

The dark side of knowledge transfer: A visual analysis using VOSviewer

Yijing Wang¹, Changfeng Wang²

¹ Zhejiang Normal University, School of Economics and Management, Department of Business Administration, China, ORCID: 0000-0002-6173-9330, WYJ657083@163.com;

² Zhejiang Normal University, School of Economics and Management, Department of Business Administration, China, ORCID: 0000-0002-5236-4485, cfw@fudan.edu.cn (corresponding author).

Abstract: Building the core competitiveness and improving the innovation performance of the team is becoming increasingly important to keep pace with changing economic environments and emerging technological opportunities. However, the dark side of knowledge transfer can lead to a series of harmful consequences which will destroy the core competitiveness and creativity of the team, even will reduce the innovation performance of the team. And the literature on the dark side knowledge transfer is very fragmented and lack of coherence, leading to more needs to systematically sort through studies on the dark sides of knowledge transfer. Therefore, this paper aims at reviewing the extant knowledge transfer and its dark side research field to understand the historical roots, its temporal progression, current state and potential future in a meaningful way. Data for this study were retrieved from the Web of Science database using a systematic literature search process. The bibliometric characteristics of 926 research documents were analyzed using bibliometric and knowledge mapping analysis. Based on a visual analysis tool VOSviewer, this paper provides a comprehensive review of the dark side of the knowledge transfer research field. The authors provide a quantitative review of these studies through the use of three bibliometric techniques: general description analysis, co-word analysis, and bibliographic coupling. This paper provides an overview of the annual publication trends, most productive and impactful countries, authors, and sources. The authors present an overview of historical progression, current status, and future directions of the dark side of knowledge transfer research based on an in-depth content analysis of these knowledge maps. This is a unique endeavor to accomplish a systematic bibliometric analysis of the dark side of knowledge transfer, offering an intellectual framework which reveals the antecedents and consequences of the dark side of knowledge transfer.

Keywords: Knowledge transfer, bibliometric analysis, co-word analysis, bibliographic coupling.

JEL Classification: D83, O30.

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Introduction

Knowledge transfer, traditionally defined as the transmission of knowledge across organizational boundaries (Easterby-Smith et al., 2008), is related to firm performance in a positive way. Knowledge transfer improves innovative capabilities (Huizingh, 2011), accelerates innovation and strengthens competitive advantage (Foss et al., 2010).

Unfortunately, knowledge transfer can also have negative consequences such as knowledge loss, knowledge leakage, etc. In the process of knowledge transfer, enterprises can acquire knowledge from cooperative companies through an exchange process. Firms must also share some of their own knowledge in order to jointly identify, acquire, and assimilate knowledge with collaborating partners (Ritala et al.,

2015; Zhang & Baden-Fuller, 2010). In fact, prior research has revealed a paradox: firms can be under protective by sharing too much knowledge, thereby weakening their competitive position, or overprotective by sharing too little knowledge, thereby weakening the positive effects of knowledge transfer (Norman, 2002). As a result, how to maximize the positive effects while minimizing the negative effects in the process of knowledge transfer is a key theme to address.

The term “dark side” has been broadly used to refer to the negative dimensions of knowledge transfer, which range from unethical practices (Arain et al., 2020) to risky behaviors (Kuwahara, 2013) or detrimental outcomes (Frishammar et al., 2015; Lin et al., 2016). In this review, we define the dark side of knowledge transfer as the set of detrimental consequences of unethical or risky practices that run counter to the objectives of knowledge transfer; these damaging aspects can weaken the core competitiveness and reduce the performance of the team.

Since 2008, the dark side knowledge transfer research landscape has grown rapidly over the years, but research in this area is fragmented and lack of coherence. To address this shortcoming, this study will systematically sort through studies on the dark sides of knowledge transfer and provide an overview of promising future research opportunities. More specifically, our bibliometric analyses include an examination of annual publication trends as well as the distribution of countries and authors. In addition, we use high-frequency keyword analysis to identify research hotspots in this field, and bibliographic coupling is used to identify research themes within the field and to derive future research opportunities.

1. Methodology

The primary goal of this study is to conduct a comprehensive review of the knowledge transfer research literature in order to investigate the dark sides of knowledge transfer. We use a quantitative literature review approach that analyzes the bibliometric indicators of selected publications to structure the literature database on the dark sides of knowledge transfer. This statistical approach employs article and citation numbers, which are considered to objectively represent research productivity and impact (Zupic & Cater, 2015).

Then, to synthesize research findings, we employ a technique known as “science mapping” (Cobo et al., 2011). This method explores how disciplines, fields, specialties, and individual papers are related to one another using bibliometric methods (Zupic & Cater, 2015). The use of bibliometric analysis is increasing, providing management scholars with a valuable tool for overcoming subjective analysis in literature reviews. The primary applications of bibliometric methods are science mapping and performance analysis. These two options allow scholars to visualize and evaluate the structure and dynamic features of specific research (Morris & Veer Martens, 2008). The use of science mapping and performance analysis reduces subjectivity and bias while also improving understanding of the current and future structure of the dark side of knowledge transfer field.

1.1 Data retrieval

This section describes the study’s data retrieval process. Bibliometric data of relevant publications were retrieved from the Web of Science on 25 February, 2022. The Web of Science database has the advantage of being regarded as a comprehensive database of scholarly literature that provides consistent coverage of published documents (Norris & Oppenheim, 2007; Gaviria-Marin et al., 2019). The following search string was used for data retrieval: TS = (“knowledge hiding” or “knowledge withholding” or “knowledge loss” or “knowledge leakage” or “knowledge accumulation” or “knowledge spillover”). This search yielded 1,288 documents, including articles from 2008 to 2022. We also excluded documents published in 2022 because the first months of the year would not have produced representative numbers in the temporal analysis. Finally, the data set contained 1,246 documents. Following that, certain inclusion and exclusion criteria were used to ensure the relevance of the publications (Tranfield et al., 2003). The following inclusion and exclusion criteria were used: articles published in the English language were included; publications in Spanish, German etc. were excluded (resulted in 5 documents); papers, online publications, reviews, conference papers, and book chapters were included; editorial materials, conference abstracts, book reviews, revisions, and letters were excluded (resulted in 22 documents); publications in subject area management, business, economics, information

science, library science, and psychology were included; and subject areas such as mathematics, environmental sciences, nursing, engineering electrical electronic were excluded (resulted in 293 documents). As a result, the final data set contains 926 documents.

