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COVID-19 and publishing

Kihong Kim

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Currently, coronavirus disease 2019 (COVID-19) is sweeping across the entire world and no one is free from its influence. All people involved in the publishing of scholarly journals including researchers, reviewers, editors, and publishers work in environments that differ significantly from those of the pre-COVID-19 era. Recently, a number of editorials and essays on how journal editors should cope with this situation have been published [1-3]. Many have expressed the opinion that research papers directly related to COVID-19 should be published as promptly as possible, though it is necessary to maintain the high quality of the peer review process. In addition, it has been suggested that more flexibility in the editorial procedure, such as relaxing the requirements for the author's revision and allowing more time to review, is desired. For obvious reasons, the number of research papers on COVID-19 has increased explosively, causing considerable difficulties for editors of related journals. However, it seems that until now, there has been no significant change in the number of papers in other scientific fields.

Due to COVID-19, many people are forced to work from home and do a lot of work online. Classes, exams, seminars, conferences, and business meetings are held online around the world. From this experience, I guess many of us have realized that a substantial part of those activities can be done more efficiently in this way. Even after COVID-19 has passed, I expect that a lot of human social activities will be changed irreversibly and rely much more on online activities than before. Such a transition will touch on all stages of writing and publishing of scientific papers. It is certain that technologies for online communication, virtual reality, artificial intelligence, and online security will evolve rapidly to make online activities more reliable in the future.

In the forthcoming issues of *Science Editing*, we plan to publish articles on various aspects of the impact of COVID-19 on scholarly publishing. In this issue, three interesting articles are published. The article by Chung et al. [4] presents and discusses the results of the survey of journal editors and staffs regarding how they assess the current and future situation of editing and publishing in the time of the COVID-19 pandemic. This survey was conducted by the Korean Council of Science Editors and the Council of Asian Science Editors and all respondents were from Asian countries including Korea, Indonesia, Vietnam, and Malaysia. Most of the respondents are affiliated with universities and serve as editors of local society journals. The article by Oh and Kim [5] presents a bibliometric analysis of COVID-19-related papers published in the field of nursing and the essay by Oh [6] discusses some experience of the impact of COVID-19 on journal editing. In the future, we will continue to publish interesting articles on

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topics such as the influence of COVID-19 on the research productivity of scientists, bibliographic analyses of COVID-19-related papers published in various academic fields, and the experiences and opinions of editors and researchers from around the world. I hope all readers of *Science Editing* will go through these difficult times well and stay healthy.

Conflict of Interest

Kihong Kim has been the editor of *Science Editing* since 2014.

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Influence of the COVID-19 pandemic on Asian scholarly journal editors' daily life, work, and opinions on future journal development

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Abstract

Purpose: This study examined changes in Asian journal editors' daily life and work during the coronavirus disease 2019 (COVID-19) pandemic and investigated their opinions on expected changes, thereby providing preliminary data to support the future needs of journal editors.

Methods: A survey questionnaire was developed and sent to 1,537 editors and staff of Asian scientific journals from July 13 to 19, 2020. The items gathered information on participants' general characteristics, changes in daily life, changes in work life, anticipated future changes, and suggestions in the context of the COVID-19 pandemic.

Results: Of the 152 respondents (response rate, 9.7%), most were editors. Fifty-seven respondents (37.5%) felt very or extremely anxious about the COVID-19 pandemic, and 101 (68.4%) reported spending more time on the internet. The workload of editing, reviewing, and publishing had increased for about one-third of respondents (34.2%, n = 52). Forty-four respondents (28.9%) said that the number of submissions had increased. Of the 68 editors who had received manuscripts on COVID-19, 30 (44.1%) prioritized them. Most respondents (73.7%, n = 112) predicted that online-only journal publishing would expand after the COVID-19 pandemic.

Conclusion: COVID-19 appears to be a source of anxiety to editors, which may be related to the increased time they spend on the internet. Some editors reported an increased workload. To promote online communication, a better environment and training tools are required. Editors and staff will need more opportunities to prepare for online publishing, as editors believed that the online-only publication of scholarly journals would accelerate after the COVID-19 pandemic.

Keywords

COVID-19; Severe acute respiratory syndrome coronavirus 2; Publishing; Anxiety; Internet

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Introduction

Background/rationale: On March 11, 2020, the World Health Organization declared coronavirus disease 2019 (COVID-19) as a pandemic to enable more vigorous measures to control and prevent this viral disease. Although this infectious disease has spread worldwide, there is no specific drug or available vaccine at this point. In response to the COVID-19 pandemic, social distancing was implemented throughout the world, including Asia, as a preventive measure to limit the transmission of COVID-19 [1]. Research activities have also been affected, although the impact of countermeasures against COVID-19 has varied across scientific fields. For example, the situation differs considerably between fields where research can be conducted online and those where laboratory research is required. Moreover, in response to the need for rapid exchange of current knowledge, many journals have received increased submissions [2], although the patterns in the number of submissions are not uniform [3]. Collectively, these findings suggest that journal editors may face changes in their workload.

No study has yet investigated work changes or changes in daily life among editors of scholarly journals during the COVID-19 pandemic. It may be meaningful to understand how social changes originating from this pandemic have influenced editors' daily life and work life. Furthermore, understanding journal editors' expectations regarding the future of journal publishing will provide a basis for strategies aiming to support their efforts to develop their journals.

Objectives: This study aimed to examine the changes in Asian journal editors' daily life and work life, and to gather opinions on anticipated changes in the age of the COVID-19 pandemic. The specific goals were as follows: to identify any changes in editors' daily life and work life, to determine whether aspects of editors' daily life or work life differed depending on their characteristics, to identify their opinions on directions for the development of academic journals, and to derive suggestions for supporting editors according to the above results. These results will identify current challenges that editors face and can help editors and publishers to set long-term directions for journal development in the future. Furthermore, this study will be able to generate the changes in researchers' writing activities and publishing environment.

Methods

Ethics statement: This study was approved by the institutional review board of Hallym University (HIRB-2020-037). Informed consent was obtained from respondents through an online survey.

Study design: This cross-sectional descriptive study employed an online survey.

Development of the measurement tool: The survey items were initially developed by one author (YC), and were then modified through discussions among seven executive board members of the Korean Council of Science Editors from June 1 to July 10, 2020. After expert agreement on all items, which were verified to be related to journal editors' work or environment, 19 survey items were finalized. A reliability test was not done since only two items gathered Likert-scale interval data. The other categorical (nominal) items could not be treated as binomial data; therefore, a goodness-of-fit test could not be executed. The 19 survey questions are presented in Suppl. 1. The survey consisted of four items on the general characteristics of respondents, two items on changes in daily life, seven items on changes in work life, and six items on anticipated future needs. The items on changes in daily life were rated on a 5-point Likert-scale and there were four open-ended items on expectations regarding the future. The other 12 items were categorical.

Participants: The mailing lists of the Korean Council of Science Editors and the Korean Federation of Science and Technology Societies ($n = 1,225$) were used for recruitment, as well as the mailing list of the Council of Asian Science Editors ($n = 312$). In total, 1,537 invitations to the survey were sent via email, with one follow-up reminder.

Data analysis: The frequency of each item of the survey questionnaire was calculated. A correlation analysis of the two Likert-scale items was done. The items were compared according to respondents' characteristics. To evaluate the significance of the association between an increased workload and an increased number of submissions, the chi-square test was done after simplifying the data into "yes" and "other" responses. DBSTAT ver. 5.0 (DBSTAT, Chuncheon, Korea) was used for the statistical analysis. Content analysis was conducted of the descriptive responses presenting reasons for participants' categorical responses to items related to online journal publishing, increases in the number of articles, changes following COVID-19, and suggested topics for editor training.

Results

The results of the survey are available in Dataset 1.

Participants: Out of 1,537 invited participants, 152 (9.7%) responded from July 13 to 19, 2020. Their role in journal publishing and affiliations are tabulated in Table 1. The majority were editors or editorial board members (80.9%, $n = 123$). Therefore, the results of this survey may be considered to reflect their opinions.

All respondents were from Asia, reflecting the fact that the

Table 1. Role and affiliation of respondents

	Editor or editorial board member	Manuscript editor	Staff, academic society	Staff, publishing company	Other	Total
University	110 (92.4)	8 (6.7)	1 (0.8)	0 (0.0)	0 (0.0)	119 (100)
Research institute	8 (88.9)	1 (11.1)	0 (0.0)	0 (0.0)	0 (0.0)	9 (100)
Publishing company	2 (33.3)	2 (33.3)	0 (0.0)	2 (33.3)	0 (0.0)	6 (100)
Academic society	2 (14.3)	4 (28.6)	8 (57.1)	0 (0.0)	0 (0.0)	14 (100)
Other	1 (25.0)	2 (50.0)	0 (0.0)	0 (0.0)	1 (25.0)	4 (100)
Subtotal	123 (80.9)	17 (11.2)	9 (5.9)	2 (1.3)	1 (0.7)	152 (100)

Values are presented as number (%).

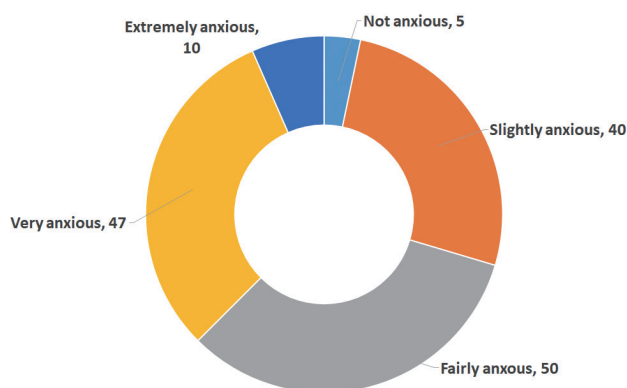


Fig. 1. Respondents' anxiety levels about the COVID-19 pandemic.

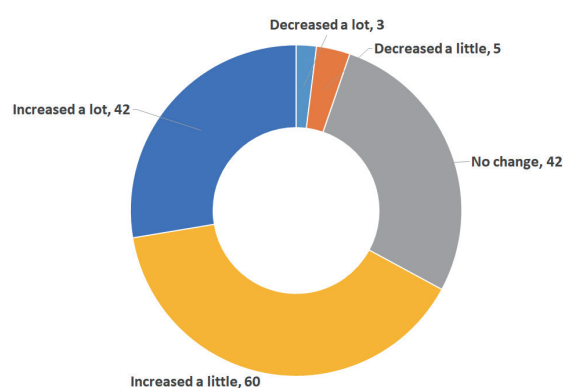


Fig. 2. Changes in time spent on the internet since the COVID-19 pandemic.

invitations were sent to the mailing list of organizations in Asia. Their research fields as follows: medical and health sciences, 65 (42.8%); engineering, 35 (23.0%); natural sciences, 20 (13.2%); arts, humanities, and social sciences, 18 (11.8%); agriculture and fisheries, 12 (7.9%); and others, 2 (1.3%).

Main results

Daily-life: Fifty-seven respondents (37.5%) felt very anxious or extremely anxious about COVID-19 (Fig. 1). More than two-thirds of the respondents (67.1%, n=102) reported spending more time on the internet during the COVID-19 pandemic (Fig. 2). The correlation between anxiety level and the time spent on the internet was weak, but statistically significant ($r=0.1986$; $P=0.0142$; 95% confidence interval, 0.0405 to 0.3468).

Work life: Eighty respondents (52.6%) said that they worked at home or alternated between working at home and their institutional office (Fig. 3). Fifty-two respondents (34.2%) stated that their workload increased after the COVID-19 pandemic. This response was especially common for respondents in natural sciences (9/20). There was no association between research field and the workload excluding agriculture and fish-

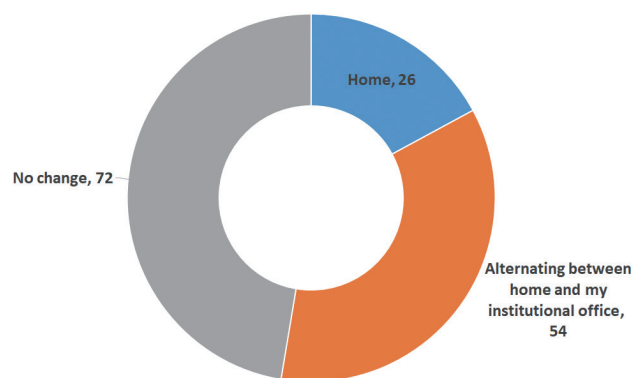


Fig. 3. Main workplace since the COVID-19 pandemic.

eries due to the response cell value less than 5 (Table 2, Fig. 4).

Forty-one respondents (27.0%) reported difficulties in communicating with other editorial board members or publishing colleagues. Since the COVID-19 pandemic, 44 respondents (28.9%) noted an increased number of submissions to their main journal than in previous years. The field where submissions had increased the most was the arts, humanities, and social sciences (8/18, 44.4%). This was followed in de-

Table 2. Chi-square test of the association between research field and workload

Field	Workload		Total
	Increased	No change or decreased	
Engineering	10	25	35
Natural science	9	11	20
Medicine	21	44	65
Social science	7	11	18
Total	47	91	138

df=3, significance level (alpha=0.05): $\chi^2=7.82$, P=0.6125.

Table 3. Chi-square test of the association between research field and number of submissions

Field	No. of submissions		Total
	Increased	No change or decreased	
Engineering	5	25	30
Natural science	7	10	17
Medicine	21	39	60
Social science	8	10	18
Total	41	84	125

df=3, significance level (alpha=0.05): $\chi^2=7.82$, P=0.1496.

Table 4. Chi-square test of the association between increased workload and increased number of submissions

Increased workload	Increased submissions		Total
	Yes	Others	
Yes	25	24	49
Others	19	69	88
Total	44	93	137

df=1, significance level (alpha=0.05): $\chi^2=3.84$, P=0.0008.

scending order, by natural sciences (7/20, 35.0%), medical and health sciences (21/65, 32.3%), agriculture and fisheries (3/12, 25.0%), and engineering (5/35, 14.3%). There was also no association between the research field and the number of submissions excluding agriculture and fisheries due to the response cell value less than 5 (Table 3, Fig. 5).

Fifty-one respondents (33.6%) said that they spent more time on reviewing or editing manuscripts since COVID-19, while 90 stated that there was no change (59.2%) and 11 (7.12%) noted a decreased time spent. The chi-square test showed a significant association between workload and the

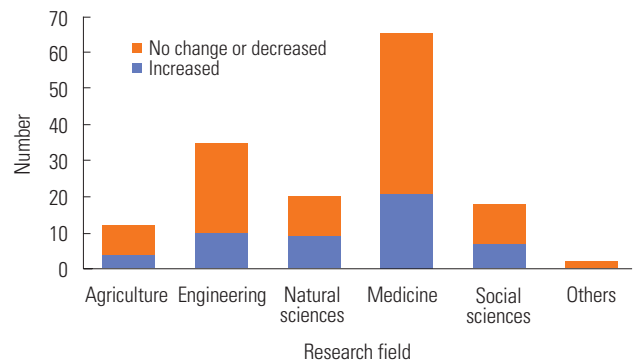


Fig. 4. Changes in editors' workload during the COVID-19 pandemic period according to the research field.

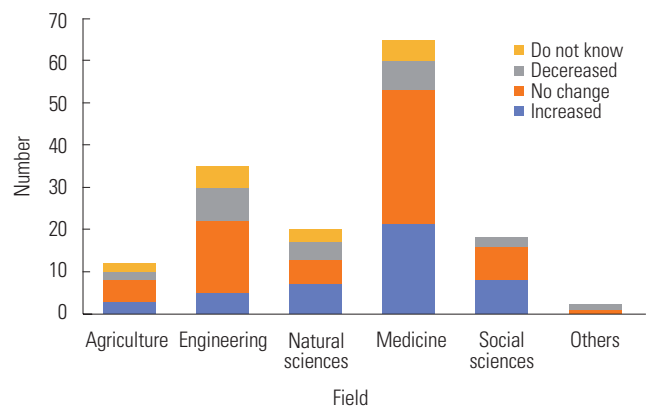


Fig. 5. Changes in the number of submissions since the COVID-19 pandemic.

number of submissions. In this analysis, responses of “do not know” (15) were removed, and responses of “no change” and “decreased” items were merged as “others” (Table 4).

When editing or reviewing manuscripts related to COVID-19 (if any), 38 out of 68 editors (55.9%) indicated that they prioritized those manuscripts (e.g., fast-track review). As for training and learning from March to June 2020, more than half of the respondents (52.6%, n=80) stated that they had not been able to attend any online training programs for journal editing or publishing (Fig. 6).

Editor's expectations for the future of journal publishing: The majority of respondents (73.7%, n=112) thought that online-only journal publishing would expand after the COVID-19 pandemic. The reasons can be summarized as follows (Suppl. 2): easy access (7), economic advantages (3), non-face-to-face exchange (1), rapid communication (3), and irreversible trends (38). Forty respondents stated that there would be no changes.

Sixty-four respondents (42.1%) said that the need for jour-

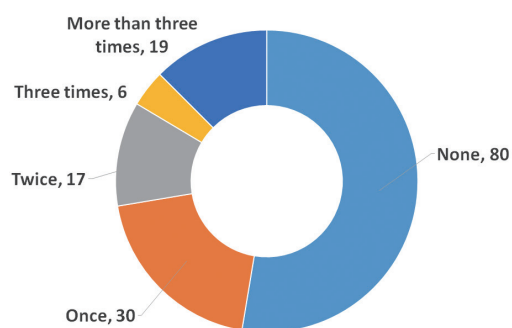


Fig. 6. Frequency of attending online training programs for journal editing and publishing from March to June 2020.

nal publishing (the number of articles or number of journals) would increase after the COVID-19 pandemic. The reasons for this anticipated increase can be summarized as follows (Suppl. 3): the emergence of new topics due to the COVID-19 pandemics (11), more time for authors to write (9), expansion of the information market (1), and the government's pressure to publish (1). In contrast, the reasons given by respondents who anticipated no changes in the number of articles included decreased research activity (including exchange programs) (10), no expected change in the publication environment (10), negative economic impacts (3), and the saturated journal market (3) (Suppl. 3).

The changes respondents expected in journal editing and publishing due to COVID-19 are tabulated in Suppl. 4. From 62 answers, the following topics were extracted: reduced submissions (7), increased submissions (1), rapid or sharp review (2), more active use of preprint servers (2), more active online publishing (12), a transition to online meetings (7), the need for an excellent editing team (3), increased budget (3), and more competition (1). Seventeen persons expected no change in the journal publishing environment.

Suggested topics for future training programs related to editing or publishing are summarized in Suppl. 5. From 43 answers, the following topics were extracted: editing or editorial process (15), publication ethics (9), upgrading the publishing process (which included the use of Open Journal Systems [<https://pkp.sfu.ca/ojs/>], digital standards of scholarly journals, ISO XML standards, and the journal management system) (8), online training (4), improving peer review (4), indexing in international databases (2), and editors' collaboration (1).

Discussion

Key results: One-third of the 152 respondents felt very or extremely anxious about the COVID-19 pandemic. Two-thirds

of respondents spent more time on the internet during the COVID-19 period. The correlation between anxiety level and time spent on the internet was statistically significant, albeit weak. One-third of respondents reported an increased workload in editing, reviewing, and publishing. Of the editors who indicated that they received submissions related to COVID-19, nearly half prioritized such manuscripts, although it is unclear whether this may have contributed to their anxiety. Three quarters thought that online-only journal publishing would expand after the COVID-19 pandemic.

Interpretation: During the COVID-19 pandemic, it appears that a sizable proportion of editors or publishing staff experienced anxiety, as reports have also shown for the general population [4]. They also reported spending more time on the internet, which may be inevitable due to social distancing and the change in the workplace from institutional offices to home. In countries such as Korea, where social distancing and home-based working policies were implemented starting in the early phase of the COVID-19 pandemic, this was more of a social mandate than personal choice.

As editing, reviewing, and publishing scholarly journals are doable both from the office and at home, the extension of work to home may have been natural in terms of flow and results. Although weak, the correlation between anxiety and increased internet time may be worth further examination in the future. As shown in Table 4, an increased number of submissions was associated with an increased workload among editors although the majority of editors did not receive more submissions and their workload did not increase. This is understandable because editors' workload can be estimated according to the number of submissions. A previous report indicated that manuscripts on COVID-19 were processed rapidly, with a median acceptance of 6 days [2]. Although fast-track review has some issues involving the quality of the review process, the circumstances of the COVID-19 pandemic may spur editors and reviewers to accelerate the process. Editors may want to recruit many manuscripts on COVID-19 to disseminate reliable information more rapidly to prevent disease transmission, achieve favorable treatment results, and speed vaccine development, which may also help explain the association of an increased workload with increased submissions. However, this pattern may fuel a cycle of stress and anxiety for editors and publishers, and this issue may need to be examined closely as the pandemic becomes prolonged. There was a different pattern of workload and number of submissions according to the fields (Figs. 4, 5). It could be anticipated that medical editors receive more submissions and their workload increased. However, results were different from the anticipation. Editors from natural science and the arts, humanities, and social sciences said that their workloads in-

creased and they received more submissions although it is difficult to say there were any differences among research fields (Tables 2, 3).

Since the reason for the increased need for journal publishing included the emergence of new topics due to the COVID-19 pandemic and more available time for authors, the research articles on COVID-19 regardless of research fields may foreseeably steadily increase even after the pandemic may dissipate. Therefore, editors should be ready to receive and review the articles on COVID-19. However, reasons for no change in the number of submissions included decreased research activities, decreased exchange programs, and negative economic impact, which may also be crucial to some research fields. Thus, sufficient budget and exchange of manpower may also be needed to maintain scholarly journal output across all fields.

Finally, respondents' suggestions for training programs highlighted concrete areas that can be covered in future conferences or workshops held by editors' associations. Aside from traditional topics such as improving reviewing and editing, emerging topics included online training, and publishing technology and platforms (for example, the Open Journal System, digital standards, and ISO XML production).

Comparison with previous studies: Life changes and psychological stress during the COVID-19 pandemics among the general population were analyzed in Germany. Out of 15,704 German adults, 44.9% showed generalized anxiety regarding COVID-19 [4]. In Taiwan, an online questionnaire commenced on February 14, 2020. Of 3,555 adults, 52.1% reported moderate to severe anxiety symptoms [5]. As such, other studies have investigated anxiety during the COVID-19 pandemic, but no previous research has specifically investigated daily life changes or changes in work among editors or publishing staff.

Limitation: The response rate was low (9.7%), most likely due to the short survey period. Most of the individuals who were invited to respond were from Korea (79.7%). Therefore, the results may not reflect all Asian editors' opinions. Another limitation is that anxiety was measured using a single question. Although weak, the correlation between anxiety and increased internet time may be worth further examination in the future. The meaning of internet use may be different according to the purpose of internet use. If it is mainly for editing or publishing, the anxiety level may not be associated with internet use per se, whereas searching the internet for COVID-19 information and developments and/or seeking entertainment may be associated with anxiety. In this survey, the allocated time of internet use was not inquired separately in light of this limitation, for more detailed data on editors' anxiety and further challenges, another survey or study is required.

Generalizability: Although the survey subjects were concentrated in Korea, this survey provides a quick snapshot of the present circumstances and work environment of Asian editors.

Conclusion: This survey found that the COVID-19 pandemic was a source of considerable anxiety for more than one-third of editors and publishers, especially as they spent more time on the internet. Some of them worked harder during the COVID-19 pandemic period than before and their increased workload was associated with an increased number of submissions. As such, a closer examination of editors' and publishers' work and anxiety may be needed as the pandemic drags on. While traditional topics for training programs were still valid (e.g., publication ethics, more advanced journal management, and editors' collaboration, etc.), a sizable proportion of respondents believed that more editorial or publishing work would be done online in the future. Thus, preparing editors for automated processing and educating them on digital standards appears to be an emerging area of need.

Conflict of Interest

Sun Huh has been the President of the Korean Council of Science Editors since January 17, 2020, but has no role in the decision to publish this article. Except for that, no potential conflict of interest relevant to this article was reported.

Data Availability

Dataset file is available from: the Harvard Dataverse at: <https://doi.org/10.7910/DVN/XVHPUF>

Dataset 1. Raw data of the survey

Supplementary Material

Supplementary file is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/XVHPUF>

Suppl. 1. Survey questionnaire

Suppl. 2. Reasons for responses of "yes" to the item "Do you think that online-only journal publishing will expand after the COVID-19 pandemic?"

Suppl. 3. Reasons for responses of "yes" or "no" to the item "Do you think that the need for journal publishing (the number of articles or number of journals) will increase after the COVID-19 pandemic?"

Suppl. 4. Answers to the item "Please describe any other changes you expect in journal editing and publishing due to COVID-19."

Suppl. 5. Answers to the item "Please suggest future training programs related to editing or publishing."

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A bibliometric analysis of COVID-19 research published in nursing journals

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Abstract

Purpose: This bibliometric study investigated the current state of documents on coronavirus disease 2019 (COVID-19) published in nursing journals. The analysis focused on the description of most productive journals, institutions, and countries, as well as the characteristics of the documents.

Methods: The publications analyzed in this study were retrieved from the Web of Science database with search keywords. The searches used to establish the study dataset were last updated on July 10, 2020. The inclusion criteria were relevant English-language publications in journals published in the Science Citation Index Expanded or Social Science Citation Index. Content analysis of original articles and reviews was done.

Results: An analysis of 125 publications on COVID-19 from 48 journals showed that the most productive journal and country were the *Journal of Clinical Nursing* (n = 18) and the USA (n = 53), respectively. Original articles (n = 27, 21.6%) and review papers (n = 4, 3.2%) accounted for 24.8% of the articles, and the highest number of papers were found in early access (published ahead of print) (n = 51, 40.8%) and Q1 journals (n = 73, 58.4%). The content analysis found 10 data-based original articles or reviews, which dealt with the topics of nurse training (n = 2), nurses' psychosocial status (n = 2), nursing research methodology (n = 1), nursing guidelines (n = 4), and protection for nurses (n = 1).

Conclusion: This study presents the current situation of nursing research on COVID-19 based on an analysis of publications in nursing journals and provides meaningful information to nursing researchers and editorial board members. The number of data-based original articles on nursing related to COVID-19 remains low.

Keywords

Bibliography; COVID-19; Scientific journals; Nursing; Web of Science

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Introduction

Background/rationale: The current situation of coronavirus disease 2019 (COVID-19) is unprecedented [1]. Shortly after COVID-19 was identified, it rapidly spread around the world;

the World Health Organization declared the COVID-19 outbreak as a pandemic on March 11, 2020 [2], and the COVID-19 pandemic has now become a major international concern. In mid-December 2019, the infection was first recognized in Wuhan, Hubei Province, China; as of July 17, 2020, over 13 million confirmed cases of this disease and 580,000 deaths have been reported worldwide [3]. COVID-19 has arguably been the major focus of researchers in relevant fields around the world during the first half of 2020, as shown by the increasing number of publications focused on COVID-19 that have been published since it was first identified [4].

Given the novelty of COVID-19, as well as its global impact, new scientific knowledge provides essential information regarding both the containment of the disease and the management of patients [4]. Scholarly journals are the most important media source for the dissemination of such research findings and information related to connecting this new evidence to practice, as these journals are the most credible and updated information resources for evidence-based practice. In particular, nursing journals play an important role in improving nurses' knowledge of new information and integrating this knowledge into nursing practice. The main target readers of nursing journals are nurses, who are positioned at the very front lines of the battle against COVID-19 [5]. There are approximately 20 million nurses around the world [6], and many of them are currently facing COVID-19 in roles that range from providing bedside nursing care for people affected by the disease to establishing healthcare policies.

Bibliometric analyses provide objective information through the comprehensive assessment of a specific scientific research trend by identifying the number and distribution of publications related to the trend, the publications' authorship and co-authorship, and the most cited articles. Additionally, bibliometric data facilitate both health policy decisions and the allocation of health resources, and they encourage further innovative studies. Several bibliometric analyses on COVID-19 have been published [4,7-10], but there is no bibliometric analysis currently available that specifically focuses on documents published in nursing journals, to the best of our knowledge.

Objectives: The present study aimed to shed light on the current state of the documents published in nursing journals. The analysis focused on describing the most productive journals, institutions, and countries, as well as the characteristics of the relevant documents. As a further analysis, research articles and review papers were evaluated as categories of research.

Methods

Ethics statement: This research did not involve human subjects, so neither institutional review board approval nor in-

formed consent was required.

Study design: This was a descriptive study based on a bibliometric analysis of a literature database.

Data collection: The publications analyzed in this study were retrieved from the Web of Science database (<https://clarivate.com/webofsciencegroup>), which is maintained by Clarivate Analytics and is one of the most authoritative databases used for such research. The publications were searched using the following search keywords: (TS = COVID-19 OR 2019-nCoV OR coronavirus 2019 OR Coronavirus disease 2019 OR SARS-CoV-2) AND (SU = Nursing). The inclusion criteria consisted of (1) publications in journals published in the Science Citation Index Expanded or Social Science Citation Index and (2) publications written in English. The searches used to establish the study dataset were last updated on July 10, 2020. This search strategy identified 132 articles, and all the bibliometric details of each article were exported into an Excel spreadsheet ("savedrecs.xls") from the Web of Science website. Seven publications with no information on the author's name or affiliation and the article's digital object identifier were excluded from the analysis. After a review of titles and abstracts by the authors, no publication was excluded for not being relevant to COVID-19. Therefore, the following parameters were extracted from 125 publications and analyzed: authors' information, journal name, volume, issue, document type, reprint address, and date of publication. Additionally, the journals were divided into four groups by their impact factor quartile (Q1, Q2, Q3, and Q4), based on the impact factor ranking from the 2020 Journal Citation Reports. Furthermore, the Web of Science website provides an "analyze report" function, which shows bibliometric information for selected publications, such as the authors' affiliated organization and country/region; we used these data to analyze the most productive countries and institutions.

Statistical methods: The analyses were conducted with Excel 2016 (Microsoft, Redmond, WA, USA) and IBM SPSS Statistics ver. 22.0 (IBM Corp., Armonk, NY, USA). Effects were considered significant when the P-value was less than 0.05. Descriptive data are presented as numbers, percentages, and rankings. Differences in types of publication and quartile scores depending on the period of publication were analyzed by the chi-square test.

Results

A total of 125 publications related to COVID-19 were analyzed. Table 1 shows the most productive nursing journals regarding COVID-19. Studies were published in 48 different journals, with the most articles being published in the *Journal of Clinical Nursing* (n = 18), followed by the *Journal of Human*

Table 1. The most productive nursing journals in terms of COVID-19 publications

Overall	Number	Original article + review	Number
<i>Journal of Clinical Nursing</i>	18	<i>International Nursing Review</i>	4
<i>Journal of Human Lactation</i>	10	<i>Journal of Clinical Nursing</i>	3
<i>Heart Lung</i>	8	<i>Journal of Human Lactation</i>	3
<i>Journal of Advanced Nursing</i>	7	<i>Bariatric Surgical Practice and Patient Care</i>	2
<i>European Journal of Cardiovascular Nursing</i>	6	<i>European Journal of Cardiovascular Nursing</i>	2
<i>International Journal of Nursing Studies</i>	6	<i>Nephrology Nursing Journal</i>	2
<i>International Nursing Review</i>	6	<i>Australian Journal of Rural Health</i>	1
<i>Intensive and Critical Care Nursing</i>	4	<i>International Journal of Nursing Knowledge</i>	1
<i>Journal of Psychiatric and Mental Health Nursing</i>	4	<i>International Journal of Nursing Studies</i>	1
<i>Australian Journal of Rural Health</i>	3	<i>Journal of Obstetric Gynecologic and Neonatal Nursing</i>	1
<i>Journal of Gerontological Nursing</i>	3	<i>Journal of Advanced Nursing</i>	1
<i>Nurse Education in Practice</i>	3	<i>Journal of Continuing Education in Nursing</i>	1
<i>Bariatric Surgical Practice and Patient Care</i>	2	<i>Journal of Gerontological Nursing</i>	1
<i>Geriatric Nursing</i>	2	<i>Journal of Nursing Education</i>	1
<i>International Journal of Mental Health Nursing</i>	2	<i>Journal of Nursing Management</i>	1
<i>Journal for Nurse Practitioners</i>	2	<i>Journal of Nursing Research</i>	1
<i>Journal of Obstetric Gynecologic and Neonatal Nursing</i>	2	<i>Journal of Transcultural Nursing</i>	1
<i>Journal of Continuing Education in Nursing</i>	2	<i>Midwifery</i>	1
<i>Midwifery</i>	2	<i>Nurse Education in Practice</i>	1
<i>Nephrology Nursing Journal</i>	2	<i>Nurse Education Today</i>	1
<i>Nursing Economics</i>	2	<i>Seminars in Oncology Nursing</i>	1
<i>Nursing Health Sciences</i>	2		
<i>Research in Nursing Health</i>	2		

Lactation (n = 10), *Heart Lung* (n = 8), and the *Journal of Advanced Nursing* (n = 7). The most original articles and reviews were published in the *International Nursing Review* (n = 4), the *Journal of Clinical Nursing* (n = 3), and the *Journal of Human Lactation* (n = 3).

Table 2 presents the most productive countries and institutions regarding COVID-19 papers. The most productive countries were the USA (n = 53) and Australia (n = 25), which together produced approximately 60% of all publications. England and China published 18 and 15 publications, respectively. The most original articles and reviews were published from the USA (n = 16), Australia (n = 6), and England (n = 4). The University of Technology Sydney (n = 14), Johns Hopkins University (n = 9), and the State University System of Florida (n = 7) were the top institutions publishing COVID-19 research. In addition, the International Council of Nurses, Johns Hopkins University, the University of Connecticut, the University of Technology Sydney, the University of Texas System each published three original articles or review papers.

