Factors influencing knowledge sharing between scientific specialists in knowledge networks and communities of practice: A systematic literature review

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Abstract:

Knowledge sharing is a competitive advantage and necessity for the success of any organization. Meanwhile, knowledge networks have been introduced as a way to enhance knowledge sharing between individuals and as an effective tool to facilitate knowledge exchange in clinical, educational, and commercial fields. The purpose of this paper is to identify the factors that can affect the level of knowledge sharing and exchange between academic and scientific specialists in knowledge networks and Communities of Practice (COP). A systematic literature review was conducted using the PRISMA guidelines. Four databases were searched, including Scopus, Web of Science, PubMed, and ProQuest. Google Scholar search was conducted to complete the search and ensure the tracking of the gray literature. Also, relevant sources, references, and reference lists of the related articles were reviewed. The studies were searched from April until August 2022 and finally the content analysis of the findings was done. Two reviewers independently assessed the quality of included studies. Data were extracted using the Joanna Briggs Institute (JBI) checklist tool. Of the 1439 records, 13 studies met the inclusion criteria. This study identified three main categories of factors affecting knowledge sharing in knowledge networks and COPs as individual factors, organizational, and structural. The results showed that knowledge networks provide opportunities to overcome professional barriers and complex systemic challenges and lead to knowledge sharing and exchange among scientific specialists. This article has important implications for managers, health policymakers, and academics who wish to expand knowledge sharing of scientific specialists through knowledge networks and CoPs in knowledge-based organizations.

Keywords:

Communities of practice, health knowledge management, knowledge network, knowledge sharing, systematic review

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Introduction

Knowledge sharing is a competitive advantage and a success factor in organizations,[1] that leads to faster deployment of knowledge in different parts of the organization from which people can take advantage.[2] Knowledge networks foster knowledge sharing and exchange among professionals,[3] and appearing in various forms such as Communities of Practice (CoPs), which offer opportunities to break down professional barriers, complex systemic challenges, and support individuals, especially newcomers. These networks provide the transfer and sharing of tacit knowledge between individuals and experts in scientific fields.[4,5] There is growing evidence that knowledge networks can be developed specifically to

support knowledge in clinical, educational, and business contexts.[6,7] For this purpose, we can refer to examples of knowledge networks and CoPs that are managed by governmental organizations in various sectors of education, public services, and healthcare.[8,9] However, most of the studies conducted in this field mainly refer to theoretical issues, and few studies have addressed the factors influencing the formation of knowledge networks and CoPs and how to exchange knowledge among researchers and professionals.[10] On the other hand, it can be said that knowledge networks have become an effective tool to facilitate knowledge sharing in a wide range of organizational knowledge management.[11,12] This view is also supported by Wenger,[13] who argues that knowledge networks are the cornerstone of knowledge management and are a place where people can interact and share knowledge effectively. However, knowledge sharing in organizations is challenging, since transferring and transference and sharing of tacit knowledge is usually voluntary and cannot be forced.[14] Organizations can manage knowledge resources more effectively only if individuals are willing to share their knowledge. In other words, it is more challenging to convince people to share their knowledge to the organization, since knowledge is generally perceived as power and is private in nature. As a result, people are more likely to be reluctant to share their knowledge (power) with others, because they may lose their values and competitive advantage.[1] Zboralski[15] also studied the role of network members' motivation to share knowledge and found that due to a lack of trust, cohesion, and positive communication less motivated individuals are willing to exchange their knowledge. Although motivating members to voluntarily share their knowledge is a challenge in sustaining knowledge networks, and the vital challenge is encouraging members to continue knowledge sharing in the network.[16] However, in knowledge networks, knowledge is shared asymmetrically between a minority of contributors and the majority of recipients.[17] For example, typically few people share knowledge, and many people use that knowledge. Since the two behaviors of sharing and seeking knowledge must happen together to ensure the expected benefits of knowledge networks, it is necessary to investigate the factors influencing these behaviors simultaneously in the research field.[1,18] So far, some studies have been conducted on factors that may influence knowledge sharing behavior in the organizations.[19] But it seems, the collection and classification of these factors, which may suggest practical concepts for researchers and practitioners, have not been considered in the literature. Therefore, this study is an attempt to fill this research gap.

The purpose of this paper is to identify the factors that can affect the level of knowledge sharing and exchange between academic and scientific specialists in knowledge networks and Communities of Practice (COP). Since the underlying concept of CoPs and knowledge networks are well differentiated in the literature, the search terms and databases in this study were selected to include both concepts in the results. In addition, this review includes networks and CoPs that occur within an organization and networks As well as CoPs that link people across organizations.