1.2 Data analysis

Our bibliometric analyses can be divided into three stages: the first stage is a general description of the dark side of knowledge transfer, which assists in understanding the annual publication trends, determining the distribution of countries, and identifying the main authors. The second stage is a co-word analysis which searches for connections between concepts that appear in titles, abstracts, or keywords. The third stage is bibliographic coupling, which we accomplished by visually structuring the bibliometric data with VOSviewer.

2. Results

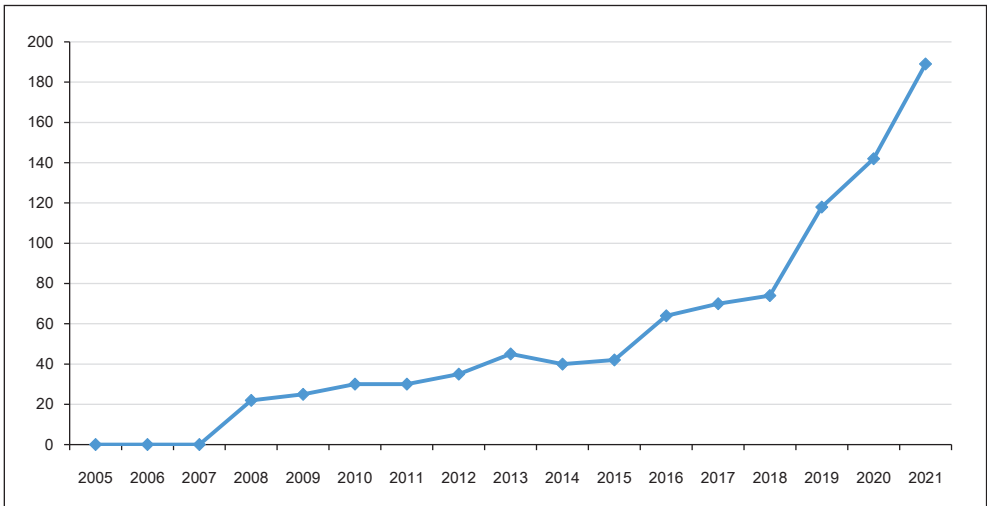
2.1 General description

Fig. 1 depicts the development of the number of publications on the dark side of knowledge transfer over time. The development can be divided into two stages. The first period, from 2008 to 2018, saw a fluctuating upward trend in the number of publications on this topic.

The first article on the subject was published in the Journal of Operations Management in 2008. The number of articles published observed a spurt during the second period, from 2018 to 2021. The annual publication trends map clearly shows that the research field is in a growth phase and that the interest in the dark side of knowledge transfer research has increased significantly in the modern scientific research environment over the last five years.

It is critical to identify the most productive nations. Tab. 1 shows that from 2008 to 2021, 233 articles were published by institutions in China, 225 articles by institutions in the United States, and 102 articles by institutions in England. Despite a large number of publications, China and the United States of America did not form close academic networks with other countries, as shown in Fig. 2. For example, Chinese researchers primarily collaborated with researchers from Sweden and Pakistan, whereas US researchers primarily collaborated with researchers from Germany. On the other hand, English researchers collaborated with researchers from other countries, such as Spain, Chile, and Wales. Italy has close ties with Australia, India, and Malaysia. Canada has close ties with Japan, South Korea and Norway. Research teams in the United

Fig. 1: Publications per year



Source: own

States and China are strong enough to conduct independent research or form cooperation systems on their own. However, globalization necessitates cooperation and examining

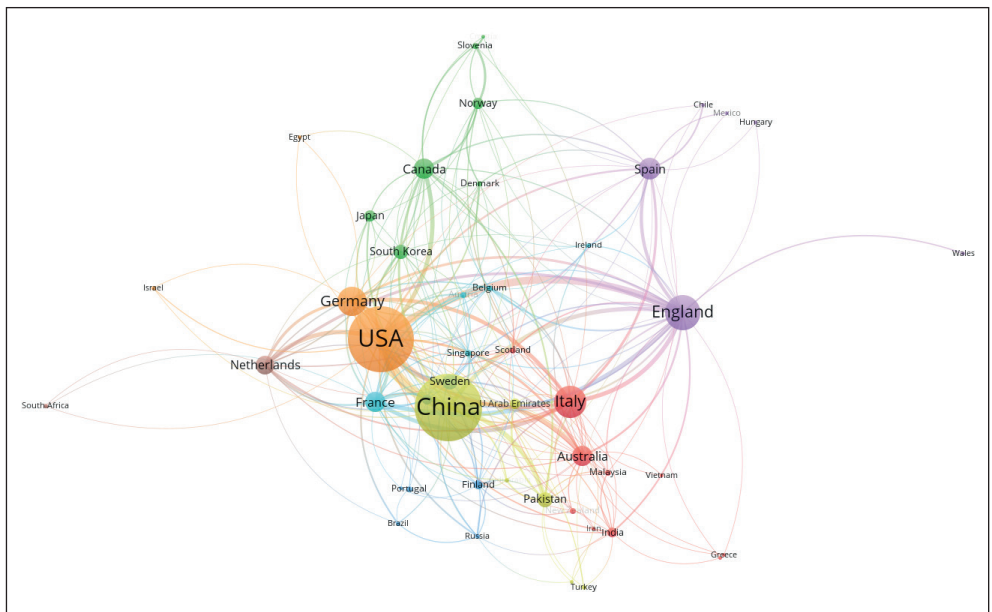
research issues from multiple angles, implying a high potential for international cooperative network development on the dark side of knowledge transfer research.

