Received: 9 May 2023 | Revised: 29 October 2023 | Accepted: 1 November 2023

DOI: 10.1002/asi.24855

RESEARCH ARTICLE

JASIST WILEY

Challenges posed by hijacked journals in Scopus

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Abstract

This study presents and explains the phenomenon of *indexjacking*, which involves the systematic infiltration of hijacked journals into international indexing databases, with Scopus being one of the most infiltrated among these databases. Through an analysis of known lists of hijacked journals, the study identified at least 67 hijacked journals that have penetrated Scopus since 2013. Of these, 33 journals indexed unauthorized content in Scopus and 23 compromised the homepage link in the journal's profile, while 11 did both. As of September 2023, 41 hijacked journals are still compromising the data of legitimate journals in Scopus. The presence of hijacked journals in Scopus is a challenge for scientific integrity due to the legitimization of unreliable papers that have not undergone peer review and compromises the quality of the Scopus database. The presence of hijacked journals in Scopus has far-reaching effects. Papers published in these journals may be cited, and unauthorized content from these journals in Scopus is thus imported into other databases, including ORCID and the WHO COVID-19 Research Database. This poses a particular challenge for research evaluation in those countries, where cloned versions of approved journals may be used to acquire publications and verifying their authenticity can be difficult.

1 | INTRODUCTION

International bibliographic databases such as Web of Science or Scopus serve as platforms for indexing scientific journals. According to the journal selection and evaluation criteria of Web of Science and Scopus, these databases focus on indexing high-quality peer-reviewed journals and on controlling their quality within the indexation period (Web of Science, n.d.; Elsevier, 2021). Assuring the quality of the databases is the core objective of the indexing platforms and is achieved through periodic re-evaluation and control of indexed journals in accordance with platform policies (Clarivate, n.d.; Elsevier, 2021).

In addition to playing an important role in the dissemination of scientific knowledge (Demir, 2020), bibliographic databases serve various purposes. Some scholars rely on international indexing databases to select high-quality journals for submitting their papers for publication (Chavarro et al., 2018). Bibliographic databases also play a crucial role in scientometric analysis and provide datasets for research (Li et al., 2018; Pranckutė, 2021). Moreover, national evaluation criteria in many countries require publications in journals that are indexed in Scopus or Web of Science for the evaluation of research output, promotions, academic degrees or financial rewards. The prioritization of publications in journals indexed in Web of Science or Scopus exists in Poland, the Czech Republic, Slovakia

(Good et al., 2015; Jonkers & Zacharewicz, 2017; Petr et al., 2021), China (Quan et al., 2017; Shu et al., 2020), Ukraine (Nazarovets, 2022), Kazakhstan (Amirbekova et al., 2022), and Russia (Denisova-Schmidt, 2021; Guba, 2022; Matveeva et al., 2021). In Latin America, the SciELO index, which is integrated with Web of Science, is used for performance evaluation (Vessuri et al., 2014). Therefore, implementing quality control measures for the indexed journals and ensuring the provision of high-quality data in the bibliographic databases is essential to enable their multifaceted use.

However, the indexing databases are not immune to mistakes and errors, as illustrated, for example, by specific occurrences in Scopus (Franceschini et al., 2016). There are also significantly heightened concerns within the scientific community regarding the presence in international citation databases of predatory journals that violate publishing ethics, publish low-quality research and mislead scholars by manipulating impact factors and other data (Bagues et al., 2019; Cortegiani et al., 2020; Demir, 2020; Severin & Low, 2019).

Indexing predatory journals in reputable bibliographic databases provides the journals with undeserved prestige (Demir, 2020), and papers that have not undergone rigorous peer review are legitimized by being included in these database indices (Beall, 2012; Bohannon, 2013; Forero et al., 2018; Freiermuth, 2023; Gilbert, 2009; Smart, 2017) and may contain violations of academic ethics (Abad-García, 2019). Scholars often trust these indices, and they may not critically evaluate the reliability and quality of predatory journals, believing that inclusion in the bibliographic database is a sufficient sign of quality (Demir, 2020). Predatory journals also undermine the credibility of scientific literature and have a detrimental effect on academic integrity (Forero et al., 2018).

Predatory journals have been identified in various bibliographic databases, such as Web of Science, Scopus, and MEDLINE (Demir, 2020; Macháček & Srholec, 2022; Marina & Sterligov, 2021; Somoza-Fernández et al., 2016). Demir (2020) analyzed the presence of 2708 potentially predatory journals in different international indices and found that Scopus is the most compromised, listing 53 problematic journals. Similar results were reported by Somoza-Fernández et al. (2016). Other studies have revealed even more concerning findings. Macháček and Srholec (2022) discovered that 324 potentially predatory journals from Beall's list that have not been updated since 2017 were still present in Scopus as of March 2018. The papers published in these journals represent 2.8% of all papers indexed in Scopus during the period 2017–2019 (Macháček & Srholec, 2022). Another study by Marina and Sterligov (2021) analyzed 637 potentially predatory journals, 215 of which were still active in Scopus as of September 2018. The presence of predatory journals in bibliographic databases raises concerns that these databases may be neglecting their vital roles in controlling the quality of the journals they index (Demir, 2020).

Recent evidence demonstrates that international bibliographic databases are also infiltrated by hijacked journals. These fraudulent publishers clone the title and ISSN of legitimate, peer-reviewed journals, register expired domains, or create fake websites of authentic journals (Abalkina, 2021a; Jalalian & Dadkhah, 2015; Moussa, 2021b). Bohannon (2015) showed that the homepage links of journals were compromised in Web of Science due to expired domains; this is because hijacked journals register expired domains of legitimate journals to deceive potential authors. Butler (2013) provided evidence that one fraudulent publisher persuaded Web of Science to include the link to a hijacked journal in the list of indexed journals. Unauthorized content was indexed in Web of Science due to registration of an expired domain of the *Russian Law Journal* (Abalkina, 2023b). Numerous studies and case studies (Abalkina, 2020, 2021a, 2021b, 2022, 2023a, 2023b; Abalkina & Keller, 2023; Abid & Yousif, 2022; Al-Amr, 2020; Khosravi & Menon, 2021; Memicevic, 2018; Müller & Sæbø, 2023; Zenthöfer, 2020) have provided evidence of content from hijacked journals that ended up in Scopus or fake websites indicated as authentic homepages of original journals in Scopus.

The phenomenon of hijacked journals appeared in August 2011 when the first documented cases of journal hijacking appeared: *Science Series Data Report*, *Innova Ciencia*, and *Science and Nature* (Jalalian & Dadkhah, 2015). Since then, more than several hundred journals have been hijacked (Abalkina, 2021a), and it is plausible that numerous cases of hijacked journals have not been documented. While the number of hijacked journals in international citation databases is not as high as that of predatory journals, there can still be thousands of papers indexed from hijacked journals (Abalkina, 2021b). Furthermore, in the profiles of certain countries, the proportion of nonauthentic content originating from hijacked journals can be significant. As of May 2021, the proportion of nonauthentic content by scholars from Uzbekistan reached 41.5% of total papers indexed in Scopus in 2021, 8.4% in Iraq, and 1.5% in India (Abalkina, 2021b).

In contrast to the coverage of predatory journals, the existing scientific literature has not extensively addressed the issue of hijacked journals infiltrating international bibliographic databases. While there is some information available on individual cases of hijacked journals in Scopus, which appears to be the database most compromised by hijacked journals, the broader problem has not been thoroughly explored. This study aims to bridge this gap in knowledge, creating a list of hijacked journals identified in Scopus and

analyzing the consequences for academic integrity and research evaluation.

2 | HOW DO HIJACKED JOURNALS DECEIVE?

Hijacked journals offer fast publication in exchange for a fee without conducting peer review (Beall, 2012; Jalalian & Dadkhah, 2015; Kurt, 2018; Lukić et al., 2014; Moussa, 2021b). The practice of hijacked journals involves creating clone websites of legitimate journals, which constitutes a form of journal scam (Butler, 2013). Dishonest publishers aim to create clone websites that appear authentic and at the same time are not easily detected as fraudulent by the scientific community or the original journal. Typically, these fraudulent publishers target specific types of journals, such as print-only journals (Shahri et al., 2018), where the clone website can serve as the only website for the journal, niche journals, stand-alone journals, university journals, or trade journals. Hijacking journals from large and reputable publishers is typically avoided, as fraud is easily recognized. Targeting the same types of journals may lead to a situation in which different fraudulent publishers hijack the same original journals, creating several clones of the same journals, as in the case of *Gorteria* or the *Seybold Report* (Abalkina & Keller, 2023; Jalalian, 2015a, 2015b).

Dishonest publishers often use the title and ISSN of a legitimate journal to create an illusion of authenticity. They may copy the editorial board of the genuine journal or create a fake one and fill it with the names of either real or fake scholars (Butler, 2013; Moussa, 2021b). In addition, hijacked journals may falsely provide an impact factor (Dadkhah, Maliszewski, & Teixeira da Silva, 2016; Jalalian, 2015a; Jalalian & Mahboobi, 2013). To convince potential authors that the journal is being published continuously, hijackers create an archive, which often includes papers from hijacked or predatory journals or even those created by artificial intelligence (Abalkina, 2021a).

Hijacked journals sometimes mimic the digital object identifier (DOI) of the genuine journal. For example, the hijacked version of the *Journal of Southwest Jiaotong University* (*Xinan Jiaotong Daxue Xuebao*) registered the DOI 10.35741/issn.0258-2724, whereas the authentic journal's DOI is 10.3969/J.ISSN.0258-2724. It is worth noting that both DOIs contain the same ISSN (0258-2724).

Hijacked journals often claim to be indexed in reputable bibliographic databases such as Scopus and Web of Science (Moussa, 2021b) or included in white lists of journals such as the Indian UGC-CARE Approved list to lure potential authors who are looking to publish their papers in international journals. Potential authors can verify the claimed indexation in Scopus or Web of Science (Menon & Khosravi, 2019), as the profile of authentic journals in these databases provides detailed information, including the homepage link, and thus detect the fraud. However, hijackers have several options to create an illusion of authenticity, such as the following:

1. Targeting print-only journals, journals without a homepage link in their profile in indexing databases, or journals with inactive website links: For example, Butler (2013) demonstrated that hijackers targeted journals such as Wulfenia and Archives des Sciences, which did not have proper websites, making them easy targets for fraudulent publishers. Another example is the Seybold Report, a trade journal with no homepage link in the Scopus profile (as of the beginning of 2023) and without a classic journal website. This journal has at least five clone websites (Abalkina & Keller, 2023)
2. Registering an expired domain of the journal: As shown above, Bohannon (2013) demonstrated how fraudulent publishers register expired domains of journals. Such a strategy allows hijacked journals to keep the link to the homepage in bibliographic databases or even to index unauthorized content like in the case of the *Russian Law Journal* which link expired in 2022 and a new journal imitating the legitimate one was established by January 2023 (Abalkina, 2023b).
3. Hacking the original website of the journal: For example, the website of the authentic *Talent Development and Excellence* was hacked in 2020, and all associated journal files were removed (Abalkina, 2020).
4. Compromising the data of the original journal in indexing databases: While cases of compromised web links and content in Web of Science are individual (Abalkina, 2023b; Bohannon, 2013; Butler, 2013), numerous cases associated with Scopus exist. These unauthorized content indexation and compromised homepage links in bibliographic databases are highly convincing and can mislead potential authors into submitting their papers to clone versions of the journal. Such indexation of hijacked content increases the risk of deception of potential authors who choose the journal based on the indexation criteria. This can be demonstrated by a comment in Scimago of a scholar who was deceived by a hijacked journal, *Journal of Talent Development and Excellence*, which succeeded in changing the homepage link in Scopus and indexing hundreds of unauthorized papers (Scimago, n.d.-a):

> Before I publish my article in a particular journal, I always ask for confirmation of the official site in the Scopus support centre.