Fig. 1 describes the bibliographic information of the included publications. With regard to the month of publication, the proportion of early access papers was the highest (n = 51, 40.8%), followed by studies published in May to June (n = 43, 34.4%), July to August (n = 23, 18.4%), and March to April (n = 8, 6.4%). None of the studies were published before February 2020. Editorial materials accounted for 60.0% of the articles (n = 75), followed by original articles (n = 27, 21.6%), letters (n = 19, 15.2%), and reviews (n = 4, 3.2%). The studies were published most frequently in Q1 journals (n = 73, 58.4%), followed by Q2 (n = 25, 20.0%), Q3 (n = 14, 11.2%), and Q4 (n = 13, 10.4%) journals. Table 3 shows differences in the types of publications and the quartiles of the journals according to the month of publication. There was no significant difference in the type of publication according to the month of publication ($\chi^2 = 11.48$, $P = 0.244$). However, a statistically significant difference in the IF quartile of the journals was found according to the month of publication ($\chi^2 = 56.34$, $P < 0.001$), indicating that a disproportionately high propor-

Table 2. The most productive countries and institutions regarding COVID-19 publications in nursing journals

	Country	Number	Institution	Number
Overall	USA	53	University of Technology Sydney	14
	Australia	25	Johns Hopkins University	9
	England	18	State University System of Florida	7
	China	15	University of Connecticut	5
	Italy	8	University of Texas System	5
	Canada	6	Linkoping University	4
	New Zealand	6	University of Birmingham	4
	Netherlands	5	University of California System	4
	Sweden	5	University of Florida	4
	France	4	University of Hong Kong	4
	Scotland	4	University of Pennsylvania	4
	Switzerland	4	Utrecht University	4
	Denmark	3	Utrecht University Medical Center	4
	Spain	3	Yale University	4
	Thailand	3		
	Brazil	2		
	Ireland	2		
	Japan	2		
	Taiwan	2		
	Original article + review	USA	16	The International Council of Nurses
Australia		6	Johns Hopkins University	3
England		4	University of Connecticut	3
Canada		3	University of Technology Sydney	3
Switzerland		3	University of Texas System	3
Denmark		2	Connecticut Children S Medical Center	2
France		2	State University System of Florida	2
China		2	University of Florida	2
Scotland		2	University of Texas El Paso	2

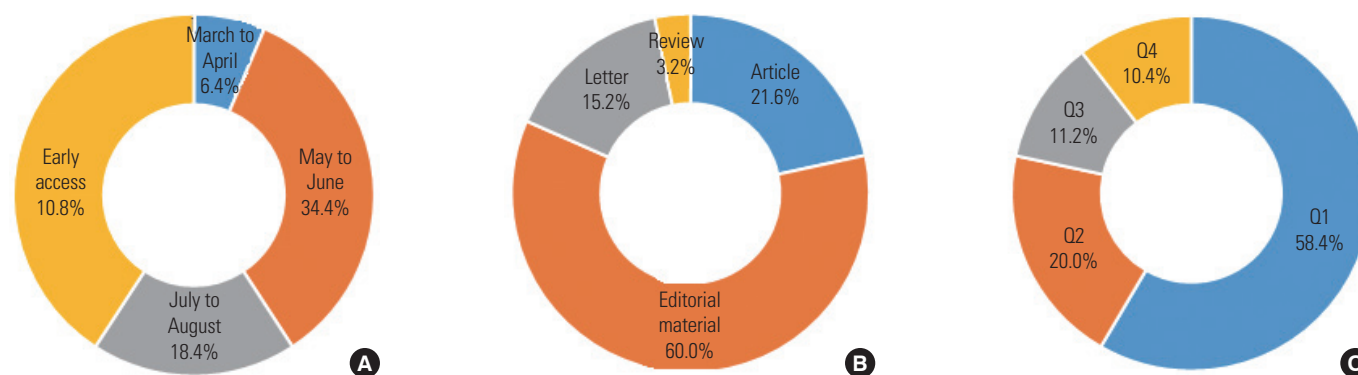


Fig. 1. Bibliographic information of publications according to (A) publication month, (B) type of publication, and (C) journal ranking.

Table 3. Bibliographic information according to publication date

		March to April	May to June	July to August	Early access	χ^2	P-value
Type	Article	3 (37.50)	10 (23.26)	3 (13.04)	11 (21.57)	11.48	0.244
	Editorial	3 (37.50)	30 (69.77)	13 (56.52)	29 (56.86)		
	Letter	1 (12.50)	2 (4.65)	6 (26.09)	10 (19.61)		
	Review	1 (12.50)	1 (2.33)	1 (4.35)	1 (1.96)		
Quartile	Q1	1 (12.50)	14 (32.56)	14 (60.87)	44 (86.27)	56.34	<0.001
	Q2	4 (50.00)	9 (20.93)	9 (39.13)	3 (5.88)		
	Q3	0 (0.00)	11 (25.58)	0 (0.00)	3 (5.88)		
	Q4	3 (37.50)	9 (20.93)	0 (0.00)	1 (1.96)		

Values are presented as number (%).

Table 4. Topics of the 10 data-based original articles or reviews of nursing articles related to COVID-19

Document type	Topic	Category	DOI
Article	Health care training app for COVID-19 patients	Nurse training	10.1016/j.nedt.2020.104479
Article	Research methodology of nursing education	Research methodology	10.3928/01484834-20200422-02
Article	Nurse's willingness to practice in an epidemic area in China	Psychosocial status of nurses	10.1111/jan.14434
Article	Nursing terminology	Nurse training	10.1111/2047-3095.12291
Article	Work stress of Chinese nurses	Psychosocial status of nurses	10.1111/jonm.13014
Review	Care for women and infants, resources	Guideline	10.1016/j.jogn.2020.04.001
Review	Clinical practice, public health Intervention	Guideline	10.1177/1043659620917724
Review	Recommendations for the patients, management program	Guideline	10.1177/1474515120934057
Review	Remote health care for cardiovascular patients	Guideline	10.1177/1474515120924530
Systemic review	Mask efficiency	Nurse training	10.1016/j.ijnrstu.2020.103629

tion of early access papers were published in Q1 journals.

Content analysis of the 31 reviews and articles showed that there were ten data-based original articles or reviews including systematic reviews (Dataset 1). The topics of the original articles were as follows: development of a health care training app for COVID-19 patients, research methodology in nursing education, nurses' willingness to practice in an epidemic area in China, nursing terminology related to COVID-19, and work stress among Chinese nurses. One systematic review dealt with the efficacy of masks for preventing COVID-19 infection (Table 4).

Discussion

Interpretation: In the present study, which focused on papers published in nursing journals, we aimed to provide information on the current status of publications related to the COVID-19 pandemic. A total of 125 studies published in nursing journals were found in the Web of Science database, and we

analyzed the related bibliometric data. Within only half a year, a large number of papers related to COVID-19 have appeared in nursing journals. The most productive country was the USA, which is in line with the results of other bibliometric studies of scientific literature related to COVID-19 [7]. This could be explained by the fact that the USA is one of the most prolific countries in regard to nursing research [11] and currently has the highest number of confirmed COVID-19 cases [4]. Researchers from East Asian countries, including China, where epidemic peaked in early 2020, published the highest number of papers on COVID-19 in medical journals [7,8], but the number of studies from these countries published in nursing journals was 15, accounting for a relatively small proportion of the documents in our findings.

Interestingly, over 50% of the examined publications were editorial materials, which suggests that many nursing journals have shown a great interest in COVID-19. However, a relatively low proportion (20.5%) of original articles and only four review papers regarding COVID-19 have been published

in nursing journals, which is lower than the number of studies analyzing COVID-19 that have been published in other fields of science [7,8]. Generally, editorial materials that introduce the editor or editorial board to the specific issue at hand have less real scientific content [12] and a lower quality of evidence [13]. The small number of published original articles can be explained by the long publication process of nursing journals. A previous study that analyzed the publication efficiency of top nursing journals reported that the publication process takes approximately 2.5 to 3 years [14]. Although the time between data collection and manuscript submission accounts for 62.5% of that time, the period from manuscript submission to acceptance and online publication takes almost 12 months on average [14].

The highest percentage of papers were published as early access, and many papers have also been published in recent months. Since our data were extracted in July, the total number of articles published in July to August must be higher than the publication number reflected in our results. In terms of journal ranking, approximately 60% of the examined papers were published in Q1 journals. Interestingly, this tendency was more obvious in July to August and early access publications; for example, over 80% of the early-access literature and 60% of the July to August articles were published in Q1 journals, which might be explained by the fact that many researchers have submitted manuscripts to more highly ranked journals. Another explanation for this outcome is the possibility that some highly ranked journals might have shortened their publication process, but further research will be needed to understand these possible factors. Therefore, addressing topics of interest to readers, such as COVID-19 (e.g., by releasing special issues), is needed to increase a journal's impact level and readership. This approach could also contribute to raising the citation index, since many nursing studies on COVID-19 are likely to be published during the COVID-19 pandemic and even after the virus is eradicated.

The content analysis showed that there were 10 data-based original articles or reviews based on data collected by a survey or literature search. In Web of Science, the document type "article" comprised a variety of publication types. Therefore, if the category of original articles is limited to studies derived from experimental data or literature reviews, the number of original articles is reduced. The reviews mostly dealt with guidelines for nursing care, while the original articles focused on the training of nurses and their psychosocial status. Therefore, it is still too early for nursing researchers to publish articles on empirical research related to COVID-19.

Limitation: This study has several limitations. First, Science Citation Index Expanded and Social Sciences Citation Index do not index all nursing journals, and we did not include

journal articles that were included in other databases, such as Scopus. Another limitation is the inclusion of only English-language articles in the study. For example, the Chinese literature might have been underestimated, and as China was found to have published the highest number of papers in previous studies [4,9]. Second, citation data were not examined in this study because most of the publications have not been cited in other studies, most likely because not enough time has elapsed for such articles to be cited. Last, the latest articles published after the middle of July 2020 were not included in this analysis. As of July 2020, the COVID-19 pandemic is not over yet; therefore, future bibliometric analyses will be needed, including citation data and a more comprehensive examination of nursing studies from several databases.

Conclusion: By demonstrating the current status of the literature through an analysis of publications found in nursing journals, this study provides meaningful information for nursing researchers and editorial board members. In the COVID-19 era, the timely accumulation of knowledge can be used to make improvements related to the health and health care of not only people affected with COVID-19, but all humankind. Journal articles are recognized as the main method for knowledge diffusion. Thus, it is necessary to encourage nurses to contribute to research on COVID-19 and to integrate that knowledge into nursing practice.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Data Availability

Dataset file is available from: the Harvard Dataverse at: <https://doi.org/10.7910/DVN/6CZCHI>

Dataset 1. Raw data from the Web of Science website

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Crossref at 20 years: what do the community need?

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Abstract

Purpose: The 20th anniversary of Crossref is a good point to evaluate where Crossref stands with the communities it supports so that it can be in a position to serve their needs in the future.

Methods: This evaluation took the form of a survey and a series of interviews run by Shift Learning in mid-2019.

Results: Results are presented in the form of a report authored by Shift Learning which is discussed in this paper.

Conclusion: Overall, Crossref is appreciated and provides value for the scholarly community. However, it needs to make sure that it continues to serve key stakeholders, ensure that core systems work smoothly for all members and that they balance the needs of its different sizes of members and those who subscribe to or use the Crossref metadata. The report from Shift Learning makes specific recommendations regarding pricing, products and services and, communications which Crossref should consider to continue to address the needs of its diverse stakeholders

Keywords

Crossref; Publishing; Digital object identifier; Metadata; Community

Introduction

Background/rationale: As membership organizations grow and mature, it is important that they make sure that they are aligned with the diverse needs of the communities they work with. Crossref, founded in 2000 is no exception to this. In a Scholarly Kitchen blog post from October 2019, Brand [1] documents how Crossref has grown and the fact that the number of members has grown 900-fold since its founding, and is now working with over 11,000 organization. Similarly, Fairhurst [2] details the increasing geographic spread of Crossref's newer members, explaining that "In more recent years, there has been a rapid growth in membership from outside of Crossref's traditional West European and North American markets, with a large percentage of new members coming from Asia, Eastern Europe, and South America."

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The type of member that Crossref works with has also expanded to include those exploring different publishing models and preprint servers and funders are also joining to register preprints and research grants.

This diversity leads to both questions and challenges. How does Crossref serve such a broad group of stakeholders, how does it help them meet their goals, what value are they deriving from Crossref and where do they see value lacking? In identifying these groups, getting a sense of their priorities and their work with Crossref, and their hopes and frustrations, there are opportunities to be gleaned that can help Crossref continue to adapt and serve the organizations it works with.

Objectives: A value research project, commissioned by Crossref and lead by Shift Learning (<https://www.shift-learning.co.uk/>) in 2019 was an important exercise in researching how the organizations that work with Crossref feel about it, to give Crossref direction on how to develop its services and work with its community going forward. Specifically, the following were research questions to be solved: What is Crossref's value to the different functions and roles in scholarly communications? What is Crossref's value to society and the general public? Is Crossref's mission understood and agreed upon? What are the barriers to achieving Crossref's mission? How does the community think Crossref has changed in recent years, and what do they think about its strategic agenda? Those questions were answered via qualitative research by telephone interview and a brief survey.

Methods

Ethics statement: All interviewees followed a script prepared by Shift Learning and agreed with Crossref. No personal or sensitive information was covered in the topics of telephone interview. The survey was answered anonymously via a web form. There were no sensitive questions in the survey items.

Study design: It consisted of both qualitative research through an interview of 41 stakeholders and an anonymous web-based survey. Qualitative research was based on analyzing the content of the interviews and the survey.

Participants: A breadth of stakeholders was surveyed and interviewed as part of this work. Publisher members formed the bedrock of the Crossref ecosystem when the organization was founded, and still form the majority of the membership. The value research project reflects this.

Measurement tools and data collection: Interviewees and those surveyed were asked about their perceptions of Crossref. Survey questions provided as a supplementary table (Suppl. 1). For qualitative research, 41 telephone interviews were conducted with Crossref community members around the world. Shift Learning recruited, conducted, and analyzed the

interviews following an email from Crossref. Each interview was 45 minutes to 1 hour long. Interviews were conducted using a guide rather than a specific set of questions. It aimed to cover the interviewees' relationship with and understanding and perception of Crossref, the value of Crossref to them and their organization, what they thought about Crossref's current mission, and what direction they thought it might take in the future. A brief survey, built by Crossref aided by Shift Learning was distributed to 476 contacts via email supplemented with other data-collection channels.

Statistical methods: All interviews were recorded and transcribed, then analyzed through qualitative data analysis software, Atlas.ti. Due to respondent confidentiality agreements, transcripts are not available to Crossref. Survey data was cleaned and processed in Q with data made available to Crossref in Q Reader.

Results

Participants: The 41 interviewees came from 10 countries, weighted towards North America and Europe, but also included responses from South America, Australia, and Asia. The interviewees consisted of nine publishers, five societies, five non-members, three university presses, three sponsoring organizations, three libraries, three researcher tools, three non-members who pay to use Crossref services (mainly metadata users), two companies, two publisher services (tools), one research funder, one government agency, and one assessment service. There were 437 survey respondents.

Outcome: A summary of the results has been shared by Shift Learning [3]. These provide a selection of quotes and details of the responses from interviewees and those who completed the survey. These have been summarized in the sections below.

Positive feedback: Many of the organizations surveyed shared positive perceptions of Crossref. There was a strong feeling that Crossref is central to the publishing ecosystem and all publishers to be involved with it benefit from the value conferred by working together on a shared service. Researchers and research systems can consistently use the digital object identifier (DOI) as it is used by a critical mass of scholarly content and Crossref provides a central place and a set structure for the information which promotes discoverability and reuse and the persistent linking ecosystem between publishers making important links between research outputs persistent. The feeling that Crossref is collaborative in this way was appreciated by those who participated in the research, and they felt that Crossref's mission was being met in this way.

Among the valuable actions attributed to Crossref related to scholarly communication were connecting research, stan-

standardizing infrastructure, managing metadata, maintaining a database, improving scholarly communications, enhancing findability, preserving content, automating discovery, and facilitating access. There were also findings that publishers, direct members and respondents based in Asia and smaller publishers were more likely to agree that working with Crossref gave them credibility and worked in a transparent way. This perception wasn't shared as strongly by all respondents, which points to regional differences in how Crossref is perceived, and also speaks to the ongoing debate about predatory publishing. Crossref doesn't vet publishers on the quality of their content, and having a DOI in itself does not infer quality as Bilder explains [4]. However, membership of Crossref does infer responsibilities for its members in terms of the maintenance of the DOIs they register and the related metadata, and asks them to make arrangements for its long-term preservation by working with archiving providers like Portico or a national library.

Survey respondents also placed value on the additional services that Crossref offers. Similarity Check, a service provided in partnership with Turnitin which provides a user-friendly tool to help scholarly publishers detect plagiarism was specifically mentioned here, as was Cited-by, which allows a member to find out which other members are citing their content. The Funder Registry, an open registry of persistent identifiers for grant-giving organizations around the world, allows everyone to have transparency into research funding and its outcomes help organizations avoid manually tracking and reporting on this information. Organizations also rated the good quality service and support they received when they needed help working with Crossref.

Organizations (apart from members) who use Crossref metadata were appreciative of the standardized metadata that Crossref members provide so that they had the capacity to use it in different tools and services, rather than having to get the information individually from publishers which do not scale well. The Metadata Plus service which provides enhanced access to all our supported Application Programming Interfaces (APIs) guarantees service levels and support and additional features such as snapshots and priority service/rate limits. Some enterprises felt that the Crossref metadata was integral to their businesses and provided a reputable alternative to the Google search and Google Scholar.

Criticism and suggested improvements: Overall, the survey provided positive feedback for Crossref. However, there were areas for criticism and concern that Crossref can aim to address. Some of these concerns came from longer-term members of the organization, who were worried that Crossref had become distracted from serving their needs, and was focused on new publishing models and the long-tail of members.

Crossref's mission is broad in scope, but with such a breadth of stakeholders, this can lead to confusion in who Crossref is serving. It can also lead to a desire for more clarity in terms of how Crossref makes strategic decisions and for more communication on product developments so that they can plan their own work in line with these.

Technical developments were noted: the creation of the Metadata Manager tool for registering content without needing to work with XML directly, the new schema for registering peer reviews, and the world-class REST (Representational State Transfer) API to access the metadata. However, further scaling and simplification of services and tools to register content with Crossref were high on respondents' wish lists. Crossref has spent time over the last eighteen months working to eliminate some of its technical debt which will leave it well-placed to address these needs.

Metadata users desired cleaner metadata with fewer errors and omissions, and it was mentioned that Crossref lacks profile in some territories like China and could improve its profile in Latin America.

The survey also took the opportunity to ask respondents for suggestions on how Crossref could improve. This spanned six main areas; communication, operation, usability, outreach and promotion, onboarding and training, and content registration.

In terms of communication, organizations would like more information on changes and developments to services, and to highlight the benefits of services rather than just the features of them, to help non-technical users. Some metadata users explained that they would like to have more of a voice with Crossref and potentially sit on the Crossref board.

On the operations and usability side, people wanted simplicity and the modernization of Crossref's core technology. This would look at things like improving search algorithms for finding content in Crossref databases, simplifying the language used and improving the quality of instructions in other languages, and building a better process for giving feedback and disputing metadata.

Respondents felt that Crossref could make sure it update regional sponsoring organizations lists, encourage the use of DOIs in book publishing and work to promote themselves to researchers and journalists. More outreach and training would also be useful - this would include more educational and training resources for new and prospective members and service users.

Finally, while survey respondents indicated they are quite highly satisfied with registering content, they would welcome improvements to make the process more automatic and efficient, which would also help with metadata improvements, along with making it easier to correct mistakes made while registering metadata which can be difficult to do.

What if Crossref did not exist?: An interesting piece of the value research talks about what risks there are for the research ecosystem if Crossref did not exist. Some of the risks identified include 1) research outputs would be worse, because of the additional costs and time required to access the same materials; 2) the landscape would become balkanized and complex to maneuver within; 3) for those that used multiple services, this would mean negotiating a swathe of new contracts from different suppliers; 4) the end to progressive developments with the likes of preprints; and 5) an existential threat to scholarship in general, with much less likely to support this agenda if there was the scope for such catastrophe.

It is clear that some of the value that members get from Crossref is that it helps them support scholarship and the aims of their organizations, and the manual work involved in recreating the collaborative nature of Crossref services would create large overheads for individual organizations.

The vast majority of survey respondents said that they planned to continue working with Crossref in the future, due to the value of the services it provided for their organization. This is a positive message for Crossref to take, but it should also be mindful that for some services there may not be any alternatives to Crossref, so it's still important that Crossref continues to improve and add to its services over time.

Discussion

Key results and interpretation: Crossref is strongly appreciated by many stakeholders and has strong positive associations, delivering strong value for many through increasing discoverability, permanence, and linking. Secondly however, for some large stakeholders, Crossref has strayed significantly from its mission. In some of their opinions, Crossref has moved from an organization which serves members to one which serves the scholarly community more directly, using their funding to push a semi-political agenda and facilitating activities which may be detrimental to these members' interests. Note that consistent with Crossref's role as a nonprofit organization with 501(c)6 tax exempt status (providing benefit to the broader, non-member industry and community is consistent with, and a requirement of, 501(c)6 status—benefits to members should be incidental to the broader industry/community benefit. Third, smaller members feel strongly that Crossref is extremely good value for money, delivering the visibility that enables them to compete with larger content owners. Those organizations benefiting from metadata services also see the value, developing innovative services that are reliant on Crossref's APIs. Some large, long-standing members again are less satisfied. They feel that they have not reaped the benefits of developments which should have reduced Crossref's

cost to them and that Crossref delivers decreasing value to them given developments in the sector and their already significant scale and visibility. Forth, while this is only a small number of publishers currently, Crossref needs to consider the decline in value of their metadata services and perhaps also in the value of membership to smaller content owners looking for credibility and contact with larger publishers that might occur were these larger publishers to follow through on their threats to leave the organization and go out on their own. Finally, proving to members that investment is going into ensuring that core systems work smoothly will be crucial to ensuring that relationships with all members are smooth moving forwards.

Limitations: All interviews were conducted in English. Respondents were self-selecting and interview incentives were not substantial and were donated to charity on behalf of the respondent. This may have resulted in a bias towards those with strong feelings towards Crossref, either positive or negative, and is likely to have resulted in a higher proportion of participation from those who already have an understanding of its activities and mission.

Recommendations on Crossref services: Crossref should be cautious in increasing prices for larger publishers (note that it was not suggested that Crossref would do this, and in 2020 Crossref has removed fees for the Crossmark service, which many publishers participate in. It has not increased membership fees for over 10 years). Crossref should be extremely cautious in increasing prices for the biggest publishers; while thinking about increasing prices for metadata users who are becoming established as businesses, and show the community how this is feeding back into further service improvements. New product development should be more transparent about its rationale, costs, and benefits to members as well as the fit to Crossref's mission. Search algorithms should be updated to finding content in Crossref databases more accurately. Any subsidies for less developed countries should be publicized more strongly.

Conclusion: The value research survey was a useful opportunity for Crossref to make sure it is aligned with the needs of its community. It helped clearly identify key areas where members and non-members get value from Crossref, where they feel Crossref is diverging from those needs and take steps to rectify areas where it could improve. It is important that Crossref listens to this feedback as it works to continue to play a key role in supporting the research ecosystem. As Brand [1] says, 'the Crossref of 2040 could be an even more robust, inclusive, and innovative consortium to create and sustain core infrastructures for sharing, preserving, and evaluating research information,' and it should work towards that goal.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Data Availability

Due to respondent confidentiality agreements, transcripts from the interviews are not available to Crossref. Responses to the survey are confidential and anonymous.

Supplementary Material

Supplementary file is available from <https://doi.org/10.6087/kcse.206>

Suppl. 1. Survey questions: the value of Crossref

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Data journals: types of peer review, review criteria, and editorial committee members' positions

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Abstract

Purpose: This study analyzed the peer review systems, criteria, and editorial committee structures of data journals, aiming to determine the current state of data peer review and to offer suggestions.

Methods: We analyzed peer review systems and criteria for peer review in nine data journals indexed by Web of Science, as well as the positions of the editorial committee members of the journals. Each data journal's website was initially surveyed, and the editors-in-chief were queried via email about any information not found on the websites. The peer review criteria of the journals were analyzed in terms of data quality, metadata quality, and general quality.

Results: Seven of the nine data journals adopted single-blind and open review peer review methods. The remaining two implemented modified models, such as interactive and community review. In the peer review criteria, there was a shared emphasis on the appropriateness of data production methodology and detailed descriptions. The editorial committees of the journals tended to have subject editors or subject advisory boards, while a few journals included positions with the responsibility of evaluating the technical quality of data.

Conclusion: Creating a community of subject experts and securing various editorial positions for peer review are necessary for data journals to achieve data quality assurance and to promote reuse. New practices will emerge in terms of data peer review models, criteria, and editorial positions, and further research needs to be conducted.

Keywords

Data journals; Data peer review; Editorial positions; Peer review system; Peer review criteria

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Introduction

Background/rationale: The importance of research data management and sharing has been emphasized in recent years in a variety of scholarly communities. Data publication has

emerged as part of these discussions, and has drawn considerable attention as a way to provide an incentive for data documentation and sharing [1]. Three primary methods of data publication exist (1) submitting data as supplementary materials to traditional journals, (2) submitting data to a data repository, and (3) publishing the data description as a data paper through data journals [2]. Of these methods, data journals make it possible for researchers generating data sets to publish data papers through peer review, thereby helping authors to be rewarded for their contributions and to earn credit through citations.

The publication process of data journals is similar to that of traditional scholarly journals, and their main process is to distribute data sets via peer review and data repositories [3]. Unlike the peer review of research articles, however, data peer review lacks agreement on consistent criteria or standards, and the understanding and approaches of data peer review vary across disciplines [4-6]. Hence, clear definitions do not exist as to how the processes of traditional peer review can be applied to data, or what should be guaranteed through peer review [1].

Some studies have analyzed peer review processes or criteria in data journals. Lawrence et al. [7] introduced the two-stage peer review procedure adopted by *Earth System Science Data* (ESSD) as a data journal, and proposed a generic data review checklist containing three categories: data quality, metadata quality, and general quality. Hrynaszkiewicz and Shintani [8] explained that the main principles of operating *Scientific Data* (another representative data journal) included credit, reuse, quality, discovery, openness, and service. The journal also specified the criteria of data peer review, including experimental rigor and technical quality, completeness, consistency, and data integrity.

Mayernik et al. [9] examined the data review criteria suggested by traditional scientific journals, data repositories, and data journals. For data journals, they analyzed the review criteria suggested by ESSD, *Geoscience Data Journal*, and *Scientific Data*. All three data journals shared an emphasis on the completeness of the data, detailed descriptions, usefulness, and openness and accessibility.

Objectives: Previous studies have mainly focused on peer review systems and criteria in a small number of data journals. Focusing on nine data journals indexed by Web of Science (WoS), in which the proportion of data papers was over 20%, we investigated the type of peer review, review criteria, and the positions of the editorial committee members of the data journals.

Methods

Ethics statement: This study did not involve human subjects. Neither institutional review board approval nor informed consent was required.

Study design: This was a descriptive study based on journals' policies.

Data sources/measurement: This study focused on data journals indexed in WoS, since these journals tend to be prestigious and to have stable operations. The data journals were assigned "data paper" as a document type, and usually multiple document types can be assigned to one journal. WoS only uses the "article" and "review" document types included in the category of citable items to calculate the impact factor (IF) of each journal. Both "data paper" and "article" are assigned as document types to a single document in the data journals indexed in WoS for calculating data journals' IF. On July 2, 2020, the advanced search function of WoS was used to find the number of data journals to which the document type of "data paper" was assigned. From the 7,362 total results in WoS, 93 data journals were found. Of these 93 data journals, nine data journals (for which the percentage of data papers among all articles was over 20%) were finally selected. When sorting data journals in descending order by the percentage of articles that were data papers, there was a considerable discrepancy between the percentage of the ninth journal (22.24%) and that of the 10th journal (7%). Therefore, a percentage of data papers of 20% was used as a cut-off criterion to select the data journals for this study. To survey the peer review systems, review criteria, and editorial committee structures of the data journals, we analyzed each data journal's data peer review policies. If clarification was needed, journal editors were queried via email, and their responses were incorporated into the analysis. To analyze peer review criteria, the present study utilized the generic data review checklist suggested by Lawrence et al. [7] and the data peer review criteria presented by Carpenter [10]. The review criteria were analyzed in three categories: data quality, metadata quality, and general quality.

Results

Characteristics of the nine target journals

Table 1 presents the journal names, publishers, subjects, IF (2019) values, publishing models, number of data papers, number of articles, and the percentage of articles that were data papers in the nine selected data journals. The percentage of articles that were data papers ranged from approximately 22% to 96%.

Type of peer review

The peer review system types of the nine data journals that actively published data papers was identified, as well as whether the journals provided guidelines. The results are presented in Table 2. *Data in Brief* (Elsevier), *Journal of Open Archaeology Data* (Ubiquity Press), and *Data* (MDPI) adopted a

Table 1. Characteristics of the data journals analyzed

Journal name	Publisher	Subject	Impact factor (2019)	Publishing model	No. of data papers	No. of articles	% (data papers/articles)
<i>Data in Brief</i>	Elsevier	Multidisciplinary sciences	NA	OA	5,044	5,238	96.30
<i>Scientific Data</i>	Springer Nature	Multidisciplinary sciences	5.541	OA	990	1,226	80.75
<i>Human Genome Variation</i>	Springer Nature	Genetics, heredity	NA	OA	78	116	67.24
<i>Earth System Science Data</i>	Copernicus Publications	Geosciences, multidisciplinary	9.197	OA	285	511	55.77
<i>Geoscience Data Journal</i>	Wiley	Geosciences, multidisciplinary	2.714	OA	40	74	54.05
<i>Journal of Open Archaeology Data</i>	Ubiquity Press	Archaeology	NA	OA	11	22	50.00
<i>Data</i>	MDPI	Computer science information systems	NA	OA	134	272	49.26
<i>Gigascience</i>	Oxford University Press	Multidisciplinary sciences	5.993	OA	149	594	25.08
<i>Biodiversity Data Journal</i>	Pensoft	Biodiversity conservation	1.331	OA	125	562	22.24

NA, not available; OA, open access journal.

Table 2. Types of data journal peer review systems

No	Journal name (publisher)	Peer review system form	Peer review guideline
1	<i>Data in Brief</i> (Elsevier)	Single-blind (a minimum of two independent expert reviewers)	Yes
2	<i>Scientific Data</i> (Springer Nature)	Single-blind (an editorial board member chooses one or more referees to evaluate the submission)	Yes
3	<i>Human Genome Variation</i> (Springer Nature)	Single-blind (data report manuscripts may be reviewed by 1 referee only)	-
4	<i>Earth System Science Data</i> (Copernicus Publications)	Interactive two-stage process involving the scientific discussion forum Earth System Science Data Discussions	Yes
5	<i>Geoscience Data Journal</i> (Wiley)	Single-blind	Yes
6	<i>Journal of Open Archaeology Data</i> (Ubiquity Press)	Single-blind	Yes
7	<i>Data</i> (MDPI)	Single-blind Reviewer suggestions (it is possible for authors to suggest three potential reviewers with the appropriate expertise to review the manuscript)	Yes
8	<i>Gigascience</i> (Oxford University Press)	Open review (non-anonymous)	Yes
9	<i>Biodiversity Data Journal</i> (Pensoft)	Community review	Yes

single-blind model for peer review. For *Geoscience Data Journal* (Wiley), no statement was given regarding its peer review system policy. Springer Nature’s *Scientific Data* and *Human Genome Variation* explicitly mentioned “blind review” on their website, but they did not specify whether the process was single- or double-blind. However, upon querying the journal editors, it was discovered that both journals utilized a single-blind model. *Gigascience* (Oxford University Press) adopted an open review model, in which neither authors nor referees remain anonymous.

All peer review models have specific strengths and weaknesses. With the recent emphasis on transparency in the peer

review culture, the data peer review model has evolved into a new modified model from the traditional review approach. ESSD (Copernicus Publications) sought to guarantee the basic scientific and technical quality of the manuscripts that it publishes by carrying out an initial access review by an editor, and then applying an interactive peer review process that supports follow-up interactive discussion and reviews, including public comments from authors and members of the scientific community. *Biodiversity Data Journal* employed a community peer review system that enables experts in various scholarly communities to join peer reviews to distribute the peer review efforts and to enhance transparency and scientific quality.

Table 3. Peer review criteria provided by the data journals

Criteria	<i>Data in Brief</i>	<i>Scientific Data</i>	<i>Earth System Science Data</i>	<i>Geoscience Data Journal</i>	<i>Journal of Open Archaeology Data</i>	<i>Data</i>	<i>Gigascience</i>	<i>Biodiversity Data Journal</i>	Total
Data quality									
Methodological appropriateness	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	7
Acceptable data format	Yes	-	Yes	Yes	Yes	Yes	-	Yes	6
Plausible data values	Yes	-	Yes	Yes	-	-	-	Yes	4
Usefulness of data	Yes	Yes	Yes	Yes	-	-	-	-	4
Identifier of data	-	-	Yes	Yes	-	Yes	Yes	-	4
Sources of errors identified	-	-	Yes	Yes	-	Yes	-	Yes	4
Originality/ novelty of science	-	-	-	Yes	-	Yes	-	Yes	3
Accuracy	-	-	Yes	-	-	Yes	Yes	-	3
Consistency	-	-	Yes	-	-	-	-	Yes	2
Meaningful coverage of data	-	-	-	Yes	-	-	-	Yes	2
Completeness of data	-	-	Yes	-	-	-	-	Yes	2
Validated data	-	-	Yes	-	-	-	-	-	1
Integrity of data	-	Yes	-	-	-	-	-	-	1
Metadata quality									
Sufficient metadata/description of methodologies	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	7
Accuracy of data description	-	-	-	-	Yes	Yes	Yes	Yes	4
Metadata conforming to standards or template	Yes	-	Yes	-	-	Yes	-	-	3
Completeness of data description	-	Yes	-	Yes	-	-	-	-	2
Metadata about the ownership of data	-	-	-	Yes	-	-	-	-	1
General									
Open license requirement	-	-	-	-	Yes	Yes	Yes	Yes	4
Data availability	-	-	-	Yes	-	Yes	Yes	Yes	4
Complete and appropriate references or acknowledgement	-	-	Yes	Yes	-	-	-	Yes	3
Suitable data repository	-	-	-	-	Yes	-	Yes	Yes	3

When a manuscript is submitted, it is assigned to a subject editor who determines whether the manuscript fits the journal's scope and whether to carry out a peer review. If a peer review is warranted, the subject editor requests two or three "nominated" referees and "panel" referees to conduct a peer review. A nominated referee should complete peer reviews within a given period, whereas a panel referee has no obligation to carry out a peer review. Furthermore, referees can choose to be anonymous or non-anonymous.