Tab. 1: Distribution of countries

Rank	Country	Documents	Citations	Total link strength
1	China	233	3,373	153
2	USA	225	9,381	217
3	England	102	3,602	152
4	Italy	91	1,890	86
5	Germany	79	3,307	75
6	Spain	54	1,372	41
7	Canada	50	2,056	53
8	Australia	50	932	55
9	France	49	824	80
10	Netherlands	46	1,307	61

Source: own

Fig. 2: Network of countries



Source: own

Following that, we attempted to understand the key scholars who are most productive in the field and their impact on the dark side of knowledge transfer research. The number of publications is represented by the node size in the author co-occurrence analysis spectrum displayed by VOSviewer, the node line represents author cooperation, and the line thickness represents the strength of cooperation. As shown in Fig. 3, prolific authors in this field are David B. Audretsch, Belitski Maksim, Cerne Matej, and others. Tab. 2 presents the details of the ten most productive authors and their various citation indexes such as total publication, citations and total link strength to provide an overview of the influential ones. These ten writers are rated according to the number of publications they have, and if there is a tie in publication counts, they are ranked according to the number of citations they have.

Dr. David B. Audretsch (21 publications; 3,253 citations) of Indiana University leads the ranking with a focus on the knowledge spillover theory of entrepreneurship (Acs et al., 2009). Dr. Belitski Maksim (13 publications, 641 citations) of Henley Business School came in second, co-authoring several of David B. Audretsch's articles and focusing on the creativity theory of knowledge spillover entrepreneurship and the role of knowledge spillovers in innovation and productivity (Audretsch & Belitski, 2013). Cerne Matej (10 publications and 771 citations) is one of the field's top three authors, primarily adding insights into knowledge

hiding in organizations and the important reasons why people hide knowledge at work (Connelly et al., 2019).

The collaborative network among authors in this field is generally loose, as illustrated in Fig. 3. However, the advancement and perfection of the academic research field are heavily reliant on researcher collaboration. As a result, author collaboration should be strengthened in the study of the dark side of knowledge transfer.

2.2 Co-word analysis

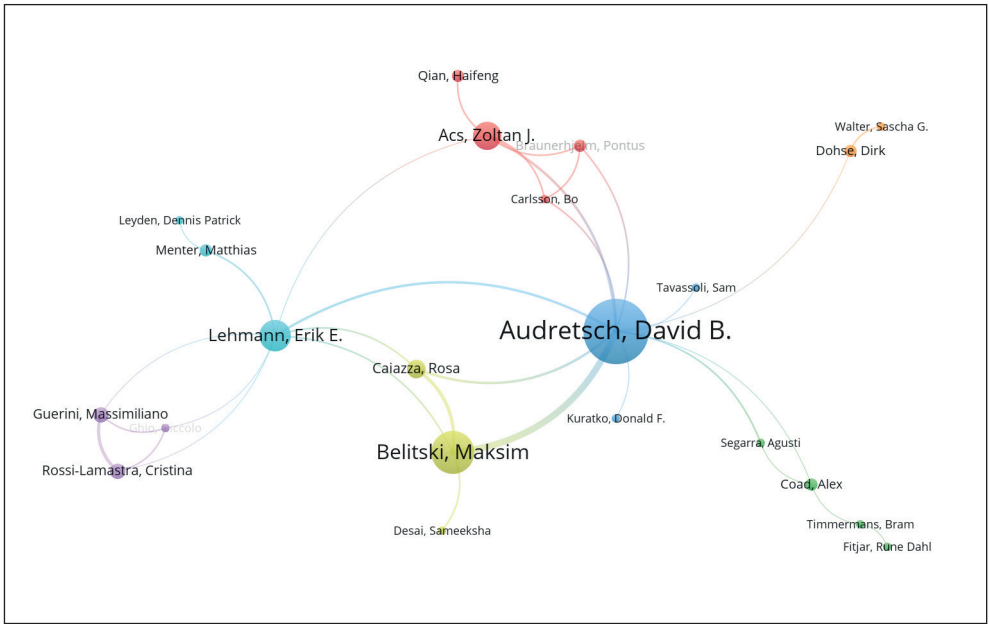
A co-word analysis was the second analysis we performed. Callon et al. (1986) proposed a co-word analysis as a bibliometric analysis technique that is effective in mapping the strength of association between concepts that co-occur in titles, abstracts, or keywords in textual data. The greater the co-occurrence frequency of two keywords, the more correlative they are (Liu et al., 2012). Furthermore, the co-word analysis assumes that a group of aggregated keywords can indicate underlying themes and that keyword co-occurrences can show the associations with the underlying themes (Hu & Yin, 2015). As a result, a cluster of keywords can be interpreted as a brief description of a research theme, and a picture of interesting research topics within the field can be drawn by studying and analyzing the co-occurrence of keywords in papers in a particular field (Ying et al., 2001). To that end, this study examines the top ten keywords based on their frequency

Tab. 2: Distribution of authors

Rank	Author	Documents	Citations	Total link strength
1	Audretsch, David B.	21	3,253	27
2	Belitski, Maksim	13	641	16
3	Cerne, Matej	10	771	17
4	Lehmann, Erik E.	9	1,161	13
5	Acs, Zoltan J.	8	2,404	10
6	Skerlavaj, Miha	7	762	17
7	Luo, Jinlian	7	303	19
8	Zhao, Hongdan	7	102	11
9	De Clercq, Dirk	6	90	9
10	Connelly, Catherine E.	5	796	11

Source: own

Fig. 3: Network of authors



Source: own

of occurrence (Tab. 3), and the keywords co-occurrence network map (Fig. 4).