> <...> the Scopus support 4!!!! times confirmed to me the site of the journal as official: "Thank you for contacting Scopus. Please find the authenticated web site of the journal" Talent Development and Excellence ISSN: 18690459 "below for your reference. Link: [http://www.iratde.com/index.php/jtde]." Later my article was indexed in the database. And only today I see the news that the journal turns out to be "not real" and the Scopus has deleted all the articles indexed in the database for 2020 (translated from Russian).

There is little information about the methods by which hijacked journals actually penetrate bibliographic databases and moreover, index the unauthorized content in these databases. According to Elsevier (2021), in Scopus it happens when "journals update URLs or content feeds." However, this explanation does not provide a clear understanding of how hijacked journals are able to index numerous papers alongside genuine journals (Menon & Khosravi, 2019) or how they are able to index unauthorized content even after the presence of hijacked journals in Scopus is discovered (Abalkina, 2023a; Al-Amr, 2020). Moreover, such indexation is a challenge for the academic community because Scopus legitimizes this unauthorized content. Papers originating from hijacked journals lack proper peer review, and some of them are illegitimate because they violate academic ethics (Abalkina, 2021e).

3 | DETECTION OF HIJACKED JOURNALS

Detecting hijacked journals poses a challenge. Hijacked journals are normally detected only after they have already deceived authors. The majority of hijacked journals have a brief duration of activity, remaining active only until scholars pay the required fee (Dadkhah & Borchardt, 2016). Afterwards, the clone website is typically abandoned, and the web domain continues to function until it expires, resulting in the loss of all data, including "published" papers. Some hijacked journals may go unnoticed by the broad academic community due to the lack of documentation.

There are a limited number of methods available to detect hijacked journals. Bohannon (2015) conducted an analysis of the registration dates of web domains belonging to journals indexed in Web of Science and identified two hijacked journals among those registered 1 year prior to the analysis. Abalkina (2021a) detected 62 web domains of hijacked journals by analyzing the archive of fraudulent journals that recycled identical papers to create a fictitious archive. Dadkhah, Maliszewski, and Lyashenko (2016) and Shahri et al. (2018) developed a classification algorithm approach to distinguish between hijacked and authentic journals. However, none of these methods is universal in recognizing hijacked journals due to the different deception methods used by unreliable journals.

There are several lists of hijacked journals. One of the lists was created and updated by J. Beall; after 2017 this list was updated on alternative websites (Beall's list, n.d.). A different list was updated by Stop Predatory Journals, which is not available anymore (Stop Predatory Journals, n.d.). The University Grant Commission in India has its own list of cloned journals (University Grant Commission, n.d.). Cabell's Predatory Reports includes criteria related to integrity violations, including journal hijacking. In 2022, the author, in cooperation with Retraction Watch, launched a list of hijacked journals (Retraction Watch, n.d.). There are also static lists of hijacked journals in several studies (Dadkhah, Maliszewski, & Teixeira da Silva, 2016; Jalalian & Dadkhah, 2015). However, none of the lists specifies the hijacked journals that compromised the homepage link in the authentic journal's profile or indexed unauthorized content in Scopus or other bibliographic databases.

Furthermore, indexing databases, such as Scopus and Web of Science, do not maintain records of cases involving the removal of content that is published in hijacked journals and subsequently indexed in these databases. For instance, Scopus keeps the list of accepted journals, discontinued titles, and the reasons for discontinuation (Scopus, n.d.), but it does not provide information about cases involving unauthorized content removal.

Despite Elsevier's claim that Scopus has "stringent procedures in place to detect hijacked journals as early as possible and to ensure that the content indexed in Scopus is from the legitimate source" (Elsevier, 2021), numerous cases exist of hijacked journals that have been present for a decade in the database. Moreover, there is evidence of numerous cases in which hijacked journals have been detected by third parties but not by Scopus. For example, scholars who have fallen victim to fake publishers discover this fraud, or the scientific community makes the discovery due to academic misconduct in papers originating from hijacked journals. However, it is primarily the responsibility of Scopus to control the quality and authenticity of the content in its database.

Numerous scholars who have fallen victim to such deceptive practices often share their experience regarding publication in hijacked journals and the subsequent withdrawal of their paper from Scopus. These comments can be found on the profiles of original journals in Scimago, a platform that provides rankings of peer-reviewed

journals. Such comments exist, for example, in the profiles of *Talent Development and Excellence* (Scimago, n.d.-a) or *PalArch's Journal of Archaeology of Egypt/Egyptology* (Scimago, n.d.-b).

To illustrate another example, hijacked journals in Scopus have also been identified by the scientific community due to academic misconduct issues in papers from hijacked journals, unusual citations, inconsistencies between the specialization of the journal and the topic of the papers submitted to the hijacked version or other anomalies. For example, the journal *Annals of the Romanian Society for Cell Biology* was identified due to inconsistency in a publication devoted to WWII and the topic of the journal (Abalkina, 2021b). The hijacked journal *Converter* was detected because it shared the same fake editor-in-chief as the journal *Annals of the Romanian Society for Cell Biology* (Abalkina, 2021b).

Currently, there is no systematic record of hijacked journals that are indexed in bibliographic databases, particularly in Scopus, which has been mentioned in numerous cases of papers indexed from hijacked journals. The goal of this paper is to bridge this gap by conducting a systematic analysis of hijacked journals in Scopus.

4 | METHODS

I use several approaches to detect and analyze hijacked journals in Scopus.

4.1 | Systematic verification

The first method involves a systematic check of previously identified hijacked journals and an analysis of whether Scopus indexes unauthorized content from hijacked journal websites or whether the homepages of the original journals have been compromised in their Scopus profiles. In this study, referring to a compromised link in a journal's profile in Scopus indicates a situation in which the homepage link in the profile leads to a hijacked website or in which there is an automatic redirection from the indicated website to a hijacked journal's website. Indexation of unauthorized content occurs when papers published on the website of a hijacked journal are covered by Scopus.

The information on identified hijacked journals is obtained from three sources: Beall's list of hijacked journals ($n = 139$), Cabell's Predatory Reports ($n = 119$), and the Retraction Watch Hijacked Journal Checker ($n = 230$) (see Figure 1). These three lists cover updates on hijacked journal detection during different time spans, encompassing the entire decade since the documentation of the first hijacked journals.

Together, these three lists contain 488 entries, 54 of which were excluded in the present study for the following reasons: duplications within an individual list because of multiple fraudulent websites for a single journal; inclusion of a fake publisher that is not a hijacked journal in Beall's list; and references to brokerage company websites but not to hijacked journals in Cabell's Predatory Report. After merging the lists and excluding duplications ($n = 113$), the final list for the present study contained 321 journal titles that were checked for the presence of hijacked journals in Scopus.

To create the list of hijacked journals in Scopus, I use only first-hand evidence. I do not include information about hijacked journals in Scopus if it is obtained solely from comments on Scimago or different posts on the internet. For example, *PalArch's Journal of Archaeology of Egypt/Egyptology* is mentioned as a hijacked journal with indexation in Scopus, and related unauthorized content was deleted from Scopus (Scimago, n.d.-b). Since the unauthorized content was deleted, I do not include it in the list presented in this study. The same is true for unauthorized content in *Transylvanian Review* (Al-Amr, 2020) and for the compromised website link of the hijacked *Talent development and excellence journal* (Scimago, n.d.-a). However, I confirm the evidence presented by Memicevic (2018) of papers covered by Scopus originating from a hijacked website of *Türk Psikoloji Dergisi (Turkish Journal of Psychology)*, as well as the finding of Khosravi and Menon (2021) concerning unauthorized content from the *Journal of Engineering Technology*, which is still present in Scopus.

There were several challenges in categorizing journals as hijacked in the cases of *Communications on Stochastic Analysis, Psychology and Education* and *Journal of Natural Remedies* (please refer to Data S1, Supporting Information for details) and the *International Journal of Advanced Science and Technology* and the *International Journal of Control and Automation* (please refer to Table 2 for details). I did not include the *GMP Review* in the list of hijacked journals. I was not able to confirm the provenance of one paper in the *GMP Review* indexed in Scopus that is most likely from a hijacked version of the journal. Unfortunately, the publisher does not provide the content of the journal on its website and did not respond to my request.

The systematic check of hijacked journals in Scopus was conducted in several steps. Initially, I began collecting cases of hijacked journals in Scopus starting in 2020 with the discovery of the hijacked journal *Talent Development and Excellence* (Zenthöfer, 2020). Subsequently, I systematically examined three lists of hijacked journals. Last, for this study, I estimated the number of historically documented cases of hijacked journals in