Criteria of peer review

All nine data journals, except for *Human Genome Variation*, suggested peer review criteria (Table 3). Among data quality

criteria, a criterion related to methodological appropriateness (e.g., "Are the protocol/references for generating data adequate?" [*Data in Brief*]) was suggested by the largest number of journals. Six journals specified a review criterion related to an acceptable data format (e.g., "The deposited data must include a version that is in an open, non-proprietary format" [*Journal of Open Archaeology Data*]), relating to whether data would be presented in an open format, a common data format, or according to the standards established by scholarly communities. Of the nine data journals, four stated that the data values should be plausible (e.g., "Are the data values physically possible and plausible?" [*Geoscience Data Journal*]), that the data be useful (e.g., "The reuse value of the resulting data-

sets” [*Scientific Data*]), that source of error should be identified (e.g., “Are possible sources of error and noise appropriately described?” [*Data*]), and that the data should have an identifier (e.g., “Is the data set accessible via the given identifier?” [ESSD]) as review criteria. Regarding identifiers, *Data* and *Journal of Open Archaeology Data* presented DOI as an example of a persistent identifier, and *Gigascience* suggested accession number.

As a review criterion related to metadata quality, seven journals suggested that data should have sufficient metadata/methodology descriptions (e.g., “Are methods and materials described in sufficient detail?” [ESSD]). Aside from that, accuracy of data description (e.g., “Do the metadata accurately describe the data?” [*Data*]) was used as a review criterion by four journals. Among the general quality criteria, open license requirements (e.g., “Is the data and software available in the public domain under a Creative Commons license?” [*Gigascience*]) and data availability (e.g., “Does the manuscript properly describe how to access the data?” [*Biodiversity Data Journal*]) were identified as review criteria by four journals.

Editorial committee members’ positions

Editorial committees normally consist of an editor-in-chief and members of the editorial board, who handle peer review and have obligations and rights to reject or accept manuscripts and organize editorial committees. When a data paper is first submitted, the editor-in-chief and editorial committee make a primary judgment regarding the manuscript’s quality, and then the editorial committee contacts referees if desired. Therefore, organizing an editorial committee is as important as conducting peer review. Since data journals handle data papers and data, examining the positions of editorial committee members is essential. The editorial committee members of the nine data journals are shown in Suppl. 1.

Of the nine data journals, seven (excluding *Biodiversity Data Journal* and *Geoscience Data Journal*) have three to 280 advisory/editorial board members. *Scientific Data* has a total of 280 editorial board members assigned to subjects as follows: biological sciences, 154; earth, environment, and ecological sciences, 65; physical sciences, 34; and social sciences, 27. *Biodiversity Data Journal* has 195 subject editors. The advisory/editorial board members are often organized according to subjects and editorial positions, including section/topic/subject editors.

Some defined positions were found with the responsibilities of evaluating data quality and providing information on data curation. For instance, *Gigascience* has one data editor who plays a wide-ranging role in technical quality review of data. The editorial committee of *Gigascience* also incorporates one data scientist, one principal software engineer, and one sys-

tems programmer analyst. *Data* (MDPI) operates a review board (eight members). As examples of relatively new positions relevant for the peer review process, *Journal of Open Archaeology Data* (Ubiquity Press) has one social media editor, and *Human Genome Variation* (Springer Nature) has one variation nomenclature and database editor.

Discussion

The present study found that most of the nine data journals used a single-blind model for data peer review, while *Gigascience* pursued an open review system. To guarantee the transparency and reliability of peer review, ESSD and *Biodiversity Data Journal* adopted modified models, such as interactive review and community review. In interactive review, the members of various scholarly communities can post their opinions, promoting communication between referees and authors. Community review, which follows a traditional peer review method, enables multiple types of referees, such as subject editors and panel reviewers, to join the peer review process and thereby help to distribute peer review efforts. In addition, the open review system allows referees to choose whether to remain anonymous.

Common emphases in the data peer review criteria were the appropriateness of the data production methodology and a detailed description of the methodology. These criteria are particularly important to facilitate research reproducibility and data reuse. The usefulness of the data was considered relevant when evaluating reusability. Likewise, review criteria regarding whether data comply with data standards or formats commonly used in scholarly communities, whether to provide information on open license and data availability, and whether to offer persistent data identifiers emphasized data accessibility for reuse.

Although the composition of the data journals’ editorial committees generally conformed to that of traditional journals’ editorial committees, the editorial committees of data journals tended to include multiple subject editors or some advisory board members with subject-level knowledge. These findings indicate that the editorial committee played a critical role in professionally understanding the data produced in a particular subject field and judging the value and quality of the data. Some, albeit relatively few, data journals incorporated data editors or experts into the editorial committees to evaluate technical data quality and to support appropriate data curation. This relates to the suggestion made by Callaghan et al., who argued in favor of a plan for reducing the data peer review burden that involved letting a data curation expert review the data’s technical quality and a subject expert review the scientific quality through “split[ting] peer review

up into separate phases carried out by different people” [5].

Conclusion: Interactive or community peer review is a new peer review model applied to data journals, which enables members of various scholarly communities to join peer reviews and helps increase peer review transparency and reliability by choosing an open review. Multiple data journals have suggested review criteria, including the appropriateness of the methodology and the need for a detailed description of the methodology. Most journals also specified the need to assess whether the following were provided: acceptable data formats, open licenses, data availability, persistent identifiers, data usefulness, sources of error, and accurate data descriptions. The editorial committees of data journals have subject editors or operate advisory boards including subject matter experts, since the characteristics and value of data are evaluated differently depending on the subject. In addition, some editorial committees include a data editor to evaluate the technical quality of data. Therefore, data journals need to secure subject editors and to establish subject advisory boards. In addition, to enhance the technical quality of data and data curation, assigning relevant positions is increasingly necessary. As data journals continue to develop as new channels of scholarly communication, new practices of peer review will emerge, and further research is necessary on data peer review.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Supplementary Material

Supplementary file is available from: <https://doi.org/10.6087/kcse.207>.

Suppl. 1. The composition of editorial committees of the data journals

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Status of the data sharing policies of scholarly journals published in Brazil, France, and Korea and listed in both the 2018 Scimago Journal and Country Ranking and the Web of Science

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Abstract

Purpose: The present study analyzed the current status of the data sharing policies of journals published in Brazil, France, and Korea that were listed in the 2018 Scimago Journal and Country Ranking and Web of Science Core Collection.

Methods: Web of Science journals were selected from the 2018 Scimago Journal and Country Ranking. The homepages of all target journals were searched for the presence of statements on data sharing policies, including clinical trial data sharing policies, the level of the policies, and actual statements of data availability in articles.

Results: Out of 565 journals from these three countries, 118 (20.9%) had an optional data sharing policy, and one had a mandatory data sharing policy. Harvard Dataverse was the repository of one journal. The number of journals that had adopted a data sharing policy was 11 (6.7%) for Brazil, 64 (27.6%) for France, and 44 (25.9%) for Korea. One journal from Brazil and 20 journals from Korea had adopted clinical trial data sharing policies in accordance with the International Committee of Medical Journal Editors. Statements of data sharing were found in articles from two journals.

Conclusion: Journals from France and Korea adopted data sharing policies more actively than those from Brazil. However, the actual implementation of these policies through descriptions of data availability in articles remains rare. In many journals that appear to have data sharing policies, those policies may just reflect a standard description by the publisher, especially in France. Actual data sharing was not found to be frequent.

Keywords

Access to information; Data sharing policy; Information dissemination; Journal publication

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Introduction

Background/rationale: Data sharing, which is defined as the “practice of making data used for scholarly research available to other investigators” [1], has been introduced to increasingly many international journals to promote research integrity and reproducibility in scholarly journals. Several studies have been conducted on data sharing policies of journals. Rousi and Laakso reported that out of 120 highly cited journals in the fields of neuroscience, physics, and operations research, 92 (76.6%) had adopted a research data sharing policy in their editorial processes, and 61 (50.8%) had incorporated data availability statements [2]. Out of 447 randomly sampled journals from the 2016 edition of Journal Citation Reports, only 12 (2.7%) required data sharing as a condition of publication, and 35 (7.8%) required data sharing, but did not explicitly state the effect on publication [3]. Of the 291 top social science journals listed in Journal Citation Reports, 155 (53.3%) had data sharing policies [4]. Thus, although some previous studies have analyzed the presence of data sharing policies and data availability statements, insufficient data exist regarding trends in data sharing policies by country.

In Korea, 13 of 100 journal editors stated that they had adopted a data sharing policy. Sharing was mandatory in 3 journals and recommended in 10 journals. The most common reasons for not having implemented a data sharing policy were a lack of knowledge, authors’ unwillingness to share data, and a lack of confidence in the effect of data sharing on scientific development. Forty-nine editors said that they would not adopt a data sharing policy in the future. However, that report is not an analysis of the literature, but rather presents the results of a survey [1]. No other reports are available on journal data sharing policies at the country level.

Adopting a clinical trial data sharing policy has been recommended by the International Committee of Medical Journal Editors (ICMJE) since July 2017. Specifically, the ICMJE stated that “as of July 1, 2018, manuscripts submitted to ICMJE journals that report the results of clinical trials must contain a data sharing statement” [5]. In 2019, PubMed began to disclose clinical trial registration through the “associated data” option under the “article attribute” filter; this option retrieves articles with a mention of “clinical trial registration” in the main text. By using this filter, it is possible to check whether a journal requires clinical trial registration with a data sharing statement. However, there are no data on how many journals have adopted this policy and, if so, how they implement it.

Objectives: This study compared the current status of the adoption of data sharing policies by international journals from Brazil, France, and Korea. Those three countries were selected arbitrarily as representatives of three continents

(South America, Europe, and Asia). In 2019, their gross domestic products (GDPs) were estimated to be 1,847, 2,707, and 1,629 billion US dollars, respectively [6]. Brazil has the highest overall GDP in South America, France is in third place in Europe, and Korea has the fourth highest GDP in Asia. The target international journals from these three countries were limited to those listed in both the 2018 Scimago Journal and Country Rank (SJR) and Web of Science Core Collection.

The specific goals of this study were to analyze the presence of data sharing policies of the journals (including clinical trial data sharing policies), the level of data availability (mandatory or optional), the repository sites, actual statements of data availability in articles, and the comparison of the results among three countries (including Brazil, France, and Korea).

Methods

Ethics statement: This was a literature-based study; therefore, neither approval by the institutional review board nor informed consent was required.

Study design: This study was a descriptive analysis of the literature focusing on journals’ policies.

Data source/measurement: Target journals were selected from the SJR (2018 edition). The selection and searches of the journal homepages were done from June 1 to June 30, 2020. Three countries (Brazil, France, and South Korea) were selected. Out of the SJR journal list, only Web of Science Core Collection journals were selected. The target journals were from all research fields, including the natural sciences, social sciences, and arts and humanities. Data were downloaded. No print versions were considered, and the homepage of each target journal was searched to answer the above goals. The terms “data sharing,” “research data,” “data availability,” and “clinical data sharing” were searched on the homepage of each journal. If there was no homepage, although the author tried her best to find the website, all question items were recorded as “none.” The terms mentioned above were required to appear in the instructions for authors or policies for a journal to be considered to have a data sharing policy. If the clinical trial data sharing policy recommended by the ICMJE was mentioned in the instructions to the author or in the journal policies, the journal was considered to have a data sharing policy.

If a journal described the policy using words and phrases such as “encourage,” “recommend,” “whenever demanded,” “will be,” “negotiable,” “maybe,” “wish,” or “optional,” the policy was classified as optional. If there were terms such as “should,” “mandatory,” or “must,” it was classified as mandatory. Wiley’s classification of data sharing policies includes four levels: “encourage,” “expect,” “mandates,” and “mandates with peer re-

view of data” [7]. In this study, “encourage” and “expect” were treated as optional policies, while “mandates” and “mandates with peer review of data” were treated as mandatory policies. Data repository sites were searched from the instructions to the authors or policies section. Description of the statements of data availability was searched in journal articles with the data sharing policies.

Bias: There was no bias in selecting journals and finding the policies, statements, level of data sharing, or repository site.

Study size: All target journals were included from the three countries; therefore, sample size is not an issue.

Quantitative variables: There were no quantitative variables because this was a study based on a qualitative review of the literature.

Statistical methods: Descriptive and comparative analyses were done. No statistical tests were required because all target journals were included.

Results

Target journals for analysis: There were 163 journals from Brazil. From France, 243 search results were returned, from which four books, five discontinued journals, and two trade journals were excluded, resulting in a total of 232 journals that were analyzed. From Korea, 170 journals were included after excluding one trade journal and one discontinued journal. The total number of target journals was 565 (Datasets 1-3).

Data sharing policies and their levels: Data sharing policies were classified as mandatory, optional, or none. The number of journals with optional data sharing policies was 11 (6.7%) in Brazil, 64 (27.6%) in France, and 44 (25.9%) in Korea. There was one journal with mandatory data sharing in Korea (*Journal of Educational Evaluation for Health Professions*) and none in Brazil and France (Fig. 1). In the *Brazilian Journal of*

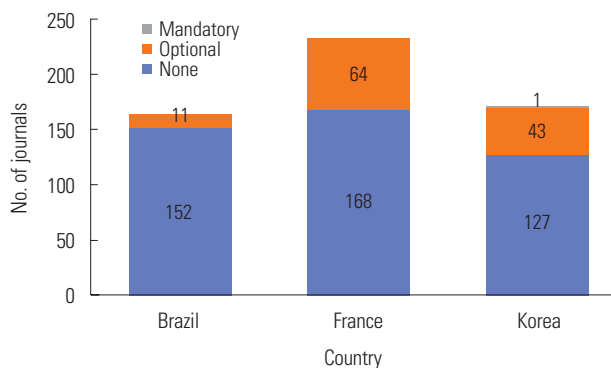


Fig. 1. The number of journals with optional or mandatory data sharing policies from Scimago Journal and Country Ranking and Web of Science Core Collection journals in Brazil, France, and Korea.

Cardiovascular Surgery, it was stated that authors should share clinical data according to the ICMJE clinical trial data sharing policy.

Of the 64 journals from France with optional data sharing policies, 59 were published by Elsevier and two by Springer. In the Elsevier and Springer journals, data sharing was encouraged. There was no description of the clinical data sharing policy recommended by the ICMJE in the journals from France.

Twenty of the 44 journals from Korea announced the IC-

Table 1. The number of entries since 2019 with associated data and clinical trials and RCTs from the 21 journals with ICMJE clinical trial data sharing policies from PubMed (N=21)

Journal title	No. of entries with associated data	No. of clinical trials and randomized controlled trials
<i>Allergy, Asthma & Immunology Research</i>	1	0
<i>Annals of Dermatology</i>	0	0
<i>Annals of Laboratory Medicine</i>	0	0
<i>Archives of Plastic Surgery</i>	0	0
<i>Asian Spine Journal</i>	1	0
<i>Brazilian Journal of Cardiovascular Surgery</i> ^{a)}	1	7
<i>Diabetes & Metabolism Journal</i>	3	3
<i>Endocrinology and Metabolism (Seoul, Korea)</i>	1	2
<i>Epidemiology and Health</i>	0	1
<i>Infection & Chemotherapy</i>	1	0
<i>Integrative Medicine Research</i>	4	0
<i>Intestinal Research</i>	2	0
<i>Investigative and Clinical Urology</i>	0	3
<i>Journal of Breast Cancer</i>	1	0
<i>Journal of Educational Evaluation for Health Professions</i>	0	0
<i>Journal of Gynecologic Oncology</i>	12	7
<i>Journal of Korean Medical Science</i>	20	11
<i>Journal of Pathology and Translational Medicine</i>	0	0
<i>Korean Circulation Journal</i>	10	
<i>Korean Journal of Anesthesiology</i>	0	10
<i>Radiation Oncology Journal</i>	0	0
Total	57	44

RCT, randomized controlled trial; ICMJE, International Committee of Medical Journal Editors.

^{a)}Published in Brazil. The other journals were published in Korea.

MJE clinical trial data sharing statement.

Statement of clinical trial data sharing: One journal in Brazil, the *Brazilian Journal of Cardiovascular Surgery*, published clinical trial numbers, and data availability was disclosed at the registration site, for example, <https://clinicaltrials.gov/ct2/show/record/NCT03304431>. Twenty journals in Korea had adopted a clinical trial data sharing policy [cited Jul 28, 2020] (Table 1), and 57 entries with associated data on PubMed were found from these 21 journals. The number of the clinical trials and randomized controlled trials from these journals on PubMed was 44.

Repository sites for data deposition: In the *Journal of Educational Evaluation for Health Professions*, the editorial office deposited data to the Harvard Dataverse, officially available at <https://dataverse.harvard.edu/dataverse/jeehp>. In the other journal, *Integrative Medicine Research*, the data may be deposited to any repository sites, or to the article site itself by authors themselves. This journal supported Mendeley Data.

Statement of data availability: It was found in articles from two journals: *Journal of Educational Evaluation for Health Professions* and *Integrative Medicine Research*.

Comparison among the three countries: The country with the highest proportion of journals that had data sharing policies was France (27.6%), followed by Korea (25.9%) and Brazil (6.7%). Published statements of data availability were only found from two journals published in Korea. The journals with clinical trial data sharing policies were from Korea (20) and Brazil (1).

Discussion

Key results: Of 565 journals from Brazil, France, and Korea, 118 (20.9%) had optional data sharing policies, and one had a mandatory data sharing policy. Of the journals with data sharing policies, actual statements of data availability in articles were only found in two journals from Korea. The repository site of one journal was Harvard Dataverse, while the other did not indicate a specific site. Twenty-one journals had adopted a clinical trial data sharing policy.

Interpretation and suggestion: Data sharing policies still have not been adopted by a sufficient proportion of journals from these three countries. Whether to adopt a data sharing policy is the choice of the editor or publisher. Some editors are not interested in adopting a data sharing policy because they are worried about a possible decrease in the number of submissions and increased workload [1]. The main issue is that many journals stating that they had data sharing policies did not have actual statements of data availability in their articles.

There are a variety of practices for supplemental data [8]. If data sharing is recommended, it is sufficient to follow one of those practices. A simple method is to deposit the data to a public repository site and present the digital object identifier (DOI) for the data, which is automatically generated after deposition. Fig. 2 is an example [9].

When authors deposit data to a repository, the data receive a DOI and the metadata are transferred to Crossref. The DOI maintains a continuous connection between the data and the

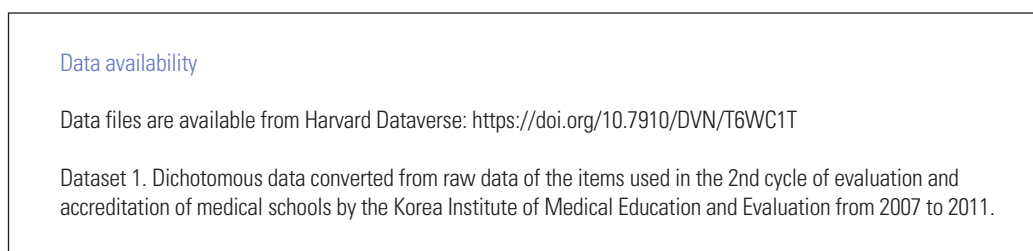


Fig. 2. Example of the statement of data availability.

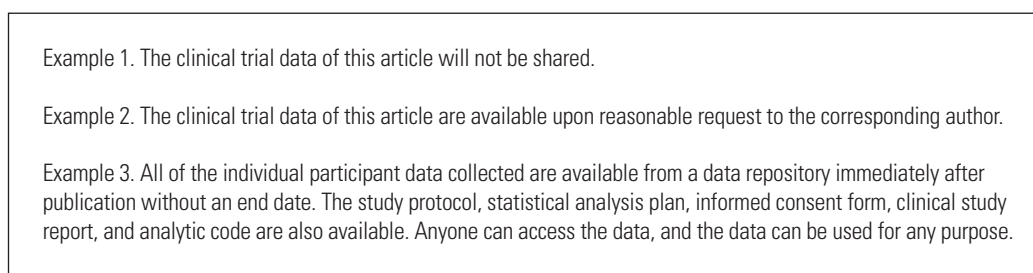


Fig. 3. Example of the statement of clinical trial data sharing.

published article [10]. If it is difficult to use a data repository site, it is also acceptable to describe data availability using phrasing such as “Data are available from the corresponding author with a reasonable request” or “Please contact the corresponding author for data availability.”

If the journal adopts a clinical trial data sharing policy, authors should present a statement of clinical trial data sharing on the clinical trial registration site in their countries. Table 1 shows the number of articles registered with clinical trial registration sites through the “associated data” filter in PubMed. From the *Korean Journal of Anesthesiology*, there were no articles listed as having “associated data,” notwithstanding the presence of clinical trial articles. However, it was found that the authors of clinical trial articles had registered the trials on their countries’ clinical trial repository sites. Therefore, the “associated data” filter does not always add those articles as having “associated data.” If authors add a statement of trial registration at the end of the abstract, it may be retrieved by PubMed. Another method of clarifying the statement of clinical trial data sharing is to describe it at the end of the text, as in Fig. 3.

Comparison with previous findings: As described in the Introduction, a previous study found that 13 of 100 journals in Korea had adopted a data sharing policy [1]. Three of those journals had adopted mandatory data sharing. The proportion of journals that had adopted a data sharing policy in the target journals of this study (23.5%) was higher than that reported in the previous survey (13.0%). This may have originated from differences in the journals that were analyzed, because the subjects of the previous survey were drawn from all scientific editors in Korea. There are no comparable studies for journals from Brazil and France.

Limitation: The analysis was done by searching the homepages of the target journals. Although the author tried her best to find the relevant terms and policies, there may be some missing data. This is an inherent limitation of manual searches.

Generalizability: Because all target journals were included, the above results can be generalized to the three countries. However, these findings cannot be extrapolated to the corresponding continents. A direction for further research on data sharing policies and statements of data availability in articles may be to investigate all journals, or a random sample thereof, that are indexed in major literature databases.

Conclusion: The proportion of target journals that adopted data sharing policies varied by country. Articles from two journals presented statements of data availability. Thus, the actual implementation of data sharing policies, as reflected by publishing a description of data availability in articles, is rare. In many journals that appear to have data sharing policies, those policies may just reflect a standard description by the

publisher, especially in France. Actual data sharing was not found to be frequent.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

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Data Availability

Dataset file is available from: the Harvard Dataverse at: <https://doi.org/10.7910/DVN/QER5O4>

Dataset 1. Raw data of scholarly journals in Brazil

Dataset 2. Raw data of scholarly journals in France

Dataset 3. Raw data of scholarly journals in Korea

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Influence of the top 10 journal publishers listed in Journal Citation Reports based on six indicators

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Abstract

Purpose: : An accurate evaluation of the influence of the largest publishers in world journal publishing is a starting point for negotiating journal subscriptions and an important issue for research libraries. This study was conducted to evaluate the influence of the largest publishers based on Journal Citation Reports (JCR) indicators.

Methods: From JCR 2014 to 2018 data, a unique journal list by publisher was created in Excel. The top 10 publishers were selected and evaluated in terms of the average share of six JCR indicators including the impact factor, Eigenfactor score, and article influence score, along with the number of journals, articles, and citations.

Results: The top three publishers accounted for about 50% of the JCR indicators, the top five for 60%, and the top 10 for 70%. Therefore, the concentration of the top three publishers, with a share exceeding 50% for five indicators, was more intensive than has been reported in previous studies. For the top 10 publishers, not only the number of journals and articles, but also citations and the impact factor, which reflect the practical use of journals, were increasing.

Conclusion: These evaluation results will be important to research libraries and librarians in deciding upon journal subscriptions using publisher information, to journal publishers trying to list their journals in JCR, and to consortium operators to negotiate strategically. Using the unique journal list created in this research process, various follow-up studies are possible. However, it is also urgent to build a standardized world journal list with accurate information.

Keywords

Article influence score; Journal Citation Reports; Eigenfactor score; Impact factor; Journal publishing

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Introduction

Background/rationale: Academic journals published by over 8,000 publishers around the world are listed in Scopus by Elsevier and Web of Science (WoS) and Journal Citation Reports (JCR) by Clarivate Analytics. The largest commercial publishers are known to have a major influence on journal publishing. Properly grasping the influence of the largest publishers is the starting point for negotiating journal subscriptions, but it is difficult to know the exact situation. Libraries and librarians in various countries have been negotiating journal subscriptions with the largest publishers, without a clear sense of the influence and status of publishers. The same issue occurred during the negotiation of the Korean Electronic Site License Initiative. The authors have made various efforts in the Korean Electronic Site License Initiative negotiations, including studying alternatives to the big deal model [1,2]. However, the status of the largest publishers remains unknown.

It is also an important issue for research libraries to accurately evaluate journals and publishers and to properly understand and utilize the results of that evaluation in their work. The JCR has data on WoS-based journals and articles, so if the publisher imprints are accurately identified, the largest publishers can be roughly evaluated. Most studies of the influence of the largest publishers have dealt with the number of journals, articles, and citations. However, few studies have evaluated journal publishers in a more complex manner, using the impact factor (IF), Eigenfactor score (ES), and article influence score (AIS) [3,4], although a previous study evaluated publishers by JCR indicators [5].

Objectives: The goal of this study is to evaluate the influence of the largest journal publishers listed in JCR. To conduct both a qualitative and quantitative evaluation, six JCR indicators were applied, including the IF, ES, and AIS, along with the number of journals, articles, and citations. This study clearly documents the status of each publisher and the dominance of the largest publishers, and therefore, its results will serve multiple purposes. Publishers will have an opportunity to review their position, and it can be used as a basis for subscription plans for librarians and for negotiation strategies for consortium operators.

In JCR's journal and article data, how much influence do the largest journal publishers have? To answer this question, JCR indicators based on original research and review articles were analyzed, with a particular focus on the largest journal publishers. We collected the journal data listed in JCR and selected six indicators that were judged to be highly relevant to the publisher's influence. On that basis, we selected the top 10 publishers.

Methods

Ethics statement: Neither institutional review board approval nor informed consent was needed because this study did not deal with human subjects.

Study design: This was a literature database-based descriptive study.

Data collection: To make a unique journal list, each journal list collected from JCR, WoS, and Scopus was combined using the VLOOKUP, IF, and FIND functions of Excel in the following order and method. Through this process, a unique journal list of 12,201 titles with six JCR indicators was created based on JCR data: downloading JCR 2014 to 2018 data to Excel; comparing the journal name and International Standard Serial Number to identify unique journal; combining the annual article number, citation count, IF, ES, and AIS for 5 years for each journal; downloading the journal list included in WoS and Scopus to obtain publisher information; combining the journal lists to confirm unique journal in order of JCR, WoS, and Scopus; grouping journals by publisher imprints (Suppl. 1); and finalizing the unique journal list while visually checking the combined list in Excel.

Statistical methods: This study was based on all target journals' indicators, and only descriptive statistics were presented.

Results

Selection of the top 10 journal publishers in JCR

The citation rate is a valuable metric for assessing the influence of a journal in relation to other journals. Among various JCR indicators, this study applied six indicators, including journals, articles, and citations for a quantitative evaluation and IF, ES, and AIS for a qualitative evaluation. Each share of the six JCR indicators by publisher was calculated among 12,201 JCR journals and then, by averaging them without weight by publisher, the top three, top five, and top 10 publishers were selected (Table 1). Elsevier, Springer, and Wiley were classified as the top three publishers, and then Taylor & Francis (T&F) and Sage were added to the top five. Then, Oxford University Press (OUP), American Chemical Society (ACS), Wolters Kluwer (Kluwer), Institute of Electrical and Electronics Engineers (IEEE), and Royal Society of Chemistry (RSC) were added to the top 10. The top five were all commercial publishers, but there were several society publishers in the top 10. As this study focused on the top 10 publishers, all other publishers were described as non-top 10. For over 250 journals from JCR, it was not possible to find accurate information on the current publisher in WoS and Scopus, so the publisher column was left empty and they were classified as non-top 10 publishers.

Evaluation of the top 10 publishers by six JCR indicators

Comparing the top 10 publishers based on six JCR indicators, the difference in influence among them can be clearly seen (Table 2). Springer published the most journals, as it increased

the number of its journals through frequent mergers and acquisitions, but Elsevier was still number one in the number of articles. In contrast, ACS and RSC, which published small-scale journals, took first place and second place in the average

Table 1. Selection of top 10 publishers using the average share of six JCR indicators

JCR share (%)	Top 3 publishers			+ Top 5 publishers		+ Top 10 publishers					Non-top 10 publishers
	Elsevier	Springer	Wiley	T&F	Sage	OUP	ACS	Kluwer	IEEE	RSC	
Journals	15.1	15.6	10.4	10.0	5.2	2.3	0.5	2.0	1.4	0.3	37.2
Articles	24.9	15.4	9.7	4.8	2.5	2.2	2.8	2.1	2.3	2.4	30.9
Citations	26.8	12.0	12.0	2.8	2.0	3.8	5.1	2.7	2.0	1.8	29.0
IF	22.2	17.5	12.8	6.9	4.1	3.1	1.3	2.3	2.0	0.9	26.9
ES	24.4	14.9	11.0	2.5	1.7	3.9	4.7	2.4	2.2	2.5	29.8
AIS	20.1	17.4	12.6	6.3	4.6	3.9	1.0	2.1	1.8	0.6	29.6
Average	22.2	15.5	11.4	5.5	3.4	3.2	2.6	2.3	1.9	1.4	30.6

JCR, Journal Citation Reports; T&F, Taylor & Francis; OUP, Oxford University Press; ACS, American Chemical Society; Kluwer, Wolters Kluwer; IEEE, Institute of Electrical and Electronics Engineers; RSC, Royal Society of Chemistry; IF, impact factor; ES, Eigenfactor score; AIS, article influence score.

Table 2. Evaluation results of the top 10 publishers by six JCR indicators

JCR		Top 3 publishers			+ Top 5 publishers		+ Top 10 publishers				
		Elsevier	Springer	Wiley	T&F	Sage	OUP	ACS	Kluwer	IEEE	RSC
Journal	Total	1,849	1,904	1,267	1,222	630	287	56	242	166	42
Article	Total	1,933,563	1,196,730	758,677	374,693	189,167	173,081	219,514	160,310	174,973	188,559
	Annual	386,713	239,346	151,735	74,939	37,833	34,616	43,903	32,062	34,995	37,712
	Average ^{a)}	209	126	120	61	60	121	784	132	211	898
Citation	Total	78,931,659	35,432,825	35,169,006	8,293,856	5,906,487	11,249,308	14,940,450	7,792,116	5,851,665	5,388,782
	Annual	15,786,332	7,086,565	7,033,801	1,658,771	1,181,297	2,249,862	2,988,090	1,558,423	1,170,333	1,077,756
	Average ^{a)}	8,538	3,722	5,552	1,357	1,875	7,839	53,359	6,440	7,050	25,661
	Average ^{b)}	40.8	29.6	46.4	22.1	31.2	65.0	68.1	48.6	33.4	28.6
IF	Total	28,038	22,037	16,182	8,696	5,148	3,878	1,648	2,877	2,455	1,190
	Annual	5,608	4,407	3,236	1,739	1,030	776	330	575	491	238
	Average ^{a)}	3.033	2.315	2.554	1.423	1.634	2.702	5.886	2.378	2.958	5.667
	AJIFP	61.2	46.4	56.8	40.6	48.5	63.7	74.3	48.5	65.8	71.5
ES	Total	121.94128	74.38793	55.31691	12.25057	8.71690	19.69265	23.59222	12.01131	10.66837	12.16481
	Annual	24.38826	14.87759	11.06338	2.45011	1.74338	3.93853	4.71844	2.40226	2.13367	2.43296
	Average ^{a)}	0.01319	0.00781	0.00873	0.00201	0.00277	0.01372	0.08426	0.00993	0.01285	0.05793
AIS	Total	9,233.176	8,022.312	5,818.428	2,896.632	2,136.389	1,793.516	466.870	954.423	807.608	286.840
	Annual	1,846.635	1,604.462	1,163.686	579.326	427.278	358.703	93.374	190.885	161.522	57.368
	Average ^{a)}	0.999	0.843	0.918	0.474	0.678	1.250	1.667	0.789	0.973	1.366

JCR, Journal Citation Reports; T&F, Taylor & Francis; OUP, Oxford University Press; ACS, American Chemical Society; Kluwer, Wolters Kluwer; IEEE, Institute of Electrical and Electronics Engineers; RSC, Royal Society of Chemistry; IF, impact factor; AJIFP, average journal impact factor percentile; ES, Eigenfactor score; AIS, article influence score.

^{a)}Annual average per journal; ^{b)}Average number of citations per article.

IF, ES, and AIS, as well as in the number of articles and citations per journal.

Looking at the annual number of articles in the JCR data, the top three publishers can be considered mega-publishers, publishing over 150,000 articles. In particular, Elsevier accounted for a 24.9% share of the total number of articles, publishing nearly 400,000 articles per year. The remaining six publishers produced about 30,000 to 50,000 articles annually, corresponding to a share of roughly 2%, except T&F with about 80,000 articles (4.8%). ACS and RSC had the smallest number of journals, but the annual number of articles per journal was about 800, much more than other publishers, indicating that they pursued efficient publishing with many articles in each journal. In contrast, T&F and Sage, which published about half of the social science journals, had the smallest number of articles in each journal, with an average of 60 articles. They were considered to pursue quantitative growth, focused on publishing small and diverse journals.