The results of the frequency analysis on the data filter to 4,144 keywords are shown in Tab. 3. The frequency ranks from the first to the fifth belonged to “knowledge spillover” (297), “innovation” (257), “performance” (214), “research-and-development” (136) and “knowledge hiding” (127). Furthermore, despite the fact that the terms “company” (113), “impact” (99), and “growth” (97) are not commonly used as keywords in articles, they are included in the high-frequency keywords due to their frequency. These keywords provide us with a general understanding of the core areas of knowledge transfer and the dark side research.

Fig. 4 depicts the results as a keyword co-occurrence network. VOSviewer identified 4,144 keywords across all 926 publications. Only 165 of the 4,144 keywords met the co-occurrence threshold, indicating that these words must appear at least ten times. As can be seen, the circles on the map represent the occurrence of the keywords. In this way, the larger the circle and the label, the more

frequent the term occurs. The distance between the circles represents their relationship in terms of how frequently the keywords occur together. The terms appeared together more frequently as the circles got closer together. The thickness of the link represents the link’s strength. The color represents the co-occurrence of words clustered together (Perianesrodriguez et al., 2016). The analysis yielded five clusters, which are depicted in Fig. 4 as red, green, blue, yellow, and purple. In all five clusters (Fig. 4), there was a total of 4,758 links and a link strength of 13,551. The research topics’ main keywords are “knowledge spillover” (297 occurrences and 1,561 total link strength), “innovation” (257 occurrences and 1,510 total link strength), “performance” (214 occurrences and 1,249 total link strength), “knowledge hiding” (127 occurrences and 734 total link strength), “impact” (99 occurrences and 460 total link strength) and “absorptive-capacity” (91 occurrences and 586 total link strength). As a result, knowledge spillover, innovation, and knowledge hiding appear to be hot topics, with various research lines emerging from these core concepts.

The first cluster contained 63 items (represented in red in Fig. 4). The most prevalent concepts in terms of occurrences, links, and total link strength were “knowledge spillover,” “entrepreneurship,” “innovation,” and “research-and-development.” A substantial literature has developed around the topic of the impact of knowledge spillover on firm innovation performance. The unintentional flow of knowledge from one network party to another is referred to as knowledge spillover, and it refers to the correlation effect in which the recipient of the demand for knowledge digests and absorbs innovative knowledge to promote economic growth (Zhao et al., 2019). Nonetheless, different types and degrees of knowledge spillover may have a negative impact on the quality and performance of firm innovation. Duan et al. (2021) investigated the impact of transnational knowledge spillover on innovation quality, especially distinguished knowledge spillover from involuntary to voluntary. The main findings of the study were as follows: as unconscious transnational knowledge spillover increases, the innovation quality of high-tech manufacturing industries decreases and then increases. Conversely, as conscious transnational knowledge spillover increases, the innovation quality of high-tech manufacturing industries first rises and then falls. In other words, unconscious knowledge spillover will have a negative impact on the quality of enterprise innovation in the early stages.

Turning our attention to Cluster 2 (the green cluster in Fig. 4), this cluster contained 48 items that dealt with “absorptive capacity,” “knowledge,” “knowledge management,” “knowledge leakage,” and “knowledge loss.” Tseng et al. (2011) advanced the concept of absorptive capacity by defining it as the interactions between knowledge input and knowledge spillover. When companies began to recognize the value of knowledge in business, knowledge management began to take shape. Scholars have demonstrated in the process of knowledge management research that knowledge transfer is an important process in companies because it involves a variety of potential benefits for a firm’s innovation activities. At the same time, various factors may affect knowledge transfer, resulting in negative outcomes such as knowledge leakage and knowledge loss. Knowledge leakage and knowledge loss are related to some extent, but there are significant differences between the two. Knowledge leakage is

defined as the uncontrollable, unwanted, and even harmful flow of knowledge outside organizational borders (Ritala et al., 2015), whereas knowledge loss is defined as the intentional or unintentional evaporation of knowledge that accumulates from learning and individual and collective actions (Perrott, 2007). Prior researchers conducted literature reviews and case studies to investigate the effects of knowledge loss and leakage in organizations, and they proposed a number of negative effects of knowledge loss and leakage on organizations. According to Daghfous et al. (2013), the consequences of knowledge loss included decreased company performance, customer satisfaction and core competencies, as well as high-training costs for strategic position recruits. Furthermore, Massingham (2008) proposed that knowledge loss will result in decreased organizational output, organizational productivity, organizational memory, organizational learning, as well as disruption or termination of external knowledge flows. In addition, Sharif et al. (2021) discovered that knowledge leakage has a negative impact on organizational competitiveness. Khoza (2019) stated that knowledge leakage is the loss of knowledge, which results in the loss of an organization’s market position.

Cluster 3 (the blue cluster in Fig. 4) included 47 items centered on “performance,” “knowledge hiding,” “knowledge accumulation.” Knowledge hiding, as defined by Connelly et al. (2012), is “an intentional attempt by an individual to withhold or conceal knowledge that has been requested by another person.” Lots of scholars have also investigated the negative impact of knowledge hiding. For example, Cerne et al. (2014) discovered that information hidiers diminish their own creativity as a result of knowledge hiding. Scholars have discovered that, in addition to impeding individual creativity, knowledge hiding can impair team creativity (Bogilovic et al., 2017) and the generation of innovative ideas (Jian et al., 2019). Knowledge accumulation refers to the collective body of knowledge, know-how, and experiences accumulated over time in a sector. And knowledge accumulates through a process of diffusion and upgrading (Zhuang et al., 2011). Unlike knowledge hiding which has negative consequences, most scholars believe that knowledge accumulation can improve organizational performance and other aspects. For instance, Forés and Camisón (2016) discovered that

both knowledge accumulation capabilities and size have a positive impact on innovation performance. When we attempted to mine other effects of knowledge accumulation, we discovered that most studies used knowledge accumulation level as a threshold variable. The empirical results from Gong (2021), for example, demonstrate that as the level of knowledge accumulation crosses a certain threshold, the influence of government R&D investment on regional innovation capabilities undergoes a structural mutation, shifting from an insignificant inhibitory effect to a significant promotional effect. In conclusion, knowledge accumulation is frequently used as a threshold variable, and because knowledge accumulation ability has a positive impact on innovation performance in general, it is not classified as the dark side of knowledge transfer in this paper.