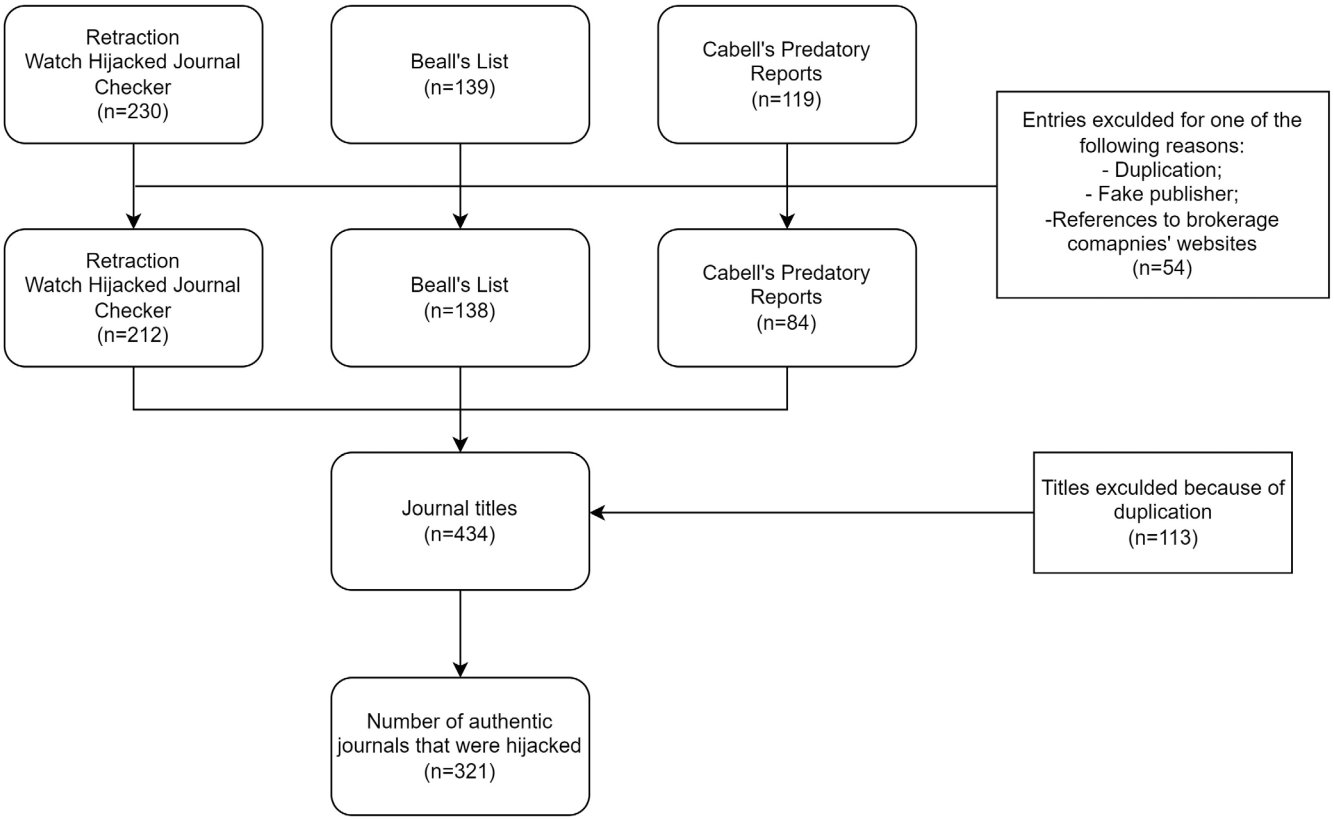

FIGURE 1 Title selection diagram

Scopus, as well as the instances of currently present hijacked journals, which were reviewed during the period 1–22 September 2023.

4.2 | A case study of four hijacked journals

I selected four hijacked journals (*Annals of the Romanian Society for Cell Biology*, *Linguistica Antverpiensia*, *Turkish Journal of Computer and Mathematics Education*, and *Turkish Journal of Physiotherapy and Rehabilitation*) that were detected in spring 2021 due to mutual citations. All of these journals managed to index papers in Scopus. This selection served as a case study to investigate citation anomalies and to collect data on countries associated with papers originating from these journals and covered by Scopus.

The data on the countries were retrieved from Scopus from May to June 2021. Citations to papers that were published in these journals were collected in May 2021 from Scopus for the journal *Annals of the Romanian Society for Cell Biology* and in October 2021 from Google Scholar for the other three journals. I used Google Scholar due to the withdrawal of unauthorized content from the hijacked versions of these three journals in Scopus.

5 | RESULTS: EVIDENCE OF HIJACKED JOURNALS IN SCOPUS

5.1 | Number of hijacked journals in Scopus

The current version of the list of hijacked journals in Scopus includes 67 titles that have been documented in Scopus using first-hand evidence (see Table 1 and Data S1). Of these, 44 indexed unauthorized content and 34 compromised the homepage link in the journal profile in Scopus (see Figure 2). Despite the correction and withdrawal of unauthorized content by Scopus, some hijacked journals currently compromise the data of legitimate journals in Scopus.

The current presence of hijacked journals was documented between 1 and 22 September 2023. As of September 2023, 41 hijacked journals still compromise the data of legitimate journals in Scopus. Fifteen journal profiles provide a link to a hijacked journal URL. In the case of 29 journals, the content is sourced from the alleged hijacked website. Fifteen journal profiles in Scopus redirect to hijacked journals (see Figure 2). It is possible that this is just the tip of the iceberg, and there may have been many more cases that were not documented. It is possible that the web domains have expired, and

that Scopus deleted the information, resulting in lost records of such hijacked journals.

This trend is referred to as *indexjacking*, where hijacked journals tamper with the genuine journal's homepage link in its profile in bibliographic databases, such as Scopus, and/or publish unauthorized content in a database.

At least 34 hijacked journals have compromised the link to the homepage of legitimate journals in Scopus, redirecting potential authors to the clone journal instead. Additionally, the *Turkish Journal of Computer and Mathematics Education's* link was directed to the English version of the journal's website, which contained a link to the cloned website. Unfortunately, this sort of fraud often goes undetected, as fake links can be altered, and there is no documentation of the cases. Such incidents occur more frequently than we realize.

At least 44 hijacked journals succeeded in getting unauthorized content indexed to Scopus. Hijacked journals were able to index anywhere from a single paper to several thousand papers each. The highest documented number of papers was indexed by the fraudulent *Annals of the Romanian Society for Cell Biology*, which indexed a dozen papers in 2020 and at least 3183 unauthorized papers in 2021.

The earliest documented cases date back to 2013, when the hijacked versions of the *Jökull* journal, *Wulfenia* journal, and *Archives des Sciences* indexed papers published in 2013. These journals belong to one of the first identified networks of hijacked journals (Jalalian & Dadkhah, 2015). As of September 2023, Scopus still covers several papers published in 2013 from *Archives des Sciences*, one of the first identified hijacked journals. Papers published in a hijacked *Jökull* journal in 2013, 2016, and 2017 were also indexed in Scopus, and at least one unauthorized paper is still present in Scopus as of September 2023. The papers published in 2013–2018 and in 2020 in the clone of *Wulfenia* were successfully indexed in Scopus, suggesting that the fraud can last unnoticed for years both for the original journal and Scopus. Several dozen unauthorized papers published in 2013–2018 and in 2020 are still indexed in Scopus as of September 2023. This means that one in every four

TABLE 1 Country of an authentic journal

Country of an authentic journal	Number of journals
China	17
USA	11
Turkey, Spain, Belgium, Switzerland	3
Australia, Canada, Netherlands, Romania, Switzerland	2
Argentina, Austria, Chile, Denmark, Finland, France, Germany, Iceland, Japan, Lithuania, Pakistan, Poland, Portugal, South Korea, Sweden, Venezuela, India	1

Note: Data on countries were retrieved from Scimago and ISSN Portal. This table represents information on authentic and legitimate journals that were hijacked, and their profiles in Scopus were compromised by dishonest publishers on the date of the investigation (see evidence in Data S1).

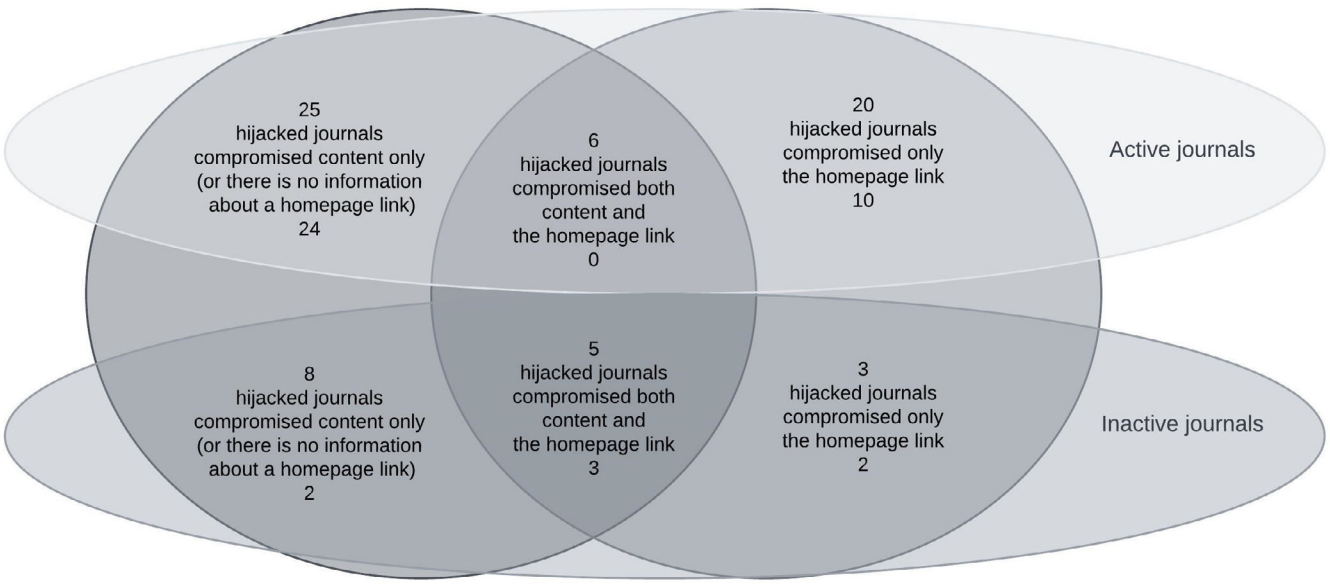

FIGURE 2 Historically documented* and current** cases of hijacked journals in Scopus. *The number of historically documented cases is represented above. **The number of current cases as of September 2023 is represented below

TABLE 2 List of hijacked journals in Scopus

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
1	Academic Leadership http://www.academicleadership.org	Academic Leadership ISSN: 1533-7812	Journal of Academic Leadership	USA	SOS	Inactive	No	Yes	No	Homepage link is n/a
2	Advances in Water Science http://www.skxjz.info/	Shuikexue Jinzhan/ Advances in Water Science ISSN: 1001-6791	China Water Power Press	China	EPS	Active	No	Yes	No	Homepage link is n/a
3	Aegaeum https://aegaeum.com/	Aegaeum ISSN: 0776-3808	Universite de Liege	Belgium	AAH, SOS	Active	Yes	No	Yes	Homepage link is n/a
4	Annals of Forest Research https://e-afr.org/	Annals of Forest Research ISSN: 1844-8135 E-ISSN: 2065-2445	Editura Silvica	Romania	ABS, ENV	Active	Yes	No	No	No
5	Annals of the Romanian Society for Cell Biology http://annalsofrscb.ro/	Annals of the Romanian Society for Cell Biology ISSN: 1583-6258	Vasile Goldis Western University of Arad	Romania	BGM	Inactive (discontinued due to publication concerns)	Yes	Yes	Yes	Yes
6	Archives des Sciences http://www.archiveofscience.com	Archives des Sciences ISSN: 1661-464X	Societe de Physique et d'Histoire Naturelle de Geneve	Switzerland	MULT	Active	Yes	n/a	Yes	Homepage link is n/a
7	Arctic Journal https://arcticjournal.org/	Arctic ISSN: 0004-0843 E-ISSN: 1923-1245	Arctic Institute of North America	Canada	ABS	Active	Yes	n/a	Yes	Homepage link is n/a
8	Atomic Spectroscopy http://atomicspectroscoopyjournal.com	Atomic Spectroscopy ISSN: 0195-5373	Atomic Spectroscopy Press Limited	USA	CHM	Active	No	Yes	No	Yes