Materials and Methods

Search strategy and database
According to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement,[20] we systematically identified all potentially relevant articles From April 2022 to August 2022 through four electronic databases: Scopus, Web of Science, PubMed, and ProQuest. Google Scholar search was conducted to complete the search and ensure the tracking of the gray literature. Also, relevant sources, references, and reference lists of the related articles were reviewed. The PRISMA flow chart and report of the study selection process are presented in Figure 1.

Search process
The search strategy used in the database from April 2022 until August 2022 was as follows:
1. "Knowledge network" OR "Research network" OR "Knowledge exchange" OR "Information exchange network" OR "Exchange of information" OR "Exchange of knowledge" OR "Knowledge share" OR "Information share" OR "Knowledge transfer" OR "Information transfer"
2. "Community of interest" OR "Network of practice" OR "Community of practice" OR "CoPs"
3. 1 AND 2.

Eligibility criteria
The following inclusion criteria were considered in this review:
1. Original Articles
2. Gray literatures
3. Papers in English and Persian languages
4. Reporting knowledge networks and COPs
5. Published until Aug 2022
6. Availability of the article full text.

Screening process and data extraction
Titles and abstracts were double-screened against the inclusion and exclusion criteria. Full-text articles, which met the inclusion criteria, based on the title and abstract, were assessed by two research team members independently. Any discrepancies between researchers' opinions were resolved through discussion and consensus so that if the agreement was not reached
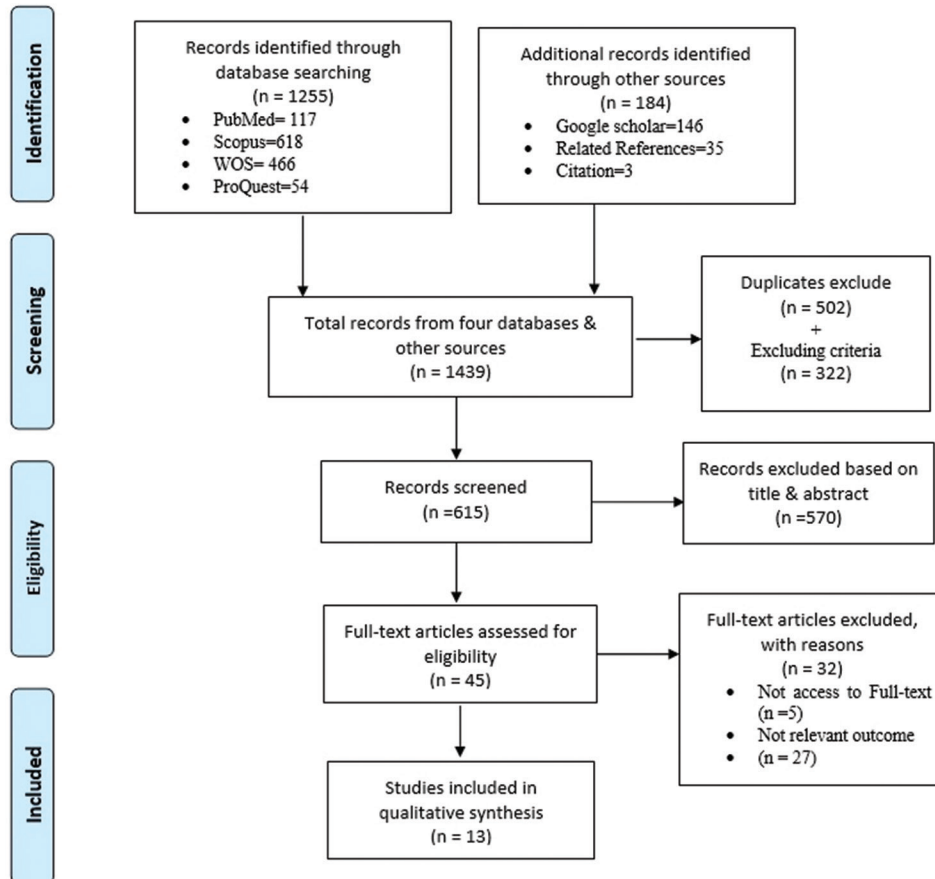
Figure 1: PRISMA flow diagram and study selection

during the initial discussion, a review by a third researcher was included in the process.