Elsevier, Wiley, OUP, ACS, and Kluwer had a strong influence on academia with a higher citation ratio than article ratio. ACS had the highest average number of citations per arti-

cle (68.1), followed by OUP (65.0). ACS and RSC were the most influential in terms of the number of citations per journal, with an average IF of 5.886 for ACS and 5.667 for RSC. Among the top three publishers, the average IF of Elsevier journals was the highest (3.033), whereas Wiley published fewer journals and articles than Springer, but had a higher average IF, indicating more average citations per journal or article. The rest of the top 10 publishers had an average IF around the 2% level, but T&F and Sage were exceptions, with 1% levels. Although not adopted as one of the six JCR indicators, the average journal impact factor percentile (AJIFP) is a useful indicator. The AJIFP assesses a journal's standing within the related subject categories, scaled from 0% to 100%. Springer, T&F, Sage, and Kluwer were ranked under 50%, while ACS and RSC had the highest AJIFP.

The ES indicator measures the journal's importance to the research community for 5 years, so the sum of all journals' ES is about 100. In terms of average ES, ACS and RSC showed significantly higher impacts than other publishers, but T&F and Sage marked lower impacts. The average ES of the remaining six publishers were similar, without significant dif-

Table 3. Evaluation results of the top three, top five, and top 10 publishers versus others

JCR		Top 3 publishers		Top 5 publishers		Top 10 publishers		All publishers
		Top 3	Non-top 3	Top 5	Non-top 5	Top 10	Non-top 10	
Journal	Total	5,020	7,181	6,872	5,329	7,665	4,536	12,201
	Share ^{a)} (%)	41.1	58.9	56.3	43.7	62.8	37.2	100
Article	Total	3,888,970	3,884,402	4,452,830	3,320,542	5,369,267	2,404,105	7,773,372
	Share ^{a)} (%)	50.0	50.0	57.3	42.7	69.1	30.9	100
	Average ^{b)}	155	108	130	125	140	106	127
Citation	Total	149,533,490	144,959,088	163,733,833	130,758,745	208,956,154	85,536,424	294,492,578
	Share ^{a)} (%)	50.8	49.2	55.6	44.4	71.0	29.0	100
	Average ^{b)}	5,958	4,037	4,765	4,907	5,452	3,771	4,827
IF	Total	66,257	59,861	80,101	46,017	92,149	33,969	126,118
	Share ^{a)} (%)	52.5	47.5	63.5	36.5	73.1	26.9	100
	Average ^{b)}	2.640	1.667	2.331	1.727	2.404	1.498	2.067
	AJIFP	54.5	39.9	51.5	38.8	52.4	34.9	45.9
ES	Total	251.64612	248.27711	272.61359	227.30964	350.74295	149.18028	499.92323
	Share ^{a)} (%)	50.3	49.7	54.5	45.5	70.2	29.8	100
	Average ^{b)}	0.01003	0.00691	0.00793	0.00853	0.00915	0.00658	0.00819
AIS	Total	23,073.916	22,996.251	28,106.937	17,963.230	32,416.194	13,653.973	46,070.167
	Share ^{a)} (%)	50.1	49.9	61.0	39.0	70.4	29.6	100
	Average ^{b)}	0.919	0.640	0.818	0.674	0.846	0.602	0.755

JCR, Journal Citation Reports; IF, impact factor; AJIFP, average journal impact factor percentile; ES, Eigenfactor score; AIS, article influence score.

^{a)}Proportion of all JCR journals; ^{b)}Annual average per journal.

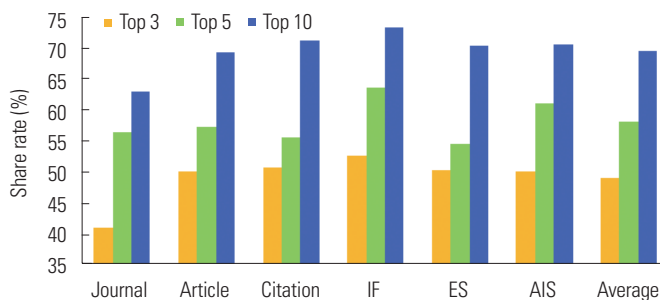


Fig. 1. Share (percentage) of six Journal Citation Reports indicators for the top three, top five, and top 10 publishers. The average was calculated by six indicators based on Journal Citation Reports 2014 to 2018. IF, impact factor; ES, Eigenfactor score; AIS, article influence score.

ferences. The AIS indicator reflects the average influence of a journal's articles over the first 5 years after publication. Therefore, the AIS is roughly analogous to the 5-year IF. ACS, RSC, and OUP had higher average AIS than other publishers, while T&F had the lowest, and the remaining six publishers showed similar levels.

Comparison of the influence of the top 10 publishers versus others

Comparing the six JCR indicators between the largest publishers and the others, the influence of the largest publishers can be clearly seen (Table 3). The top five publishers accounted for more than half of JCR journals. The top three publishers accounted for precisely half of the total number of articles, while the top 10 accounted for about 70%.

Looking at the annual citations per journal, the top three publishers had an average of about 6,000, with a share of 50.8% of the total citations. The citation share increased significantly from the top five publishers to the top 10. In terms of the IF, the majority of the top 10 publishers had an average of roughly 2, and were found to have more influence than in terms of articles and citations. In terms of the average IF, ES, and AIS per journal, when looking at the gap between the top three, top five, and top 10 publishers and the others, the difference for the top 10 publishers showed a similar trend to the top three. However, in the top five publishers, the shares of ES and AIS indicators were anomalous.

Consequently, the top three publishers have secured their position as the largest publishers, with more than half of the citations and the IF, reflecting the practical use of their journals as well as external metrics such as the number of articles. In addition, the top 10 publishers also showed a strong influence of around 70% in the five indicators except the number of journals. Therefore, extending the focus of this study to encompass the top 10 publishers, instead of the top three or five, was worthwhile.

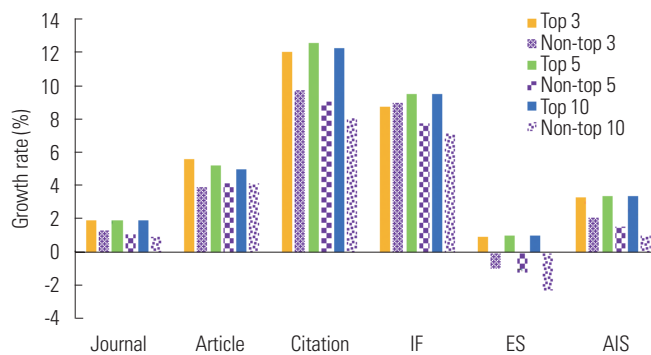


Fig. 2. The growth rate of six Journal Citation Reports indicators for the largest publishers versus others. The growth rate was calculated from Journal Citation Reports 2014 to 2018, divided by 4 years. IF, impact factor; ES, Eigenfactor score; AIS, article influence score.

Comparison of the influence of the top three, top five, and top 10 publishers

Fig. 1 shows the difference of the share of the six JCR indicators in the largest publishers. In the figure, the rightmost shows the average of the six JCR indicators for all JCR journals, making it easy to see which indicator is below or above the average. The number of journals was the least relevant indicator. The top five publishers were weak in terms of articles, citations, and the ES. However, it seemed that rather than the top five publishers, the top three and top 10 were highly similar in most indicators, clearly showing their position in the world journal publishing. The largest publishers were confirmed to be at the forefront of journal publishing, with the top three publishers accounting for about 50%, the top five for 60%, and the top 10 for 70%.

Comparing the growth rate of each indicator, the difference between the largest publishers and the others was clear (Fig. 2). According to the JCR 2014 and 2018, the growth rate for articles was higher than that for journals, and the growth rate for citations was higher than that for articles. The growth rate of ES and AIS was small, but similar to that of journals. However, for the ES indicator, all other publishers showed a negative increase. As such, the number of citations and IF showed higher growth rates than that of journals and articles, and the influence of the largest publishers was further strengthened qualitatively as drivers of the growth of JCR content.

Discussion

Evaluation and characteristics of the top 10 publishers: As shown in Table 2, the average number of citations per journal was higher for ACS and RSC than for Elsevier. OUP, IEEE, and Kluwer were cited more than Wiley or Springer. Compared with Elsevier, ACS showed a higher citation rate, with

more than six times citations per journal and a higher number of citations per article. In contrast, T&F and Sage had very low influence in terms of citations. The influence of journal publishing is easily judged from external metrics, such as the number of journals or articles. However, when planning journal subscriptions, librarians need to consider citations and/or IF, which reflect the practical use of journals, rather than their external scale.

As a result of the evaluation based on the share of the six JCR indicators, the influence of the top three, five, and 10 publishers in JCR was 49.1%, 58.0%, and 69.4%, respectively. Among the top three, Elsevier's share was 22.2%. The gap between the top three and top five was so large that it seemed like a stretch to call T&F and Sage as the top five publishers. The top 10 publishers had only a 20% increase over the top three, despite the addition of seven publishers. Ultimately, the top three publishers predominated, accounting for close to 50% of JCR indicators.

The concentration of the top three publishers: As the articles and journals of the largest publishers increased over the years, the average number of citations and IF were also increased; therefore, it was confirmed numerically that the largest publishers led the field of global journal publishing. According to a previous study that examined journal publishers from 1997 to 2009, six publishers produced more than 50% of journals, eight publishers accounted for more than 50% of articles, nine publishers did so for citations, and ten publishers did so for IF [5]. In this study, from 2014 to 2018, the three largest publishers produced more than 50% of the five JCR indicators except the number of journals, and four publishers published more than 50% of JCR journals. With frequent mergers and acquisitions between publishers, the concentration of the top three publishers has become stronger than the case 9 years ago. As journal publishing becomes more and more focused on the top three publishers, it is a very meaningful aspect of this study that it expanded the research scope to the top 10 publishers and evaluated them quantitatively and qualitatively based on six JCR indicators.

New findings from JCR indicator analysis: In the JCR, which contained 7,773,372 research and review articles from the past 5 years, the articles were cited 294,492,578 times over the last 5 years. Thus, authors cited each JCR article on average at least 37.9 times. This study makes a meaningful contribution by showing general trends in JCR articles and journals. It presents objective results obtained from large-scale data, unlike previous studies. In addition, as the average IF of JCR journals in 5 years was found to be 2.067, the average IF level of the major journals distributed through WoS can be grasped. This information is important for journal publishers who are trying to publish good journals suitable for being listed in JCR and WoS.

Limitation: In the process of journal integration, if the accuracy of the Excel VLOOKUP comparison was poor due to diversity in journal names, new International Standard Serial Number assignment, journal duplication, the presence or absence of a space in the title, and so on, duplicated journals were merged manually. When identifying a unique journal from each journal list produced from various sources, it was not easy to check whether the same journals were perfect matches. As experienced career librarians, we did our best to reduce errors. The journals that switched publishers were analyzed under the assumption that the current publisher had published all the past articles, because it is time-consuming and difficult to analyze the history of publisher changes by year. JCR indicators of null and "0" were excluded when calculating the averages. Given the lack of humanities journals in the JCR, a limitation of this study is that it only dealt with science, technology, and medicine journals, as well as some in the social sciences.

Conclusion: According to the average per JCR journal, the number of articles was 127, the number of citations 4,827, IF 2.067, ES 0.00819, and AIS 0.755. As the number of publishers included increased from the top three to the top five and top 10, the overall influence was found to be about 50%, 60%, and 70%, respectively. The top 10 publishers, especially the top three publishers, entirely overwhelmed other publishers. The concentration of the top three publishers was severe, as they led global journal publishing and even showed a major gap with T&F and Sage, who were added to the top five. The remaining five publishers included in the top 10 reflected all aspects of the largest publishers, with high citation ratios compared to journal and article ratios. Therefore, libraries and librarians need to pay special attention not only to journals published by the top five commercial publishers, but also those published by the five society and specialty publishers added to the top 10.

This study showed possibilities for how further studies could be conducted, if other journal-related information is combined with the unique journal list generated herein. The expected follow-up studies will address issues such as the article processing charges in open access journals, the prices of subscription journals, and the estimated market share by publisher. However, the lack of standardization of journal names was a problem and it took a considerable amount of time to check the same journals from various journal lists. Therefore, it is imperative to establish an internationally standardized journal database covering world journals to maintain accurate journal information as well as to enable reasonable evaluations of journals and publishers.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Data Availability

Most of the raw data in this paper are various indicator values of JCR, which is sold as a paid commercial database; therefore, sharing is not available. Please contact the corresponding author for raw data availability.

Supplementary Material

Supplementary file is available from: <https://doi.org/10.6087/kcse.209>.

Suppl. 1. Largest publisher imprints referenced by the Scopus classification

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Market share of the largest publishers in Journal Citation Reports based on journal price and article processing charge

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Abstract

Purpose: There are growing questions about the market share of the largest publishers. Although evaluations based on Journal Citation Reports (JCR) are important, librarians are more interested in journal costs. Therefore, this study was conducted with the aim of estimating the market share of the largest publishers listed in JCR using the journal subscription price (journal price) and article processing charge (APC).

Methods: The top 10 publishers were selected based on six indicators in JCR 2014 to 2018, and then their journal prices and APCs were investigated according to list prices. Other prior studies were also compared to estimate their market share more realistically because list and actual prices are not identical.

Results: The estimated average price of subscription journals in JCR was 2,300 US dollars and the average APC for an article was 2,652 US dollars. The APC per article was more expensive than the average journal price. Based on journal price and APC, the market influence of the top three publishers was 48.0%, but their market share was estimated to be 55.2% when annual reports and other studies were combined with this study. The difference was due to Elsevier's journal costs, as Elsevier's market share was higher than its market influence.

Conclusion: APCs require additional budgetary resources from institutions, but are another revenue source for publishers. Librarians need to reflect APC spending in journal subscription negotiations with the largest publishers. To clarify the market share more accurately, it is necessary to share information on subscription and APC costs paid by institutions.

Keywords

Article processing charge; Journal Citation Reports; Journal subscription price; List price; Market influence

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Introduction

Background/rationale: As e-journal package contracts with publishers and inter-publisher mergers have induced markedly lopsided payments to the largest publishers, questions about their influence and dominance in the global journal market are growing. Many commercial publishers, such as Elsevier-Cell, Springer-Nature, and Wiley-Blackwell, focusing on science, technology, and medicine journals, are known to have a significant influence. However, the exact status of the market share and power of society publishers, the role of which varies across fields, remains unknown. In this situation, Outsell estimated that English-language science, technology, and medicine journal publishing had global revenues of 9.9 billion US dollars (USD) in 2017 [1]. Checking the market share of the largest publishers in the world journal market is essential for negotiations, but it is difficult to obtain accurate information because commercial publishers keep sensitive profit information confidential and treat their subscription agreements as trade secrets. The Korean Electronic Site License Initiative (KESLI) is negotiating journal subscriptions under these conditions. The biggest question in the KESLI negotiations is how to evaluate the e-journal prices proposed by the publishers and how to agree and proceed with a consortium contract in which rates would increase. We studied the influence of the largest journal publishers according to Journal Citation Reports (JCR) 2014 to 2018 by using six JCR indicators, including the journal impact factor, Eigenfactor score, and article influence score, along with the number of journals, citable items, and total cites [2]. Nonetheless, regarding the influence of the largest publishers, libraries and librarians are particularly sensitive to costs, although JCR indicator-based measures of influence are also significant.

The largest publishers have been raising journal subscription prices (journal prices) faster than the rate of increase of library budgets or inflation. Article processing charges (APCs) are also expected to be a major revenue source for these publishers, as they expand open access (OA) journals. As journal prices and APCs are interrelated in journal publishing, librarians have begun to negotiate journal prices together with APC spending. Studies of journal subscription costs or library budgets have been limited by the reluctance of publishers and libraries to make this information public; therefore, large-scale studies on journal prices are rare [3].

Objectives: This study aimed to estimate the market share of the largest journal publishers listed in JCR using journal prices and APCs, as a follow-up study of the influence of those journal publishers based on six JCR indicators [2]. How large is the estimated market share of journal costs imposed by the publishers, as distinct from their influence measured by the

six JCR indicators? To solve this research question, we roughly estimated the market share of the top three publishers based on journal price and APC. As this study could not deal with the paid costs [4,5], its results were also compared with those of previous studies to estimate the actual market share more precisely. The result of this study will provide practical assistance to libraries, librarians, and consortia negotiators.

Methods

Ethics statement: This was not a study with human subjects, so neither institutional review board approval nor informed consent was required.

Study design: This was a descriptive study conducted by collecting data on journal prices and APCs.

Data collection: To estimate market share of journal publishers, libraries' subscription costs or publishers' sales information is required, but it is difficult to collect accurate data. As the list journal prices and APCs may somewhat differ from the costs that are actually paid, the validity of the estimation can be increased by conducting an analysis in combination with other studies. This paper analyzed the top 10 publishers by collecting their journal prices and APCs.

To prepare a journal list, JCR data over the past 5 years, including the most recent edition of JCR 2018 in 2019, were exported to Excel, and a list of 12,201 unique journals was created by integrating them into a single list. Missing publisher names were added from Web of Science or Scopus, and the journal list was finally classified by the publisher imprints. Collecting all the JCR journal prices was difficult, to the point of impossibility. According to the authors' paper based on six JCR indicators [2], the influence of the largest journal publishers was found to be 49.1% for the top three publishers, 58.0% for the top five, and 69.4% for the top 10. The top 10 publishers are, in order, Elsevier, Springer, Wiley, Taylor & Francis (T&F), Sage, Oxford University Press (OUP), American Chemical Society (ACS), Wolters Kluwer (Kluwer), Institute of Electrical and Electronics Engineers (IEEE), and Royal Society of Chemistry (RSC). This study limited the research target to the top 10 publishers, and we collected their prices from their Korean branches or publisher websites. We estimated the price level of the non-top 10 publishers as about 30.6% of all JCR journals [2], without trying to acquire more specific price information. To estimate the market share of the top three publishers more precisely, we compared the findings of this study with the publisher revenue and subscription amounts found in annual reports and other studies.

The prices were collected from February to April 2020 to reflect the latest information. For non-USD prices, we searched for foreign exchange rates in the United States Fed-

eral Reserve System and converted them into USD using the 1-year average for 2019. In this study, journal prices were analyzed using list prices instead of actual paid costs, online instead of print subscriptions, public rather than corporate affiliations, individual subscriptions rather than packages, and the USA region rather than the rest of the world. Although we tried to collect 2020 journal prices, the collected information for IEEE was from 2019. The 2020 journal prices for IEEE were calculated by applying the consortium increase rate in 2020. OUP did not provide APC information, so instead of each journal's APC, the average APC from the INTACT project [6] from 2018 to 2019 was applied. For APCs, the CC-BY-NC-ND price was applied, as it is cheaper than CC-BY. Fully OA journals without APC information or subscription-only journals without journal prices were excluded from the calculation of each average price.

Analysis methods: Data were tabulated, and the proportions of the cells were calculated.

Results

Journal prices and APCs of the top 10 publishers

The average price of subscription journals was higher than 3,000 USD for Elsevier, ACS, and RSC (Table 1). Most of the remaining publishers had average journal prices around 2,000 USD, but Sage, OUP, and IEEE were around 1,000 USD, which were the lowest among the top 10 publishers. For most of the publishers, except Elsevier and RSC, the APC per article was more expensive than the average journal price. The average APC for hybrid and fully OA journals was investigated, and the highest was found for ACS (3,871 USD), followed by Wiley (3,200 USD) and Springer (3,039 USD). The lowest

average APC was found for RSC (2,017 USD), followed by IEEE (2,057 USD). Springer currently sets various APCs for each journal, but the APC was set at 3,000 USD per article when the “Open Choice” program launched in 2004. That APC price has since become more or less a de facto standard. Therefore, T&F, Sage, ACS, IEEE, and RSC also set the same APC for most journals and then applied discounts according to various options, such that the actual APC varies from article to article.

As shown in Table 2, 23.6% of the journals had prices of 500 to 1,000 USD, followed by 17.0% with prices of 1,000 to 1,500 USD and 12.9% with prices of 5,000 USD or more. More than half of journals (50.9%) had APCs of 2,500 to 3,000 USD, while 16.5% had APCs of 3,000 to 3,500 USD and 13.2% had APCs of 2,000 to 2,500 USD. Most of the price points of APCs were around 3,000 USD, corresponding to the “Open Choice” level. Although it is doubtful whether the APCs set by some publishers have a scientific basis, the journal price was distributed more diversely than the APC, with the distribution of journals in various price intervals decreasing after a peak at 500 to 1,000 USD.

Market influence of the largest publishers versus others

Before any discounts, the average price of subscription journals in JCR was estimated to be 2,300 USD and the average APC was estimated to be 2,652 USD (Table 3). Thus, if one were to subscribe to all 10,535 journals—excluding fully OA journals from the 12,201 journals in the JCR—the sum of the journal prices was estimated to be about 24 million USD. Nonetheless, the total APC amount required to submit an article to each of the 11,287 fully and hybrid OA journals was about 30 million USD. The top three publishers accounted for

Table 1. Results for the top 10 publishers by journal price and APC

JCR		Top 3 publishers			+ Top 10 publishers						
		Elsevier	Springer	Wiley	T&F	Sage	OUP	ACS	Kluwer	IEEE	RSC ^{b)}
JCR	Journal	1,849	1,904	1,267	1,222	630	287	56	242	166	43
Journal price (USD)	Journal	1,599	1,574	1,103	1,120	558	241	38	201	147	38
	Total	5,268,186	4,045,842	2,995,079	2,510,658	761,613	275,044	121,020	517,235	179,664	141,062
	Average ^{a)}	3,295	2,570	2,715	2,242	1,365	1,141	3,185	2,573	1,222	3,712
APC (USD)	Journal	1,720	1,598	1,216	1,189	614	287	56	205	165	42
	Total	4,747,649	4,856,840	3,891,288	3,561,055	1,761,714	732,366	216,750	579,275	339,327	84,721
	Average ^{a)}	2,760	3,039	3,200	2,995	2,869	2,552	3,871	2,826	2,057	2,017

APC, article processing charge; JCR, Journal Citation Reports; T&F, Taylor & Francis; OUP, Oxford University Press; ACS, American Chemical Society; Kluwer, Wolters Kluwer; IEEE, Institute of Electrical and Electronics Engineers; RSC, Royal Society of Chemistry; USD, US dollar.

^{a)}Average per journal excluding null data; ^{b)}The number of RSC journals increased compared to the authors' previous study [2], because one journal was newly discovered due to a problem with space in the journal name.

a higher percentage in their journal share in JCR, and their average journal price was higher than that of the top 10 publishers. This means that the top three publishers are publishing numerous expensive and high-APC journals.

Table 2. Distribution of price range by journal price and APC of the top 10 publishers

Price range (USD)	Journal price		APC	
	Journal	Share (%)	Journal	Share (%)
<500	554	8.4	38	0.6
500–1,000	1,559	23.6	37	0.5
1,000–1,500	1,124	17.0	105	1.5
1,500–2,000	762	11.5	255	3.7
2,000–2,500	512	7.7	902	13.2
2,500–3,000	374	5.6	3,476	50.9
3,000–3,500	329	5.0	1,130	16.5
3,500–4,000	218	3.3	670	9.8
4,000–4,500	181	2.7	176	2.6
4,500–5,000	150	2.3	25	0.4
>5,000	856	12.9	17	0.3
Total	6,619	100	6,831 ^{a)}	100

APC, article processing charge; USD, US dollar.

^{a)}Oxford University Press journals were excluded, as the average APC was applied instead of each APC.

Expanding the scope of the inquiry from the top three publishers to the top 10, the APC share increased more than the journal price share. Most of the publishers added to the top 10 required higher APCs than journal prices. Since publishers are generating new revenue from APCs, it may be due to their price policies that the six publishers added to form the top 10 (excluding RSC) tried to compensate for their subscription sales, which are lower than those of the top three publishers, through APCs. The journal price level seemed to have some correlation with the number of articles and the six JCR indicators. The top three publishers showed a market influence of 49.1% according to the six JCR indicators [2], but their market share was estimated to be 50.8% based on journal prices and 45.1% based on APCs. Therefore, based on the investigated prices, the top three publishers were also found to have a high level of dominance in the journal market.

Discussion

Estimating the market share of the top three publishers: According to prior studies, in 2016, academic libraries in the USA paid 2.3 billion USD for journal subscriptions [7], and the 31 consortia in European countries spent 726 million European Union euros (EUR) [8]. Similar to these studies, some other studies have partially exposed the magnitude of subscription sales for various publisher imprints [3]. According to the publishers' annual reports, Elsevier's subscription sales

Table 3. Market influence of the top three and top 10 publishers versus others

JCR		Top 3 publishers		Top 10 publishers		All publishers ^{a)}
		Top 3	Non-top 3 ^{a)}	Top 10	Non-top 10 ^{a)}	
JCR	Journal	5,020	7,181	7,666	4,535	12,201
	Journal share (%)	41.1	58.9	62.8	37.2	100
	Article share (%)	50.0	50.0	69.1	30.9	100
	Six JCR indicators' share (%) ^{b)}	49.1	50.9	69.4	30.6	100
Journal price (USD)	Journal	4,276	6,259	6,619	3,916	10,535
	Total	12,309,107	11,920,580	16,815,403	7,414,284	24,229,687
	Share (%)	50.8	49.2	69.4	30.6	100
	Average ^{c)}	2,879	1,905	2,540	1,893	2,300
APC (USD)	Journal	4,534	6,753	7,092	4,195	11,287
	Total	13,495,777	16,433,596	20,770,985	9,158,388	29,929,373
	Share (%)	45.1	54.9	69.4	30.6	100
	Average ^{c)}	2,977	2,434	2,929	2,183	2,652

JCR, Journal Citation Reports; USD, US dollar; APC, article processing charge.

^{a)}Non-top 3, non-top 10, and all publishers: estimated as 30.6% of the total based on the six JCR indicators' share of 69.4% for the top 10 publishers; ^{b)}Number of journals, citable items, total cites, impact factor, Eigenfactor score, and article influence score [2]; ^{c)}Average per journal excluding null data.

are about 2.5 billion USD (2.0 billion British pound), Springer's are 1.4 billion USD, and Wiley's are 1.3 billion USD [9-11]. Only some publishers provide access to their annual reports, so there is a limit to the degree to which it is possible to investigate the world journal market share. Journal subscription costs at the national or regional level reported in papers and documents are only partially helpful in understanding the overall market share because the target libraries or publishers are limited.

Among the 10 publishers, the top three, including Nature Publishing Group (a Springer imprint), occupy about 70% of the total share [12], and the 10 publishers account for about 93 million British pound in 2014 subscriptions. However, because cost information is not included in these figures from the publisher, the paper was not used for the final estimation of market share. According to the National Research Council of Science and Technology, the total journal budget of 25 government-funded research institutes in South Korea (focused on the science and technology fields—excluding medicine—and not including university libraries) was about 12 million USD in 2020. In the materials budgets of 25 research libraries in 2018 to 2020, the share of journal subscriptions was 71.0% [13]. The top three publishers accounted for 67.1% of those expenditures, and the top 10 for 78.8%. Those results present an even higher share of the largest publishers than was found herein.

The journal market share of the top three publishers was comprehensively predicted by averaging six sources, including annual reports and the other studies cited above, along with this study (Table 4) [1-3,8-11,13]. The final result was about 55.2%, with a range from 48.0% to 67.1%. This level is much higher than the directly calculated result of this study (48.0%) and the share of 49.1% calculated based on the six JCR indicators [2]. The reason for this is the major difference

between Elsevier's list and actual prices. However, Springer and Wiley showed a small difference. As a result, the estimated market share shift to Elsevier was much stronger than in the authors' studies.

Evaluation of journal prices and APCs: To determine whether the investigated prices of the top 10 publishers were related to the six JCR indicators, the findings of this study were graphically compared to those of the authors' previous study [2]. Springer, Wiley, and Kluwer seemed highly correlated, but the remaining publishers had poor correlation (Fig. 1). In particular, Elsevier had a much lower APC relative to the six JCR indicators and journal price, but the converse was found for T&F and Sage. The shares of ACS, IEEE, and RSC according to both journal prices and APCs were lower than their shares according to the six JCR indicators.

According to EBSCO's 5-year price increase history, the av-

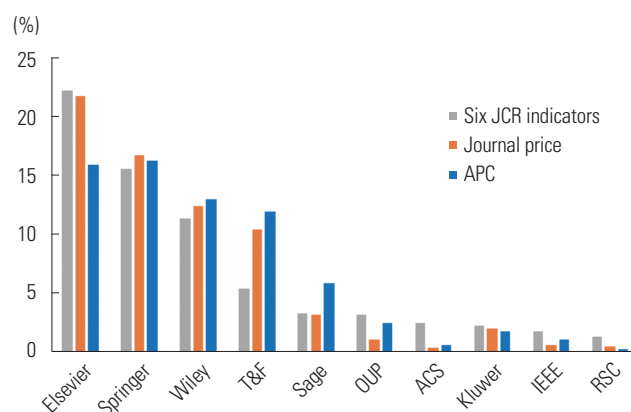


Fig. 1. Comparison of the results of this study with those obtained using the six Journal Citation Reports (JCR) indicators for the top 10 publishers. APC, article processing charge; T&F, Taylor & Francis; OUP, Oxford University Press; ACS, American Chemical Society; Kluwer, Wolters Kluwer; IEEE, Institute of Electrical and Electronics Engineers; RSC, Royal Society of Chemistry.

Table 4. Estimation of the average share of the top three publishers in world journal market

Source	World market share (%)				Non-top 3	Total
	Elsevier	Springer	Wiley	Top 3		
Estimated revenue ^{a)} by annual reports [9,10,11]	25.4	14.2	12.9	52.5	47.5	100
European University Association's study [8]	36.6	10.5	11.8	58.9	41.1	100
Bergstrom's study based on USA libraries [3]	33.6	12.9	9.4	55.9	44.1	100
Document on 25 NST libraries in South Korea [13]	38.9	16.1	12.1	67.1	32.9	100
The authors' study based on six JCR indicators [2]	22.2	15.5	11.4	49.1	50.9	100
This study based on journal price and APC	18.8	16.5	12.7	48.0	52.0	100
Average	29.2	14.3	11.7	55.2	44.8	100

NST, National Research Council of Science and Technology; JCR, Journal Citation Reports; APC, article processing charge.

^{a)}The top three publishers' revenue was estimated to account for 5.2 billion USD of the total 9.9 billion USD based on Outsell's estimation [1].

erage increase rate of journal prices for invoices in USD from 2010 to 2019 was 5.7% annually, and the average journal price paid by academic and medical universities in 2019 was 1,785 USD [14]. However, the average price of the JCR journals estimated in this study was 2,300 USD. The reason for this discrepancy is that the present study analyzed list prices before any discount, while the EBSCO data is the final contract amounts, reflecting journal preferences and discount for packages or consortia. Using the average journal price of 2,300 USD, publishers need to obtain subscriptions for roughly 409 libraries for each of the 10,535 subscription journals in order to account for the 9.9 billion USD of the world journal market [1].

In this study, the average APC was estimated to be 2,652 USD, which was higher than the average journal price. Since the average annual number of articles per JCR journal is 127 [2], the 10,535 subscription journals will annually publish about 1,337,945 articles. Multiplying this number of articles by the 2,652 USD of APC for OA publishing, 3.5 billion USD would be spent annually. Other papers reported that the average APC was 2,415 USD and 2,727 USD in 2014 [4,15]. According to the 2014-2018 APC data in the INTACT project [6] published by the Open Knowledge Foundation Germany, the average APC was 2,255 USD (2,015 EUR), corresponding to total spending of 202 million EUR for 100,401 OA articles. The APCs paid in the INTACT project were lower than those in this study, and this discrepancy likely reflects discounts. Therefore, an APC of 2,000 EUR per article, which was based on the OA2020 plan, was established as the appropriate level [16].

The average expenditures of institutions are 87.5% for subscriptions, 11.8% for APCs, and 0.6% for administrative costs [4]. The OA publishing market was estimated to be around 758 million USD in 2019, and therefore, the APC market share was estimated to account for 7.7% of the world journal market. Although this study did not accurately show the costs of subscription contracts or APCs, it could be used as a reference when negotiating contracts for journal subscriptions.

Limitation: Journals that changed publishers were considered not to have any fluctuations; instead, the current publisher was used, because it would be time-consuming and challenging to analyze the history of publisher changes by year. In investigating journal prices and APCs, this study applied list prices, even though these may be different from the finally contracted and paid prices. The journal prices and APCs of the non-top 10 publishers and the world journal market were estimated, not directly calculated.

Conclusion: In this study, the average APC for an article was estimated to be more expensive than the average journal price of one JCR journal. According to journal prices and APCs,

the market influence of the top three publishers was 48.0%. However, in combination with information on actual subscriptions obtained from the annual reports and other studies, their market share was finally estimated to be 55.2%. The difference was caused by Elsevier's real market share, which was higher than its market influence. As a result, the shift to the top three publishers from the top 10 was stronger in terms of actual contract amounts. In addition to subscription revenue, publishers are expected to increase APC revenue by expanding OA articles and journals. Therefore, librarians need to watch the market share trend of the largest journal publishers based on journal prices and APCs, and should actively reflect APC spending in journal subscription negotiations. In conclusion, a more accurate market share of the most significant journal publishers can be identified through the disclosure and sharing of subscription and APC costs paid by institutions.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Data Availability

Dataset is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/FZ3OIA>

Dataset 1. List prices of the top 10 journal publishers in JCR 2014 to 2018

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Historical diagnostic and therapeutic changes of ischemic stroke based on the highly cited articles

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Abstract

Purpose: Stroke is a global economic burden of health, which means that it is critical to evaluate changes of optimal diagnoses and treatments. The aim of the study reported herein was to identify the most-cited articles in the field of ischemic stroke and assess their characteristics.