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
9	Ayer http://www.ayeronline.com	Ayer ISSN: 1134-2277	Marcial Pons	Spain	AAH, SOS	Active	Yes	n/a	Yes	Homepage link is n/a
10	Baltic Journal of Law and Politics https://versita.com/bjp/	Baltic Journal of Law and Politics ISSN: 2029-0454	Vytautas Magnus University	Lithuania	SOS	Active	Yes	Yes	Yes	Homepage link is n/a
11	Boletin de Literatura Oral https://www.boletindeliteraturaoral.com	Boletin de Literatura Oral E-ISSN: 2173-0695	Universidad de Jaen	Spain	AAH, SOS	Active	No	Yes	No	Yes
12	Boreal Environment Research http://www.borenv.com/	Boreal Environment Research ISSN: 1239-6095	Finnish Environment Institute	Finland	ABS, EPS, ENV	Active	Yes	Yes	Yes	No
13	CEPAL Review http://www.cepalreview.org/	CEPAL Review ISSN: 0251-2920 E-ISSN: 1684-0348	United Nations Publications	USA	EEF, SOS	Active	Yes	Homepage link is n/a	Yes	Homepage link is n/a
14	China Petroleum Processing and Petrochemical Technology http://www.zgsyjgysyhgjs.cn/	China Petroleum Processing and Petrochemical Technology ISSN: 1008-6234	Research Institute of Petroleum Processing, SINOPEC	China	CHE, ENE, ENG	Active	No	Yes	No	Yes
15	Ciencia e Tecnica Vitivinicola http://ciencia-e-tecnica.org/	Ciencia e Tecnica Vitivinicola ISSN: 0254-0223	Instituto Nacional de Investigacao Agraria e das Pescas	Portugal	ABS	Active	Yes	Homepage link is n/a	Yes	Homepage link is n/a
16	Communications on Stochastic Analysis https://serialsjournals.com/index.php?route=product/product&product_id=304	Communications on Stochastic Analysis E-ISSN: 2688-6669	Louisiana State University	USA	MTH	Inactive	n/a	Yes	n/a	Yes

(Continues)

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
17	Community Practitioner https://commprac.com/	Community Practitioner ISSN: 1462-2815	Community Practitioners And Health Visitors Association	UK	MED, NUR	Active	No	Yes	No	Yes
18	Converter http://www.converter-magazine.info/	Converter E-ISSN: 0010-8189	Faversham House Group Ltd	UK	CHE, ENG, MAT	Inactive	Yes	Yes	No	Yes
19	Degres Degres.pw	Degres ISSN: 0376-8163	A.S.B.L. Degres	Belgium	AAH, SOS	Active	Yes	No	Yes	Homepage link is n/a
20	Design Engineering http://thedesignengineering.com/	Design Engineering (Toronto) ISSN: 0011-9342	Rogers Media Publishing	Canada	ENG	Active	Yes	Yes	No	No
21	Entomologist's Gazette https://gempublishing.co.uk/	Entomologist's Gazette ISSN: 0013-8894	Pemberley Books Publishing	UK	ABS	Inactive (discontinued due to metrics)	No	Yes	No	Homepage link is n/a
22	Gedrag en Organisatie https://lemma-tijdschriften.com/	Gedrag en Organisatie ISSN: 1021-3619	Amsterdam University Press	Netherlands	BMA, PSY	Active	Yes	No	Yes	No
23	gis.Business https://gisbusiness.org/	gis.Business ISSN: 1869-9286	ABC Verlag	Switzerland	EPS	Active	Yes	No	Yes	Homepage link is n/a
24	Hong Kong journal of Social Sciences http://hkjoss.com/	Hong Kong Journal of Social Sciences ISSN: 1021-3619	City University of Hong Kong Press	China	SOS	Active	Yes	No	Yes	No
25	Hunan Daxue Xuebao/Journal of Hunan University Natural Sciences http://jonuns.com/	Hunan Daxue Xuebao/Journal of Hunan University Natural Sciences ISSN: 1674-2974	Hunan Daxue/Hunan University	China	MULT	Active	Yes	Homepage link is n/a	Yes	Homepage link is n/a

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
26	Interciencia Journal https://intercienciajournal.com/	Interciencia ISSN: 0378-1844	Interciencia Association	Venezuela	MULT	Active	Yes	n/a	Yes	No
27	International Journal of Advanced Science and Technology http://sersc.org/journals/index.php/ijast	The authentic journal "International Journal of Advanced Science and Technology" was not identified. However, the domain http://sersc.org/journals/index.php/ijast is very likely to be registered by a hijacker. ISSN: 2005-4238 E-ISSN: 2207-6360	n/a	Australia	CSC, ENE, ENG	Inactive (discontinued due to publication concerns)	Yes	n/a	Yes	No
28	International Journal of Control and Automation http://sersc.org/journals/index.php/ijca	The authentic journal "International Journal of Control and Automation" was not identified. However, the domain http://sersc.org/journals/index.php/ijca is very likely to be registered by a hijacker ISSN: 2005-4297	n/a	Australia	ENG	Inactive (discontinued due to publication concerns)	Yes	Yes	Yes	Yes

(Continues)

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
29	International Neurourology Journal http://einj.net/index.php/INJ	International Neurourology Journal ISSN: 2093-4777 E-ISSN: 2093-6931	Korean Association of Medical Journal Edirors	South Korea	MED, NEU	Active	No	Yes	No	Yes
30	Ion Exchange and Adsorption https://www.lzjhyxf.cn/	Lizi Jiaohuan Yu Xifu/ Ion Exchange and Adsorption ISSN: 1001-5493	Nankai Daxue/ Nankai University	China	CHE, CHM, MAT	Active	No	Yes	No	Homepage link is n/a
31	JJM (Jundishapur Journal of Microbiology) https://www.jjmicrobiol.com/index.php/jjm	Jundishapur Journal of Microbiology ISSN: 2008-3645 E-ISSN: 2008-4161	Kowsar Publishing Company	Netherlands	IAM, MED	Active	No	Yes	No	No
32	Jökull journal http://www.jokulljournal.com/	Jökull ISSN: 0449-0576	Joklarannsoknafelag Islands/ Glaciological and Geological Societies of Iceland	Iceland	EPS	Active	Yes	n/a	Yes	Homepage link is n/a
33	Journal of Aeronautical Materials https://www.hkclxb.cn/	Hangkong Cailiao Xuebao/Journal of Aeronautical Materials ISSN: 1005-5053	Beijing Institute of Aeronautical Materials	China	ENG, MAT	Active	No	Yes	No	Homepage link is n/a
34	Journal of Biomedical Engineering/Shengwu Yixue Gongchengxue Zazhi http://www.swyxgcx.cn/index.php/jbme	Journal of Biomedical Engineering/ Shengwu Yixue Gongchengxue Zazhi ISSN: 1001-5515	Sichuan Society for Biomedical Engineering	China	CHE, ENG, MED	Active	No	Yes	No	Homepage link is n/a
35	Journal of clinical otorhinolaryngology, head, and neck surgery	Journal of clinical otorhinolaryngology, head, and neck	Tong ji yi ke da xue Fu shu xie he yi yuan	China	MED	Active	No	Yes	No	Homepage link is n/a

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
	www.lcebyhkzz.cn	surgery (Lin chuang er bi yan hou tou jing wai ke za zhi) ISSN: 1001-1781								
36	Journal of Data Acquisition and Processing www.sjcjycl.cn	Journal of Data Acquisition and Processing/Shu Ju Cai Ji Yu Chu Li ISSN: 1004-9037	Nanjing University of Aeronautics and Astronautics	China	CSC	Active	No	Yes	No	Homepage link is n/a
37	Journal of Engineering Technology	Journal of Engineering Technology ISSN: 0747-9964	American Society for Engineering Education	USA	ENG	Active	Yes	n/a	Yes	No
38	Journal of Harbin Engineering University https://harbinengineeringjournal.com/index.php/journal	Harbin Gongcheng Daxue Xuebao/Journal of Harbin Engineering University	Harbin Engineering University	China	CHE, ENE, ENG	Active	Yes	Yes	Yes	Homepage link is n/a
39	Journal of Natural Remedies https://jnronline.com/	Journal of Natural Remedies ISSN: 0972-5547 E-ISSN: 2320-3358	Informatics Publishing Limited	India	PTP	Active	Yes	n/a	Yes	No
40	Journal of Northeastern University http://dbdxxb.cn/	Dongbei Daxue Xuebao/Journal of Northeastern University ISSN: 1005-3026	Northeastern University	China	CSC, ENG, MTH	Active	No	Yes	No	No
41	Journal of Optoelectronics Laser http://gdzjg.org/index.php/JOL	Guangdianzi Jiguang/Journal of Optoelectronics Laser ISSN: 1005-0086	Tianjin University	China	ENG	Active	No	Yes	No	No

(Continues)

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a] Title and ISSN	Publisher	Country	Subject area	Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus As of September 2023	Current homepage link to the cloned website in Scopus As of September 2023
42	Journal of Propulsion Technology https://www.propulsiontechjournal.com/index.php/journal	Tuijin Jishu/Journal of Propulsion Technology ISSN: 1001-4055	Journal of Propulsion Technology	China	ENG	Active	No	Yes	No	Yes
43	Journal of Research on the Lepidoptera http://www.lepidopteraresearchfoundation.org/	Journal of Research on the Lepidoptera ISSN: 0022-4324 E-ISSN: 2156-5457	The Lepidoptera Research Foundation	USA	ABS	Inactive (the journal cannot be located using its title or ISSN in Scopus)	Yes	n/a		
44	Journal of Southwest Jiaotong University https://www.jsju.org/	Xinan Jiaotong Daxue Xuebao/Journal of Southwest Jiaotong University ISSN: 0258-2724	Science Press	China	MULT	Active	Yes	No	No	No
45	Journal of Talent Development and Excellence http://iratde.com	Talent Development and Excellence ISSN: 1869-0459 E-ISSN: 1869-2885	International Research Association for Talent Development and Excellence	Germany	PSY, SOS	Inactive (Discontinued due to publication concerns)	Yes	n/a	No	Homepage link is n/a
46	Latin American Journal of Pharmacy http://actafarmbonaerense.com.ar/index.php/latamjpharm	Latin American Journal of Pharmacy ISSN: 0326-2383	Colegio de Farmaceuticos de la Provincia de Buenos Aires	Argentina	PTP	Active	No	Yes	No	Yes

