0.6889	0.1070	41.4329	**0.0000**	**1.9916**	1.6147	2.4565
Comm.(informal)	1.3813	0.1078	164.3110	**0.0000**	**3.9802**	3.2224	4.9162
Trustworthiness	0.4909	0.1098	19.9697	**0.0000**	**1.6338**	1.3173	2.0262
Helpfulness	-0.1185	0.1123	1.1148	0.2910	0.8882	0.7128	1.1068
Informedness	0.3519	0.1180	8.8980	0.0029	1.4218	1.1283	1.7916
Problem solving	0.7820	0.1187	43.4099	**0.0000**	**2.1858**	1.7321	2.7582
Personal support	1.5970	0.1084	217.2338	**0.0000**	**4.9383**	3.9934	6.1067
Same department	0.6169	0.1089	32.0805	**0.0000**	**1.8531**	1.4969	2.2941
Same hierarchy level	-0.1816	0.1054	2.9712	0.0848	0.8339	0.6784	1.0252
Constant	-3.1499	0.1220	666.6543	0.0000	0.0429		
Sample organization 3							
Variables	B	S.E.	Wald	Sig.	Exp(B)	95% conf. interval	
Comm. (formal)	1.1002	0.0460	571.1494	**0.0000**	**3.0046**	**2.7454**	3.2883
Comm. (informal)	1.2456	0.0489	648.6763	**0.0000**	**3.4750**	**3.1574**	3.8246
Trustworthiness	0.2939	0.0494	35.3407	**0.0000**	**1.3417**	**1.2178**	1.4782
Helpfulness	0.1201	0.0509	5.5696	0.0183	1.1276	1.0206	1.2459
Informedness	1.0242	0.0497	424.0719	**0.0000**	**2.7849**	**2.5262**	3.0700
Problem solving	1.0988	0.0480	523.4755	**0.0000**	**3.0004**	**2.7309**	3.2966
Personal support	0.5818	0.0515	127.6992	**0.0000**	**1.7893**	**1.6175**	1.9793
Same department	-0.4471	0.0463	93.2291	0.0000	0.6395	0.5840	0.7002
Same hierarchy level	1.1111	0.0531	437.4226	**0.0000**	**3.0377**	**2.7373**	3.3711
Constant	-3.4431	0.0565	3710.7357	0.0000	0.0320		

Source: authors

4   Discussion and Conclusions

Theorizing on advice-seeking behaviour in knowledge networks has tended to focus on either the effects of specific organizational factors (e.g., structure, culture and leadership) or interpersonal dynamics based on one actor's individual judgments (e.g., expertise) and affections (e.g., sympathy and friendship) towards others. This paper proposes that there is merit in conceptualizing advice-seeking behaviour as a dyadic phenomenon embedded in an inherently complex social world that can only be comprehensively captured through a multiplex (multi-layered) approach. Multiplex analysis of organizational social networks may shed light on the relational foundations of advice seeking and knowledge sharing, that is, the type of relationships that make these behaviours more likely to occur.

Although the odds ratios of specific variables in the model vary across datasets, there is a consistent pattern in their significance and relative explanatory power. Informal communication and perceived problem-solving ability were most substantial in all three samples. Differences in the odds ratios might be due to external organizational factors, such as culture, leadership style or operational profile. In sample organization 2, for instance, a higher education institution, actors (many of whom are researchers and thus can be each other's competitors) seem more reluctant to ask for help without a conviction that the other is dependable and can even be trusted with personal matters. Sample organizations 1 and 3, on the other hand, operate in the business sector where being well-informed and good at problem solving outweighs trustworthiness. The role of belonging to the same level of hierarchy seems particularly significant in sample organization 3, although it is not self-evident if this difference is due to size, core activity or culture (i.e., American versus Central European).

In line with Borgatti et al. (2014) and Labianca (2014), this paper captured relationships as relatively enduring combinations of feelings (affects), judgments (cognitions) and behavioural intents to others. It examined the individual relational dimensions that are most commonly associated with advice-seeking behaviour (i.e., trustworthiness, helpfulness, perceived expertise) and created a more comprehensive model of these relational antecedents that explained 26.7% to 43.0% of the total variance in the formation of advice-seeking ties. The results of this study corroborate earlier findings such as those of Swift and Hwang (2013) and Cross et al. (2001b) about the significance of interpersonal trust in workplace collaboration and learning. These results also provide support for the theory of Agneessens and Wittek (2012) and Mattar et al. (2022) that actors with a higher formal or informal status are more likely to be sought out for help or advice.

Following Hortoványi and Szabó's (2006) study, this paper also found that for knowledge transfer to occur, structural, cognitive and relational conditions must be met. Regular formal and informal communication between actors was proven essential in all three sample datasets. Contrary to what has been reported by Cross et al. (2001a), the perceived helpfulness of an actor was not a significant precursor of another's willingness to seek them out. Overall, data in this analysis show that well-established formal and informal communication channels serve as structural means of advice seeking; while judgments of other actors (such as perceived problem-solving abilities, trustworthiness and informedness) make them a viable target. It seems that organizations and their managers should handle several layers of social dimensions beyond structural and procedural solutions if they want to foster knowledge-seeking behaviour and collaborative problem solving.

The findings of this study are, in some respects, limited and need to be qualified in other ways. Firstly, case study methods or qualitative research tools may help formulate a more comprehensive image of the sample organizations and thus explain individual differences due to organizational context. Secondly, as data in this study were collected before the pandemic, they did not reflect the socio-technical changes in the past few years that partially altered how people interact and collaborate in the workplace. A repetition of this study on post-pandemic samples might also give an opportunity to better understand the impacts of social distancing on social network dynamics and the impact of those on advice-seeking behaviour and collaborative problem solving and to compare the embeddedness of remote and on-site workers in organizational knowledge networks.

More recent papers investigating similar research questions have led, however, to congruent conclusions. Agneessens et al. (2022) found that expertise and psychological safety affect advice-seeking network formation at both the dyadic and group levels. They argue that expertise as a resource-related attribute makes those actors highly perceived as experts more attractive to advice seekers and that actors with constructive attitudes have a higher propensity to build ties, while these same actors might be more inclined to build ties to similar actors with high constructive attitudes (Agneessens et al., 2022). Ajimati et al. (2022) investigated a sample of software developer professionals and reinforced that high connectedness in business and technical advice networks has a positive relationship with improving the problem-solving competence of software developers. Providing support to the results of this study, Wang et al. (2022) examined a post-pandemic online Q&A community and found that knowledge-seeking quality and quantity positively affect social capital that, in turn, acts as a mediator between knowledge seeking and knowledge contribution. In line with the results of this paper, Natu and Aparicio (2022) also corroborated that intrinsic motivation (that is generally due to interpersonal relationships between actors) is the most important driver in explaining knowledge-sharing intentions.

In addition to theoretical contributions, research findings in this paper also suggest to managers that by enhancing organizational communication, building interpersonal trust and helping their employees to make their expertise more visible, they can effectively foster advice-seeking behaviour. Team building or merely creating opportunities for employees to bond over lunch or after work may strengthen their sense of trust. The use of enterprise social media or other tools that support ambient awareness (knowledge of who knows what and who knows whom) may also help employees make their expertise more visible to others. Rotation programmes and cross-functional project assignments, on the other hand, can help advice-seeking ties cross horizontal and vertical organizational boundaries.

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