The fourth (the yellow cluster in Fig. 4) and fifth (the purple cluster in Fig. 4) clusters were the tiniest. Cluster 4 had only four items, and the dominant concepts in Cluster 4 were “impact” and “quality.” The essential notion in Cluster 5 was “empirical evidence.” Overall, the five clusters of terms and themes highlighted the dark side of knowledge transfer literature’s past, present, and future.

We discovered through co-word analysis that popular topics in the dark side of knowledge transfer research, such as “knowledge hiding” and “knowledge spillover” concepts, have

been thoroughly investigated in the field of knowledge transfer research. Notably, while important terms like “knowledge leakage” and “knowledge loss” appeared in Cluster 2 of this keywords co-occurrence network map, their frequency is low. These keywords, however, are all closely related to the dark side of knowledge transfer. The relatively lower presence of these keywords may indicate a higher potential for future development of these types of studies. As can be seen, dark side of knowledge transfer is still a developing research field that requires further investigation and discussion.

2.3 Bibliographic coupling

Finally, we used bibliographic coupling to investigate the dark side of knowledge transfer research field. Bibliographic coupling is a way of analyzing similarity that reveals how closely two articles reference one another. The most important aspect of bibliometric analysis is determining which sources are the most active. The bibliographic coupling analysis is performed using “source” as the unit of analysis to provide a graphic analysis of the bibliographic coupling of sources. A source’s minimum number of documents was set to six, and its minimum number of citations was set to zero. As a result, 30 of the 329 sources meet the criteria. The bibliographic coupling of the sources is depicted in Fig. 5, and the analysis produced two clusters, which are depicted in red and green.

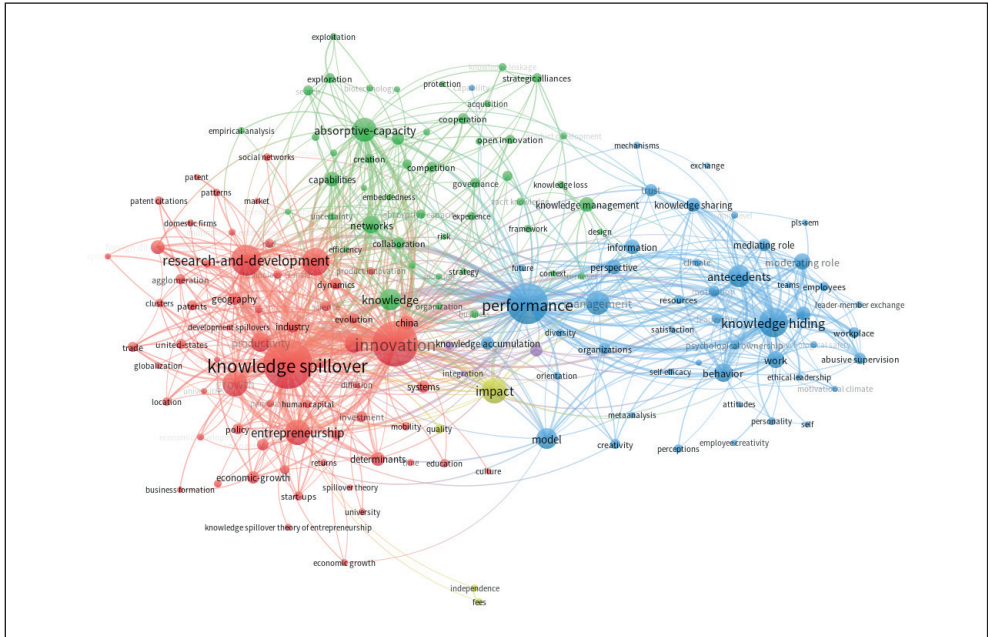
Tab. 3: Top ten keywords based on their occurrences

Rank	Keyword	Occurrences	Total link strength
1	Knowledge spillover	297	1,561
2	Innovation	257	1,510
3	Performance	214	1,249
4	Research-and-development	136	821
5	Knowledge hiding	127	734
6	Firm	113	681
7	Entrepreneurship	99	589
8	Impact	99	460
9	Growth	97	531
10	Absorptive-capacity	91	586

Source: own

Fig. 4:

Keywords co-occurrence network map



Source: own

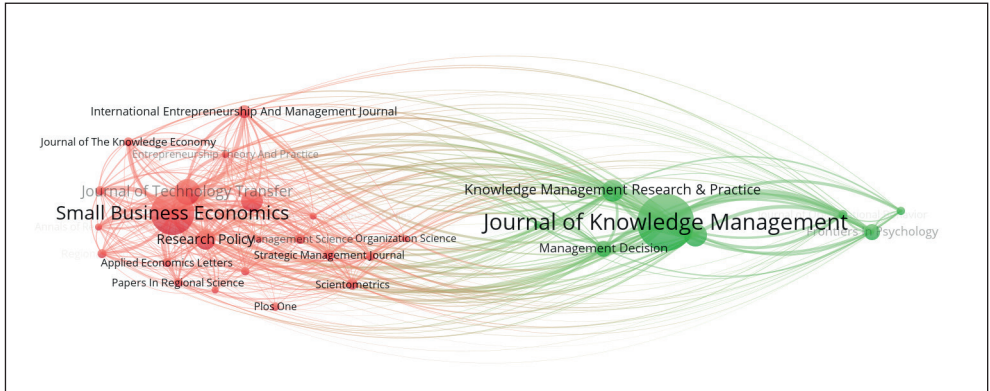
Tab. 4:

Bibliographic coupling by sources

Rank	Journal	Documents	Citations	Total link strength
1	Journal of Knowledge Management	76	2,057	23,222
2	Small Business Economics	54	3,948	23,767
3	The Journal of Technology Transfer	28	778	13,211
4	Journal of Business Research	25	653	12,511
5	Knowledge Management Research & Practice	23	122	9,813
6	Technological Forecasting and Social Change	23	435	6,131
7	Research Policy	21	942	9,555
8	Management Decision	16	316	6,639
9	Frontiers in Psychology	16	62	5,414
10	International Entrepreneurship and Management Journal	12	338	5,289

Source: own

Fig. 5: Network of the bibliographic coupling – journals



Source: own

There were 410 links and a total link strength of 67,550 in both clusters (Fig. 5). The first cluster is shown in red, and it includes twenty-two items and is dominated by Small Business Economics. The second cluster, made up of eight objects, is represented by green.

The top ten sources that published knowledge transfer research are listed in Tab. 4. According to an examination of the most influential journals, researches on the dark side of knowledge transfer have been published in journals such as economics, general business, general management, psychology, and technology management. This implies that knowledge transfer covers all aspects of the business.

3. Discussion

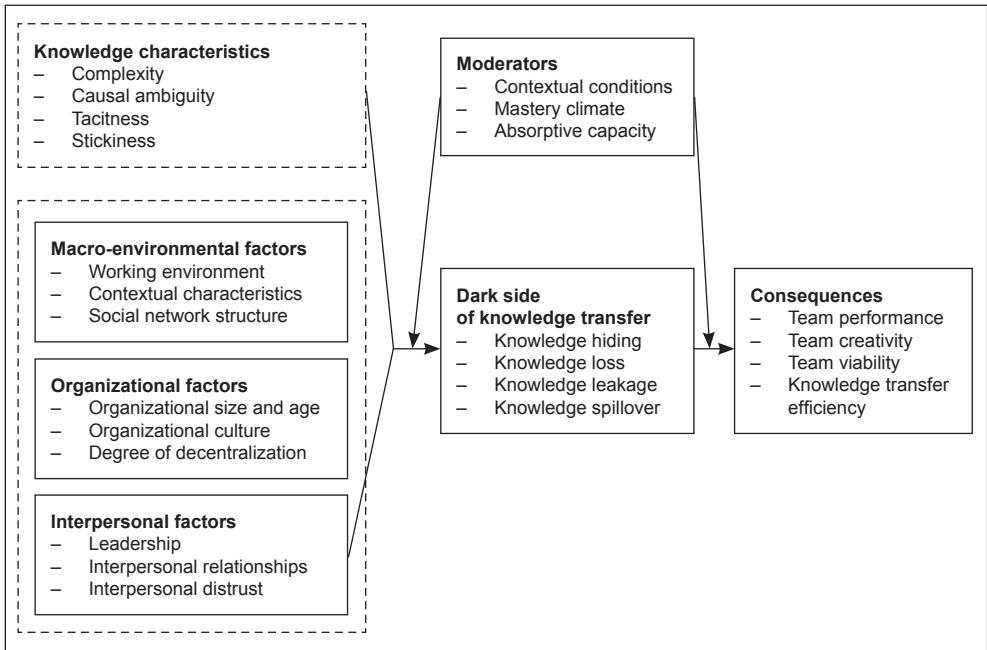
3.1 Performance of knowledge transfer and its dark side research

Using a quantitative and knowledge mapping approach, this paper reviews 14 years (2008–2021) of knowledge transfer and its dark side research with the assistance of the VOSviewer software. We examined 926 research documents in order to provide a reflection on the historical progression of this field of research, its current state and impact, and to forecast potential future research direction. This study, in particular, provides a comprehensive summary of yearly publishing patterns, contributing nations, most prolific authors and their connections, most productive journals, and most commonly appearing keywords in the dark side of knowledge transfer research.

In terms of contributing countries, authors and journals, the United States of America, China, and England, are the major driving forces of knowledge transfer and its dark side research. Dr. David B. Audretsch, Dr. Belitski Maksim, Dr. Cerne Matej, and Dr. Lehmann, Erik E. are top contributors, with Dr. David B. Audretsch being the center of one of the most important cooperative networks. The Journal of Knowledge Management and Small Business Economics was ranked first and second in the list of the most influential journals. Based on the bibliometric analyses and an in-depth content analysis of these identified clusters, four dark sides of knowledge transfer were identified within our bibliometric review: knowledge hiding, knowledge loss, knowledge leakage, and knowledge spillover. Furthermore, we rigorously synthesize the existing literature on the dark side of knowledge transfer in order to create an intellectual structure map (Fig. 6) of the antecedents and consequences found across the literature on the dark side of knowledge transfer.