The following data were extracted and summarized from the selected studies: Dimensions and components of knowledge networks and CoPs (including purposes, membership level, and type of interaction), study design, data collection method, participants, study results, and bibliographic information. Content analysis was used to review the articles. For this purpose, the articles were first read once to obtain an overall idea of how the effects of knowledge sharing in knowledge networks were described in the articles. After reading and re-reading the content for several times, preliminary themes emerged. After data clustering and thematization, the sub-themes and main themes were identified.

Quality assessment
In this review, two quantitative and qualitative study evaluation checklist tools of Joanna Briggs Institute (JBI) were used.[21,22] Detailed information on criteria and quality assessment of studies are provided in the Appendix [Tables A1 and A2]. For studies that used mixed methods, both checklists were completed. For each question, the articles were given a score of 0-1 based on the article's compliance with the requirements. This way, articles with a score of less than six were considered inappropriate and removed from the eligibility set.

Results

Characteristics of the included studies
In the initial search of the target databases and Google search engine, 1439 related articles were retrieved. After removing 502 duplicates and applying the inclusion and exclusion criteria, the number of articles was reduced to 615. Of these, the researchers selected 45 records after two stages of screening (title and abstract) to assess the content to be checked for eligibility. Afterwards, out of the remained 45 records, five articles were excluded due to the lack of access to the full texts, and 27 articles excluded due to ineligibility. Finally, 13 articles remained for data collection and content analysis. To retrieve more relevant documents, we reviewed the reference lists of the mentioned 13 articles, and the articles that cited them. Three articles were identified which were also removed due to non-compliance with the entry and eligibility criteria. Finally, the same 13 articles remained in the study, which were analyzed. Figure 1 shows an overview of the search process and study selection.

The main features of the 13 selected articles included in the study are described in Table 1. According to this table, in terms of the subject area of the articles, two studies separately dealt with CoP and the influential factors in its formation in the field of health.[4,23] Four studies focused on modeling knowledge networks in industrial and specialized organizations,[24-27] and three studies focused on technology and software development with knowledge networks.[24,28,29] The rest of the papers were related to areas such as inter-university research partnership,[19] collective education and learning,[30] interdisciplinary and transdisciplinary studies,[31] the typology of different types of knowledge sharing and exchange networks in international organizations,[32] and the mechanisms of creating inter-organizational knowledge sharing communication.[3]

The goal of all reviewed studies was to influence, improve or support the performance of CoPs and knowledge networks in knowledge exchange between members (intra-organizational and inter-organizational). Geographically, one study supported knowledge sharing in an international CoP (Italy, Finland, Norway, France, and the Netherlands), while the remaining studies focused on CoP and national and regional knowledge networks in Canada (n = 3), Iran (n = 3), the United States of America (n = 3), Sweden (n = 1), China (n = 1) and Saudi Arabia (n = 1). The highest frequency of the published articles was related to the years 2019 (n = 4) and 2017 (n = 2), respectively.

Out of the 13 articles, six studies considered CoPs and knowledge networks to be applied in line with each other and CoPs as a foundation and as one of the success dimensions of knowledge exchange networks.[19,23,24,28,30,33] In terms of the methodology of the reviewed articles, qualitative studies (n = 7), quantitative-experimental studies (n = 1), and mixed methods (qualitative-quantitative) (n = 5) articles were classified. Qualitative studies often used interviews or debate as well as an evaluation checklist, and quantitative studies mainly used a questionnaire to get feedback on factors affecting the functioning of knowledge networks.

Factors affecting knowledge networks
In this study, we identified the influential factors affecting knowledge sharing in knowledge networks and CoPs from the reviewed literature and categorized them into three groups of individuals, organizational and structural factors [Table 2].

Individual factors are related to individual culture of network members, such as trust, enthusiasm, and commitment to teamwork, sharing of specialized findings, learning, and individual skills that can affect knowledge sharing behavior in CoPs and knowledge networks. Mutual trust and commitment are among the factors that create a cooperative atmosphere among network members. To provide relationships based on trust and mutual recognition and active participation of people, it is necessary to spend appropriate time. Scheduling is essential for participation in sharing and collaboration activities, so people must be able to adapt to their daily schedule. In such a collaborative environment, people have frequent opportunities to interact and share knowledge to create their professional identity. Time limitation and lack of trust between participants can lead to a lack of interaction and less activity in knowledge networks.[19,24] Eagerness to exchange knowledge, understanding different views and experiences, eagerness for teamwork and continuous effort to apply effective and ethical methods are among the factors that facilitate the success of knowledge sharing in knowledge networks. On the other hand, concerns and uncertainties related to the financial budget and environmental instability limit the activity of knowledge sharing in knowledge networks.

