



VISUALIZING THE SOCIAL STRUCTURE OF ORGANIZATIONAL KNOWLEDGE LOSS (OKL): A BIBLIOMETRIC ANALYSIS

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ABSTRACT: Organizational Knowledge Loss (OKL) is a significant concern for companies as the loss of knowledge and experience can hinder progress and innovation. This study aims to understand the social structure of OKL. For this purpose, a bibliometric analysis consisting of performance and science mapping analyses was conducted. The results indicate different patterns of influence and cooperation, with Durst emerging as the most influential author. In addition, institutions such as University of Skövde, the University of Hong Kong, Northwestern Polytechnical University, Asian Centre for Organisation Development, and Southwest Jiaotong University are central to promoting cooperation between different research institutions. Understanding the dynamics of research collaboration networks and the role of individual researchers and institutions is crucial for shaping the landscape of knowledge production and dissemination. Future research should consider additional aspects, such as the conceptual and intellectual structure of OKL research. This will allow a more coherent picture to emerge.

KEY WORDS: Organizational Knowledge Loss; Bibliometric Analysis; Social Structure.

1. PURPOSE OF THE PAPER

This study attempts to gain a comprehensive understanding of the research landscape and collaborative efforts in the field of OKL by investigating the social structure of the field. The following research questions guide this study:

- *RQ1. What is the local impact of authors in the OKL field?*
- *RQ2. What patterns can be identified in research collaborations among authors in the OKL field?*
- *RQ3. What patterns can be identified in research collaborations among institutions in the OKL field?*

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2. RELATED WORK

OKL is an issue of increasing importance that has been examined extensively in recent literature because of its potentially detrimental effects on organizations (Daghfous et al., 2023; Durst and Zieba, 2019; Galan, 2023; Massingham, 2018; Zieba et al., 2022). Durst and Zieba (2019) define it as a circumstance in which “an organization loses a part or all of its crucial knowledge” (p. 8). OKL can be driven by various factors, including employee turnover, retirement, inadequate documentation, and ineffective knowledge sharing within an organization (Daghfous et al., 2023; Durst and Zieba, 2019; Galan, 2023). The implications of OKL can be severe, leading to diminished efficiency, stifled innovation, increased costs, and a loss of competitive advantage (Daghfous et al., 2023; Galan, 2023; Massingham, 2018).

3. METHODOLOGY

In this study, we conducted a bibliometric analysis, combining performance and science mapping analyses, to investigate the local impact of authors and the social structure in the OKL field. We identified articles on management and economics indexed in the Social Sciences Citation Index (SSCI) of the Web of Science (WoS) and combined them with listed articles in Scopus journals to form a dataset. We then used OpenRefine to clean the data, remove irrelevant articles, and address missing or inconsistent data (Ham, 2013). This process yielded a refined corpus of 146 articles. This final dataset included articles published between 2004 and 2023. The articles were analyzed using Biblioshiny, a powerful bibliometric software tool that facilitates the visualization and evaluation of various bibliometric indicators (Aria and Cuccurullo, 2017).

4. FINDINGS

4.1 RQ1: Authors' local impact

Table 1 assesses the authors' local impact based on their h-index, g-index, m-index, total citations, number of publications, and publication year start. The metrics show that three researchers have a high local impact. These include Durst, a researcher from the University of Skövde, Sweden, and Fawad and Naiding, researchers from Northwestern Polytechnical University, China.

Starting in 2012, Durst has an h-index of eight, signifying that at least eight of her publications have been cited at least eight times each (Hirsch, 2005, p. 16569). Her g-index of nine suggests that the top nine works have been collectively cited at least 81 times, indicating a strong influence (Egghe, 2006, p. 132). The m-index of 0.73 highlights her consistent research output, producing, on average, 0.73 highly cited works per year since the start of her career (Hirsch, 2005, p. 16571). Her work has been cited 292 times, and she has published nine papers.

Having started in 2020, Fawad made noteworthy strides with an h-index of three and a g-index of four, respectively, demonstrating that his research is gaining recognition in the scientific community. He consistently produced, on average, 1.00 highly cited works per year (m-index of 1.00), and his work has been cited 20 times in total. Fawad has four publications in his name.

Naiding, also starting in 2020, has an h-index and g-index of three, suggesting that his work is gaining traction in the academic community. His m-index of 1.00 indicates a steady output of highly cited works per year. His research has been cited 19 times, and he has published three papers. These achievements highlight the influence and productivity of Durst, Fawad, and Naiding in their respective research fields. The citations indicate that their work has had an impact and is well-regarded within the scientific community.

Table 1. Authors' Local Impact.