Methods: We searched all included articles that had been cited more than 100 times using the “Cited Reference Search” in February 2016 from Web of Science Core Collection. Among a total of 2,651 articles, we excluded articles on basic science and which involved only hemorrhagic strokes and identified the top-100 cited articles on ischemic stroke.

Results: The number of citations for the articles analyzed in this study ranged from 5,182 to 580. Most of the articles were published in *The Lancet* (25%) and *Stroke* (23%), and originated from the United States of America (n = 44). Most of them were original articles (65%) and dealt with stroke risk factors (32%) and stroke management (30%). A novel study of hyperacute treatment involving recombinant-tissue plasminogen activator was described in the top-ranked article.

Conclusion: Reviews on highly cited articles can help physicians identify trends in the diagnosis and treatment of ischemic stroke in the past. This bibliometric analysis can provide a unique perspective on historical developments in this field.

Keywords

Bibliometrics; Cerebral infarction; Ischemic stroke; Stroke

Introduction

Stroke is a disastrous disease with high mortality and morbidity rates that represent a global economic burden of health. Moreover, the ever-increasing size of the elderly population is likely to substantially increase the stroke burden within the near future. One epidemiological study of stroke have found that ischemic stroke (IS) accounts for approximately 76.1% of all types of strokes [1]. Since stroke has a heterogeneous pathophysiology and evolving treatment meth-

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ods, the ability to evaluate stroke diagnoses and treatments is important to the clinical outcomes.

A surrogate for the impact of a new reported finding in a scientific field is the number of times that the article has been cited (the citation count). The Science Citation Index was started by the Institute for Scientific Information (ISI) with the purpose of providing a systematic ongoing measurement of the citation counts for scientific journals [2]. The number of citations might be useful for quantifying the influence of an article in its field, although the value of citation indices is still debated [2]. Numerous studies have analyzed the most-cited articles in various medical fields, including neurosurgery [3], general surgery [4], orthopedics [5], and radiology [6]. However, a bibliometric analysis of the most-cited articles in the field of stroke has not been reported previously.

The purpose of this study was to investigate which of the studies received high citations in the field of IS because reviews on highly cited articles can help physicians identify trends in the diagnosis and treatment of IS.

Methods

To identify the most-cited IS articles, journals listed under the following categories of the ISI Web of Knowledge Journal Citation Reports Science Edition 2014 (Thomson Reuters, New York, NY, United States of America) were assessed for inclusion “clinical neurology” (192 journals), “neuroscience” (252 journals), and “medicine, general & internal” (154 journals). The category of “medicine, general & internal” was included because it covers journals with high impact-factor that contain a diffuse variety of papers that span miscellaneous fields. We searched all included articles that had been cited more than one-hundred times using the “Cited Reference Search” (Thomson Reuters) in February 2016. The ISI Web of Knowledge-Web of Science provides the overall citation counts for published scientific articles since 1945.

To identify IS journals, we searched for the following terms either singly or in combination: “cerebral infarction,” “cerebral ischemia,” “cerebrovascular disease,” “cerebrovascular ischemia,” “stroke,” “cerebral thrombosis,” “cerebral embolism,” “cerebral thromboembolism,” “brain ischemia,” “brain infarction,” “brain embolism,” “brain thromboembolism,” “cerebrovascular insufficiency,” “lacunar infarction,” “malignant infarction,” and “central nervous system infarction.” Among a total of 2,651 articles, we excluded 30 that appeared to be duplicate in the analyzed journals. We also excluded articles on basic science based on animal models and which involved only hemorrhagic strokes.

We reviewed the following categories of the journals: title, publication date, country of publication, institution of publi-

cation, department, authorship, number of citations, subtype of article (guidelines, original article, stroke classification and scale, systematic review or meta-analysis, review or editorial, or national registry), and main topic. The author information of the articles was defined as those of the first author. If the first author had duplex affiliations, the correspondent’s one was used. If the first author was involved in a group and the first or corresponding author was not presented clearly, we did not assess the first or corresponding author, institution, or country. Institutional review board approval was unnecessary since we conducted a bibliometric analysis of existing published articles that did not contain human subjects.

Results

We finally identified the most frequently cited 100 articles from the Web of Science Core Collection (Table 1 and Suppl. 1). The most-cited article was cited 5,182 times, while the least-cited article was cited 580 times. The National Institute of Neurological Disorders and Stroke (NINDS) r-tPA Stroke Trial published the top-ranking article in 1995, which was a randomized clinical controlled trial that demonstrated the effect of tissue plasminogen activator (tPA) on acute IS [7]. The number of citations annually ranged from 17.3 to 426.5, and approximately one-third of the articles were cited more than 1,000 times. The article with the most annual citations since publication was a guideline for the early management of patients with acute IS from the American Heart Association/American Stroke Association (AHA/ASA) that was published in 2013 [8].

Only 16 journals provided the top-100 articles in our bibliometric analysis of IS (Table 2). Of the 16 journals, *The Lancet* (n = 25), *Stroke* (n = 23), *New England Journal of Medicine* (n = 17), and *Journal of the American Medical Association* (n = 12) contained the majority of the articles. The articles were published from 1977 to 2013 (Fig. 1). Most of the top-100 cited articles on IS originated from the United States of America (n = 44), followed by the United Kingdom (n = 16) (Suppl. 2). The most-represented departments were the Department of Neurology, University of California (n = 5) and the Department of Clinical Medicine, University of Oxford (n = 5) (Suppl. 3). The author with the most contributions was Hacke W (n = 12), followed by Wolf PA (n = 7) (Table 3).

There were 65 original articles and 13 systematic reviews/meta-analyses (Table 4). The main topics included “stroke risk factors” (n = 33), “stroke registry” (n = 3), “stroke review” (n = 3), “stroke guidelines” (n = 6), “stroke diagnosis, pathophysiology” (n = 15), “stroke management” (n = 32), and “stroke prognosis” (n = 8) (Table 5). The most frequently described topics about “stroke risk factors” in our analysis were atri-

Table 1. The top-10 cited articles on ischemic stroke^{a)}

Rank	Article	No. of citations	No. of annual citations	No. of annual citations, rank
1	Marler JR, Brott T, Broderick J, et al. Tissue plasminogen activator for acute ischemic stroke. <i>N Engl J Med</i> 1995;333:1581-8.	5,182	259.1	3
2	Adams HP Jr, Bendixen BH, Kappelle LJ, et al. Classification of subtype of acute ischemic stroke: definitions for use in a multicenter clinical trial. <i>Stroke</i> 1993;24:35-41.	3,673	159.7	8
3	Collins R, Peto R, MacMahon S, et al. Blood pressure, stroke, and coronary heart disease. Part 2, Short-term reductions in blood pressure: overview of randomised drug trials in their epidemiological context. <i>Lancet</i> 1990;335:827-38.	2,914	116.6	19
4	O'Leary DH, Polak JF, Kronmal RA, et al. Carotid-artery intima and media thickness as a risk factor for myocardial infarction and stroke in older adults. <i>N Engl J Med</i> 1999;340:14-22.	2,862	168.4	7
5	MacMahon S, Peto R, Cutler J, et al. Blood pressure, stroke, and coronary heart disease. Part 1, Prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias. <i>Lancet</i> 1990;335:765-74.	2,847	113.9	21
6	Wolf PA, Abbott RD, Kannel WB. Atrial fibrillation as an independent risk factor for stroke: the Framingham Study. <i>Stroke</i> 1991;22:983-8.	2,612	108.8	25
7	Go AS, Hylek EM, Phillips KA, et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: the AnTicoagulation and Risk Factors in Atrial Fibrillation (ATRIA) Study. <i>JAMA</i> 2001;285:2370-5.	2,507	179.1	5
8	Probstfield JL. Prevention of stroke by antihypertensive drug treatment in older persons with isolated systolic hypertension: final results of the Systolic Hypertension in the Elderly Program (SHEP). <i>JAMA</i> 1991;265:3255-64.	2,382	99.3	30
9	Hacke W, Kaste M, Bluhmki E, et al. Thrombolysis with alteplase 3 to 4.5 hours after acute ischemic stroke. <i>N Engl J Med</i> 2008;359:1317-29.	2,221	317.3	2
10	Sever PS, Dahlöf B, Poulter NR, et al. prevention of coronary and stroke events with atorvastatin in hypertensive patients who have average or lower-than-average cholesterol concentrations, in the Anglo-Scandinavian Cardiac Outcomes Trial--Lipid Lowering Arm (ASCOT-LLA): a multicentre randomised controlled trial. <i>Lancet</i> 2003;361:1149-58.	2,160	180.0	4

^{a)}See Suppl. 1 for all 100 articles.

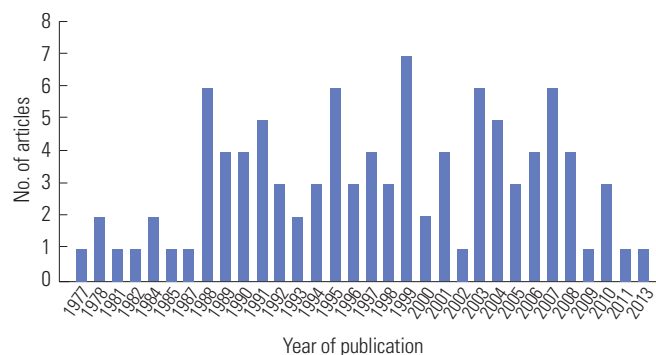


Fig. 1. Most popular articles cited by decade.

al fibrillation (n=5), hypertension (n=4), dyslipidemia (n=4), and coagulopathy (n=4), while those about “stroke management” were tPA (n=9) and antithrombotic therapy (n=10).

Discussion

We analyzed the top-100 cited articles in the field of IS. The top-ranked article was a report of the NINDS r-tPA Stroke Trial demonstrating the effect of r-tPA on acute IS in 1995 for the first time [7]. The article with the most citations annually was a guideline for the early management of patients with acute IS from the AHA/ASA that was published in 2013 [8]. Original articles accounted for two-thirds of the 100 articles. The top-ranked main topics were “stroke risk factors” and “stroke management.”

Many randomized controlled trials have resulted in landmark articles on acute treatments of IS. The NINDS r-tPA Stroke Trial has since 1995 (*1*; the parenthesized italicized numbers refer to the rank in Table 1) been the most influential trial in the field of IS. r-tPA is the only method used to recanalize occlusive arteries in patients with hyperacute IS. Despite an increased rate of symptomatic intracerebral hemorrhage (ICH), intravenous r-tPA within 3 hours of the onset of

Table 2. Journals in which the top-100 cited articles were published

Rank	Journal	No. of articles
1	<i>The Lancet</i>	25
2	<i>Stroke</i>	23
3	<i>New England Journal of Medicine</i>	17
4	<i>JAMA: Journal of the American Medical Association</i>	12
5	<i>Annals of Neurology</i>	4
6	<i>Neurology</i>	4
7	<i>Archives of Internal Medicine</i>	3
8	<i>Lancet Neurology</i>	3
9	<i>Annals of Internal Medicine</i>	2
10	<i>Brain</i>	1
11	<i>Cerebrovascular Diseases</i>	1
12	<i>Journal of Cerebral Blood Flow and Metabolism</i>	1
13	<i>Journal of Neurology Neurosurgery and Psychiatry</i>	1
14	<i>Journal of the Neurological Sciences</i>	1
15	<i>Nature Reviews Neuroscience</i>	1
16	<i>Trends in Neurosciences</i>	1

Table 3. Authors who contributed at least 5 of the top-100 cited ischemic stroke articles

Rank	Author	No. of top-100 cited articles	Types of author association according to number of top-100 cited articles
1	Hacke W	12	First (n=6), corresponding (n=6)
2	Wolf PA	7	First (n=4), corresponding (n=3)
3	Bamford J	4	First (n=2), corresponding (n=2)
3	del Zoppo GJ	4	First (n=2), corresponding (n=2)
3	Feigin VL	4	First (n=2), corresponding (n=2)
3	Smith WS	4	First (n=2), corresponding (n=2)

Articles from specific groups whose first or corresponding authors could not be determined (article no. 3, 17, 18, 22, 25, 28, 38, 39, 46, 50, 51, 54, 68, 79, 80, and 85) are excluded from this table.

Table 4. Types of the top-100 cited ischemic stroke articles

Type of article	No. of articles
Original article	65
Guidelines	6
Stroke classification or stroke related scale	6
Review article or editorial	7
Systematic review or meta-analysis	13
National registry	3

Table 5. Main topics covered in the top-100 cited ischemic stroke articles

Topic	No. of articles
Stroke risk factor	
Multiple risk factor	3
Hypertension or blood pressure	4
Diabetes mellitus	1
Dyslipidemia or statin therapy	4
Atrial fibrillation	5
Coagulopathy (fibrinogen, factor V, sickle cell anemia, estrogen)	4
Carotid artery or aortic arch stenosis	2
Homocysteine	3
Diet (vitamin, fruit, alcohol, etc.)	3
Obstructive sleep apnea	1
Patent foramen ovale	1
C-reactive protein	1
Inflammatory mediator	1
Published guidelines	6
Stroke registry	3
Stroke review	3
Stroke diagnosis, pathophysiology	
Pathophysiology	6
Subtype classification	3
Scale (mRS, NIHSS, etc.)	3
Imaging modalities	3
Stroke management	
Tissue plasminogen activation (intravenous-tPA)	9
Thrombolysis (intraarterial-urokinase, desmoteplase)	3
Mechanical thrombectomy	1
Decompression surgery	1
Bypass surgery	1
Carotid endarterectomy	1
Antithrombotic therapy (aspirin, clopidogrel, dipyridamole, ticlopidine)	10
Warfarin or anticoagulation	6
Stroke prognosis	
Dementia	1
Mood	1
Rehabilitation	1
Reorganize or recovery	5

IS reportedly improves short-term outcomes [7]. That article prompted the use of r-tPA to spread worldwide and become accepted as the appropriate management in patients with hy-

peracute stroke. It is remarkable that an article that is more than 20 years old is still being cited continuously, which has resulted in it being ranked third in the overall annual citation rankings (Table 1). Furthermore, the European Cooperative Acute Stroke Study (ECASS) III trial showed significant efficacy of r-tPA when it is administered for up to 4.5 hours [9]. The SITS-MOST (Safe Implementation of Thrombolysis in Stroke—Monitoring Study) (44) evaluated the safety and efficacy of r-tPA at both 3 and 4.5 hours [10]. Current guidelines recommend that r-tPA should be administered to eligible patients for up to 4.5 hours after symptom onset or the last known normal time. However, the ECASS I (13) and ECASS II (20) trials did not demonstrate significant efficacy on the mortality rate at 30 days or the overall incidence of intracerebral hemorrhage in IS patients with r-tPA compared to placebo treatment [11,12]. However, we assume that administering r-tPA at a dose of 1.1 mg/kg (in ECASS I) and at an injection time of within 6 hours after stroke onset (in both ECASS I and II) might have influenced the results. This shows the importance of reporting on both negative and positive studies.

The numerous studies aimed at proving the efficacy of various types of thrombolysis therapy have presumably involved physicians actively applying acute IS treatments. A randomized trial that tested the recanalization efficacy of recombinant prourokinase demonstrated that the intra-arterial administration of prourokinase within 6 hours after stroke onset was associated with better recanalization and a good clinical outcome at 90 days of acute IS (a phase II randomized trial of recombinant pro-urokinase by direct arterial delivery in acute middle cerebral artery stroke [PROACT], 66; intra-arterial prourokinase for acute ischemic stroke [PROACT II], 15) [13,14]. Administering another promising thrombolysis drug, desmoteplase, at 3 to 9 hours after acute symptom onset was associated with a higher incidence of reperfusion in IS patients (Desmoteplase in Acute Ischemic Stroke trial, 78) [15]. Advancements in techniques and materials are leading to endovascular thrombectomy emerging for the management of acute IS. In reflecting these trends, two articles on the Merci Retriever, a device used for mechanical clot extraction in cerebral arteries, were included in our study (60, 74). Although the recanalization rate was higher for a newer-generation device than for first-generation ones, these differences were not statistically significant. Other devices used for mechanical thrombectomy such as the Trevo and Solitaire stents were not listed in our top-100 cited articles. Since the results will be related to the development of the order of retriever, such articles might become more common in the near future. Despite the absence of the subsequent related articles, the Extending the time for Thrombolysis in Emergency Neurological Deficits with Intra-Arterial therapy (EXTEND-IA) trial (206 citations)

[16], Endovascular Treatment for Small Core and Proximal Occlusion Ischemic Stroke trial (ESCAPE) (214 citations) [17], and Multicenter Randomized Clinical Trial of Endovascular Treatment for Acute Ischemic Stroke (MR CLEAN) study in the Netherlands (271 citation) [18] were the most prominent findings in the field of IS in 2015. These articles reported on the effectiveness of mechanical thrombectomy and might be milestones in the acute management of acute IS. This led to the AHA/ASA association updating the guidelines for the early management of patients with acute IS regarding endovascular treatment in 2015 [19].

Regarding antithrombotic agents for the prevention of IS, the International Stroke Trial (32) suggested that aspirin was both safer and more effective than heparin in acute IS [20]. Except in embolic stroke, the efficacy of heparin for preventing IS has not been studied. The poor preventive effect on IS has resulted in physicians trying more aggressive treatments such as using dual antiplatelets. However, unlike in cardiac research, dual antiplatelet therapy does not significantly reduce major vascular events and is associated with major bleeding events (management of atherothrombosis with clopidogrel in high-risk patients with recent transient ischaemic attack or ischaemic stroke [MATCH] trial, 31) [21]. However, considering the findings of the Clopidogrel in High-risk Patients with Acute Non-disabling Cerebrovascular Events (CHANCE) trial, current guidelines recommend that the combination of aspirin and clopidogrel can be initiated within 24 hours of a minor IS or transient ischemic attack and continued for 21 days.

Stroke classifications/scales and national registries have been used as references (stroke classifications/scales, $n=6$; national registries, $n=3$). These articles included the Trial of Org 10172 in Acute Stroke Treatment classification (2), and have provided important methodologies for the clinical research of strokes.

Five of the six guidelines related to IS were published in the journal *Stroke*. Guidelines for the early management of patients with IS were published in 2003 (80), 2007 (25), and 2013 (50), with the last being the most-cited article annually [8,22,23]. Guidelines for preventing IS or transient ischemic attack were published in 2006 (38) and 2011 (54) [24,25]. An especially notable finding is that recent guidelines were cited more frequently, which is attributable to physicians focusing more on treating patients using evidence-based guidelines nowadays. With regard to the publication patterns, many of the randomized controlled trials were published in *New England Journal of Medicine*, and most of the guidelines in patients with IS were published in *Stroke*.

This study was subject to some limitations. First, there may be numerous biases, including self-citations, journal citations with higher impact-factor, country parochialism, inhouse ci-

tations, language bias (English journal-oriented citation), and omission bias. Second, “obliteration by incorporation” is a major problem. As precious knowledge becomes generalized, physicians no longer need to cite the paper [26]. Third, the method used to calculate the number of total citations might be affected by the duration since article-publication, which is why we added the rank based on the number of annual citations. Finally, articles on trials that evaluated stroke as one of multiple endpoints were not included in this bibliometric analysis. Because this “Cited Reference Search” facility searches for titles of articles, it might have resulted in the omission of relevant articles that were published in various medical journals. For example, although most of the large randomized multicenter trials of novel oral anticoagulants other than edoxaban (Effective Anticoagulation with Factor Xa Next Generation in Atrial Fibrillation–Thrombolysis in Myocardial Infarction 48 [ENGAGE AF-TIMI 48], 384 citations) were cited more than 1,700 times (Randomized Evaluation of Long-term Anticoagulation Therapy [RE-LY] trial, 3,152 citations; Rivaroxaban Once Daily Oral Direct Factor Xa Inhibition Compared with Vitamin K Antagonism for Prevention of Stroke and Embolism Trial in Atrial Fibrillation [ROCKET AF], 1,914 citations; and Apixaban for Reduction in Stroke and Other Thromboembolic Events in Atrial Fibrillation [ARISTOTLE] trial, 1,702 citations), these were not included in the present lists. However, we tried to identify many journals on IS and evaluated various fields: “medicine, general & internal,” “neuroscience,” and “clinical neurology.” Our main purpose was to identify trends in clinical decision-making in neurological sciences. Although citation statistics might have some critical limitations, analyzing citation rates might provide a unique perspective of historical diagnostic and therapeutic changes in the field of IS. By identifying trends in the diagnosis and treatment of IS in the past, physicians will be able to develop new ideas or new plan.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Supplementary Material

Supplementary file is available from <https://doi.org/10.6087/kcse.211>

Suppl. 1. The top-100 cited articles on ischemic stroke

Suppl. 2. Countries of origin of the top-100 cited articles

Suppl. 3. Institutions most frequently represented in the top-cited articles

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Bibliometric analysis of flipped classroom publications from the Web of Science Core Collection published from 2000 to 2019

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Abstract

Purpose: This study analyzed the bibliometric characteristics of flipped classroom publications in the Social Science Citation Index and Science Citation Index Expanded from 2000 to 2019.

Methods: The terms related to “flipped classroom” and “inverted learning” were the keywords for searching journal articles on January 3, 2020.

Results: There are 645 articles (including 33 early-access articles), representing 1,938 authors in the 210 journals scanned. The United States, China, and Taiwan were three leading countries/regions in this field. In the top 10 countries, to 10 institutions, the top eight most-cited journals were identified by either the number of publications or the number of citations. Hot-spot themes from the 24 highly-cited articles and author keyword co-occurrence analysis focus on empirical research in the flipped classroom, the overall feasibility of the flipped classroom course design and practical model, and students’ performances, and student-regulated learning (active learning and readiness) outcomes.

Conclusion: The results indicate that the United States dominated flipped classroom research, originating most of the highly-cited articles, having more prolific authors, and presenting the most-cited institutions. Furthermore, little research has been undertaken into arriving at an understanding of evidentiary effectiveness or consistency in a flipped classroom. Based on the trends identified, we need a call for more specific types of research into the effectiveness of flipped classroom studies and systematic reviews.

Keywords

Bibliometric analysis; Flipped classroom; Visualization; Keyword co-occurrence, Co-authorship

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Introduction

Background/rationale: The flipped classroom has recently become an important pedagogical approach for students to learn in an interactive learning environment. Unlike traditional teach-

ing methods, the concept of flipped classroom refers to the conversion of the roles of teachers and students. Simply put, a flipped classroom approach is a type of blended learning strategy that reverses the traditional learning environment by delivering online learning materials before class, with instructional time to deepen learners' understanding through discussion with peers to facilitate more extensive problem-solving activities. Although the flipped classroom approach has rapidly become the academic focus of education, there is little empirical research on the effectiveness or consistency of flipping classrooms [1].

Perhaps because of the lack of rigorous research design, they still cannot be considered as evidence-based teaching methods even if studies have pointed out that flipped classroom approach can meet the needs of teachers and students [2]. To date, no articles have been published to illustrate the entire picture of flipped classroom-related publications, including the distribution of annual publications, source of authorship, most influential articles.

Purpose: We would like to map flipped classroom knowledge through bibliometric and social network analyses, including annual publications, most-cited countries, most-cited journals, most-cited institutions, most-cited institutions, hot-spot themes, and potential trends.

Methods

Ethics statement: Neither institutional review board's approval nor informed consent is required because it is a study based on the literature database.

Study design: It is the bibliometric analysis of the specific topic from literature databases.

Data/measurement: Data related to the present study were retrieved from the core collection of Web of Science on January

3, 2020. Twenty-two terms related to "flipped classroom" and "inverted learning" were used as the keywords for searching journal articles. Only those publications published in the years ranging from 1900 to 2019 were considered. The timespan was set as "all year" to thoroughly retrieve related data from the past. There are 645 articles (including 33 early-access articles), representing 1,938 authors in the 210 journals scanned. A total of 15,654 references with 1,440 keywords are included in the titles and abstracts (Dataset 1).

Visualization: Data obtained from the core collection of Web of Science were exported to VOSviewer used to visualize bibliometric maps related to scientific affairs [3] and to estimate the relationships among actors (i.e., author, country, journal, institution) in the given network by centralities and density contour maps.

Results

As shown in Fig. 1, the first two articles appeared in 2000 and then there was a four-year long pause until 2004. Only two articles were published in 2004 and from then on the growth rate remained null until 2012. Most publications were in 2018. A total of 53 countries were counted and only the top 10 countries were listed. Top 10 countries were presented in Fig. 2. The United States, ranking first, contributed the most original articles (284, 46.5% of the 611); followed by the China (78,12.8%), Taiwan (74, 12.1%), Spain (43,7%), and Australia (40, 6.5%). The United States had the most citations, followed by Australia, Taiwan, China, and Canada, respectively. Australia ranked second in the number of citations (1,241), followed by Taiwan (992) and China (516). Among the co-authorship relations of the top 10 countries, the three top international co-authorship relations are the United States, Taiwan, and China (Fig. 3).

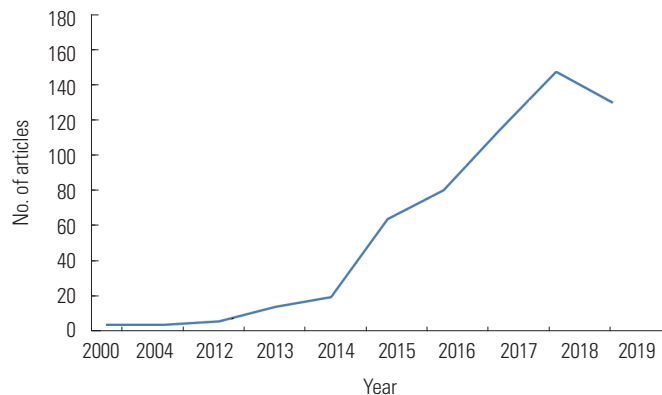


Fig. 1. The distribution of annual publications on the flipped classroom approach.

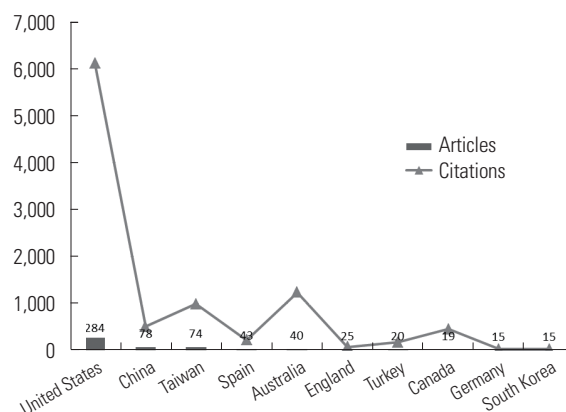


Fig. 2. Top 10 countries [cited on January 3, 2020].

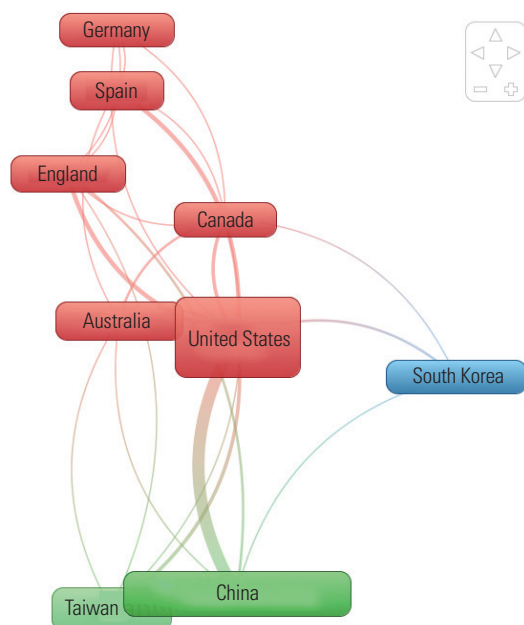


Fig. 3. Bibliometric network of co-authorship relations among top 10 countries.

As shown in Fig. 4, National Taiwan Normal University produced most articles (15 articles), followed by National Taiwan University Science & Technology (13), University North Carolina (13), University Hong Kong (10), and Harvard Medical School (9). The University of North Carolina ranks first in citations (660), followed by National Taiwan Normal University (182), and National Taiwan University of Science & Technology (176). The eight most-cited journals with citation of at least 300 in Fig. 5 were *Computer & Education* (24), *Educational Technology & Society* (22), *Internet and Higher Education* (5), *Journal of Economic Education* (6), *Higher Education Research & Development* (2), *BMC Medical Education* (21), *American Journal of Pharmaceutical Education* (23), *IEEE Transactions on Education* (6), *Academic Medicine* (3), and *Journal of Chemical Education* (25).

In Fig. 6A, lines represent their co-occurrence connection among those keywords shown and the size of each node indicates the number of documents, the larger the node the more documents co-occur. The term flipped classroom is the leading keyword and has stronger links with active learning, blended learning, higher education, and inverted classroom. As shown in the density visualization of Fig. 6B, three hot-spot keywords, flipped classroom, active learning and blended learning, are detected to lead the research trend.

As shown in Fig. 7, a visual representation of the top 24 most-cited articles in the past 20 years was extracted by their numerical citations in 210 journals and in the direct citations made between those 645 articles. The most significant articles

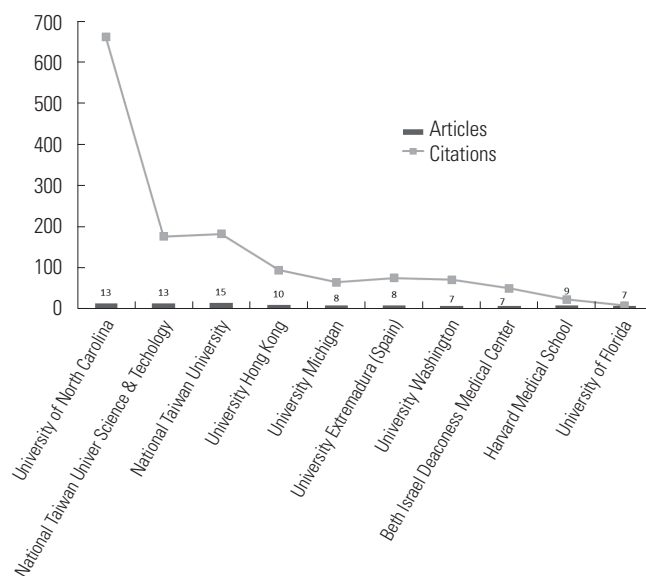


Fig. 4. Top 10 most-cited institutions by articles and citations.

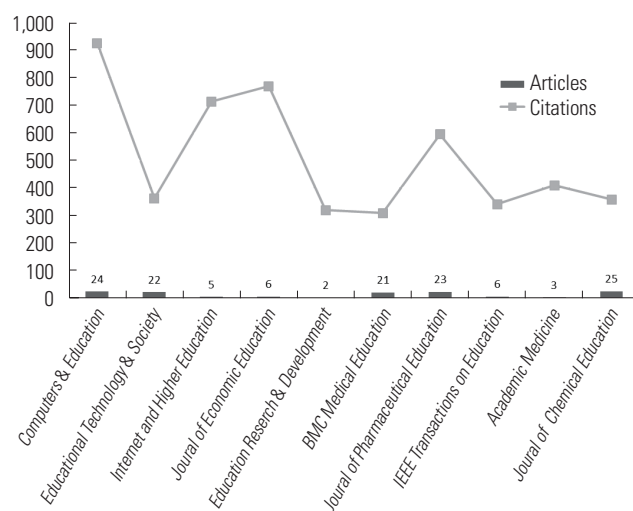


Fig. 5. Top eight most-cited journals with citation of at least 300.

of the 24 most-cited articles were written by Lage and Platt [4], O'flaherty and Phillips [5], McLaughlin et al. [6], Abeysekera and Dawson [1], and Mason et al. [7]. Derived from the 24 most-cited articles, the hot-spot themes on the flipped classroom approach, higher education, redesign course model, students' performance and engagement, and active learning.

Discussion

A total of 645 flipped classroom-related articles were published during the past 20 years, from 2000 to 2019. The amount of publications gradually increased after 2013 and

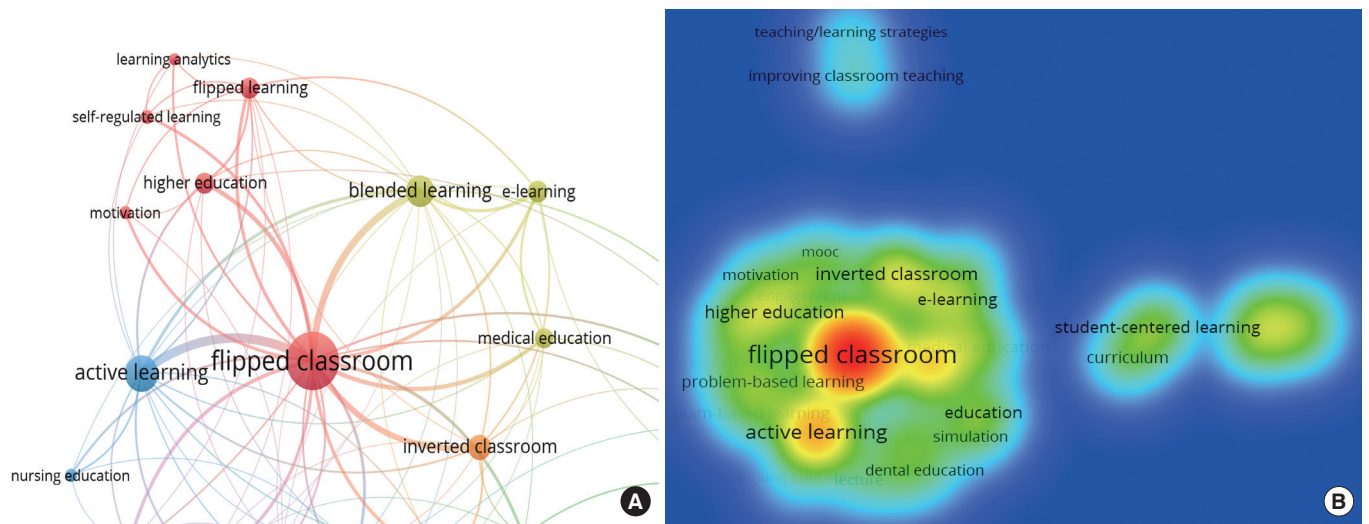


Fig. 6. Visualization map of keyword co-occurrence analysis. (A) Network visualization map based on occurrence-weights and (B) density visualization map based on occurrence-weights.