In this study, organizational factors as the main elements of structured knowledge networks formation are related to strategic leadership, policy-making, organizational culture, network management, and items that coordinate the processes of development and innovation and sharing of organization resources. If these factors are implemented effectively, they can create inter-organizational trust among network members and facilitate knowledge sharing and transfer. In fact, development of management processes has the greatest impact on the successful formation of knowledge networks among members.[33]

Finally, structural factors include the structural facilities of networks in the organization, network size, geographic density of network members, information technology facilities, and knowledge brokers that might be effective communication channels in knowledge networks. In fact, for effective knowledge management in organizations, it is necessary to develop a set of knowledge management competencies, which in turn positively affect the performance of knowledge networks, including the implementation of appropriate information technology systems[24]. Although online interaction is an adaptation strategy, everyone agrees that nothing replaces face-to-face interactions, however, well-designed technological networks positively affect teaching and learning processes to educate members.[30,31]

Discussion

This article was a systematic literature review of knowledge networks and their types, including CoPs, which was conducted to identify factors

Table 1: Overview of the studies included

Author/year/country	Research design and Method	Participants and study context	Purpose	Dimensions and components of the knowledge network	Perceived outcomes of knowledge network
Ngai *et al*./2008/ China [24]	Qualitative – case Study. Qualitative analysis	16 in-depth and systematic interviews with senior managers and executives of high-tech companies	Presenting an integrated conceptual model based on knowledge theory and inter-organizational KM network theory and CoPs development	Two dimensions of inter-organizational cooperation for the implementation of knowledge management include: 1- Network embedding 2- Intensity of interaction between members	1-Mutual trust and commitment should be established within the network as soon as possible 2- Developing a series of KM capabilities, which in turn will positively affect CoPs performance, including setting up appropriate IT systems
Verburg and Andriessen/ 2011/Netherlands[32]	Quantitative The analysis was experimental	38 knowledge networks, in 23 organizations in five countries, by scoring a set of knowledge network characteristics for analysis	The aim was to collect and analyze various knowledge networks from different organizations in terms of characteristics of the networks	Two dimensions for knowledge networks: 1- The organizational dimension that deals with the development of the organization 2- The dimension of interaction between members to gain trust and cooperation. The first dimension includes five characteristics, including organizational orientation. The second dimension includes four features: including agent interaction	1- Four basic types of knowledge networks: strategic networks, informal networks, question and answer networks and online strategic networks. 2- High score in face-to-face communication as the primary mode of interaction in the network
Tremblay and Psyché/2012/ Canada[19]	Qualitative- Action Research. Thematic analysis	Collaborative scenarios, debates and semi-structured interviews of 23 members of the network based on research partnerships between universities	The aim is to identify factors that can explain the degree of knowledge sharing in a CoP	1- spending enough time, 2-Development of trust 3-Obligation between members 4-Leadership development toward a common goa	1- In order to create trust-based relationships, it is necessary to spend time to get to know each other and actively participate. 2- Time limitation and lack of confidence of participants and lack of leadership can lead to less activity of communities
Ali Alkhuraiji *et al*./2016/Saudi Arabia (2016)[29]	Qualitative – case Study. Thematic and comparative analysis	34 in-depth semi-structured interviews from seven companies including leading international companies and local companies (software and hardware) and public organizations in IT projects.	This study, using actor network theory (ANT), describes the structure of knowledge networks, the consequences of their creation and key factors on their construction.	Three factors: organizational strategy, organizational culture, and organizational capacity (such as IT) on the structure of knowledge networks and three main factors: external factors, knowledge broker and knowledge management infrastructure affect knowledge channels.	The results show that organizational factors play an important role in the implementation of structured knowledge networks.

Table 1: Contd...