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
47	Linguistica Antverpiensia https://www.hivt.be/linguistica	Linguistica Antverpiensia, New Series—Themes in Translation Studies ISSN: 0304-2294	Department of Applied Linguistics, Translators and Interpreters, University of Antwerp	Belgium	SOS	Active	Yes	n/a	No	No
48	Multicultural Education http://ijdri.com/me	Multicultural Education ISSN: 1068-3844	Caddo Gap Press	USA	SOS	Inactive	Yes	n/a	No	No
49	Onomazein http://www.onomazein.com/index.php/onom/	Onomazein ISSN: 0717-1285 E-ISSN: 0718-5758	Pontificia Universidad Catolica de Chile	Chile	SOS	Active	No	Yes	No	Yes
50	Pakistan Heart Journal www.pkheartjournal.com (registration of an expired domain)	Pakistan Heart Journal ISSN: 0048-2706 E-ISSN: 2227-9199	Pakistan Cardiac Society	Pakistan	MED	Active	No	Yes	No	Yes
51	Pensee www.penseejournal.com	Pensee ISSN: 0031-4773	Espaces Marx	France	AAH	Active	Yes	n/a	Yes	No
52	Psychology and Education http://psychologyandeducation.net/pae/index.php/pae	Psychology and Education ISSN: 0033-3077	Psychology and Education	USA	PSY, SOS	Inactive (Discontinued due to publication concerns)	Yes	n/a	No	Homepage link is n/a
53	Rare Metal Materials and Engineering https://rmmep.org/index.php/rmme	Xiyou Jinshu Cailiao Yu Gongcheng/Rare Metal Materials and Engineering ISSN: 1002-185X	Rare Metals Materials and Engineering Press	China	ENG, MAT	Active	No	Yes	No	Yes

(Continues)

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
54	Sapporo Medical Journal https://www.maejournal.com/	Sapporo Medical Journal ISSN: 0036-472X	Cancer Research Institute, Sapporo Medical University	Japan	MED	Active	Yes	Homepage link is n/a	Yes	Homepage link is n/a
55	Scandinavian Journal of Information Systems http://sjisscandinavian-iris.com/	Scandinavian Journal of Information Systems ISSN: 0905-0167 E-ISSN: 1901-0990	Institute of Electronic Systems, University of Aalborg	Denmark	CSC	Active	Yes	Homepage link is n/a	No	Homepage link is n/a
56	Semiconductor Optoelectronics https://www.bdtgd.cn/	Bandaoti Guangdian/ Semiconductor Optoelectronics ISSN: 1001-5868	China National Publishing Industry Trading Corporation	China	ENG	Active	No	Yes	No	Homepage link is n/a
57	Seybold Report https://seyboldjournal.com	Seybold Report ISSN: 1533-9211	Seybold Publications	USA	BMA, ENG	Active	Yes	Yes	No	Homepage link is n/a
58	Solid State Technology https://www.solidstatetechnology.us	Solid State Technology ISSN: 0038-111X	Pennwell Corporation	USA	ENG, MAT, PHA	Inactive	Yes	n/a	No	Homepage link is n/a
59	Sylwan http://sylwan.ibles.org	Sylwan ISSN: 0039-7660	Polish Forestry Society	Poland	ABS	Active	Yes	n/a	No	Homepage link is n/a
60	Test Engineering & Management https://testmagzine.biz/	Test Engineering and Management ISSN: 0193-4120	Mattingley Publishing	USA	BMA, ENG, PHA	Inactive (Discontinued due to publication concerns)	Yes	Yes	Yes	Yes
61	Turkish Journal of Computer and Mathematics Education (TURCOMAT) https://turcomat.org	Turkish Journal of Computer and Mathematics Education	Karadeniz Technical University	Turkey	CSC, MTH, SOS	Inactive (Discontinued due to	Yes	n/a	No	Homepage link is n/a

TABLE 2 (Continued)

S. No.	Hijacked journal	Authentic journal[a]				Status of the authentic journal in Scopus (as of August 2023)	Documented inauthentic content in Scopus	Documented homepage link to the cloned website in Scopus	Current inauthentic content in Scopus	Current homepage link to the cloned website in Scopus
		Title and ISSN	Publisher	Country	Subject area				As of September 2023	
		E-ISSN: 1309-4653				publication concerns)				
62	Turkish Journal of Physiotherapy and Rehabilitation https://turkjphysiotherrehabil.org/	Turkish Journal of Physiotherapy and Rehabilitation ISSN: 2651-4451 E-ISSN: 2651-446X	Turkish Physiotherapy Association	Turkey	HEP, MED	Active	Yes	Yes	Yes	No
63	Turkish Journal of Psychology http://www.turkpsikolojidergisi.org	Turkish Journal of Psychology (Turk Psikoloji Dergisi) ISSN: 1300-4433	Cyprus Mental Health Institute	Turkey	MED, PSY	Inactive	Yes	n/a	Yes	Homepage link is n/a
64	Vegueta https://vegueta.org/index.html	Vegueta ISSN: 1133-598X E-ISSN: 2341-1112	University of Las Palmas de Gran Canaria, Faculty of Geography and History	Spain	AAH, SOS	Active	Yes	n/a	Yes	Homepage link is n/a
65	Wulfenia journal https://www.multidisciplinarywulfenia.org/	Wulfenia ISSN: 1561-882X	Landesmuseum Karnten	Austria	ABS	Active	Yes	n/a	Yes	Homepage link is n/a
66	Wutan Huatan Jisuan Jishu http://www.wthtjsjs.cn/	Wutan Huatan Jisuan Jishu ISSN: 1001-1749	China National Publishing Industry Trading Corporation	China	EPS	Inactive (Discontinued due to radar)	Yes	Yes	No	Homepage link is n/a
67	Ymer https://ymerdigital.com/	Ymer ISSN: 0044-0477	University of Stockholm	Sweden	ENV, SOS	Active	Yes	Homepage link is n/a	Yes	Homepage link is n/a

Abbreviations: ABS, Agricultural and Biological Sciences; AAH, Arts and Humanities; BGM, Biochemistry, Genetics and Molecular Biology; BMA, Business, Management and Accounting; CHE, Chemical Engineering; CHM, Chemistry; CSC, Computer Science; EPS, Earth and Planetary Sciences; EEF, Economics, Econometrics and Finance; ENE, Energy; ENG, Engineering; ENV, Environmental Science; HEP, Health Professions; IAM, Immunology and Microbiology; MAT, Materials Science; MED, Medicine; MULT, Multidisciplinary; NEU, Neuroscience; NUR, Nursing; PTP, Pharmacology, Toxicology and Pharmaceutics; PHA, Physics and Astronomy; PSY, Psychology; SOS, Social Sciences.

[a]These columns represent information on authentic and legitimate journals that were hijacked and that had their profiles in Scopus compromised by dishonest publishers on the date of the investigation (see evidence in Data S1).

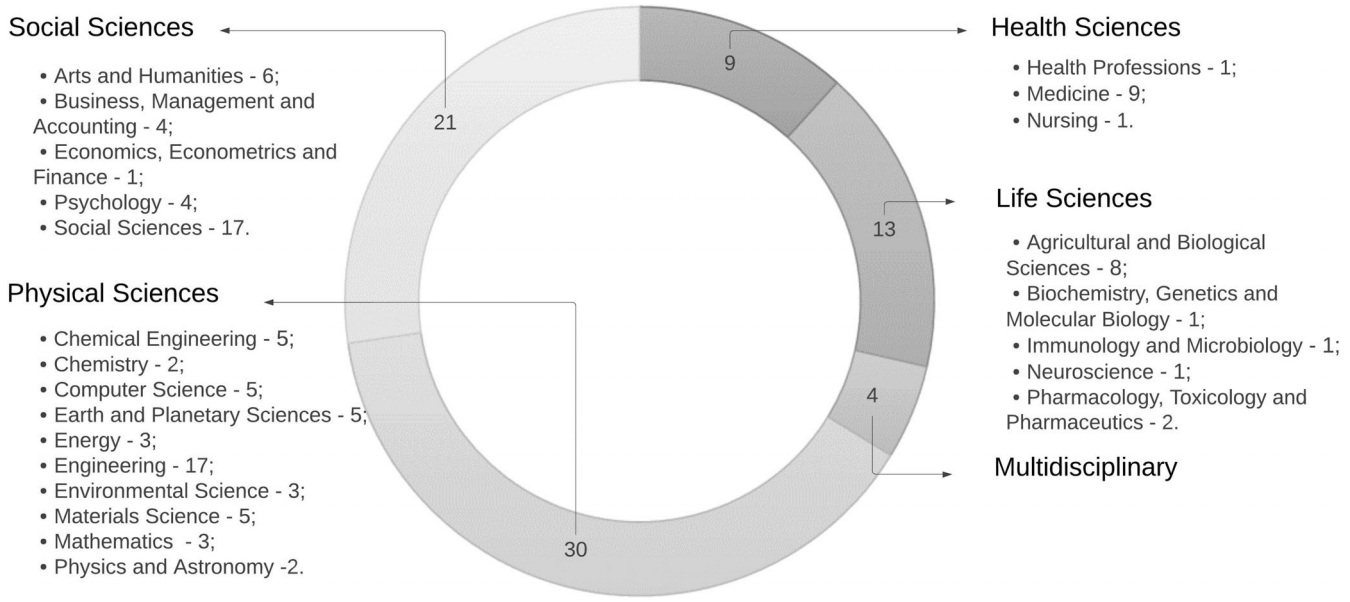

FIGURE 3 Subject areas of authentic journals hijacked by fraudulent publishers (*, **). *Some journals may have two or three subject areas. **This figure represents information on authentic and legitimate journals that were hijacked, and their profiles in Scopus were compromised by dishonest publishers as of the date of the investigation (see evidence in Data S1). *Source*: Scopus, Scimago

papers indexed in *Wulfenia* in Scopus between 2013 and 2020 originated from a hijacked journal.

The most recent case was registered in 2023 for the cloned version of *Hunan Daxue Xuebao/Journal of Hunan University Natural Sciences*, which is *indexjacked*, that is, papers from these fake journals are indexed by Scopus. Overall, unauthorized content has been consistently covered by Scopus and as of September 2023 can be said to have remained present every year throughout the period 2013–2023.

5.2 | Authentic journals as targets for hijacking

In total, 28 countries had authentic journals that were hijacked, and their profiles in Scopus were used for the dishonest activities of fake journals (see Table 1). China leads the list with 17 journals, which is a concerning trend in recent times (Abalkina, 2021a). One possible explanation for the hijacking of Chinese journals could be the challenge of detecting authentic homepage links due to language barriers.

Hijacked journals clone journals from small publishers, standalone journals, or those published by universities (see Table 2). They avoid hijacking journals from major publishers because such fraud can be easily detected. In the majority of cases, the publishers of hijacked journals are unknown because they anonymize their fraudulent activities.

The authentic journals, which are the victims of hijacking, represent all disciplines and nearly all subject areas (see Figure 3). However, the most frequent cases of hijacking are observed in the social sciences and engineering. In contrast, cloned versions of these journals often turn specialized journals into multidisciplinary ones, accepting papers from a wide range of disciplines to maximize their publication output.

The majority of cases of hijacked journals in Scopus, both registered and currently present in the bibliographic database, are associated with currently active journals in Scopus. Hijacked journals manage to get papers indexed to the profile of the journal in Scopus simultaneously with a genuine journal (Khosravi & Menon, 2021). For example, in 2022, four hijacked journals, including *Hunan Daxue Xuebao/Journal of Hunan University Natural Sciences*, *Journal of Southwest Jiaotong University*, *Annals of Forest Research*, and *Baltic Journal of Law and Politics*, had unauthorized content indexed together with the content of the legitimate journal.