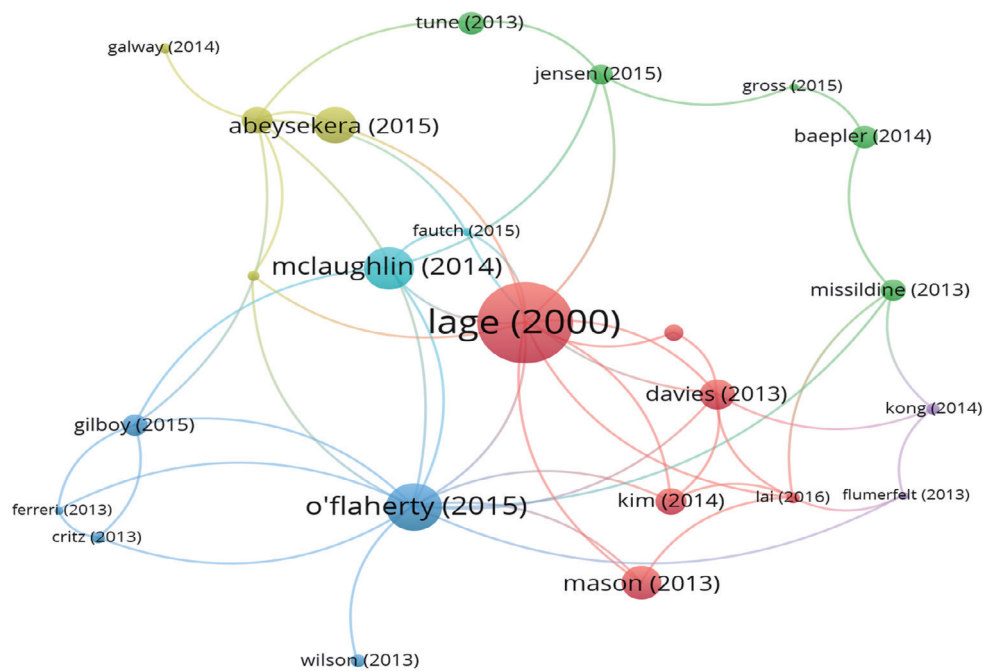


Fig. 7. Bibliometric network map of authors of the 24 most-cited articles.

then dramatically increased from 2015 onwards. The publications between 2013 and 2019 cover 98.7% of the total of 611 articles (Fig. 1). The most productive publication time was from 2017 to 2018. The United States is the world's leading country with the most publications, most citations, and the highest total link strength, the positive strength of links with other countries (Fig. 2). There was a considerable international collaboration by the United States with eight countries

(three Asian countries, except Turkey, three European countries, Canada, and Australia). Taiwan ranked second in total link strength, followed by China, Australia, and Spain. On the other hand, the number of research collaborations with Turkey is zero (Fig. 3). Out of the top ten institutions, three institutions are located in Asia, one in Spain, and six institutions are in the United States (Fig. 4). The University of North Carolina ranks first in citations (660), followed by National Tai-

wan Normal University (182), and National Taiwan University of Science & Technology (176). The University of North Carolina also ranks first in Total Link Strength. Indicating its significant impact on co-authorship relations, followed by National Taiwan University of Science & Technology, National Taiwan Normal University, and the University of Hong Kong.

These top eight most-cited journals in Fig. 5 are attributed to three clusters: Cluster 1 includes education-related journals, such as *Computers & Education*, *Educational Technology & Society*, *Internet and Higher Education* and *IEEE Transactions on Education*; Cluster 2 includes medically-related journals, such as *BMC Medical Education*, *American Journal of Pharmaceutical Education*, and *Academic Medicine*; Cluster 3 includes higher education-related journals, such as *Higher Education Research & Development* and *Journal of Chemical Education*.

Authors' keywords with higher centralities are closer to the core concept of the flipped classroom approach. A keyword co-occurrence analysis network is investigated to understand the co-occurrence of keywords in global flipped classroom publications at the micro level. Authors' keywords reflect the core content of a publication [8], and they make a paper searchable and then lead to a successful search reference resource [9]. A keyword co-occurrence analysis network is investigated to understand the co-occurrence of keywords in global flipped classroom publications at the micro-level. Those author keywords in Fig. 6 indicate that flipped classroom, also known as an inverted classroom, is an approach to improve active learning in higher education using blended learning strategy.

The leading article "Inverting the classroom: a gateway to creating an inclusive learning environment" [10] explained the evidence of a mismatch between an instructor's teaching style and a student's learning style to illustrate the scenario of the inverted classrooms for readers. Most-cited articles in 2013 focus on either case studies in various subjects (i.e., chemistry, statistics, nursing education, physiology) for at-risk students and college students or comparison studies to prove the positive effects of flipped classrooms on students' performance and engagement. The articles in 2014 present the second theme that flipped classroom model or course redesign is useful to foster students' active learning, performance, and engagement. Articles in 2015 center on students' motivation and perceptions towards implementing the flipped classroom approach for most researchers who believe that the positive effects found in this approach will contribute significantly to students' outstanding performance and great satisfaction.

In 2016, the research focus has been shifted forward from students' surface performance to self-regulated learning readiness and retention. For example, Ryan and Reid [11] men-

tioned students' performance and retention in the surgery core clerkship flipped classroom; McLean et al. [12] state that students learning in flipped classrooms do not just obtain surface gains; Hao [13] brings up "learning readiness" which is pivotal for the success of implementing the flipped classroom approach. Lai and Hwang's study [14] provides a self-regulated flipped classroom and presents the transformative potential and different research focus from the past. The tailored flipped classroom model is emphasized to meet the requirement and needs for different subjects to be instructed [11,14].

Hot-spot themes from the highly-cited articles and author keyword co-occurrence analysis focus on empirical research in the flipped classroom, the overall feasibility of the flipped classroom course design and practical model, and students' performances, and student-regulated learning (active learning and readiness) outcomes.

The results of this study indicate that the United States dominated flipped classroom research, originating most of the highly-cited articles, having more prolific authors, and presenting the most-cited institutions. Furthermore, emerging hot-spot themes from the highly-cited articles and author keyword co-occurrence analysis focus on empirical research in the flipped classroom, the overall feasibility of the flipped classroom course design and practical model, and students' performances, and student-regulated learning (active learning and readiness) outcomes, which are likely to be paid more attention in the future. Despite flipped classroom approaches having recently been the subject of much popular attention in the media, Google Search, etc., little research has been undertaken into arriving at an understanding of evidentiary effectiveness or consistency in a flipped classroom. After all, flipped classroom approach is not a panacea, nor is it a one-size-fit-all method. The studies suggest a call for more specific types of research into the effectiveness of flipped classroom studies and systematic reviews which may illustrate the entire picture of the flipped classroom approach as a whole. These insights into the exhibited priorities and trends of recent (past two decades) research may assist future academic pursuits leading to further adoption of the flipped learning approach.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Data Availability

The dataset file is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/39TUY4>

Dataset 1. Add raw data of the 645 articles with references and keywords

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Bibliometric analysis and visualization of Islamic economics and finance articles indexed in Scopus by Indonesian authors

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Abstract

Purpose: This study aimed to analyze the bibliometric characteristics and trends of articles on Islamic economics and finance (IEF) indexed in Scopus by Indonesian authors.

Methods: Data were retrieved from the Scopus database. Articles were searched in June 2020 with the limitation of Indonesian authors or affiliation. The keywords used in this study included IEF, and variations thereof, with the search filtered by Indonesian affiliation. Simple statistical methods were used, and a bibliometric analysis was conducted using VOSviewer software. This study visualized patterns of the co-occurrence of keywords, citations of documents, co-citation relationships, and bibliographic coupling.

Results: The number of studies in the field of IEF increased in recent years. Articles on IEF have been published in more than 150 journals, among which the most popular was *Talent Development and Excellence*. Collaboration among authors reached 33 countries, most prominently Malaysia. Certain keywords, such as *halal* tourism, *zakat*, and Islamic microfinance, have become the most popular in the last few years. The bibliometric analysis showed that 24 documents had the largest citation relationship, 52 journals had the largest co-citation network, and 172 documents had the largest bibliographic coupling relationship.

Conclusion: Research in the field of IEF by Indonesian authors has increased rapidly, with extensive collaboration. *Halal* tourism is among the most popular research topics in the last few years and is a prospective topic for future research. Moreover, the results showed that sources on IEF were widely used as references.

Keywords

Bibliometric analysis; Indonesia; Islamic economics and finance; Scopus databases; VOSviewer

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Introduction

Background/rationale: Economic studies based on Islamic principles, a field that has subsequently become known as Islamic economics and finance (IEF), experienced a resurgence starting around 5 or 6 decades ago. Chapra discussed four fundamental elements (vision, mechanism, methods, and worldview) to demonstrate the differences between Islamic economics and conventional economics [1]. Likewise, Indonesia, as the world's largest Muslim country, has not been left behind in studies of IEF. The idea of the Islamic economy was introduced in Indonesia approximately in the early 1980s [2]. However, IEF in Indonesia developed rapidly in the last 2 decades. Educational programs in the field of IEF have been established by universities starting from the undergraduate and extending to doctoral level. Research on IEF has been published in numerous national and international journals in the last decade. Based on the Indonesian journal database (Garba Rujukan Digital, <http://garuda.ristekbrin.go.id>), there are approximately 150 journals on IEF. These observations document the rapid growth of IEF research in Indonesia.

Nevertheless, the growth of IEF articles by Indonesian authors that are indexed by Scopus needs further research. The question is whether the growth of articles on IEF published in qualified, Scopus-indexed journals matches the growth of research published in Indonesian journals. Based on the latest research, 66.5% of Indonesian researchers are familiar with Scopus, but unfortunately, 76% of them have never published an article in journals indexed by Scopus [3]. However, in the 2010s, a new regulation made Scopus publication an important criterion for higher education assessment [4]. This regulation might urge lecturers to conduct research and to publish articles in journals indexed by Scopus. For this reason, it is necessary to explore the current state of IEF articles in Scopus-indexed journals by Indonesian authors or authors with Indonesian affiliation. To the best of the author's knowledge, this issue has yet to be investigated, although a recent study presented a bibliometric analysis of IEF articles that were indexed in the SINTA database [5].

Objectives: This study aimed to analyze the bibliometric characteristics and trends of IEF articles by Indonesian authors in the Scopus database. These findings may provide useful data for researchers to understand trends in research and to discover the novelty of their research in the field of IEF.

Methods

Ethics statement: This was not a human subject study; therefore, neither institutional review board approval nor informed consent was needed.

Study design: This was a literature database-based descriptive bibliometric study.

Setting: A bibliometric analysis was conducted to observe the distribution of articles on IEF by Indonesian authors. Data were retrieved from the Scopus database in June 2020. This study primarily used the Scopus document search option with the period set as "all years." The results were filtered by setting Indonesia as the affiliation country to identify authors from Indonesia or affiliated with any institution in Indonesia.

The first step was defining the keywords to use. To incorporate all aspects of IEF, the study used separate keywords such as "halal industry/tourism," "Islamic capital market," "Islamic banking," "Islamic finance," "Islamic microfinance," "Islamic insurance," "zakat," "waqf," "Islamic accounting," "Islamic marketing," and "Islamic fintech." The second step, after finalizing the keywords, was finding the articles from the Scopus database. The search was limited to journal articles and conferences with authors from Indonesia. The initial search found 649 documents.

The third step was refining the initial results by excluding duplicate documents, which led to the identification of 559 relevant documents. Finally, the data analysis process was conducted by using the VOSviewer software to analyze and visualize co-authorship, citation analysis, co-occurrence, co-citation, and bibliographic coupling.

Statistical methods: Descriptive statistical analyses were carried out to present the timeline and distribution of the articles.

Results

Based on the data retrieved from the Scopus database, the first finding was the trend in the number of papers on IEF published in Scopus. The first paper appeared in Scopus in 2004 (one article). As shown in Fig. 1, there was a stable increase in the number of papers published in Scopus-indexed journals from 2004 to 2014. However, in the last 5 years, the number of papers published has increased rapidly. Therefore, 2015 may have been a turning point in authors' interest in publishing in Scopus indexed journals.

Fig. 2 shows the most 24 popular journals among Indonesian authors for publishing articles on IEF. Of 559 published articles, almost half ($n = 268$, 47.9%) were published in these 24 journals. In contrast, the other 291 articles (52.1%) were scattered across more than 100 journals that published four or fewer articles each. As shown in Fig. 2, the most popular journal was *Talent Development and Excellence* with 35 articles (6.26%), and the last place among the 24 most popular journals was jointly occupied by *Academy of Strategic Management Journal* and *Advanced Science Letters*, with five articles each (0.89%). Additionally, based on the Scimago journal

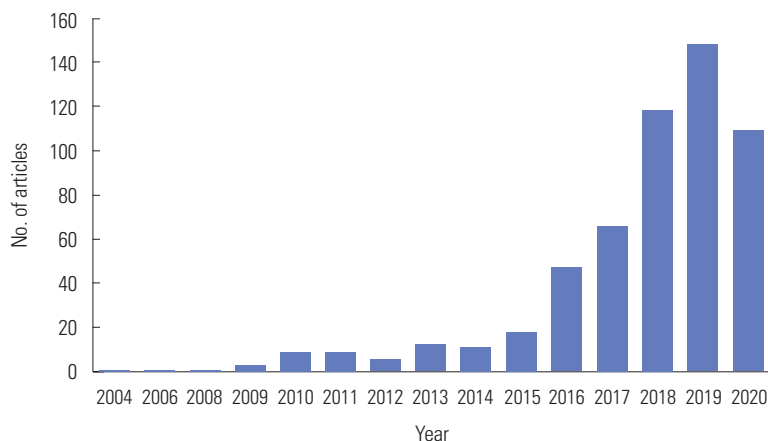


Fig. 1. Yearly trends in articles on Islamic economics and finance by Indonesian authors.

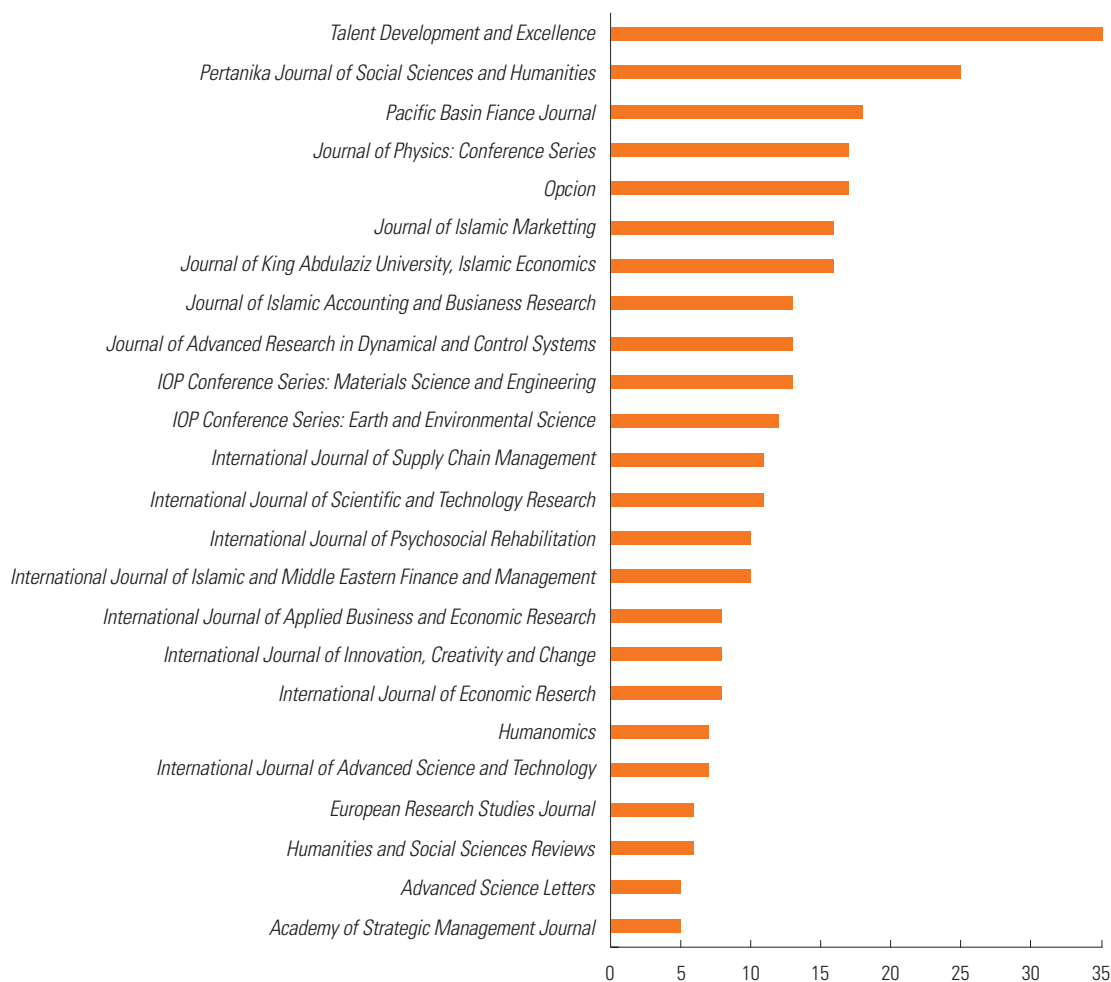


Fig. 2. Top 24 journals and their publishers.

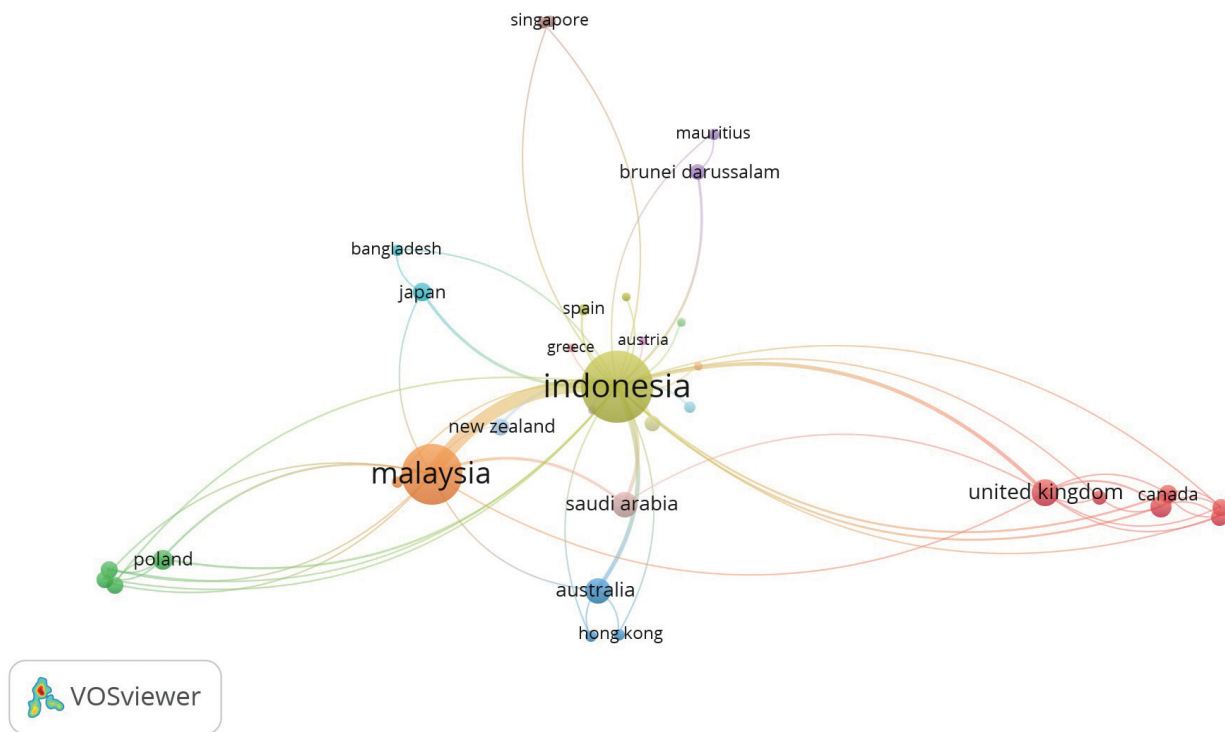


Fig. 3. The co-authorship network of articles on Islamic economics and finance in terms of countries.

ranking (Suppl. 1), there were 10 Q3 journals, six Q2 journals, five Q4 journals, and one Q1 journal, whereas two still did not have a Scimago journal ranking assigned.

The next step was visualizing the data on IEF articles in terms of co-authorship-related countries, co-occurrence-related author keywords, citation-related publication sources, co-citation-related publication sources, and bibliographic coupling. The first visualization was co-authorship related to countries. The purpose of country co-authorship analysis was to determine the degree of communication and influence between countries in the field of IEF. The distribution map of the country co-authorship network of IEF is shown in Fig. 3. The co-authors of IEF articles from Indonesia had affiliations with 33 countries. The colors of the nodes represented the diversification of the research field, which formed 17 clusters.

In Fig. 3, the large nodes denote significant countries. Links between nodes indicate the relationships among countries, and the thickness of the link and distance between the nodes show the level of collaboration between countries. As shown in Fig. 3, the center of the network is Indonesia, since the articles were written by Indonesian authors. The main countries of collaboration were Malaysia, Australia, Saudi Arabia, and England. The strength of the link between Indonesia and Malaysia was 93, while the strengths of the links between Indonesia and Australia, England and Saudi Arabia were 9, 7, and

13 respectively. Additionally, an overlay visualization indicates that recent collaboration mostly came from Bahrain, followed by Poland, Japan, Pakistan, and Spain.

The distribution map of keywords in the IEF articles is presented in Fig. 4. When the 1,503 keywords were filtered using a minimum appearance of 5 times, 43 keywords met the threshold. The size of the nodes and words in Fig. 4 represents the weights of each keyword with larger size indicating a greater weight. The keyword “Indonesia” was the most common, occurring 60 times followed by “Islamic banking” (53), “*zakat*” (34), and “*halal* tourism” (19), “Islamic bank” (19), and “religiosity” (19). More detailed information on the keywords is presented in Suppl. 2.

Furthermore, the distance between nodes reflects the strength of the relationship between those nodes. A shorter span indicates a stronger connection. A link between two keywords indicates that they appeared together, while the thickness of the link shows the density of co-occurrence. Nodes with the same color belong to a cluster. As shown in Fig. 4, the node “Indonesia” had thick lines connecting it with “Islamic banking” (9), “Islam” (8), “Malaysia” (4), “bank” (4), and “*halal* tourism” (2). The node “Islamic banking” had thick links with “Indonesia” (9), “service quality” (5), “customer satisfaction” (4), and “performance” (3). The keywords of IEF articles were divided into 7 clusters. VOSviewer also

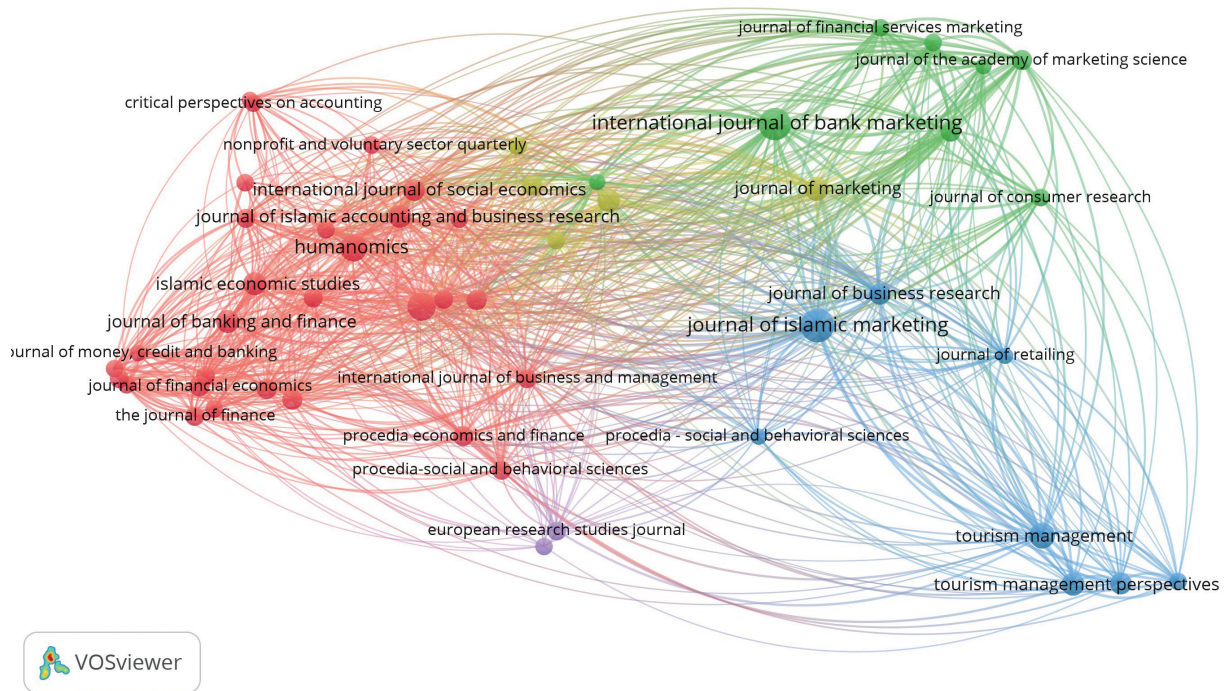


Fig. 6. The co-citation network of articles on Islamic economics and finance in terms of publication sources.

provided an overlay visualization of trends in keyword appearance. Recently, appearing keywords included *halal* tourism, Islamic tourism, religiosity, inflation, performance, customer loyalty, and Islamic microfinance institution.

Based on VOSviewer, there were 175 sources. However, when a filter was applied to sources with at least one document and two citations, 84 sources met the threshold and VOSviewer divided them into 6 clusters. Of 84 sources that met the threshold, only 24 documents had strong connections between each other, as shown in Fig. 5. The colors of the nodes correspond to separate clusters that were assigned. The size of a node denotes the number of citations received by the sources. The thickness of links and the distance of the nodes indicated the closeness and strength of the relationship between the nodes. Thicker nodes and closer distances indicate more frequent and stronger relationships. As shown in Fig. 5, the most commonly cited journal by authors was the *Journal of Islamic Marketing* with 180 citations of 25 documents, and it had 9 links and a total link strength of 12. The *International Journal of Islamic and Middle Eastern Finance and Management* placed second with 81 citations of 17 documents, and it had 5 links and a total link strength of 6. The *Humanomics* journal followed, with 78 citations of 13 documents, and it had 7 links and a total link strength of 11. The other details on the top 10 sources by citation number are shown in Suppl. 3.

Based on VOSviewer, there were 10,484 sources. When filtered with a minimum co-citation count of 20, 52 sources met the threshold. Fig. 6 shows 52 nodes representing the journal co-citation network. The size of the node indicates the frequency of the journal and the number of published articles. As shown in Fig. 6, the distance between two nodes reflects the closeness of the relationship of the journals. The closer two journals are, the greater the co-citation frequency is. The colors of the nodes designate 5 clusters. The most active journal in the red cluster was the *International Journal of Islamic Middle Eastern Finance and Management* which had 45 links, 125 citations, and a total link strength of 1,212. The most active journal in the blue node was the *Journal of Islamic Marketing*. The journal had 39 links, 219 citations, and a total link strength of 2,408. The most active journal in the green node was the *International Journal of Bank Marketing*, which had 44 links, 182 citations, and a total link strength of 3,336. The most active journal in the yellow node was the *Journal of Business Ethics*, with 44 links, 60 citations, and a total link strength of 816. Finally, the most active journal in the purple node was the *European Research Studies Journal*, which had 26 links, 33 citations, and a total link strength of 167.

The last meta-analysis was the bibliographic coupling analysis. Of the 559 articles on IEF, 221 met the threshold of having at least one citation. However, not all of documents were

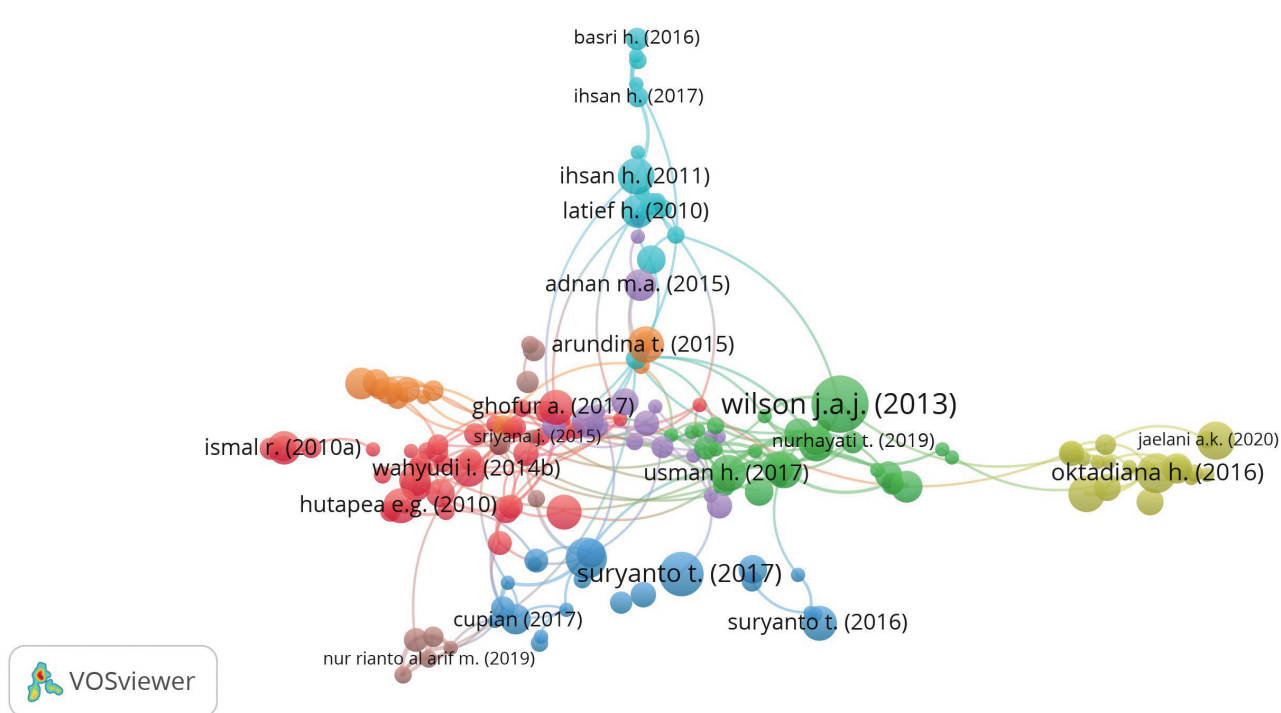


Fig. 7. The bibliographic-coupling network of articles on Islamic economics and finance.

connected, and the largest network contained 172 documents, as shown in Fig. 7. The documents were divided into 13 clusters, which are represented by the colors of the nodes. In the visualization presented in Fig. 7, each node represented an author or a group of authors. Larger nodes indicate more influential author(s). As shown in Fig. 7, Wilson et al. (2013) were the most influential author with seven links, a total link strength of 8, and 91 citations, followed by Suryanto et al. (2017) (four links, a total link strength of 2, and 40 citations); Oktadiana et al. (2016) (eight links, a total link strength of 6, and 27 citations). The distance between two nodes, represents the closeness of the relationship between two researchers. In other words, authors close to each other tend to cite the same articles.

Discussion

The above results show the detailed bibliographic characteristics of articles on IEF published by Indonesian authors in Scopus-indexed journals. IEF research has grown quite rapidly in the last few years. This shows that the international publication of IEF research has grown in parallel with the increasing number of domestic publications. Based on the journals where the articles were published, it can be seen that research on IEF has been widely accepted by the scientific community throughout world. The variety of journals also indicates the

diversity of topics discussed in the field of IEF.

The analysis of co-authorship relationships showed co-authorship relationships with researchers from more than 30 countries. This means that Indonesian authors actively collaborated with researchers from other countries. Malaysia, Saudi Arabia, and the UK had the most frequent collaborations. These countries actively offer education at the doctoral level and are centers of IEF studies. However, it was interesting to note that Australia, which was the country with the second-highest number of collaborators, has no specific educational programs or centers related to IEF studies. Nonetheless, these findings may be due to the close relationship between these two countries and the fact that many students who pursue doctoral-level studies in that country specialize in IEF.

The analysis of the co-occurrence of keywords showed the patterns and relationships between keywords appearing together in an article. The pattern of these keywords makes it easier for the researcher to identify novel research patterns. As mentioned previously, a focus of recent research has been *halal* practices or *halal* tourism. Therefore, for example, as shown in Fig. 4, there is a wide scope for research on how *halal* practices or *halal* tourism is related to economic growth. Accordingly, areas related to *halal* practices or *halal* tourism, such as *zakat* or *waqf*, Islamic banking, or Islamic microfinance also have a wide scope for future research.

Figs. 2 and 5 show that there was no direct correlation between the number of publications in a certain journal and the number of citations. For example, although the *Journal of Islamic Marketing* was ranked sixth in terms of publications, it was ranked first in terms of the number of citations. Interestingly, even though *Talent Development and Excellence* was the top journal that published articles on IEF, it had no records in the citation network. This result also seems to indicate that the Scimago journal ranking by Scopus tended to influence the level of citations among the articles. Based on the results of the co-citation network, from more than 10,000 sources, only approximately 50 sources met the co-citation threshold of 20. This indicates that various sources on IEF were available for references. Furthermore, bibliography coupling-related documents indicated the closeness and patterns of influence of the articles. Of the 559 documents, 221 had a network, but only 172 had networks of a strong relationship, while the remaining 338 documents had no network.