Author/year/country	Research design and Method	Participants and study context	Purpose	Dimensions and components of the knowledge network	Perceived outcomes of knowledge network
Šmite *et al.* /2017/ Sweden[28]	Qualitative – case Study. Network analysis and thematic analysis	61 individual interviews of members of two large software companies, including several mature and new project teams and company representatives	Examining the role of collective capital and social capacities in terms of knowledge networks	1- Team work, 2- Individual skills, 3- Network size 4-Experience of participating in Cop 5- Transfer of employees, 6- Allocation of duties	1-Factors affecting the size of the network (Experience participating in COP, employee transfer, assignment of tasks) 2- Factors affecting network behavior (familiar and less complex tasks, coordination of experts, information storage).
Wanberg, *et al.* /2017/ USA[33]	Mix method (Quantitative-Qualitative). Thematic analysis	77 semi-structured telephone interviews on communication among members of three intra-organizational CoPs located in two multinational engineering and construction companies.	How do professionals initiate knowledge sharing communications in geographically and organizationally dispersed CoPs?	Four effective communication mechanisms include: 1- Organizational control, 2- Organizational opportunity, 3- Social network works and 4-non-person-oriented search	1- Communication mechanisms are a combination of social and organizational structures that reinforce the need for the creation and management of CoPs in organizations. 2- managerial control in CoPs is still an important mechanism to facilitate knowledge sharing communication in distributed CoPs.
Watkins, *et al.* /2018/ USA[31]	Qualitative – case Study. Qualitative content analysis	An exploratory survey with forest and livelihood stakeholders. Interviews semi-structured telephone with 180 people: researchers, practitioners, policymakers and other	The goal is the design and participation in a Forests and Livelihoods Cop to generate new and beneficial outcomes for stakeholders	The main dimensions of creating COP: 1- common goal, 2- effective and diverse leadership, 3- face-to-face participation 4- collective identity 5- Sufficient time to build trust between members, especially in face-to-face interactions 6- Provision and support of financial resources.	1- Face-to-face interactions, ongoing sponsorship, and regular communication are key to building trust among members 2- Although online interaction is a compliance strategy, nothing replaces face-to-face interactions 3-Sustainable financial support is a challenge 4-Evidence shows that flexibility, sustainable communication, and trust are critical to COP success

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Author/year/country	Research design and Method	Participants and study context	Purpose	Dimensions and components of the knowledge network	Perceived outcomes of knowledge network
Gholamhosseinzadeh, and Riahinia,/2019/Iran[25]	Mix method (Quantitative-Qualitative). Thematic analysis	A structured interview of 9 senior managers and 226 questionnaires of research managers of oil research institute.	Designing the research network model of the oil research institute	9 dimensions of knowledge network (strategic dimension, structure, background, environmental factors, sharing culture, knowledge, content, knowledge network, infrastructure, motivation and mission) were identified.	The multidimensional nature of the knowledge network of the oil industry research institute has led to successful knowledge management in the research institute
Trust and Horrocks/2019/USA[30]	Qualitative. Thematic analysis	In-depth semi-structured interview of 26 trainers and teachers' members of discovery learning network who had teaching experience	This study sought to investigate a unique composite COP to identify the factors influencing the formation of COP in the educational environment	Six factors: 1-Leadership roles, 2-personal learning, 3- Guiding principles, 4- Organizational support, 5- Learning and 6- Collective goal	Well-designed COPs can positively impact teaching and learning and shape the use of technology in classrooms.
Rezaeian *et al.* /2019/Iran[27]	Mix method (Quantitative-Qualitative). Qualitative and thematic content analysis	16 semi-structured interviews and 25 questionnaires from experts in automotive engineering fields	Modeling factors affecting knowledge networks in knowledge-based companies (automotive company)	Eight components in the form of five concepts. These concepts include: environmental factors, knowledge content, cultural factors, information technology systems and networks, organizational structure	The development of management processes has the greatest impact on the formation of knowledge networks
Alary Gauvreau, *et al.*/2019/Canada[4]	Mix method (Quantitative-Qualitative). Thematic analysis	Interview with 13 speech-language pathologists (men and women) who have at least 6 months of experience in aphasia rehabilitation and finally	Description of components and evaluation of a CoP for speech-language pathologists in aphasia rehabilitation	Four effective factors They were: 1- the time available to perform the activity, 2- the level of interaction and cooperation between the participants, 3- the format of the activity 4- Activity content	1-Participants had frequent opportunities to interact, share and create clinical tools that can build their professional identity 2- Evidence shows that individual offline CoP activities can be as effective as interactive activities
Mashhadi Hajiali *et al.*/ 2020/Iran[26]	Mix method (Quantitative-Qualitative). Qualitative and thematic analysis	Inductive-exploratory approach 15 in-depth and semi-structured interviews and three questionnaires, from members of the Defense Industries Research Center	Designing an effective scientific cooperation network model in Iran's defense research center	Nine main categories (network performance, network structure, network process, network performance, network members, cooperation issues, collaborative environment the motivation of network managers, and motivation of network colleagues) and 25 subcategories	The extracted model has examined various parts of the network with a more comprehensive view than the rest of the studies