Element	h-index	g-index	m-index	TC	NP	PY_start
Durst S.	8	9	0.727	292	9	2012
Fawad S. S.	3	4	1.000	20	4	2020
Naiding Y.	3	3	1.000	19	3	2020
Zieba M.	3	3	0.500	101	3	2017
Sumbal M.	3	3	0.500	63	3	2017
Tsui E.	3	3	0.500	63	3	2017
Massingham P.	3	3	0.200	167	3	2008
Ibrahim R.	3	3	0.188	57	3	2007
Bruns G.	2	2	0.333	18	2	2017
Casey A.	2	2	0.250	43	2	2015

Note: TC = Total citations, NP = Number of publications, PY_start = Publication year start.

4.2 RQ2: Network visualization of author collaboration

Figure 1 shows a scientific map of author collaboration divided into ten clusters. It can be observed that the individual nodes vary in size. Thus, large nodes are observed in the blue, red, and brown clusters, indicating a high collaboration density.

The blue cluster includes such distinguished researchers as Durst, Zieba from Gdansk University of Technology (Poland), Bruns from University of Iceland (Iceland), Wilhelm from University of Liechtenstein (Liechtenstein), and Ali from King Abdulaziz University (South Arabia).

The red cluster encompasses respected authors, such as Sumbal, Tsui, and See-to from the Hong Kong Polytechnic University (China), Shujahat from the University of Hong Kong (China), and Ali from National University of Sciences and Technology (NUST, Pakistan).

Finally, the brown cluster houses distinguished authors Fawad and Naiding on the one hand, and on the other hand, Rehman from Asian Centre for Organization Development (Pakistan) as Kanwal from Southwest Jiaotong University (China).

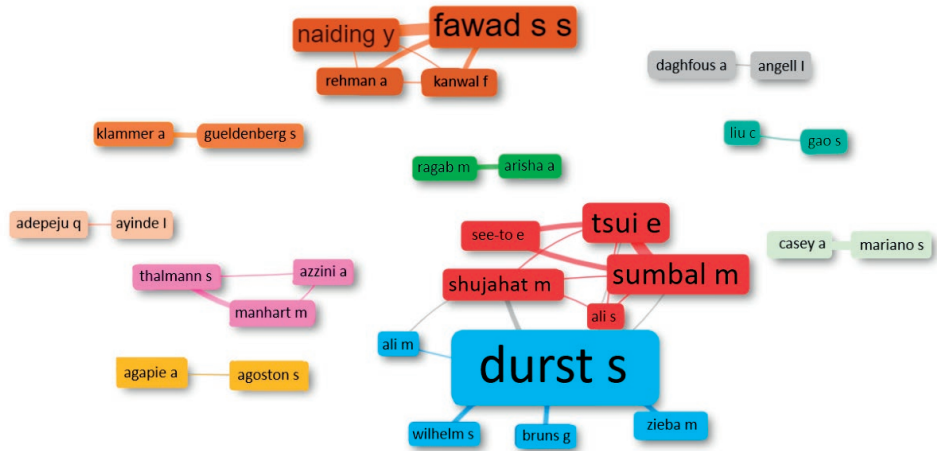


Figure 1. Network Visualization of Author Collaboration.

Table 2. provides an analytical snapshot of author collaboration dynamics in the OKL field using network metrics, such as betweenness centrality, closeness centrality, and PageRank.

Betweenness centrality represents a metric that emphasizes a node’s capacity to act as an information intermediary among distinct clusters of nodes. An augmented value suggests that an author is pivotal in interconnecting researchers from disparate groups (Donthu et al., 2021, p. 290). Durst stands out with the highest betweenness centrality score of 23, while Sumbal and Tsui also make considerable contributions, both holding a score of 3.5.

Closeness Centrality is an indicator that gauges the adjacency of a specific node in relation to other nodes within the network, with superior scores suggesting an author’s proficiency in effectively propagating knowledge to other authors in the network (Donthu et al., 2021, p. 291). In a remarkable collaboration display, Fawad, Naiding, Kanwal, and Rehman all share the maximum closeness score (0.33).

Finally, PageRank analysis can identify the prestige of publications within a network based on highly cited publications (Donthu et al., 2021, p. 291). A higher score suggests a more significant influence within the network, with Durst securing the top spot with a PageRank score of 0.08, closely followed by Sumbal and Tsui, each with a score of 0.05.

Table 2. Network Metrics for Author Collaboration in the OKL Field.

Node	Cluster	Betweenness	Closeness	PageRank
Durst S.	Blue	23	0.100	0.078
Ali M.	Blue	0	0.059	0.016
Zieba M.	Blue	0	0.056	0.016
Bruns G.	Blue	0	0.056	0.016
Wilhelm S.	Blue	0	0.056	0.016
Sumbal M.	Red	3.5	0.077	0.046
Tsui E.	Red	3.5	0.077	0.046
Shujahat M.	Red	2	0.077	0.038
Ali S.	Red	0	0.071	0.026
See-To E.	Red	0	0.050	0.025
Fawad S. S.	Brown	0	0.333	0.044
Naiding Y.	Brown	0	0.333	0.032
Kanwal F.	Brown	0	0.333	0.027
Rehman A.	Brown	0	0.333	0.027

4.3 RQ3: Network visualization of institution collaboration

Figure 2 shows a visual representation of institutional cooperation in seven clusters. To the node’s size, the two most collaborative clusters are red and purple.