Limitation: However, this study is not free from limitations. This study was limited to five bibliometric analyses, which focused on analyses of single types of units; therefore, many angles remain to be explored. The keyword search used only general keywords, so some relevant articles might have been missed. Thus, further research might broaden the types of units that are analyzed, include more detailed keywords, and expand the scope of databases to include others, such as Web of Science.

Conclusion: The results statistically showed that the number of articles on IEF published in Scopus-indexed journals has increased, especially in the last decade. Furthermore, the results show that authors have wide-open opportunities to collaborate with researchers from other countries. It seems that *halal* practices or *halal* tourism is a trending topic in recent years, which provides a major opportunity for further research. Additionally, the results showed that sources on IEF research are extensively available and accessible for future research.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Data Availability

Dataset file is available from: the Harvard Dataverse at: <https://doi.org/10.7910/DVN/YGWA06>

Dataset 1. Raw data of IEF articles

Supplementary Material

Supplementary file is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/YGWA06>

Suppl. 1. List of top 24 journals on Scimago journals ranking

Suppl. 2. List of keywords

Suppl. 3. List of 30 journals based on total citations

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A bibliometric analysis of articles on innovation systems in Scopus journals written by authors from Indonesia, Singapore, and Malaysia

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Abstract

Purpose: The aim of this study was to analyze the bibliometric characteristics of articles on innovation systems published in Scopus-indexed journals by authors with Indonesian affiliations from 1998 to 2019, in comparison with those published by authors from Singapore and Malaysia.

Methods: We conducted a bibliometric and content analysis of publications in the Scopus database. A total of 138 articles from Indonesia, 209 articles from Singapore, and 309 articles from Malaysia were analyzed. They were classified by publication year, authors, co-authors' country, affiliation, keywords, and journal title.

Results: Authors with affiliations from Malaysia were more productive than authors from Singapore and Indonesia during 1998 to 2019. In terms of the quality of papers, Singapore had more productive authors than Malaysia and Indonesia based on the citation frequency.

Conclusion: Although fewer articles on innovation systems were published by authors from Indonesia than by those from Malaysia and Singapore, the recent increase in the number of publications by Indonesian authors suggests that number of articles from Indonesia will soon surpass those from the other two countries. International collaboration will help accelerate the number of publications.

Keywords

Bibliometric; Scopus; Innovation systems; Comparative study; Publications

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Introduction

Background/rationale: Over the last 21 years, there has been a substantial rise in the number of Indonesian scientific papers published in Scopus and the Web of Science. Data from Scima-

go for the last two decades show that the number of publications from Indonesia increased five-fold in all subject areas (157,912 documents). The comparative analysis conducted by Wiryawan [1] showed that in 2010, the number of publications was only 2,903, but it increased sharply to 44,743 papers in 2019.

Objectives: This study aimed to analyze the bibliographic characteristics and content of Indonesian papers on innovation systems published in Scopus-indexed journals from 1998 to 2019. This topic is part of the study of science, technology, and innovation systems [2]. Furthermore, the findings were compared with data from Singapore and Malaysia to provide additional context.

Methods

Ethics statement: This was not a human subject study; therefore, neither institutional review board approval nor informed consent was needed.

Study design: This was a literature database-based descriptive bibliometric study.

Data source/measurement: In this study, the researchers utilized methods that have been successfully applied in a variety of previous bibliometric and content analyses of publications in international databases [3]. The Scopus database was searched on April 20, 2020, using the search option “affiliation country” with “Indonesia” and “Singapore” and “Malaysia” as the country names. For the search option of “subject area,” the researchers used “social sciences,” and chose “Business, Management and Accounting,” and “Economics, Econometrics and Finance,” and “Arts and Humanities” and “innovation system” to search within the results. The search was limited to papers from 1998 to 2019, and yielded 138 articles (Indonesia), 209 articles (Singapore) and 309 articles (Malaysia) in English. A detailed analysis of the bibliographic data was performed, including publication year, affiliations, authors, and co-authors from foreign countries, journals, keywords, and citations.

We measured the number of papers on innovation systems that had been written annually over the last 21 years to analyze the countries of co-authors contributing to papers from Indonesia. We also investigated the higher education institutions and research institutions in Indonesia that accounted for most of the papers. We also listed Scopus-indexed journals where articles on innovation systems by Indonesian authors were published. Finally, we illustrated the keywords commonly used in the literature and analyzed the papers that had been written in different sub-fields of innovation programs.

For comparisons among Indonesia, Singapore, and Malaysia, the researcher conducted comparisons of 1) the number of

publications based on the year of publication, 2) the institutions that produced the most papers, 3) co-authors’ affiliations based on country, 4) the journals where the articles were published, 5) the top 3 authors from each country, and 6) classifications of the keywords used in innovation system papers.

Results

Bibliographic characteristics and content of Indonesian papers

In the bibliographic and content analysis of 138 articles, the articles were categorized by year of publication, international co-authors, organizational affiliation, journal title, keywords, category, and citation frequency. A steady rise in publications occurred from 1999 to 2011, followed by an increasing number of articles released annually between 2013 and 2019. The number of articles has risen significantly in recent years. From 1998 to 2019, the number of articles increased fourfold.

Although almost 150 research institutions in Indonesia were listed for the authors of the 138 papers, the institution with the highest number of papers accounted for 9.42% of the papers. Fig. 1 presents identifies the top 10 organizations with the most publications on innovation systems.

Many of the 138 papers were written in collaboration with authors from other countries. Fig. 2 presents the top 10 countries of co-authors contributing to papers from Indonesia; the Netherlands and Japan accounted for 7.97% and 5.07% of the total articles, respectively. Authors from two other countries (Australia and Malaysia) contributed to five publications, respectively. Authors from four countries (France, Germany, Philippines, and the United States) contributed to three publications, respectively. Authors from Kenya and Italy contributed two publications each. Authors from the following 14 countries contributed one publication each: Brazil, Burkina Faso, Colombia, Denmark, Ecuador, Ethiopia, Finland, Lithuania, Norway, South Korea, Spain, Taiwan, the United Kingdom, and Vietnam. Several authors used both a foreign affiliation and an Indonesian affiliation, which was counted as a co-author’s affiliation with an institution in a foreign country.

The researcher also identified the foreign institutions from which co-authors collaborated with Indonesian researchers to publish papers on innovation systems. As shown in Suppl. 1, the Netherlands accounted for three of the top five institutions, while Switzerland and Malaysia each had one institution.

In addition, the titles of the journals that published articles on innovation systems written by Indonesian authors were tabulated. Suppl. 2 presents a list of six journals with three or more innovation system papers by Indonesia authors. The majority of these journals were Scimago Q3 journals in the subject area of innovation systems, while two were Q2 journals and one was a Q4 journal. In addition to the journals on

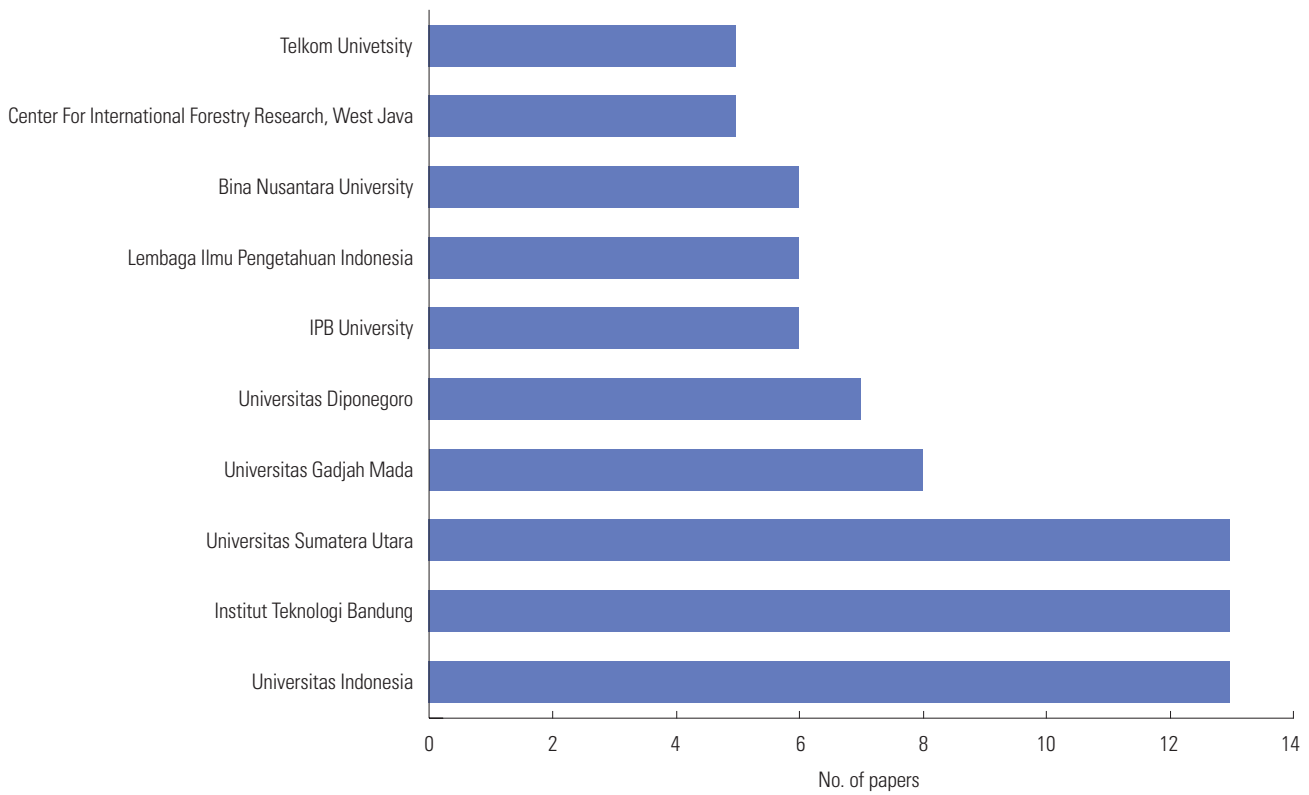


Fig. 1. Top ten institutions from Indonesia that produce most paper in Scopus database on innovation system from 1998 to 2019.

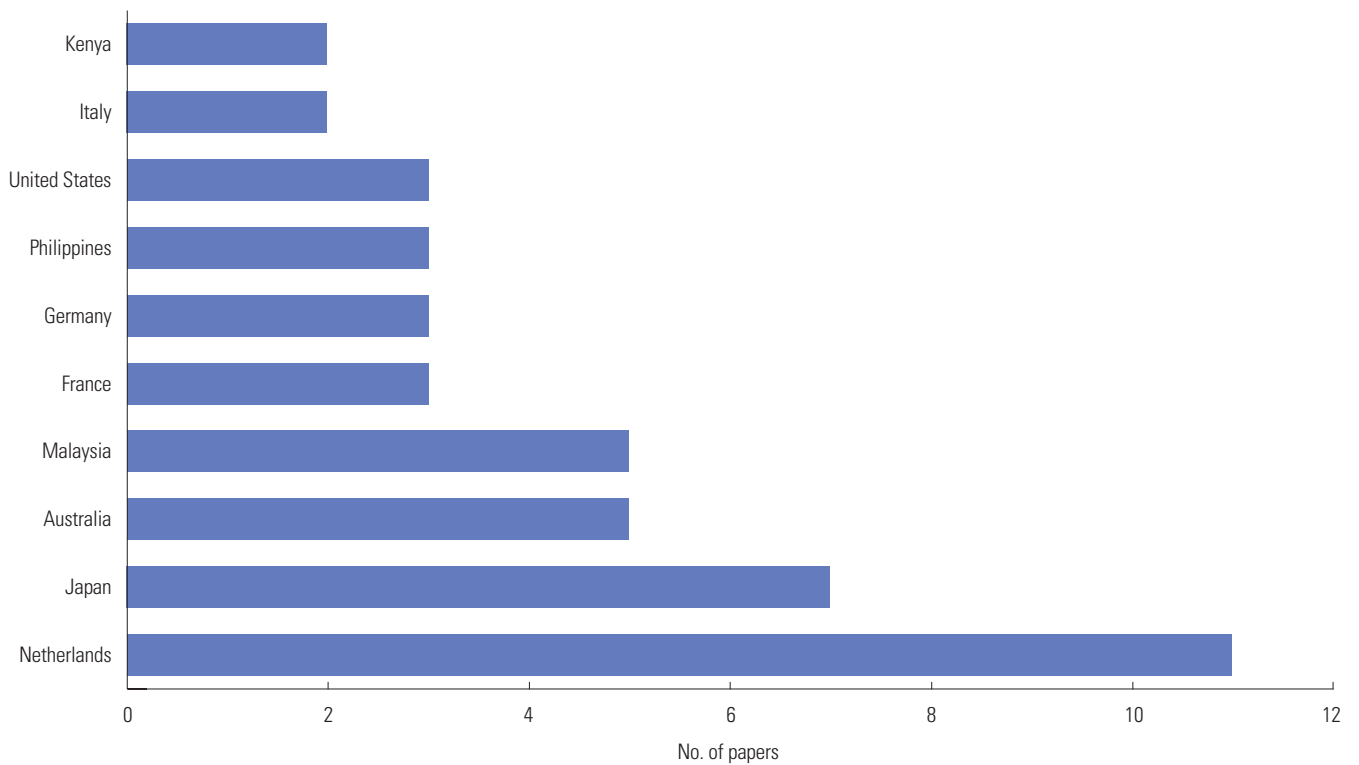


Fig. 2. Top ten foreign countries in which the co-authors with most papers in Scopus database on innovation system affiliated with Indonesia authors from 1998 to 2019.

this list, there were 22 other journals in which two papers on innovation systems were published by authors working at Indonesian research institutions.

The researcher of this study also listed the top 10 authors from Indonesia, and found that two authors from Indonesia had published nine papers on innovation systems. One author published five papers, and another author published four papers. The remaining six authors published three papers each, and only one author published two papers (Suppl. 3).

From the list of the top 10 papers with the most citations from Indonesian authors (Suppl. 4), the three most cited papers were “Critical success factors of downstream palm oil-based of Small and Medium Enterprises (SME) in Indonesia” published in the *International Journal of Economic Research* in 2016 with 88 citations; “Identification of factors of failure in Barisan Mountains Agropolitan area development in North Sumatera–Indonesia” published in the *International Journal of Economic Research* in 2016 with 77 citations, and “Bibliometric analysis of absorptive capacity” published in the *International Business Review* in 2017 with 56 citations.

The researchers identified common keywords that were utilized in the 138 articles (Suppl. 5). Keywords such as “innovation” and “Indonesia” appeared most often. The researchers further analyzed the use of the keyword “innovation” in subfields such as business, mobile technology, and national innovation systems and the use of the keyword “Indonesia” in the subfields of innovation, productivity, and technological

development. This analysis demonstrated that authors from Indonesia produced numerous papers under the themes of business, mobile technology, national innovation systems, productivity, and technological development.

Comparison with data from Singapore and Malaysia

The number of papers on innovation systems written by authors affiliated with institutions in Indonesia significantly increased in the last 21 years, especially since 2013. However, the productivity of Indonesian authors on this topic is lower than that of authors from Malaysia (Fig. 3).

The National University of Singapore (129 papers) was found to be the most productive institution for articles on this topic published in Scopus-indexed journals in the last 21 years (Table 1), followed by the University of Malaya (106 papers) and Universiti Teknologi Malaysia (35 papers).

Of note, Australia was the only country that was one of the top five foreign countries in terms of co-authors for Indonesia, Singapore, and Malaysia (Table 2). The greatest collaborative productivity in publishing papers on innovation systems in international journals was found for the United States (31 papers for Singapore). This figure is higher than that of the Netherlands, with 11 papers (the top country of co-authors for papers from Indonesia), or the United Kingdom, with 20 papers (the top country of co-authors for papers from Malaysia).

Authors with affiliations from Singapore published many of their papers in Q1 Scopus-indexed journals (Table 3), unlike

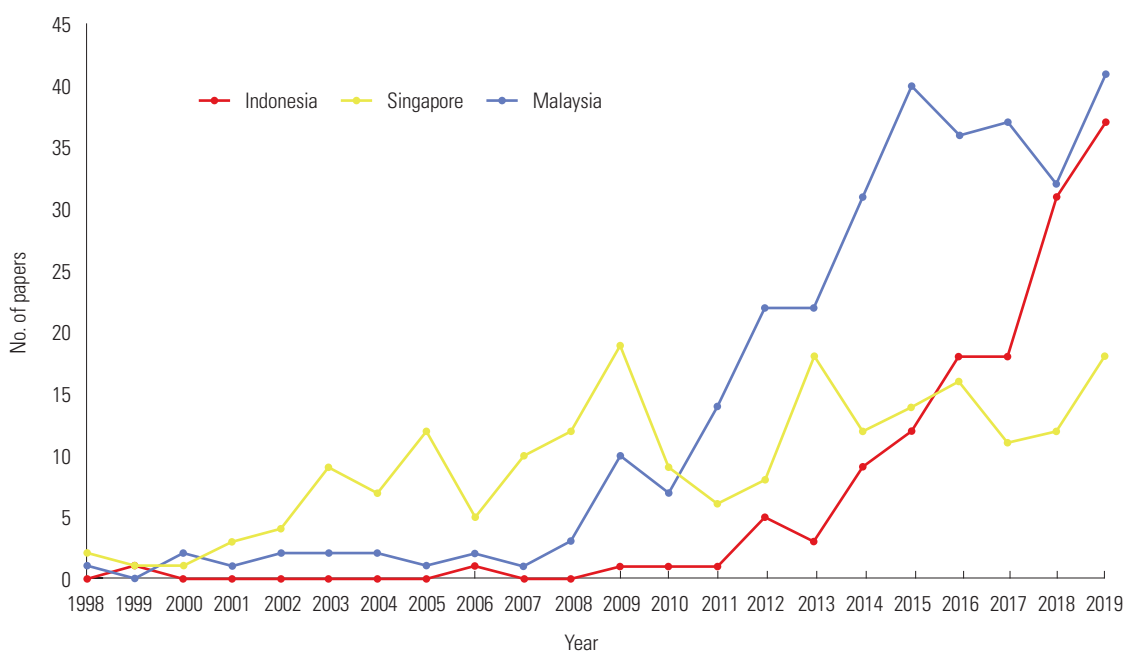


Fig. 3. Number of published papers on innovation system listed in Scopus database from Indonesia, Singapore, and Malaysia from 1998 to 2019 by years.

writers with affiliations from Indonesia, most of whom published papers in Q3 Scopus-indexed journals. Meanwhile, authors with affiliations from Malaysia had a tendency to publish papers in journals in all Scopus quartiles.

An author from Malaysia (Rasiah R from the University of Malaya, with 46 papers) had the highest productivity in terms of publishing papers on innovation systems in Scopus-indexed international journals (Table 4). The second-most pro-

Table 1. Top five institutions producing papers on innovation systems published in Scopus-indexed journals from Indonesia, Singapore, and Malaysia, from 1998 to 2019

Rank	Indonesia		Singapore		Malaysia	
	Institution	No. of papers	Institution	No. of papers	Institution	No. of papers
1	Universitas Indonesia	13	National University of Singapore	129	University of Malaya	106
2	Institut Teknologi Bandung	13	Nanyang Technological University	27	Universiti Teknologi Malaysia	35
3	Universitas Sumatera Utara	13	NUS Business School	15	Universiti Kebangsaan Malaysia	30
4	Universitas Gadjah Mada	8	NUS-Lee Kuan Yew School of Public Policy	14	Universiti Sains Malaysia	23
5	Universitas Diponegoro	7	Singapore Management University	13	Universiti Teknologi MARA	15

Table 2. Top five foreign countries of co-authors of papers on innovation systems published in Scopus from Indonesia, Singapore, and Malaysia, from 1998 to 2019

Rank	Indonesia		Singapore		Malaysia	
	Country	No. of papers	Country	No. of papers	Country	No. of papers
1	Netherlands	11	United States	31	United Kingdom	20
2	Japan	7	China	14	Australia	17
3	Australia	5	United Kingdom	13	China	14
4	Malaysia	5	Canada	12	United States	14
5	France	3	Australia	11	Netherlands	11

Table 3. List of Scopus-indexed journals where three or more papers on innovation systems were published by authors from Indonesia, Singapore, and Malaysia authors from 1998 to 2019

Rank	Indonesia		Singapore		Malaysia	
	Journal	No. of papers	Journal	No. of papers	Journal	No. of papers
1	<i>International Journal of Economic Research</i> (Q4)	6	<i>Research Policy</i> (Q1)	8	<i>Asia Pacific Business Review</i> (Q2)	10
2	<i>International Journal of Technology</i> (Q2)	4	<i>International Journal of Technology Management</i> (Q1)	5	<i>Advanced Science Letters</i> (Q4)	8
3	<i>Journal of Applied Economic Sciences</i> (Q3)	4	<i>International Journal of Entrepreneurship and Innovation Management</i> (Q3)	4	<i>Asian Social Science</i> (Q3)	8
4	<i>Quality Access to Success</i> (Q3)	4	<i>Journal of International Business Studies</i> (Q1)	4	<i>Journal of Cleaner Production</i> (Q1)	8
5	<i>Asian Journal of Technology Innovation</i> (Q3)	3	<i>Scientometrics</i> (Q1)	4	<i>Scientometrics</i> (Q1)	7

Table 4. Comparison of the top three authors with innovation system publications from institutions located in Indonesia, Singapore, and Malaysia

Rank	Indonesia		Singapore		Malaysia	
	Author	No. of papers	Author	No. of papers	Author	No. of papers
1	Muda I (Universitas Sumatera Utara)	9	Wong PK (National University of Singapore)	29	Rasiah R (University of Malaya)	46
2	Suryanegara M (Universitas Indonesia)	5	Singh A (National University of Singapore)	8	Chandran VG (University of Malaya)	8
3	Aminullah E (Lembaga Ilmu Pengetahuan Indonesia)	4	Yeung HW (National University of Singapore)	8	Ng BK (University of Malaya)	8

Table 5. Comparison of keywords in publications on innovation systems from authors at institutions located in Indonesia, Singapore, and Malaysia

Indonesia		Singapore		Malaysia	
Keyword	No. of papers	Keyword	No. of papers	Keyword	No. of papers
Innovation	29	Innovation	46	Malaysia	58
Indonesia	22	Singapore	28	Innovation	49
Mobile technology	5	Asia	21	Research and development	15
Creative industry	4	Eurasia	19	China	14
Entrepreneurship	4	Singapore (Southeast Asia)	17	Knowledge management	13
National innovation systems	4	Public policy	13	Sustainability	13
Organizational learning	4	Southeast Asia	13	Technological development	13
Productivity	4	Globalization	12	Human capital	12
Research and development	4	Technology	12	Industry	12

Table 6. Comparison of the number of published papers on innovation systems and the number of citations

	No. of published papers	No. of citations	Quality of the papers
Indonesia	138	792	5.74
Singapore	209	6,581	31.49
Malaysia	309	2,825	9.14

ductive author was from Singapore (Wong PK from the National University of Singapore, with 29 papers), followed by an author from Indonesia (Muda I from the University of North Sumatra, with 9 papers).

Authors from Indonesia and Malaysia tended to publish papers with keywords such as “research and development” (Table 5). Authors from Singapore had more highly cited papers than authors from Malaysia and Indonesia (Table 6). Based on Scopus data from 1998-2019 for papers in the innovation system field, papers from Singapore-affiliated authors had the most citations (6,581 citations of 209 articles), followed by Malay-

sia-affiliated authors (2,825 citations of 309 articles), and Indonesia-affiliated authors (792 citations of 138 articles).

Discussion

Interpretation: There is a strong demand for scientific publications, in line with the policy that requires lecturers, researchers, and doctoral students to publish in international journals as a prerequisite for promotion and graduation. Additionally, several international publication incentive programs are provided by a budget allocation from the Ministry of Research and Technology, the Ministry of Finance, and some research institutions [4]. However, Indonesia produced at least 138 papers related to innovation systems from 1998 to 2019. In contrast, Singapore and Malaysia produced 209 and 309 papers, respectively. Based on these results, authors affiliated with institutions in Malaysia were the most productive in writing papers on innovation systems in the last 21 years when compared to authors from Indonesia and Singapore. Papers of cooperation with foreign researchers (58, 42.0%) contributed to the number of papers from Indonesia (Fig. 2).

Therefore the support of long-term exchange programs with foreign researchers by the Indonesian government will be a good incentive for Indonesian researchers even in the field of the innovative system. The rapid increase of papers on the innovative system in Indonesia from 2013 to 2019 may reflect the high economic growth rate of Indonesia, 5 to 6%, where the innovative system has been introduced to the Indonesian industries (Fig. 3). The citation frequency of papers from Indonesia-affiliated authors was lower than that from Singapore and Malaysia. It may be originated from the fact the application of the content to the industries or researches was not frequent. The content of papers from Indonesia should be strengthened for its application to other studies.

Conclusion: The results of this study provide an overview of the quantity and quality of papers on innovation systems produced by authors from Indonesia, Singapore, and Malaysia. Recent increase in the number of publication on innovative system by Indonesian authors suggest that number of articles from Indonesia will soon surpass those from Malaysia and Singapore. Future studies should analyze not only the number of publications, but also the content of the papers to obtain a more critical understanding of publications on innovation systems.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Supplementary Material

Supplementary file is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/D79R7Y>

Suppl. 1. Top 15 foreign institution with which the co-authors of the most papers on Innovation System with Indonesia authors were affiliated.

Suppl. 2. List of journals where three or more papers on Innovation System by Indonesia authors were published.

Suppl. 3. Top authors from institutions located in Indonesia with Innovation System publications.

Suppl. 4. Top-cited papers from 1998 through 2019 according to the number of citations in Scopus (Indonesia authors).

Suppl. 5. Classification of keywords in innovation system papers in Scopus from Indonesia, from 1998 to 2019.

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Analysis of consultations by the Committee for Publication Ethics of the Korean Association of Medical Journal Editors

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Abstract

This study aimed to analyze the inquiries on research and publication ethics submitted to the Committee for Publication Ethics of the Korean Association of Medical Journal Editors. A total of 80 inquiries were initiated over the course of 3 years, from April 2017 to March 2020. Based on a categorization of these inquiries, four common topics are discussed in detail. We present specific cases derived from actual situations, and the steps taken in processing these inquiries. The number of inquiries by topic was as follows: duplicate publications (12), secondary publications (11), authorship disputes (11), informed consent (6), proceedings (5), copyright (5), institutional review board approval (5), plagiarism (4), corrections (4), and others (17). Cases of duplicate publication and authorship disputes can be treated according to the flow chart of the Committee on Publication Ethics of the United Kingdom. Secondary publications may be permitted if the readers or audiences are different and both journals' editors grant permission. Editors should be cautious about publishing cases without informed consent, even in the absence of identifiable photos, because patients or their families may be able to identify the cases. An adequate awareness of ethical considerations relevant to publication can help reduce the number of instances of research and publication ethics misconduct.

Keywords

Authorship; Ethics; Publication; Republic of Korea

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Introduction

Background/rationale: The importance of publication ethics cannot be overemphasized. To deal with questions and disputes among authors and/or editors, the Committee for Publication Ethics was established by the Korean Association of Medical Journal Editors (KAMJE) in 2006.

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The Committee receives inquiries from member societies and editors. Based on the seriousness of the inquiries, the Committee responds through official or informal deliberations. Nonetheless, we emphasize that the Committee is not a legal consultant and note that it was established to enhance the quality of medical journals.

Objectives: We present several cases derived from actual situations and the steps followed in processing them. These cases were chosen to help editors, authors, and journals when they encounter ethical issues in the publication process. This study examines the most common and important consultations such as those on duplicate publications, secondary publications, authorship disputes, and informed consent. We believe that this study can help editors and authors by addressing their concerns.

Methods

Ethics statement: Neither institutional review board approval nor informed consent was required because this study is based on consultation reports.

Study design: This is a descriptive and narrative study on the results of consultations during a 3-year period.

Data collection and analysis: We analyzed the inquiries received by the Committee, which belongs to the KAMJE, between April 2017 and March 2020. Most inquiries came from the member societies of the KAMJE, and some minor inquiries came from individuals. Reviews and consultations on various aspects of publication ethics were requested in 80 inquiries, which we grouped according to the topics, and we reported the content of the deliberations conducted in response to the inquiries. Official deliberations were conducted through panel discussions with experienced ethics experts who were members of the Committee. Briefly, two members of the Committee were assigned to review each case, and they presented their opinions. Subsequently, all members of the Committee discussed the inquiry and gave their comments. Finally, the consensus opinions were circulated again and if there were no dissenting opinions, the content of the official deliberation was sent to the member societies. Informal deliberations were carried out by two experienced ethics experts of the Committee.

Results

Among the 80 inquiries, 13 were addressed through official deliberations and the remaining were handled through informal deliberations. These inquiries were categorized as dealing with duplicate publications (12), secondary publications (11), authorship disputes (11), informed consent (6), proceedings (5), copyright (5), institutional review board approval (5), plagiarism (4), corrections (4), and others (17) (Fig. 1).

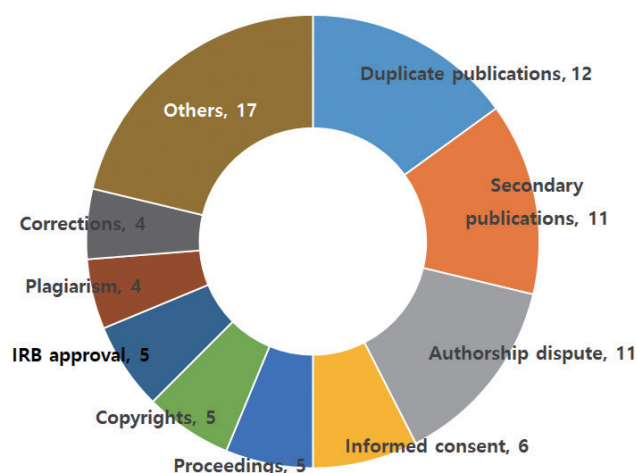


Fig. 1. Categorization and distribution of 80 inquiries on research and publication ethics to the Committee for Publication Ethics of the Korean Association of Medical Journal Editors from April 2017 to March 2020. IRB, institutional review board.

Duplicate publications

Duplicate publications were the most common topic of consultations (15%). This term refers to the publication of an article that overlaps substantially with an earlier article published elsewhere without a proper citation [1]. Duplicate publication is a form of research misconduct and is prohibited because it wastes resources such as the review process and editor’s activity, as well as space in journals. It can cause results to be overestimated owing to an increase in the number of papers on a given subject without any substantive enhancements. Furthermore, duplicate publication can breach copyright [1].

All suspected cases of duplicate publication were reviewed through official deliberations. In 2011, the Committee for Publication Ethics published sample cases of duplicate publications [2]. Here, we introduce an example that hints at the possibility of a duplicate publication. While reviewing a submitted manuscript, an editor searched for papers to determine its correspondence with earlier publications and found that the submitted manuscript was starkly similar to an earlier publication, in terms of both the topics chosen and the methods used. Several sentences were identical in the abstract, methods, and discussion sections of both papers. The similarity index showed an incredible rate of 86%. The editor asked for this case to be treated as a real instance of a duplicate publication and sought information on how this could be addressed.

After an internal discussion, the Committee concluded that this was a case of duplicate publication by evaluating it against the established criteria [3]. Both papers had similar hypotheses, used identical methods, produced similar results, and involved an identical corresponding author and several co-au-

thors. There was no new information in the subsequent paper. Duplicate publications are of three kinds: copy, salami, and imalas publications [4]. This case was classified as a salami publication. As several identical sentences were found, it was clear that text recycling had been carried out, which was a step too far. We recommended that the editor follow the Committee on Publication Ethics (COPE) flow chart [5], which requests the corresponding author to present an explanation. If this explanation is found inadequate, the editors are obliged to contact the co-authors of that paper and institutional leaders of the corresponding author, such as a department chair.

Interestingly, duplicate publication was the most common reason (57.0%) for retraction in 111 papers that were published and retracted in KoreaMed from 1990 to January 2016 [6]. This result is markedly different from Western studies, which reported that around 15.8% to 17% of retractions were due to duplicate publication [7,8]. Some papers were retracted inappropriately, such as retraction of the first article published in a case of duplicate publication. This result may be associated with the recent publication awareness campaign in Korea to prevent duplicate publication [9]. In recent years, editors have been recommended to use a similarity check system when they receive a paper submission to help detect possible plagiarism and duplicate publication [10]. Altogether, duplicate publication is an important issue in publication ethics and should be prevented.

Secondary publications

Many editors had questions about secondary publications. Editors reported having occasionally received requests from certain societies or institutes to publish a commentary or a mini-review of public health issues in different journals. The editors wanted to know if doing so would lead to a duplicate publication problem and accordingly, how this could best be addressed. The term “secondary publication” is defined as a permitted duplicate publication that meets established criteria [1]. Several conditions need to be fulfilled for a secondary publication: the permission of editors of both journals must be sought, both journals should have different reader groups and audiences, the previous publication should be named in a footnote (“This article is based on a study first reported in the <Journal title>, <full reference>”), and the article must have a title that indicates the paper has been published as a secondary publication (republishing, summary, etc.) [1]. Secondary publications can be simultaneous or joint. According to the International Committee of Medical Journal Editors (ICMJE) guidelines, in cases of a public health emergency, duplicate submissions and publications may be permitted. The important consideration is that the editors of both journals should be notified in advance. Editors should also check

the conditions for secondary publication and mention the secondary publication in a footnote.