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Author/year/country	Research design and Method	Participants and study context	Purpose	Dimensions and components of the knowledge network	Perceived outcomes of knowledge network
Shaheen, *et al.*/2021/Canada[23]	Mix method (Quantitative-Qualitative). Qualitative and thematic analysis	17 semi-structured interviews of 30-60 minutes with CoP members who are stakeholders in geriatric health. 21 observations and field notes on activities and 55 documents prepared and used by CoP members.	A secondary qualitative analysis of ethnographic data is the results of a study to explore the cultural factors of two CoPs related to the elderly health knowledge network.	1-Effective communication between members 2- desire, hope, 3-commitment and sacrifice, 4- Cohesive social environment, 5- Self organized and independent institutions, 6- Collective thinking	1- Cultural factors that facilitate CoP efforts include hope, understanding of diverse perspectives and experiences, enthusiasm for a team environment, and continuous striving for effective practices and work ethics 2-Cultural factors that limited CoP success, concerns and uncertainties related to funding and environmental instability

Table 2: Three main categories of factors affecting knowledge networks

Category factors affecting knowledge networks		References
individual factors	-Commitment and trust between members	Ngai *et al.*, 2008[24]
	-Teamwork	Tremblay and Psyché, 2012[19]
	-Individual skills	Šmite *et al.*, 2017[28]
	-Face-to-face communication	Watkins *et al.*, 2018[31]
	-Experience of participating in Specialized projects	Trust and Horrocks, 2019[30]
	-Personal learning	Alary Gauvreau *et al.* 2019[4]
	-Enough time to create effective interaction	Shaheen *et al.*, 2021[23]
	-Interest in participation and continued collaboration	
	-Experience, education, and previous knowledge	
	-Endogenous emotional factors such as individual ego	
Organizational factors	-Financial and organizational support,	Verburg and Andriessen, 2011[32]
	-Cooperative work culture	Alkhuraiji *et al.*, 2016[29]
	-Procedures and standards	Wanberg *et al.*, 2017[33]
	-Leadership	Gholamhosseinzadeh and Riahinia 2019[25]
	-Common goals	Rezaeian *et al.*, 2019[27]
	-Common interests	Trust and Horrocks, 2019[30]
	-Variety of work and expertise	Mashhadi Hajiali *et al.*, 2020.[26]
	-Variety of resource	
	-Allocation of resource	
	-Various organizational affiliations	
	-Time commitments	
Structural factors	-The size of the network	Ngai *et al.*, 2008[24]
	-The geographical dispersion of network members	Verburg and Andriessen, 2011[32]
	-Knowledge brokers	Alkhuraiji *et al.*, 2016[29]
	-The Technological infrastructure such as IT	Gholamhosseinzadeh and Riahinia 2019[25]
	-Innovative tools and technologies, interactive web, social network	Rezaeian *et al.*, 2019[27]
		Trust and Horrocks, 2019[30]
		Alary Gauvreau *et al.* 2019[4]
		Mashhadi Hajiali *et al.*, 2020[26]

affecting knowledge sharing and exchange in various organizational and academic aspects among scientific specialists.

The present study showed that the factors affecting knowledge sharing in knowledge networks and CoPs could be classified into three organizational, individual,

and structural groups, which are consistent with the results of the previous studies.[6,34] In addition, the results of this study indicate that one of the significant challenges of knowledge networks is to encourage the willingness of members to participate in knowledge sharing practices, which is in line with previous studies.[3,35] This study also determined that several factors affect knowledge sharing in a cooperative environment, such as CoPs and knowledge networks. Still, the most influential factor is the creation of trust among members. Trust plays a vital role in successful social interactions for publishing and sharing content in knowledge networks.[12,34]

Sensuse's[36] study showed that positive interaction between members of knowledge networks could increase trust. It is believed that trust has the greatest impact on knowledge sharing and can improve knowledge sharing performance. In addition, it can increase the closeness of relationships and thus scientific cooperation within a team and reduce possible conflicts that can hinder the achievement of the organizational goals. Therefore, the present study identified that trust is crucial in a collaborative environment.