Hijacked journals may also try to have unauthorized content indexed alone, for example, in cases where an authentic journal ceases publication. For instance, Kearney (2022) reported that the *Journal of Research on the Lepidoptera* stopped publishing in 2017. Fraudulent publishers registered the expired domain of the genuine journal to exploit its Scopus profile in order to have unauthorized content indexed. Unfortunately, after Scopus withdrew the unauthorized content, this journal in its genuine form could not be retrieved by its

TABLE 3 Countries of author affiliation in hijacked journals: A case study of four journals indexed in Scopus

	Annals of the Romanian Society for Cell Biology	Turcomat	Linguistica Antverpiensia	Turkish Journal of Physiotherapy and Rehabilitation	Total
India	1458	671	14	213	2356
Iraq	531	95	14	4	644
Uzbekistan	519	61	8	4	592
Malaysia	88	272	11		371
Indonesia	151	114	12	7	284
South Korea	122	117			239
Russia	46	29	1		76
Egypt	56	5	2		63
Peru	9	23	9	12	53
Saudi Arabia	31	15	2	1	49
Thailand	29	10	1		40
Iran	38	0			38
Nigeria	16	12	4	1	33
Morocco	7	23			30
Ukraine	25	2			27
Turkey	5	15	2	3	25
Viet Nam	11	11	2		24
Jordan	7	11	5		23
Ethiopia	13	6			19
Azerbaijan		17			17
Philippines	9	7	1		17
Kazakhstan	10	2	1		13
Oman	3	6			9
Kyrgyzstan	3				3
Tajikistan		1			1

Source: Scopus.

title on the Scopus list of sources or on the list of discontinued titles.

Unauthorized content from hijacked journals can still have a significant impact on the profiles of genuine journals in Scopus. For example, as of March 2023, between 2019 and 2022, approximately one-third of the papers indexed in the *Journal of Southwest Jiaotong University* were found to originate from the clone website https://www.jsju.org/. Based on my estimate, 9% of all papers indexed in this journal in Scopus are not from the genuine journal as of March 2023. Similarly, 33.3% of all papers indexed in Scopus from the *Hong Kong Journal of Social Sciences* were sourced from a cloned website as of March 2023.

In many cases, the topics of the indexed papers do not correspond to the theme of the journal title. For instance, Scopus indexed a paper on a road trip planner using Google Maps in the *Turkish Journal of Rehabilitation and Physiotherapy*. Additionally, a paper titled "The Similarities and Differences of Proverbs in Relation to Other Genres of Folklore" was published in the hijacked version of *Test Engineering and Management*. It is typical for hijacked journals to accept papers across a broad range of topics and disciplines (Memon, 2019; Moussa, 2021b) to maximize revenue.

5.3 | Author geographic distribution: A case study

Table 3 presents data on unauthorized content in Scopus obtained from four hijacked journals (*Annals of the*

Romanian Society for Cell Biology, *Turkish Journal of Computer and Mathematics Education (Turcomat)*, *Linguistica Antverpiensia*, and *Turkish Journal of Physiotherapy and Rehabilitation*) in May–June 2021. These fraudulent journals were established around 2020–2021 and collectively have indexed thousands of papers in Scopus. The indexing of these papers offers insights into the volume of publications and countries associated with publications in hijacked journals. Table 3 displays data on selected countries based on the number of unauthorized papers. Publications in hijacked journals are mostly associated with developing and emerging economies in East and Southeast Asia, South Asia, the Middle East, ex-Soviet countries, and certain African and Latin American countries. India has the highest number of papers originating from hijacked journals (2356), followed by Iraq (644) and Uzbekistan (592). These data suggest that country affiliations represent mainly lower-middle income and upper-middle income countries, resembling the pattern observed for predatory journals (Xia et al., 2015). High-income countries (except for several oil-rich economies and South Korea) and the least developed countries appear to be less affected, similar to what is observed for predatory journals (Macháček & Srholec, 2022). However, it appears that compared to predatory journals, hijacked journals target scholars from a more restricted number of

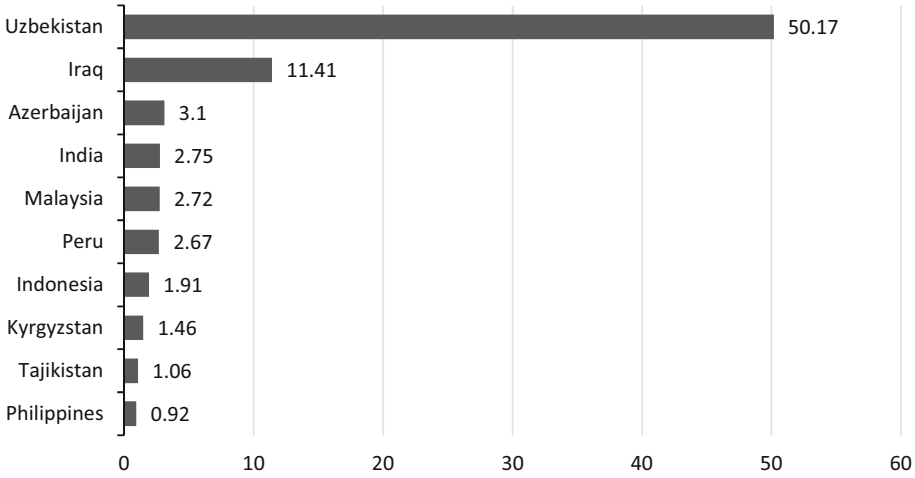

FIGURE 4 Share of nonauthorized content indexed in 2021 as a share of total journal articles in Scopus indexed in 2021 (by mid-May 2021). *Source*: Scopus

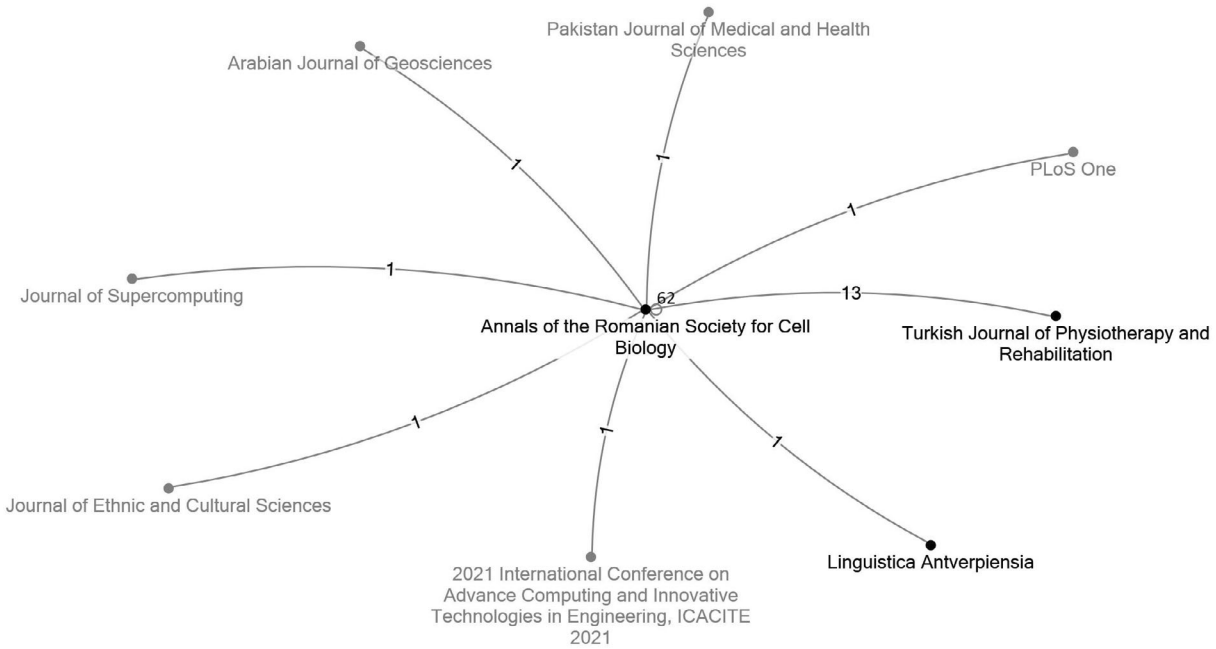

FIGURE 5 Citations to papers published in *Annals of the Romanian Society for Cell Biology*. *Source*: Scopus, June 2021

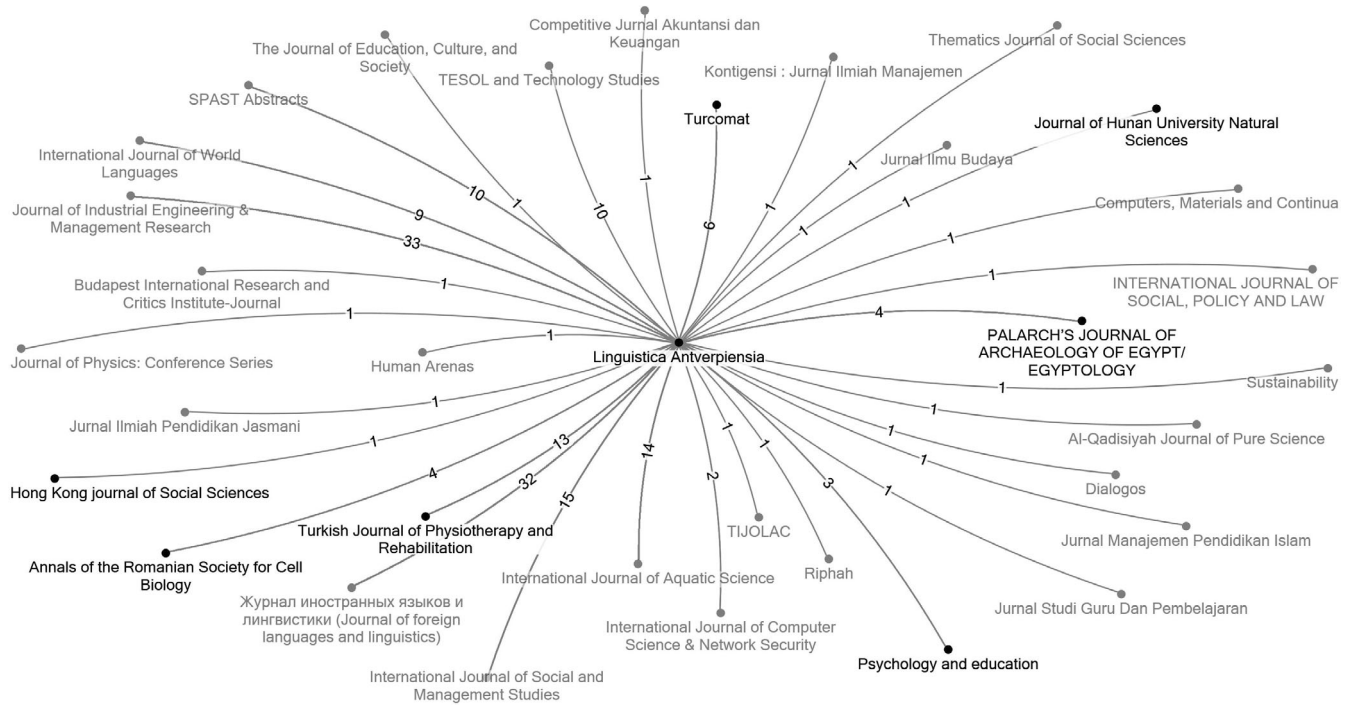

FIGURE 6 Citations to papers published in *Linguistica Antverpiensia*. Hijacked journals are marked in bold. *Source*: Google Scholar, October 2021