We examine the dark side of knowledge transfer antecedents from four perspectives: knowledge characteristics, macro-environmental factors, organizational factors, and interpersonal factors. One of the first antecedents popular among scholars is knowledge characteristics. Ko et al. (2005) point out that the complexity of the knowledge to be transferred may influence employees' knowledge transfer behaviors. Because complex knowledge takes more time

Fig. 6: Network of the bibliographic coupling – journals



Source: own

and effort to generate, knowledge owners tend to keep the knowledge for themselves. Connelly et al. (2012) discovered that the complexity of the knowledge being requested is positively related to knowledge hiding behaviours. Furthermore, because complex knowledge consists of many interconnected parts, there is more causal ambiguity and a greater volume of information and skills to be transferred (Bhagat et al., 2002; Hatch, 2006). As a result, knowledge ambiguity impedes the process of knowledge transfer. Furthermore, a substantial number of previous studies suggest that knowledge tacitness influences the difficulties of knowledge transfer and, as a result, influences knowledge transfer performance (Simonin, 1999). Leonard and Sempster (1998) have claimed that the level of tacit knowledge influences the depth of knowledge transfer, which in turn affects group innovation and knowledge transfer efficiency. Tacit knowledge is not the same as explicit knowledge. Explicit knowledge can be edited using text, formulas, icons, and other formal symbols, whereas tacit knowledge is unstructured knowledge

that is embedded in processes and behaviors and can only be obtained through face-to-face communication between individuals, making it difficult to improve its transfer efficiency. Sticky knowledge, which is not only complex, but also tacit and systemic, creates barriers to knowledge transfer (Bhagat et al., 2002). In conclusion, the more complex, causally ambiguous, tacit, and sticky knowledge is, the more difficult it is to transfer.

What macro-environmental factors influence knowledge transfer and lead to dark sides of knowledge transfer? According to the reviewed papers, the macro-environmental factors to consider include working environment, contextual characteristics, and social network structure. According to Kang and Kim (2017), creating a working environment conducive to knowledge transfer and motivating competent employees to transfer their knowledge are critical to successful knowledge transfer. Through regression analysis, Lovin et al. (2021) discovered that working environment culture is a sufficient condition for the dark side of

knowledge transfer. As a result, it is reasonable to believe that a poor work environment will trigger the dark side of knowledge transfer. Aside from that, previous research indicates that contextual characteristics are important elements characterizing social relations on a macro scale that influence the dark side of knowledge transfer. Contextual characteristics in this study are primarily concerned with three aspects: various distances between knowledge sources and receivers, including institutional distance, geographic distance, knowledge distance and cultural distance (Jlc & Bst, 2003), the trusting relationship (Fukuyama, 1995) and common cognition (Nahapiet & Ghoshal, 1998). In general, the greater the cultural distance, geographic distance, knowledge distance and institutional distances, the more dark side of knowledge transfer will appear (Jlc & Bst, 2003; Junni, 2011). Coccia (2008) discussed spatial distance as an antecedent of knowledge transfer and concluded that when distance between the knowledge sources and receivers increases, there is a negative effect in knowledge transfer. Bhagat et al. (2002), in particular, investigated the impact of cultural distance on knowledge transfer and concluded that knowledge transfer is most efficient when partners are located in contexts with similar cultural standards. According to Ireland et al. (2002) and Inkpen and Tsang (2005), the smaller the cultural distance between the partners, the less dark side knowledge transfer it will be. Furthermore, a substantial body of evidence suggests that both trusting relationships and common cognition can improve knowledge transfer performance and decrease the dark side of it (Dhanaraj et al., 2004; Zhou et al., 2010). Furthermore, Uzzi (1997) first applied "social network" in his study on knowledge transfer, and he investigated the effect of the strength of network connection on knowledge transfer. Besides, Helmsing (2010) claimed that network stability might strengthen members' trusting relationships and commitment, resulting in long-term collaboration and lower dark side of knowledge transmission.

In terms of organizational level, a stream of research has focused on organizational factors as antecedents of the dark side of knowledge transfer. Many scholars have investigated the roles of organizational size and age, organizational culture, and degree of decentralization in the dark side of knowledge transfer. Previous research has clearly shown that organizational

size and age are positively related to organizational knowledge transfer. Larger organizations or firms may not only have more diverse knowledge resources that allow for the absorption of new knowledge (Cohen & Levinthal, 1990), but they may also have more resources to devote to knowledge transfer with smaller dark sides (Gupta & Govindarajan, 2000). On the other hand, the age of organizations may have an impact on the dark side of knowledge transfer; older units appear to have difficulty transferring knowledge within the organization. Furthermore, it has been demonstrated that organizational culture is closely related to the process of knowledge transfer (Inkpen & Tsang, 2005). According to Serenko and Bontis (2016), a positive organizational culture reduces the occurrence of knowledge hiding. In other words, a negative organizational culture can constrain knowledge transfer within an organization. Furthermore, the degree of decentralization is critical to organizational knowledge transfer. Decentralization involves moving the locus of authority and decision-making down the hierarchy and reflects the extent to which decision making is dispersed in an organization (Massingham, 2008). Prior research has mostly found a favourable association between decentralization and organizational knowledge transfer; nevertheless, a high amount of decentralization tends to have a detrimental impact on knowledge transmission within the organization. In a highly decentralized organization, too much freedom within the organization may result in improper knowledge protection, as well as a risk of knowledge leakage and knowledge loss.

On the interpersonal factor level, we discover that leadership, interpersonal relationships, and interpersonal distrust have a significant impact on the dark side of knowledge transfer. Scholars are most concerned with abusive leadership when it comes to leadership. According to Khalid et al. (2018), leaders abuse supervision due to their supervisors' supreme power and status in organizations, whereas employees react negatively to the leaders' abusive supervision, leading them to conceal knowledge. In addition, the relationship between the actors is indeed of critical nature for the effectiveness of knowledge transfer (Battistella et al., 2016). Prior research on interpersonal relationships found that interpersonal abuse and interpersonal injustice significantly increased employees' negative behaviours

during the knowledge transfer process. Abubakar et al. (2019) point out that employees who experience interpersonal injustice are less willing to share their personal knowledge assets with others. Similarly, Anand et al. (2020) found that bad interpersonal experiences such as interpersonal abuse and antagonism cause employees to hide knowledge. Prior research indicates that interpersonal distrust frequently drives employees to hide knowledge from their colleagues (Connelly et al., 2012). Furthermore, knowledge hiding among colleagues or between supervisors and subordinates can wreak havoc on workplace relationships, leading to a trust crisis (Connelly et al., 2012). Similarly, Cerne et al. (2014) found that when employees keep their information hidden, it creates a reciprocal mistrust cycle in which co-workers are reluctant to share their knowledge with them.