Face-to-face communication is also one of the factors that affect the amount and intensity of communication among members and can ultimately affect the sharing and exchange of knowledge in networks and CoPs.[23,31,32] Some studies have indicated that effective social interaction is as important as professional learning for sharing and exchanging knowledge among people in a network. Mutual interactions in the form of verbal conversations or body language among network members can help develop and create knowledge. Lack of this social interaction leads to the loss of direct human communication and as a result, the reduction of transmission and sharing of hidden knowledge among members.[4,23] Another effective factor in this category is the experience of participating in specialized projects and the previous knowledge. In this regard, surveys pointed out that the presence of experienced people in specialized fields in knowledge networks is highly valuable, in fact, the knowledge and skills of these people are precious experiences that have been gained over years. Therefore, network members, especially young members, can benefit more from them.[4,23,28]

Another effective component from the category of individual factors is sufficient time for effective interaction. The results showed that timing is important for participation in team sharing and collaborative activities, because it is necessary to spend the right time to build relationships based on trust and mutual recognition and active participation of people.[4] Time limitation and as a result lack of trust between participants can lead to decreased activity of knowledge networks.[19] On the other hand, knowledge sharing requires a proper environment for knowledge sharing culture, which should be encouraged in the organizations as the results show, a certain level of trust is necessary for knowledge sharing, but it is not desirable to invest all efforts to reach a 100% trust level, because sometimes increasing trust will not lead to fully effective knowledge sharing, and there is a risk of blind trust.[37]

In addition to individual factors such as trust, this study showed that organizational benefits and incentives are important organizational factors that could widely affect knowledge sharing. Hernaus[38] stated that reward is one factor that affects knowledge sharing and cooperation among scientific specialists. Jeon and Lee's[3] study on knowledge networks has identified three main motivations for network members including anticipated benefits and rewards, moral obligation, and reliable altruistic behavior that is in line with the results of the present study.

Connelly *et al*.[39] also showed that members of CoPs and knowledge networks seek possible rewards for performing network activities. Hence, if knowledge is related to the interests of knowledge holders, their expectation of competitive advantage is likely to prevent knowledge sharing. On the other hand, in organizations, people expect to receive external incentives (such as salary increase, bonus, promotion, and job security) in exchange for knowledge sharing. In other words, organizations have provided reward systems to encourage people to share knowledge. In this regard, the willingness of members to share knowledge in knowledge networks will be affected by interpersonal competition. As a result, an organizational atmosphere that emphasizes individual competition may hinder knowledge sharing among individuals. In contrast, a cooperative environment may promote knowledge exchange among individuals by creating trust, which is necessary for knowledge sharing.[40-42] In addition, members of scientific knowledge networks have specific needs and motivations related to different knowledge sharing behaviors.[43] If incentives are designed within networks appropriately, they can influence knowledge sharing behavior among members and be used in the short and long term. When the motivations and goals of a scientific network are balanced, the sharing and exchange of knowledge between academic members also increase.[34]

The next influential factor in this category is culture. In knowledge-based organizations that lack attractive organizational culture to encourage knowledge sharing and exchange, members will not be willing to exchange knowledge in knowledge networks. Therefore, reforming and institutionalizing the culture of knowledge sharing

and exchange, creating a space to transform knowledge sharing into valuable behavior in the organization, and spreading the culture of teamwork and collaborative learning will be effective in the formation of successful knowledge networks.[23,25,27,29]

Another important and effective organizational factor includes procedures and standards. In this regard, studies show that rules, standardization, and certain criteria are effective in sharing knowledge and creating specialized networks.[25,29,30,32] Another effective subset of organizational factors is management and leadership. In some studies, issues related to alliance and strategic leadership, and detailed policies for managing the space of knowledge sharing in knowledge networks have been proposed. Leadership and management play a key role in ensuring the success of sharing and exchanging knowledge and creating knowledge networks.[19,30,31,33] Leadership is responsible for directing efforts, motivating, and sustaining people's morale to effect change and create a culture that encourages effective knowledge exchange.[19,31] Another effective factor is the variety of knowledge and expertise. In some studies, attention has been paid to the use of different knowledge sources and expertise to increase efficiency and to form more successful knowledge networks.[23,27,28-30,32] Knowledge is enhanced when it is shared with others in any organization. Also, organizations that are more effective in transferring and exchanging knowledge have shown a higher level of productivity.[23,28,32] Allocation of resources and budget was an important subcategory in this category of studies. Allocation of sufficient financial resources and financial support in the implementation, coordination, and encouragement of collaborative programs accelerates the formation of networks.[23,27,31]