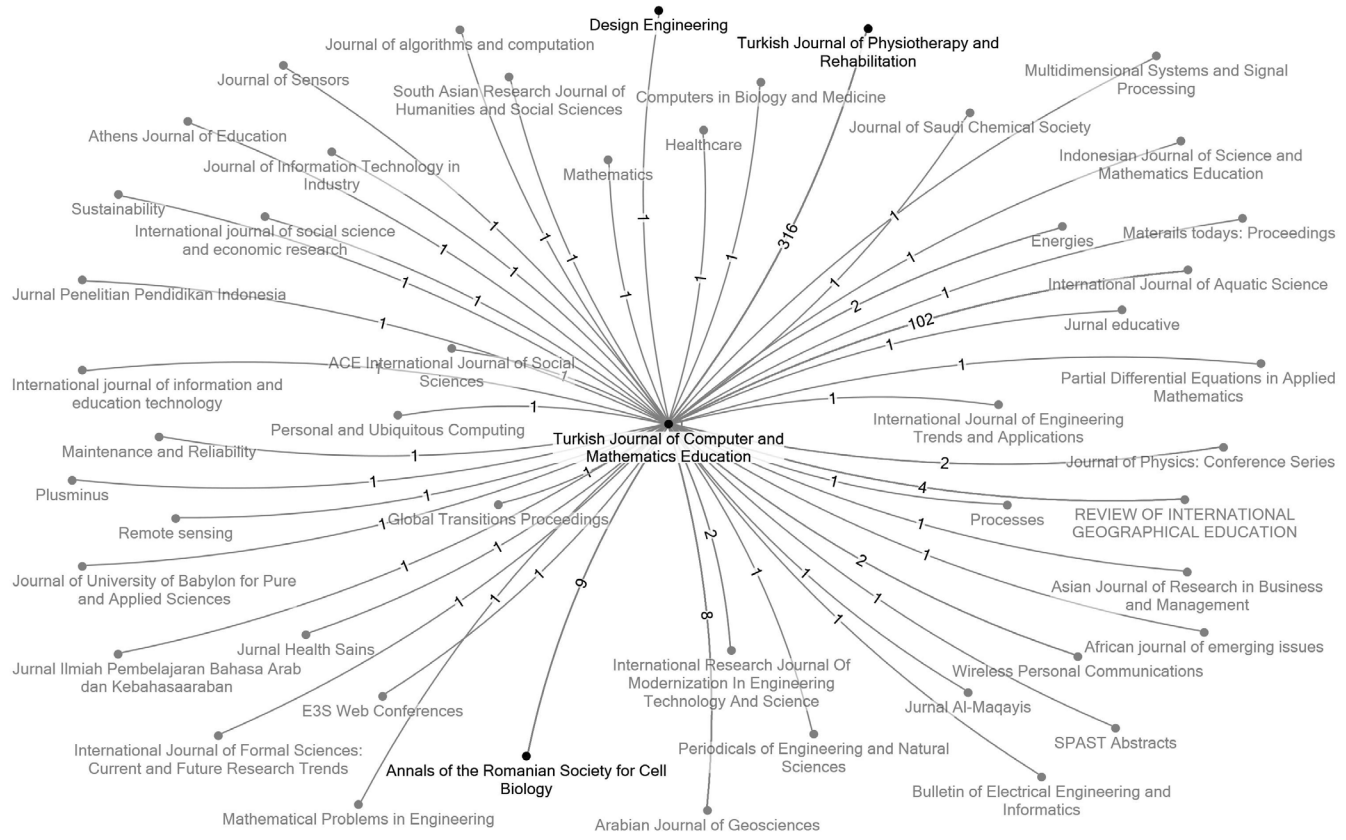

FIGURE 7 Citations to papers published in *Turcomat*. Hijacked journals are marked in bold. *Source*: Google Scholar, October 2021

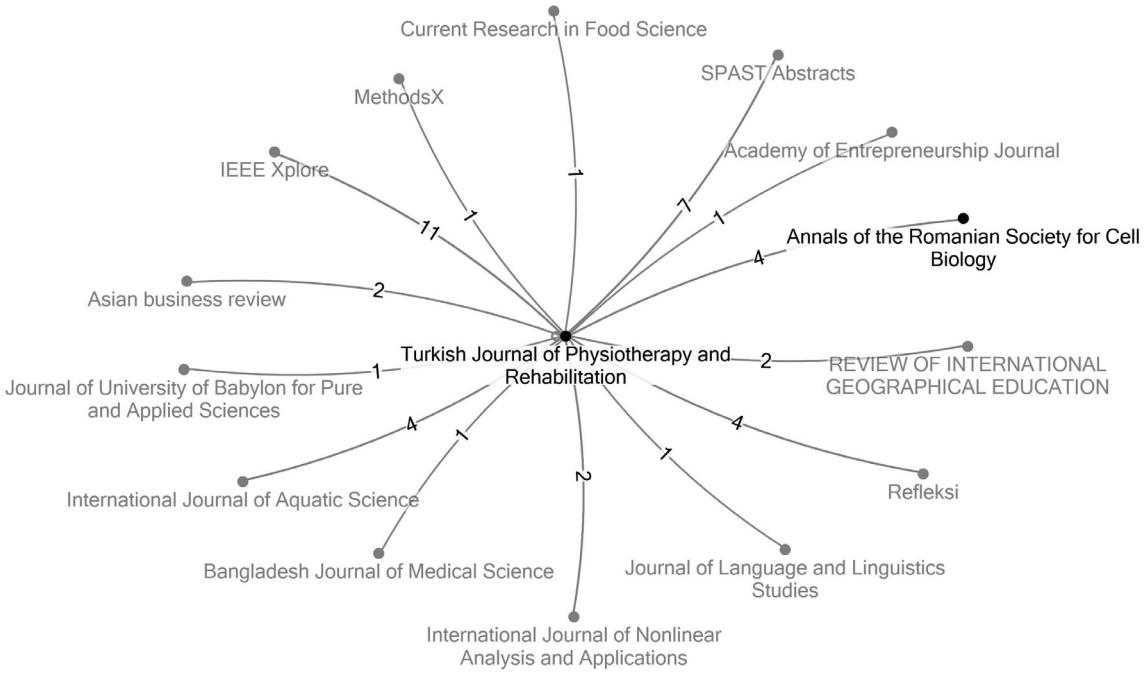

FIGURE 8 Citations to papers published in the *Turkish Journal of Physiotherapy and Rehabilitation*. Hijacked journals are marked in bold. *Source*: Google Scholar, October 2021

countries (Macháček & Srholec, 2022). However, this finding should be interpreted with caution given the limited number of four journals in the case study.

The total number of papers originating from these four journals and indexed in Scopus is not high in comparison with the total number of papers in Scopus; however, for selected countries, they play an important role. For example, more than 50% of indexed papers from Uzbekistan over 5 months in 2021 represented papers from hijacked journals (see Figure 4). This number is different from previous estimations (Abalkina, 2021a, 2021b, 2021c, 2021d, 2021e) due to more hijacked journals being included in the estimation.

Although the number of papers from hijacked journals in Scopus may not be as extensive as that from predatory journals, they can still skew bibliographic data by country or journal.

5.4 | Citation anomalies

From May to June 2021 and in October 2021, I conducted a citation analysis of four hijacked journals indexed in Scopus (see Figures 5–8). Papers published in these journals demonstrate citation anomalies. First, these journals have a high incidence of self-citation. In the case of *Annals of the Romanian Society for Cell Biology*, this resulted in a ridiculous situation where papers at the beginning of an issue were cited by papers at the end of the same issue. Second, hijacked journals extensively cite each other, suggesting potential citation inflation and the formation of citation cartels (Fister Jr. et al., 2016; Kojaku et al., 2021). A plausible approach for future studies could involve applying the snowball method of citation analysis to identify hijacked journals or other problematic journals.

Another concerning finding is that reputable journals cite papers published in hijacked journals. Such citations legitimize unreliable papers from hijacked journals (Abalkina et al., 2022; Moussa, 2021a).

6 | THE POLICY OF SCOPUS TOWARDS DISCOVERED HIJACKED JOURNALS

After unauthorized content is discovered, Scopus deletes it (Elsevier, 2021):

> Where there is evidence that the articles in Scopus are not authentic, that is, are not sourced from the genuine journal, the content will be removed from Scopus.

The majority of unauthentic content from journals mentioned in Table 2 was removed from Scopus after the middle of 2021 and all unauthorized content mentioned in Table 3 has been deleted. However, some journals from Tables 2 and 3 still have unauthorized content in their

profiles. There are several explanations for why unauthorized content is still indexed in several dozen journals. First, evidence suggests that hijacked journals continue fraud even after the discovery of unauthorized content. For example, after the withdrawal of papers published in the clone journal *Linguistica Antverpiensia* from Scopus, the original journal updated the profile of the journal in Scopus to its new title *Linguistica Antverpiensia*, *New Series—Themes in Translation Studies*. In 2021–2022, the fraudulent publisher succeeded in indexing seven more times unauthorized content to a new profile of the journal (Abalkina, 2023a). A similar situation occurred in the *Turkish Journal of Rehabilitation and Physiotherapy* when, after the removal of unauthorized content, several papers were indexed again (Abalkina, 2022). One unauthorized paper is still present in Scopus as of September 2023.

Second, Scopus can delete papers indexed in a certain year, but unauthorized content can be indexed in various years. For example, the journal *Annals of the Romanian Society for Cell Biology* penetrated Scopus with unauthorized papers published in 2020 and 2021. The papers from 2021 have been deleted, but approximately a dozen papers from 2020 are still there.

Third, there is evidence that some individual papers originating from hijacked journals can remain unnoticed by Scopus or even the genuine journal, such as in the case of *Jökull*, where the majority of unauthorized content was deleted but with some unauthorized papers remaining. Based on this evidence, I hypothesize that similar cases might exist that have not yet been identified.

Fourth, some recent cases of *indexjacking* remain undetected by Scopus. For example, Scopus covers papers published in the cloned version of the *Journal of Hunan University Natural Sciences* in 2022 and 2023.

Fifth, there are at least three cases of discontinued journals where there are hundreds of papers from hijacked journals. The investigation of delisted journals can be of less priority for Scopus. For example, the discontinued journal *Test Engineering and Management* hosts several hundred unauthorized papers originating from a hijacked version. Moreover, the link to the hijacker is still in the profile of the journal in Scopus. Scopus was informed about the case in March 2021 when the journal was already delisted. However, unauthorized content and the link to a hijacked journal are still in the profile of the journal as of September 2023. Hundreds of papers from the potentially hijacked *International Journal of Control and Automation* and *International Journal of Advanced Science and Technology* are also still in Scopus.