As demonstrated by our framework, contextual condition, mastery climate, and absorptive capacity are considered moderators of the relationships between the dark side of knowledge transfer and its antecedents and consequences. Contextual conditions, according to Wijk et al. (2008), play a moderating role in the relationships between the dark side of knowledge transfer and its antecedents and consequences. According to Cerne et al. (2017), the mastery climate modifies the relationship between knowledge hiding and innovative work behaviour. Similar findings are obtained by Bari et al. (2019), who discover that a perceived mastery climate lowers the harmful impact of knowledge hiding on team creativity. Similarly, Men et al. (2020) believe that the mastery climate moderates the relationship between ethical leadership and knowledge hiding. In addition, absorptive capacity is the major moderator in the link between knowledge hiding and team creativity, according to Fong et al. (2018). Furthermore, absorptive capacity has the potential to moderate the relationships between organizational and network characteristics, as well as organizational knowledge transfer.

We also notice four dimensions of consequences associated with the dark side of knowledge transfer: team performance, team creativity, team viability, and knowledge transfer efficiency. According to our systematic review, previous research has found that knowledge hiding has a significant negative impact on team performance (Zhang & Min, 2019), team creativity (Bari et al., 2019; Fong et al., 2018),

and team viability (Wang et al., 2019). The study by Zhang and Min (2019) found that knowledge hiding has a detrimental impact on team performance due to team learning and the dependent roles of project-based work qualities and that knowledge hiding is adversely related to team performance. According to Wang et al. (2019), the dark side of knowledge transfer in our study, particularly knowledge hiding, will harm the stability of team structure and team viability. Furthermore, it is self-evident that knowledge hiding will impair the effectiveness of knowledge transfer among partners since concealing key knowledge would obstruct the production of new ideas and may even jeopardize interpersonal trust within the business (Connelly et al., 2012), increasing the risk of knowledge loss and inhibiting the creativity of individuals and teams (Bogilovic et al., 2017; Cerne et al., 2014).

3.2 Implications and future research opportunities

This paper used bibliometric analyses to create a comprehensive overview of the most influential studies on the dark side of knowledge transfer, and researchers will gain a broader understanding of the literature on this research field. Another significant contribution of our research is a novel theoretical framework that identifies and connects the antecedents and consequences of the dark side of knowledge transfer.

Based on our findings, we identified several future research opportunities in the field of the dark side of knowledge transfer. In order to gain a more nuanced view of the dark side of knowledge transfer research, future research can extend the intellectual framework in this paper by including additional antecedents, moderators and associated consequences from relevant theories, as well as further focusing on mediators that affect the relationship between antecedents and the dark side of knowledge transfer and determine its consequences. In short, more research on the dark side of knowledge transfer is required to enrich the antecedents–dark side of knowledge transfer–consequences research path. Second, future work can consider more studies relating to knowledge transfer and its dark side, regardless of written language, to broaden the depth and scope of this study and to understand the true picture of the dark side of knowledge transfer research among scholars worldwide. Third, given the dark side of knowledge transfer,

such as knowledge leakage and knowledge loss, which can harm a firm's innovative performance and competitiveness, figuring out how to dynamically realize knowledge transfer process protection is a potential step forward in the present literature. Fourth, knowledge transfer is a multifaceted organizational behaviour that affects individuals, teams, and organizations at all levels. Future research could, therefore, diversify research designs by introducing new paradigms for the dark side of knowledge transfer research, such as multilateral, cross-level dark side of knowledge transfer studies. Finally, there is a dearth of cross-country academic collaboration, as stated in the co-authorship analysis findings and country distribution of publications. Therefore, it is necessary to encourage cross-country research that focuses on the relationship between cultural dimension, geographical dimension, institutional dimension and the dark side of knowledge transfer.

3.3 Limitations

We acknowledge that our bibliometric analyses are subject to some methodological constraints and potential limitations, but we believe that there are opportunities to expand on this research. The main limitation of the paper is most likely the required selection of documents to be analysed. Though the database chosen, Web of Science, contains the vast majority of the most important publications in this field, several articles devoted to knowledge transfer and its dark side may not be included in the Web of Science Core Collection. As a result, future research could make use of additional databases. In addition, the data set for the present paper was extracted from the Web of Science Core Collection using selected keywords. As a result, language bias may occur in the study because those keywords were in English, and some of the work that does fall within the scope of the current theme may be excluded. Although we took every precaution to include and retrieve relevant publications, the possibility of some exclusion cannot be ruled out. Finally, although being based on clusters and in-depth content analysis, our studies of keyword co-occurrence maps, bibliometric coupling maps, and other analyses may inevitably have a subjective component. Researchers with diverse knowledge bases and associations may have arrived at a different conclusion. Despite these limitations, our research broadens the understanding of knowledge transfer and its dark sides.

Conclusions

In this study, we aimed to provide an exhaustive description of the dark side of knowledge transfer research, so we used bibliometric analyses to structure the large and fragmented literature on the dark side of knowledge transfer. Furthermore, the conceptual and intellectual structure of the research field was expanded in order to comprehend its origins, historical progression, current status, and potential future research opportunities. The paper's data were obtained from Web of Science, and the bibliometric characteristics of 926 primary documents were analysed with VOSviewer. The bibliometric and knowledge mapping analysis approaches used in this paper provide a general description of the research field in terms of annual publications trends, most productive and impactful countries, authors and sources, etc. This analysis also provides the research field's intellectual framework, which reveals the antecedents and consequences of the dark side of knowledge transfer, assisting readers in comprehending the significant relationships between knowledge transfer and team performance and innovativeness. In summary, this paper paints a picture of the current characteristics of the dark side of knowledge transfer research while also meaningfully describing its potential future.

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