The red cluster encompasses institutions such as University of Skövde (Sweden), Gdansk University of Technology (Poland), the University of Hong Kong (China), University of Iceland (Iceland), National University of Sciences and Technology (NUST, Pakistan), and Tallinn University of Technology (Estonia).

In the purple cluster, Northwestern Polytechnical University (China), Asian Centre for Organization Development (Pakistan), and Southwest Jiaotong University (China) have found collaborative niches. The other clusters, including the blue cluster, exhibit collaboration between fewer institutions.

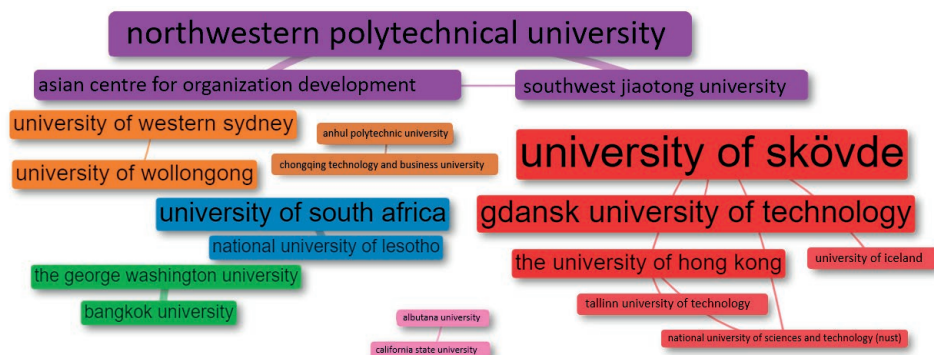


Figure 2. Network Visualization of Institution Collaboration.

Table 3 lists the social structure metrics of the clusters.

In the red cluster, University of Skövde stands out with the highest betweenness score (7), signifying its crucial function as a bridge within the network. The University of Hong Kong, another cluster member, also plays a vital role as a connector with a betweenness centrality score of 4. Despite the differences in their betweenness centrality, these institutions are critical in facilitating communication and collaboration within a cluster.

The purple cluster is noteworthy owing to its high closeness centrality. Institutions such as Northwestern Polytechnical University, Asian Centre for Organization Development, and Southwest Jiaotong University all exhibit a closeness centrality score of 0.50. This high score implies that these institutions are well-integrated and closely knit within their clusters, furthering internal collaboration effectively. In essence, while the nodes in the red cluster act as key connectors, facilitating the flow of information across different clusters, the institutions in the purple cluster are characterized by their solid internal connectivity. This distinction highlights the different roles of the institutions within an academic collaborative network.

Table 3. Network Metrics for Institution Collaboration in the OKL Field.

Node	Cluster	Betweenness	Closeness	PageRank
University of Skövde	Red	7	0.167	0.101
The University of Hong Kong	Red	4	0.143	0.076
National University of Sciences and Technology (NUST)	Red	0	0.125	0.051
Gdansk University of Technology	Red	0	0.100	0.029
University of Iceland	Red	0	0.100	0.029
Tallinn University of Technology	Red	0	0.091	0.029
Northwestern Polytechnical University	Purple	0	0.500	0.062
Asian Centre for Organization Development	Purple	0	0.500	0.048
Southwest Jiaotong University	Purple	0	0.500	0.048

5. RESEARCH LIMITATIONS

This study has three main limitations. First, restricting data acquisition to Scopus and WoS could limit the breadth of the research landscape. While these databases are reputable and widely used, relevant studies and data may be present in other databases or grey literature not included in this analysis. Second, the authors' and affiliated institutions' information may not remain current. Third, our study focuses solely on the social structure of OKL. While this provides crucial insights into collaboration networks and influential entities within the field, it does not capture other essential aspects, such as the conceptual or intellectual structure of OKL.

6. PRACTICAL IMPLICATIONS

When seeking collaboration opportunities, it is crucial to consider researchers with a proven record of productivity and influence, as demonstrated by Durst's impressive h-index and the g-index. Similarly, the rapid productivity growth of Fawad and Naiding implies that aspiring researchers can significantly contribute to research projects. The research community can use this knowledge to enter targeted collaborations with researchers and associated institutes, such as University of Skövde, Northwestern Polytechnical University, Asian Centre for Organization Development, and Southwest Jiaotong University.

7. ORIGINALITY

This study offers a novel examination of the research terrain in OKL by mapping social structure and accentuating the institutional networks and the impact of authors. A significant finding is the influential role of Durst and University of Skövde as central and well-connected entities within the OKL research network. Additionally, we noted the emergence of rising researchers, such as Fawad and Naiding, from Northwestern Polytechnical University. These findings underscore Sweden and China's central role in OKL research.

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