Scopus has a different policy towards hijacked journals compared to predatory journals, both of which violate publishing ethics. Predatory journals have their content officially indexed in Scopus, and in case of their delisting, the process is transparently and thoroughly documented. Any content that was published before the delisting remains indexed. However, the situation is different with hijacked journals. The content from hijacked journals is illegitimately indexed, and when the fraud is identified, the content is deleted without notice or documentation. This lack of transparency poses a significant challenge for the academic community, as hijacked journals can continue to deceive scholars even after their removal from Scopus or by the importation of many unauthorized papers to different databases.

Scopus may penalize legitimate journals for the actions of hijacked ones due to the penetration of unauthorized content. Unfortunately, some genuine journals have been discontinued due to publication concerns caused by fraudulent journals but not by any wrongdoing on the genuine journal's part. For example, *Talent Development and Excellence*, a genuine journal, was discontinued in Scopus due to publication concerns, even though its publisher was not involved in dishonest practices. In my view, this approach is not appropriate, as it penalizes genuine journals for the misdeeds of fake publishers, adversely impacting the reputation of authentic journals, even if they have ceased publication.

The findings indicate that hijacked journals consistently manipulate data and content in Scopus. At the same time, the measures applied by Scopus do not seem to be sufficient to identify hijacked journals and protect the database from fraud. Unauthorized content has been detected and is still present in the index from every year between 2013 and 2023 (as of September 2023). It has been observed that at least 30% of legitimate journals listed in the Retraction Watch Hijacked Journal Checker had also been compromised in Scopus (as of September 2023).

This evidence shows that Scopus has a reactive policy towards hijacked journals rather than a proactive policy. Many cases of hijacked journals in Scopus were reported by third parties (including the author of the present study) but were not identified by the database. Considering dozens of cases of hijacked journals in Scopus, the efforts and procedures of Scopus against hijacked journals are insufficient to ensure the quality of the database.

7 | LIMITATIONS AND DISCUSSION

The results of this study are limited by the documented cases of hijacked journals in Scopus, but it is possible that the actual number of occurrences is greater. Nevertheless, the identified cases of hijacked journals provide valuable insight into the challenges faced by the

academic community due to the infiltration of fraudulent journals into reputable indexing databases.

International bibliographic databases, such as Scopus and Web of Science, and their content are used as a proxy of quality (Brainard, 2023; de Rijcke & Stöckelová, 2020). The indexation of predatory journals and the penetration of hijacked journals in Scopus challenge academic integrity. The vulnerability of bibliographic databases and insufficient quality control are accompanied by the proliferation of fraudulent businesses.

The penetration of hijacked journals into Scopus legitimizes unreliable papers from problematic journals because such papers have not undergone peer review. There is also evidence that papers published in hijacked journals violate academic ethics and contain plagiarism and dubious authorship (Abalkina, 2021e).

There is also a spillover effect of the penetration of hijacked journals into Scopus. First, some international and national bibliographic databases or libraries import entries from Scopus. For example, the WHO COVID-19 Research Database replenishes its listings of scientific literature on COVID-19 from leading databases including Medline, Scopus, Web of Science, and so forth. In 2021, 383 papers from three hijacked journals were detected in the WHO COVID-19 Research Database, which were imported from Scopus (Abalkina, 2021d). When Scopus deletes the content of hijacked journals, it does not report to other databases about the withdrawal of this unauthorized content, and it remains listed as legitimate and authentic. Papers indexed in Scopus, including those from hijacked journals, are imported into researchers' profiles in ORCID. Even if Scopus deletes unauthorized content, such papers remain in ORCID. The unauthorized content was also detected in the Russian bibliographic database eLibrary, which was imported from Scopus. Thus, the indexation of unauthorized content has spillover effects, and nonpeer-reviewed literature remains legitimized in various databases even after the withdrawal of such content from Scopus.

Second, papers originating from hijacked journals are cited not only by dishonest journals but also by reputable journals. Abalkina et al. (2022) found 828 articles in journals from 67 reputable publishers citing unreliable articles originating from 12 hijacked journals. There is also evidence of the references lists linking the paper from a hijacked journal to Scopus suggesting that the references were imported from Scopus. Third, such unreliable papers can be used for meta-research when imported from reputable indexing databases.

The proliferation of predatory publishing and hijacked journals has led to various efforts to combat them, such as creating black and white lists of journals (de Rijcke & Stöckelová, 2020) on both international and national levels. However, this can also result in information asymmetry. Many countries maintain local lists of approved journals where scholars are required to publish papers to obtain promotions, rewards or grants. The approved lists typically include journals indexed in international bibliographic databases, such as Scopus and Web of Science, and local peer-reviewed journals. However, a problem arises when clone versions of the approved journals are used for publication. Local academic authorities may not be able to distinguish between authentic and hijacked journals and confirm the publication, for example, by the title and ISSN of the journal, which can be identical in authentic and illegitimate journals. For example, in Pakistan, the Higher Education Commission of Pakistan (HEC), which is responsible for maintaining the list of approved journals, failed to differentiate between authentic and cloned journals (Yousafzai, 2022). As a result, papers published in hijacked journals were recognized as those published in legitimate journals on the approved list. Such information asymmetry and lack of access to scientific infrastructure in developing counties contribute to the deception of scholars, universities and official bodies.

The proliferation of hijacked journals can be attributed to the growing demand for fast and easy publication without rigorous peer review. This trend is driven by the increasing internationalization of research evaluation methods and the standardization of easy-to-apply quantitative metrics, such as the number of publications in international journals indexed in Scopus or Web of Science. Additionally, researchers from developing countries may face high requirements from reputable journals while not receiving sufficient training and support to conduct research at the necessary level (Kurt, 2018). Hijacked journals may be a more attractive option for scholars due to economic reasons. The article processing charges (APCs) in hijacked journals are significantly smaller compared to many legitimate open-access journals. This also explains why authors who submit papers to hijacked journals are often affiliated with specific lower middle-income countries.

8 | IMPLICATIONS FOR INDEXING DATABASES

- Bibliographic databases should implement effective and proactive procedures to detect hijacked journals, protect their databases from fraud, control the quality of their databases, and prevent fraudulent publishers from compromising the web links of legitimate journals or seeking the indexing of unauthorized content.

Additionally, they should avoid repeated indexing of unauthorized content after the discovery of hijacked journals and withdrawal of indexed papers.
- Indexing databases should investigate the cases of hijacked journals and correct the entries. This should also be applied to journals that are discontinued because there is evidence that hijacked journals continue to operate illegitimately even after Scopus detects the fraud and withdraws unauthorized content from the database.
- Indexing databases should maintain updated journal profiles. In the case of journal *indexjacking*, a link to the authentic journal should be amended as quickly as possible (where possible).
- Legitimate journals should not be discontinued from Scopus due to publication concerns resulting from the actions of hijacked journals.
- The most important implication for international bibliographic databases is to increase the transparency of hijacked journal penetration in the databases and register cases of content removal from hijacked journals. The lack of transparency enables the hijacked journals to dupe scholars even after the withdrawal of unauthorized content. Despite the withdrawal of content in Scopus and even the expiration of the domain when all the content of the original hijacked journals is lost, the papers from hijacked journals can be found in different databases, such as the WHO COVID-19 Research Database, ORCID, and eLibrary, or on various online repositories, such as ResearchGate, Academia.edu, SSRN, or websites of universities, where such papers are cited or imported into different databases. Therefore, transparent documentation can help to overcome information asymmetry and maintain scientific integrity.

9 | CONCLUSIONS

Hijacked journals are a growing phenomenon aimed at redistributing the economic rent accumulated by publishers and journals indexed in Scopus or Web of Science. They achieve this by fraudulently deceiving potential authors and mimicking legitimate international journals. These hijacked journals cater to an increasing demand from scholars affiliated with middle-income countries for publications in international journals, which has arisen due to the internationalization and standardization of research evaluation policies in many developing countries.

Hijacked journals are undoubtedly fraudulent, and their proliferation reflects a broader issue of publication pressure in developing countries and the disadvantages of relying on journal-based research evaluation strategies. Journal-based research evaluation criteria, such as relying on publication counts or impact factors to assess the quality of researchers or institutions, can exacerbate this pressure and incentivize unethical practices.

This study represents the first attempt to compile a list of hijacked journals in which data or content were compromised in the international citation database Scopus. *Indexjacking*, the infiltration of hijacked journals into indexing databases, for example, Scopus, has been an ongoing issue for over a decade, with the phenomenon first appearing in the early 2010s. Scopus is one of the most impacted databases, with at least 67 cases of hijacked journals documented. While Scopus has removed the majority of unauthorized content, as of September 2023, 41 hijacked journals remain present in the database. Of these, 29 journals still contain unauthorized content, and 15 journal profiles include links to hijacked journals.

The study demonstrates that journal hijackers primarily target standalone journals, those from small publishers, or university journals and typically avoid cloning journals from major publishers. Journals from 28 countries were genuinely published but later hijacked, with their profiles in Scopus being misused by hijackers. These authentic journals cover all disciplines and almost all subject areas. However, hijackers tend to modify their cloned versions to multidisciplinary journals to maximize their number of published papers. Insights into the publishers of hijacked journals are limited, as they anonymize their dishonest activities.

The presence of unauthorized content in Scopus legitimizes unreliable papers that originated from hijacked journals. This not only deceives scholars but also compromises the quality of the database itself. The presence of hijacked journals in Scopus has far-reaching consequences, including the propagation of unreliable information through citations, the inclusion of untrustworthy papers in meta-studies, and the incorporation of Scopus data into various databases, where unauthorized content may persist even after Scopus has removed it. Therefore, it is crucial that the remaining cases of hijacked journals in Scopus are thoroughly investigated and that the database entries are corrected accordingly. This study also raises concerns about the quality control at Scopus and the procedures in place to protect the database from fraud and detect hijacked journals. To maintain academic integrity, Scopus should ensure effective quality control of the database, register the withdrawal of unauthorized content and ensure transparency.

ACKNOWLEDGMENTS

I would like to thank researchers from all over the world who sent me details about potential hijacked journals. I would like to thank Mohammed Al-Amr for indicating several hijacked journals for the initial draft paper. I would like to thank Ivan Oransky for a suggestion to demonstrate the documented evidence of journal hijacking in a separate appendix of the Supplementary material. I further thank Cabells for providing a trial period to access Cabell's Predatory Reports. I extend my gratitude to an editor and two anonymous reviewers for their valuable suggestions and comments. Open Access funding enabled and organized by Projekt DEAL.

CONFLICT OF INTEREST STATEMENT

Anna Abalkina creates and maintains the list of hijacked journals (Retraction Watch hijacked journals checker) in collaboration with Retraction Watch. She received financial compensation for this activity from Retraction Watch.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Abalkina, A. (2024). Challenges posed by hijacked journals in Scopus. *Journal of the Association for Information Science and Technology*, *75*(4), 395–422. https://doi.org/10.1002/asi.24855