The results of this research on structural factors also showed that technological infrastructures such as information and communication technology, the use of innovative tools and technologies, interactive web, and social networks can be effective in the formation of knowledge networks. It has been mentioned in the conducted surveys that for the effective management of knowledge flow in networks, it is necessary to develop a series of capabilities, which in turn will have a positive effect on the performance of knowledge networks.[24-28,30-32] Studies have shown that in terms of mechanisms and technologies used for knowledge sharing and collaboration in networks, the web, and web-based applications such as social networks are the most widely used technologies to support knowledge sharing and group collaboration.[4,31] Another important and effective structural factor is knowledge brokers. Some studies have pointed out the advantage of having knowledge brokers as the key to connecting decision-makers to knowledge sources, because they contribute to the knowledge infrastructure and the formation of strategic knowledge communication channels and facilitate the knowledge sharing process.[28,29,32]

Conclusion and Future Research

This article has important implications for scientific specialists who wish to expand knowledge sharing through knowledge networks and CoPs in organizations and universities. In other words, if knowledge-oriented organizations such as health organizations want to remain sustainable in today's competitive world, they must implement a dynamic method of social interaction and operational flexibility. Therefore, the main concern of the managers of medical organizations and universities should be to develop effective knowledge management initiatives such as the use of knowledge networks and CoPs, which help to improve knowledge sharing and exchange of ideas among academic members. This in turn can promote innovation, solve problems, and increase organizational competitiveness. The findings of this study show how CoPs and established knowledge networks can be managed in knowledge organizations and how the effect of three organizational, individual, and structural factors lead to the excellent performance of knowledge management in specialized and knowledge-oriented organizations. However, examining all organizational and non-organizational factors together is limited. In addition, further exploration is required to find important similarities and dissimilarities among factors that significantly contribute to knowledge networks and increase knowledge sharing in national and international organizations. Finally, to disclose other ways of exchanging knowledge in this field is suggested.

Conflicts of interest
There are no conflicts of interest.

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Table A1: Components of qualitative assessment

Components	Ngai et al., 2008	Tremblay and Psyché 2012	Alkhuraiji et al., 2016	Smite et al., 2017	Wanberg et al., 2017	Watkins et al., 2018	Gholamhosseinzadeh, and Riahinia, 2019	Trust and Horrocks 2019	Rezaeian et al., 2019	Alary et al. 2019	Mashhadi Hajiali et al. 2020	Shaheen et al. 2021
Is there congruity between the stated philosophical perspective and the research methodology?	*	*	*	*	*	*	*	*	*	*	*	*
Is there congruity between the research methodology and the research question or objectives?	*	*	*	*	*	*	*	*	*	*	*	*
Is there congruity between the research methodology and the methods used to collect data?	*	*	*	*	*	-	*	*	*	*	*	*
Is there congruity between the research methodology and the representation and analysis of data?	*	*	*	*	*	*	*	*	*	*	*	*
Is there congruity between the research methodology and the interpretation of results?	*	*	*	*	*	*	*	*	*	*	*	*
Is there a statement locating the researcher culturally or theoretically?	‌—	—	—	—	—	—	—	—	—	—	—	—
Is the influence of the researcher on the research, and vice- versa, addressed?	*	*	*	—	*	*	*	*	*	*	*	*
Are participants, and their voices, adequately represented?	*	*	*	*	*	*	*	*	*	*	*	*
Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	—	—	—	—	—	—	*	—	*	—	*	—
Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	*	*	*	*	*	*	*	*	*	*	*	*

Table A2: Components of quantitative assessment

components	Verburg and Andriessen, 2011	Wanberg, *et al* ;2017	Gholamhosseinzadeh, and Riahinia, 2019	Rezaeian *et al*. ,2019	Alary *et al*.2019	Mashhadi Hajiali *et al* 2020	Shaheen *et al*. 2021
Were the criteria for inclusion in the sample clearly defined?	*	*	*	*	*	*	*
Were the study subjects and the setting described in detail?	*	*	*	*	*	*	*
Was the exposure measured in a valid and reliable way?	*	*	*	*	*	*	*
Were objective, standard criteria used for measurement of the condition?	*	*	*	*	*	*	*
Were confounding factors identified?	_	_	_	_	_	_	_
Were strategies to deal with confounding factors stated?	_	_	_	_	_	_	_
Were the outcomes measured in a valid and reliable way?	*	*	*	*	*	*	*
Was appropriate statistical analysis used?	*	*	*	*	*	*	*