Authorship dispute

Being an author of a scientific manuscript is a privilege and an honor for a scientist. Authorship represents a critical element of scientific research and conveys professional benefits and responsibilities. However, authorship is one of the most commonly disputed areas. The Committee received several inquiries about authorship. The most common inquiries dealt with adding or deleting a specific author or authors to and from already published articles.

The ICMJE guidelines provided criteria for updated authorship in 2013 and indicated that individuals listed as authors must satisfy all four criteria [1]: “1) Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; 2) Drafting the work or revising it critically for important intellectual content; 3) Final approval of the version to be published; and 4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.” An individual who does not meet all four criteria should be mentioned in the acknowledgments or contributorship section, rather than as an author. However, authorship abuse can occur and takes several forms, including coercive authorship, honorary or gift authorships, and ghost authorship [11,12]. In an authorship dispute involving the deletion or addition of specific authors, we recommend that if there is a consensus among all authors to add or delete a specific author or authors and if they are able to provide a suitable reason to the editor for doing so, a change in authorship can be made according to the COPE flow chart [5]. A correction letter should then be issued. It is important to note that author disputes are not the responsibility of editors or journals. This issue should be resolved among the authors themselves and institutions should step in only if these problems persist.

There have been concerns about inappropriate authorship in Korea because the number of authors in original articles from a single institution in Korea is larger than that of other countries. It is recommended that Korean researchers be aware of and follow the global standards of publication ethics regarding authorship [13].

Informed consent

Informed consent involves securing permission to disclose personal information in research. It is gaining more importance in the publication process, and journals are strongly recommended to protect the personal information of the patients that are presented in the articles they publish. The Gen-

eral Data Protection Regulation (GDPR) implemented by the European Union aims to protect the personal data of individuals [14]. According to the GDPR, without prior informed consent, no personal information, including pictures, can be published in journals. The authors should obtain informed consent from their study subjects and clarify and confirm the extent to which their information will be exposed in a manuscript before publication. The Committee received several inquiries about informed consent. In one case, a child had a very rare disease, but the parents refused permission to report the case. Therefore, the author omitted photographs showing the child's face and other pictures in which the child was recognizable. The authors stated that they did not obtain the permission of the parents and thus omitted the pictures. However, the editor was concerned about the publication of this report because even though there were no personal data, the authors did not have permission to present the relevant information. Thus, the Committee responded by saying that although the case had academic value, without the permission of the parents of the child, it was unethical to publish the report, especially as it was likely to encounter major problems after publication. Editors are expected to check the personal data protection strategy and the acquisition of informed consent in the course of processing and evaluating submissions to the journal. Authors should present details about how informed consent was obtained from subjects in their manuscripts.

Conclusion

Ethical issues in publication are more important now than ever before. According to the "Regulation on the management of national research and development" by the Korean government, research misconduct includes fabrication, falsification, plagiarism, inappropriate authorship, and duplicate publication (https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=43461&type=sogan&key=54). Among them, inappropriate authorship and duplicate publication involve misconduct of publication ethics. By explaining some cases addressed by the Committee, we believe that a heightened awareness of particular ethical challenges that are relevant to academic publishing can help authors, reviewers, and editors reduce instances of misconduct. In addition, we recommend referring to the third edition of the *Good publication practice guideline for medical journals by the Committee for Publication Ethics* [15].

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Coaching early-career social sciences researchers to publish their first indexed publications: the Research Coach in Social Sciences program as a model

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Introduction

In this short essay, I describe how our Vietnam-based continuing education program, Research Coach in Social Sciences (RCISS), supports early-career researchers to (co)publish their first international indexed publications (i.e., publications in Clarivate Web of Science [WoS] or Scopus-indexed journals). In developed countries, junior researchers often seek help from university professors to publish their first publication. However, given the chronic shortage of senior social sciences scholars with international publishing experience in Vietnam, along with outdated and ill-designed PhD programs, early-career researchers in the social sciences in Vietnam often face challenges in international publishing.

In February 2017, the RCISS program was founded by the author of this paper, a foreign-trained returnee, based in Hanoi, Vietnam. By the time that this paper is being written (June 2020), the RCISS program has provided coaching services for 200 junior social researchers, of whom 28 have published at least one article or book chapter indexed by Clarivate WoS or Scopus. In the following sections, I describe the context of social sciences research in Vietnam, as well as the overarching concepts and operational model of the RCISS program. Subsequently, I present some examples, which reflect three successful models that the RCISS program has adopted in order to support the coachees to publish their first international publication. The paper ends with a conclusion, which provides implications and suggestions.

Context of Social Sciences Research in Vietnam

In the past, the Vietnamese research sector lagged far behind that of its neighboring countries. According to Clarivate Analytics [1] statistics, in 2004, Vietnamese scholars published only 510 publications indexed by the Science Citation Index Expanded (SCIE), Social Science Citation Index (SSCI), and Arts and Humanities Citation Index (AHCI). This is much lower than the

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respective figures of Singapore (6,623), Thailand (2,574) or Malaysia (1,548). A closer look at different disciplines reveals that between the social sciences/arts and humanities and the hard sciences in Vietnam, social sciences/arts and humanities have played a comparatively modest role. Thus, as observed in the Clarivate Analytics [1] database in 2004, Vietnamese authors published 486 SCIE publications, while the respective figure as indexed by the SSCI and AHCI was only 36, equaling 7.4% of the SCIE publications. In 2005, the Vietnamese government issued the Higher Education Reform Agenda (HERA) with the ambition to renovate the whole university system [2]. Thus, among the measures implemented by the HERA, enhancing research capability through internationalization has been regarded as a key strategy. Such strategies might be illuminated through several programs and initiatives, as described below.

First, following the HERA's scheme, thousands of young future faculty members were sent to developed countries to pursue PhD degrees at renowned universities [3]. Second, the National Foundation for Science and Technology was launched in 2008 with the adoption of Clarivate and Scopus as references to evaluate and grant funding for research projects [4]. Third, a new regulation on doctoral education was issued in 2017 to set a new bar for both PhD candidates and their supervisors. Specifically, PhD candidates are required to have at least one international publication before their final defense, whereas faculty members must have at least one international publication as the first/corresponding author to be eligible to serve as a PhD supervisor [4].

The new regulations on doctoral education, coupled with the growing flow of foreign-trained PhD holder returnees since the mid-2000s and the increasing role of the National Foundation for Science and Technology, have resulted in a new aspiration among academics in Vietnam to reach international standards. Consequently, recent statistics have documented a tremendous leap forward of international research output in Vietnam [4]. In 2018, Vietnamese scholars published 6,001 publications indexed by the SCIE, SSCI, and AHCI [1], a figure that is 11.8-fold higher than that of 2004. According to Clarivate Analytics, within the South and Southeast Asian region, Vietnam is the country with the highest growth rate in terms of Clarivate Analytics WoS-indexed publications between 1991 and 2017 [5].

Nevertheless, international publications in Vietnam mostly come from scholars in hard science disciplines. According to the most recent Clarivate Analytics [1] statistics in 2018, for every 100 publications published by Vietnamese authors in the SCIE database, only about 13 publications indexed in the SSCI and AHCI were published. Due to their lack of research skills, scholars in social sciences still face several challenges

when striving to publish internationally. Nevertheless, it is apparent that social scientists currently have a different point of view toward international publishing compared to their peers a decade ago. In the past, social scientists in Vietnam often disregarded the importance of international publishing; instead, they thought that publishing in Vietnamese was more important since Vietnamese publications would contribute directly to the development of the national socio-cultural and economic system. Today, the requirement for international publication not only applies to newly enrolled PhD students, who have to consider it as a *sine qua non* to graduate, but also to other groups of social scientists, including senior scholars (even those with no previous experience in international publishing).

RCISS: Concepts and Operational Model

In the early 2010s, when I started my PhD program in international business in Taiwan (Republic of China), I immediately realized that there was a major gap between social researchers in Vietnam and in developed countries in terms of research skills and capability. Junior social researchers in developed countries, especially those undertaking PhD programs in the US, Canada, South Korea, Taiwan, or Singapore, often have to take a wide range of courses in research methods skills, from beginning to advanced levels. During their coursework, many subjects are presented, including econometrics, introduction to conducting research, qualitative methods, survey questionnaire methods, time series, and panel data analysis, academic writing, and so forth [6]. On average, courses in research methods might account for 20% to 30% of the total credits in the PhD program. Furthermore, the instructors of research methods courses are usually active researchers. Thanks to these features, PhD students in developed countries are well trained and prepared before moving on to the next phase: conducting their PhD dissertation.

A glimpse of the situation in social sciences PhD programs in Vietnam provides a contrasting picture. Coursework credits only account for a small proportion of the PhD program, with less emphasis on research methods skills. Furthermore, courses on research methods are not always delivered by active researchers who have experience in international publishing.

In order to bridge this substantial gap, I started to think about a concept, which later became the RCISS program. Three years since the first class of only four coachees in February 2017, the program has provided coaching services to about 200 junior social researchers from over 90 institutions and nine countries. Specifically, 30% of the coachees are young lecturers working in the academic sector, about 25% are master's or PhD students who face challenges while undertaking their dissertations/theses, about 25% are fourth-year under-

graduate students or recent bachelor's graduates, and the rest (approximately 20%) are from governmental, non-governmental, or private organizations. Their main motivations to participate in the RCISS program are two-fold: having papers published in internationally indexed journals and/or writing research proposals for overseas master's/PhD scholarship applications.

The staffing of the RCISS program started with only one person in early 2017 (the author of this article); to date, the personnel of the RCISS program has expanded to nine staff members, including one head coach, one coach, and seven assistant coaches, along with several senior advisors. To meet the demands and needs of our coachees, the RCISS program is organized as follows.

Components: Head coaches and senior colleagues deliver the RCISS with two main components: training and coaching. The key features of these two components are discussed as follows. (1) The training component provides a fundamental background for junior researchers through a series of research methods courses similar to the PhD coursework in developed countries. To date, the RCISS program has offered four courses, namely (i) Introduction in Research Methods in Social Sciences, (ii) Academic Reading and Writing Skills, (iii) Structural Equation Modeling, and (iv) Delphi and Analytical Hierarchy Process. Several other syllabi are being prepared, such as (i) Econometrics, (ii) Secondary Data Analysis, and (iii) Bibliometric Analysis, to name a few. On average, an RCISS course lasts from 3 to 5 intensive weeks with 3 hours of training per week and other side activities. The schedule is tailored to feature the busy schedule of each coachee. (2) The coaching component elevates coachees who are seriously committed to academia. A coachee might be arranged to work with their coach (or supervisor) or other coachees to conduct research as in any research team across the world. This component is illuminated in more detail by three success cases, which are described in the next section.

Mode of training and coaching delivery: To satisfy the diverse demands of our coachees, who are often busy and located in different zip codes, both offline and online means of communication are being used. Online training or coaching is delivered synchronously via Zoom (<https://zoom.us/>), whereas Facebook groups are being used as a means for exchange between coaches and coachees and among coachees.

Resources: The RCISS program utilizes the advantages of the ongoing open science movement [7], as the academic materials used in the RCISS program mostly come from open access journals and sources, while other open tools such as Mendeley are being used.

Side activities: Apart from the two main activities of training and coaching several extra activities have been implemented

to support our coachees. (1) Academic writing group: Each week, the RCISS program asks two coachees to summarize an academic issue and post their writing to the group for cross-checking. All other coachees are encouraged to revise the writing work of the two coachees. (2) Invited speaker seminars: Twice per quarter, the RCISS program invites senior scholars to deliver seminars such as (i) introduction of a research method, or (ii) introducing a paper of an invited scholar. The ultimate purpose of the seminar series is two-fold: (i) to avoid the problem of the inbreeding effect in academia, and (ii) to create opportunities for coachees to join the research group of invited senior scholars. (3) Annual conference: Annually, the coachees may present their research proposals or draft manuscripts in front of a committee consisting of invited senior scholars. Based on the feedback of the committee members, coachees improve their proposal/manuscript for further submissions.

Three Success Cases

In this section, I describe some high-profile success cases of coachees, who have published their first international publication under the supervision or with the collaboration of RCISS. These cases also illuminate three models that RCISS often support their coachees to meet the standard: publishing their first international publication.

Case 1: RCISS coachees co-publish with RCISS members

This case involves a coachee who joined a research project of RCISS members. The project started in November 2018 when I read a working paper entitled, "What makes a quality curriculum? In-progress reflection no. 2 on 'Current and critical issues in curriculum and learning'" by Stabback [8]. The RCISS team wanted to follow Stabback's suggestion to adapt his framework to tackle local issues, but I faced difficulties in finding schools that would allow us to pilot the framework. Eventually, the problem was resolved with the participation of a coachee from the K-12 schooling sector. Our manuscript, titled: "Introducing a tool to gauge curriculum quality under UNESCO's Sustainable Development Goal 4: an analysis of four primary schools in Vietnam" was finished in November 2019 and accepted by the *International Review of Education* in March 2020 (the online version is expected to be issued in August 2020). Following this first project, the coachee remained with the RCISS team to conduct further studies, one of which was recently published by *Data in Brief* (see [9]).

Case 2: RCISS coachees publish together with support from the RCISS program

This situation started when a coachee asked me to revise a

manuscript draft in the accounting field that she wrote with her colleagues. Since the manuscript was well-written and well-designed, I encouraged the coachee to translate the manuscript into English and submit it to an international journal. The coachee seemed to be reluctant due to her inadequate proficiency in English writing. Thus, I introduced her to another coachee with a higher level of proficiency in English writing, and urged them to collaborate. Thanks to their collaborative work, the English version of the manuscript was completed, and subsequently was published internationally [10].

Case 3: RCISS coachees co-publish with other senior scholars

In recent years, there has been a small but increasing number of middle- to high-level Vietnamese scholars in the social sciences. These senior scientists, who reside in Vietnam or overseas, have a high demand for recruiting junior researchers in Vietnam to join their research groups as research assistants. However, as mentioned at the outset of this study, due to the outdated and ill-designed PhD programs, these senior scholars often face difficulties in finding qualified personnel. Given this circumstance, the RCISS program serves as a bridge to match the demand (from the senior scholars) with the supply (from the early-career researchers). After several training courses through the RCISS program, some early-career researchers have enhanced their capacities to meet the requirements of the senior scholars. A high-profile case involved a coachee who joined Dr. Vuong Quan Hoang's (<https://orcid.org/0000-0003-0790-1576>) research group. The coachee co-published her first international publication with Dr. Vuong's research team in April 2020 [11]. Other notable cases involved a coachee who joined Dr. Nguyen The Ninh's (<https://orcid.org/0000-0001-6050-2633>) team [12] and another who joined Dr. Tran Xuan Bach's (<https://orcid.org/0000-0001-7827-8449>) team [13].

Conclusion

The internationalization of research has been one of the most visible components of higher education reform in Vietnam over the previous decade. The two key strategies underlying internationalization have been sending early-career researchers to study for their PhD degrees abroad and encouraging domestic researchers to publish internationally. However, a problem is that some junior researchers are not qualified enough to study abroad or cannot study abroad despite being qualified to do so due to personal reasons. Staying at home, these junior researchers face several challenges when striving to publish their first international publication. Given these circumstances, the RCISS program was established to support this group of researchers. Personally, I do not think that the

RCISS program is inherently an innovative concept, since it adopts several features of PhD programs in developed countries. However, I believe in the efficiency of my model in identifying and supporting local demands. In order to promote the social research sector in Vietnam, I suggest that all PhD programs must be reformed radically. I am willing to share our experiences with Vietnamese universities, which have plans to renovate their research activities as part of PhD programs. Various aspects of my program could be adopted by universities in other developing countries.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Ultrasonography: road to SCIE listing

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Introduction

Ultrasonography is the official journal of the Korean Society of Ultrasound in Medicine (KSUM), and it was listed in the Science Citation Index Expanded (SCIE) in September 2019. It started as a Korean academic journal in Korean, and has long been established as Korea's leading medical ultrasound journal, but it was quite challenging to develop *Ultrasonography* into an internationally recognized journal by introducing an internationalized editing system to keep pace with the trends of globalization, including the exclusive use of the English language. Through this essay, I would like to share my experiences with the process as the editor-in-chief.

A New Beginning with International Open Access

Our society was founded in 1980, and the *Journal of Korean Society of Ultrasound in Medicine* was launched in 1982. In 2006, the KSUM co-hosted the 11th Congress of the World Federation for Ultrasound in Medicine and Biology with the World Federation for Ultrasound in Medicine and Biology, and the "KSUM" (<https://2020.ksum.or.kr/>) became an international conference since 2010; nonetheless, most of the papers in our journal, which is published four times a year, were case reports, and it was rare for there to be more than 10 original articles per year. As the quality of the society and the academic achievements of our members improved, society members preferred to submit papers to internationally renowned journals, and the quality of the papers published in our journal became relatively low. Its role was reduced to satisfying the required thesis achievements for trainees' qualifications to take the board exam. In this situation, where it was difficult to publish high-quality papers and to publish a sufficient number of papers in each issue, we had two choices: to disband the journal or to globalize it as an English-language journal. At the start of the new KSUM board meeting in 2013, I and the board of directors of the society chose to pursue internationalization based on a full investment of the appropriate resources [1].

First, we changed the journal name to a simple name that made no reference to location, ensured financial support from the society, and switched to a full open-access policy. Although the number of articles in each quarterly issue was maintained, exposure was maximized by moving the date of publication of the first issue from late March to early January. To ensure

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that the journal management aligned with global standards, there was a debate regarding whether to switch to a well-known international publisher; however, we decided to work with a domestic company in order to build up the editing system early, with smooth communication to ensure immediate implementation of our requirements and to save costs. Fortunately, several Korean companies have accumulated sufficient experience and are catching up with global editorial trends. Another reason for selecting a domestic company was the difficulty in registering for PubMed Central early when a commercial company such as Springer or Elsevier manages a journal. M2 Community has not only managed the journal's homepage (<https://e-ultrasonography.org/>) and submission system (<http://submit.e-ultrasonography.org/>), but also carries out JATS XML (Journal Article Tag Suite extensible markup language) and DOI (digital object identifier) work for papers in a timely manner, and plays an important role in maximizing the exposure of our journal through electronic publications ahead of print.

On the Way to Becoming an Internationally Renowned Journal

Since our goal was to be listed in SCIE from the beginning, 15 internationally renowned editors were recruited through networking via the KSUM, and the existing editors were maintained while forming an editorial board. The biggest problem that had to be solved when re-launching the journal was how to attract excellent papers. For at least the first 2 years, the key issue was how to obtain a sufficient number of articles per issue. Because simply changing the journal name and submission system did not lead to an immediate influx of numerous high-quality papers, we actively promoted the journal among our members, branch societies, and acquaintances around the world, both through personal networks and through the KSUM, pointing out the advantages of publishing in our journal, including the free article processing charges, a rapid review and e-publication process, and free mobile apps for all issues with full open access [1]. In the early years of the journal, the provision of some honoraria for distinguished original articles and incentives for invited papers was also helpful to attract high-quality papers.

In order to meet the SCIE listing requirements, and in particular to receive citations, we had to be listed in PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/>) to maximize the exposure of papers in our journal to researchers around the world, as well as to attract papers on the most popular topics. With the help of domestic companies, we were lucky enough to be listed in PubMed Central, enabling us to post our articles in PubMed, in July 2014 by having basic qualifications in terms of journal

editing [2]. In retrospect, I think that early indexing in PubMed Central was the most essential factor in the internationalization of the journal.

The first application for SCIE indexing was done 1 year after the journal system was changed. The first application sought to confirm the international status of *Ultrasound* and to identify any issues that still needed to be addressed, rather than with an expectation for immediate acceptance. I received a decision letter from Thomson Reuters in November 2015 stating that *Ultrasound* could not be selected because it was not cited enough by journals in the Web of Science (WoS) Core Collections. Instead, the journal was accepted for a new edition of WoS launched at that time, referred to as the Emerging Sources Citation Index (ESCI), which would make our articles discoverable and citable on WoS with coverage of journal content published starting in 2015 [3]. ESCI journals do not receive an official Journal Citation Ranking impact factor (IF), but the articles cited by ESCI-listed journals are considered meaningful because those citations are reflected in the official IF of SCIE-listed journals.

Raising the Citation Rate and the Second Challenge

Just after *Ultrasound* was listed in ESCI, the management of SCIE was transferred from Thomson Reuters to Clarivate (<https://clarivate.com/>). On the table of the journal evaluation process for the WoS Core Collections [4], citation analysis appeared to be the most important factor for the transition from ESCI to SCIE listing. After the initial rejection, in order to pursue more international diversity, the role of domestic editors was limited to section editors and we increased the number of international editors with the help of individual contacts and networking through branch societies. From the time that the journal was re-launched to 2016, the editorial board grew from 18 editors from eight countries to 33 editors from 22 countries.

Since the reason that *Ultrasound* was not listed in SCIE was that there were too few citations, we focused on increasing the citation rate. To maximize the exposure time, accepted articles after the peer review process were uploaded to PubMed immediately after the layout was edited (i.e., before the official publication). After the official publication of each issue, we collected as many e-mail addresses as we could find online and sent the table of contents to global investigators, as well as to our society members. Meanwhile, based on our initial 2 years of experience, we found that citations for review articles were nearly three times higher than those for original articles, while there were few citations for case reports. Therefore, while continuing to attract review articles on hot topics, we changed the journal policy to exclude case reports [5].

Therefore, when applied for SCIE listing a second time, our self-calculated IF for 2016 was 2.075 and real-time monitoring of the IF for 2017 showed a further increase. It was expected that the conditions for inclusion in SCIE would be met, and we received a decision letter for our second submission for SCIE listing from Clarivate in September 2017. We failed again.

Two Years of Waiting and the Third Challenge

In the decision letter, three reasons were given for why they did not select *Ultrasonography* for inclusion in SCIE. First, through an evaluation process considering many factors, their analysis of *Ultrasonography* placed it below the second quartile of the Radiology, Nuclear Medicine & Medical Imaging subject category. Second, their Radiology, Nuclear Medicine & Medical Imaging subject category consisted of over 100 total journals, which included satisfactory representation of East Asian titles. Third, the international diversity of the journal's authors was not sufficient for the global scope of SCIE. It was not easy for me to agree with these three reasons.

According to the self-calculated IFs of 2.075 (58th among 128 journals) in 2016 and 2.838 (39th among 129 journals) in 2017 in the Radiology, Nuclear Medicine & Medical Imaging subject category of SCIE, it was difficult to understand why the journal's status would be considered to be in the middle or why it would be a reason for rejection, even when compared to journals already listed in SCIE [6].

I also searched to see whether it was true that there were enough relevant SCIE journals from East Asia. The position of Korea in the diagnostic imaging category can be estimated to some extent by referring to its status in the annual conference and official journal of the Radiological Society of North America, a representative society of radiology. Korea ranks just after the United States, along with Japan and China, in terms of submissions and publications in *Radiology* (<https://pubs.rsna.org/journal/radiology>). During the most recent 5 years (from 2016 to 2020), the authors of 167 articles were Korean, while 733 articles were written by authors in the United States. Comparing Korea (n = 167) to China (n = 134) and Japan (n = 79), it can be seen that Korea overwhelms other East Asian countries in the number of published papers. However, in terms of the number of relevant journals currently listed on SCIE, the United States accounted for more than 50% (65 out of 128), while the total number of journals from East Asia was 7, and the *Korean Journal of Radiology* was the only Korean journal. It is difficult to compare simple figures, but since the number of papers published by Korean authors in *Radiology* is slightly one-fifth of the number of papers published by authors from the United States, the presence of a

serious skew towards North America and Europe is shown by the fact that Korea has fewer than one-sixtieth as many SCIE journals in this field than the United States. Therefore, the number of SCIE journals was clearly too small considering the ability of East Asian researchers in comparison to the representation of journals from Europe and America. Meanwhile, when we made our second application for SCIE listing, international authors accounted for 25% to 30% of all published articles annually in *Ultrasonography*, so the judgment that the international diversity of the journal was insufficient appeared highly subjective.

According to the policy of Clarivate, we had to wait 2 more years to apply a third time for SCIE listing. During these 2 years, we could not solve the problem of regional bias in the number of SCIE journals, so we kept the policy of raising the IF and increasing the proportion of foreign authors. Fortunately, a combined annual meeting of the Asian Federation of Societies for Ultrasound in Medicine and Biology and the KSUM was held in Korea in 2018. We actively commissioned international speakers invited to this conference to write review articles. Subsequently, papers by international authors accounted for over 50% of all papers published in 2018 and 2019 [7]. Regarding the IF and journal ranking, which were related to the first reason of rejection, the IF was 2.813 in 2018 (45th out of 129 SCIE journals in the relevant category). During this period, we did not recommend or suggest self-citations to our journal authors. The self-citation rate was approximately 6% and the overall citation rate of the papers in *Ultrasonography* by Korean researchers in other WoS Core Collection journals was approximately 20%.

SCIE Listing and Future Directions

In the second rejection letter sent in September 2017, Clarivate said that they would welcome the resubmission of the journal for SCIE evaluation in September 2019. A year later, in September 2018, we made a PowerPoint file about the latest advances of *Ultrasonography* with arguments against the three reasons for rejection that were difficult for us to agree with, and emailed it to Clarivate. We did not receive a response to the email. The third submission was sent in early September 2019, and we received an email telling us that *Ultrasonography* had been selected for SCIE listing a week later [8].

After being listed in SCIE, the number of submissions has tripled in the last 8 months compared to the previous year. In particular, the number of original articles from domestic researchers increased at a rate similar to that of overseas submissions. To continue the policy of actively publishing up-to-date guidelines of ultrasonography and review articles on hot issues to maintain or increase the IF, the editorial policies

need to be adjusted. At the same time, solely having a high IF is not enough for *Ultrasound* to be considered a leading academic journal. Ultimately, in order to increase the number of excellent papers on various topics according to the aims and scope of *Ultrasound*, which covers general clinical ultrasound, we will have to increase the number of articles per issue. Effective short-and long-term strategies are required to increase the quantity of articles, along with improving the quality of the journal's content [9,10].

Conclusion

There are many ways to evaluate a journal, but it is well known that many countries and people estimate a journal's international reputation based on whether it is listed in SCIE. To be listed in SCIE, it is first necessary to internationalize the editorial system, and PubMed indexing seems to be essential to maximize awareness of published papers. To increase the citation rate, which appears to be most important factor for being listed in SCIE, the key point is to select internationally attractive authors and themes that will be consulted by many readers and frequently cited. To this end, internationalization and financial support from the related academic society, which can provide various connections, are essential. If this process results in a competitive IF in the relevant field, along with diversification of authors in terms of nationality, being listed in SCIE is a feasible achievement.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Impact of COVID-19 on the duration of the peer review process of the *Journal of Animal Science and Technology*

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Introduction

The unprecedented global spread of coronavirus disease 2019 (COVID-19) has caused rapid changes in existing social systems and industries across the globe.

Even during the most unprecedented times in South Korea, schools have never been locked down. However, since March 1, 2020, South Korea has been on an academic shutdown, which emphasizes just how severe the impact of the virus was on a nationwide scale.

The Great Depression, which started in 1929, was characterized by disruptions in production and supply caused by overproduction. In an interesting echo of those circumstances, one of the characteristics of the COVID-19 outbreak is that production and supply chain logistics have been halted due to the Great Lockdown.

In Korea, the first case of COVID-19 was reported on January 21, 2020 [1]. Despite the efforts of the Korean government to control the spread of this virus, the number of infections started to rise rapidly in late February 2020. Since then, the Korean government has clearly notified residents of Korea to refrain from face-to-face contact and has prohibited group meetings. On March 22, 2020, a social distancing policy was implemented in order to resume daily-life activities.

This essay aims to provide an analysis of the impact of COVID-19 on the editing process of a scholarly journal, *Journal of Animal Science and Technology* (JAST, International Standard Serial Number 2055-0391), which is published by the Korean Society of Animal Sciences and Technology. The analysis presents a comparison of the total time (days) it took for a manuscript to receive a final decision in order to see the impact of COVID-19 on JAST's editing processing time.

Peer Review Time of JAST

JAST was launched in 1958 as a Korean academic journal that publishes research articles on the subject matter of domestic animal science. It has been published in English since 2014 in order to expand further as an international journal. JAST was listed in PubMed Central in

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2015 and listed in Scopus and Science Citation Index Expanded in 2019.

Given the total number of studies published in JAST, it would be premature to directly compare the number of papers published before and after COVID-19. Since JAST was listed in SCIE in October 2019, the number of papers received by Korean authors has increased significantly. Therefore, it would be appropriate to compare the average processing time (APT) for an effective decision to be made on a submitted manuscript. The APT is defined as the average total time it takes for a manuscript to receive a decision from the day it is submitted.

Many of the submitted manuscripts are reviewed by Korean reviewers; therefore, the APT may be affected by aspects of the social situation specific to Korea. For instance, the APT in July and August 2019 was relatively high because there are many conferences, vacations, and personal trips in the summer months in Korea (Fig. 1).

Starting in February 2020, the APT was shorter than average, even during the spread of COVID-19, except for the month of April (Fig. 1). This is because of the social changes caused by COVID-19. In South Korea, the spring semester (also known as the first semester) usually starts around the beginning of March. Due to COVID-19, school opening was postponed 5 times during March and April. On April 9, universities started online classes, and schools (elementary, middle, and high school) slowly followed. Starting in March, the total shutdown of entire social and school systems was mostly dedicated to the preparation of video lectures and logistical operations. Professors had little time to prepare video lectures, office hours, and other changes needed to respond to students' needs. Therefore, due to the changes in the social and educational system that the reviewers had to adapt to, the APT for the manuscripts submitted in April was noticeably

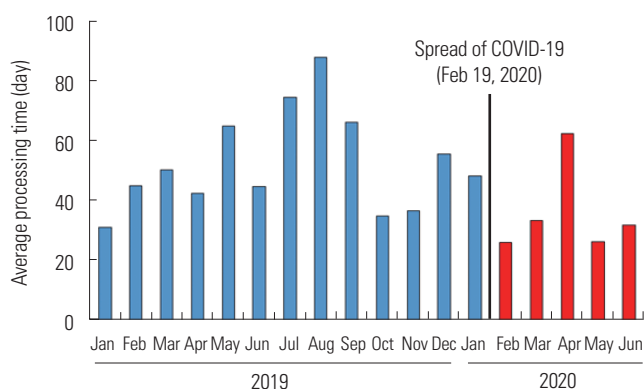


Fig. 1. Average processing time for manuscripts submitted to the *Journal of Animal Science and Technology*. The average processing time was defined as the average amount of days it took for a manuscript to receive a final decision.

longer than for those submitted in other months.

However, since May 2020, the APT has stably decreased. It is believed that the APT will continue to become shorter, as time spent at home will increase in the future (Fig. 1).

The Great Lockdown has influenced research at laboratories. Generally, publishing an article requires first collecting data, and then writing, submitting, reviewing, and publishing the manuscript. The lack of new research, due to the lockdown of many laboratories, may impact the ability to collect new data, which then impacts the writing process and subsequent steps of the publishing process. In the early stages of COVID-19, the impact of the shutdown has not led to immediate consequences for academic publishing, since researchers have been able to write and review articles using previously collected data. However, COVID-19 will affect every step of the publishing process in the near future.

Most international journals and publishers have already adopted open access and have completely transitioned to digital and virtual spaces. Therefore, the editorial team has not experienced any difficulties with handling manuscripts. In the future, articles may be reviewed by artificial intelligence or machine learning applications that will grade and numerically value the accuracy and implementation possibilities of each article [2]. Extensive preparatory measures are needed for the development of journals in the post-COVID-19 era.

Conclusion

There was a notable fluctuation in the interval from submission to the final decision since COVID-19 was first reported in South Korea in January 2020. The APT decreased, increased, and decreased again (Fig. 1). This phenomenon may be explained by changes in the educational environment of the universities with which reviewers are affiliated. The rapid change to remote classes starting in March, the start of the first semester in Korea, may have affected professors' review time of manuscripts. Because this study analyzed the APT of a single journal, it would be difficult to assume that the impact of COVID-19 has been the same for other journals. More data should be collected and analyzed to determine whether this has been a general phenomenon.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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How was the *Diabetes Metabolism Journal* added to MEDLINE?

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Introduction

What is the role of academic journals, especially medical journals? As of June 2019, 41 of the 264 journals represented in the Korean Association of Medical Journal Editors (15.5%) were listed in the Science Citation Index Expanded (SCIE) or Social Sciences Citation Index (SSCI), corresponding to 33.3% of all 123 SCIE- or SSCI-registered journals published by Korean academic associations and/or societies in the field of science and technology. Medical journals from Korea have advanced to the international level very rapidly. However, the impact factor, which simply reflects a high number of citations, cannot be interpreted as an inherent measure of academic progress. Instead, it is important to reconsider the proper role of journals and to establish a solid basis for further directions of development. A major role of an academic journal is to open a window for academic exchange among researchers, and another role is to contribute to advances in the public interest. For medical journals, another task is to contribute to the advancement of medicine through research results. Starting in March 2018, I have worked on the application of the *Diabetes Metabolism Journal* (DMJ) to MEDLINE as a member of the journal's task force for applying to MEDLINE. In this essay, I will briefly summarize my efforts and the processes required to add DMJ to MEDLINE, a goal that was accomplished in December 2019.

Why Was the Application to MEDLINE Pursued?

The DMJ is the official journal of the Korean Diabetes Association. The journal was launched in 1972 and was published under the title the *Journal of the Korean Diabetes Association* until 2007. In 2011 (volume 35), the title was changed to its present one, the DMJ. The aims of DMJ are to contribute to the cure of and education about diabetes mellitus, and the advancement of diabetology through the sharing of scientific information on the latest developments in diabetology among members of the Korean Diabetes Association and other international societies [1]. DMJ has been indexed in SCIE since October 2017.

However, DMJ was not satisfied with only being listed in SCIE; instead, we worked towards a new goal of being listed in MEDLINE. The meaning of being a MEDLINE journal may be its

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payoff in terms of the brand of the journal, as being listed in MEDLINE means that a medical journal is officially certified by the US National Medical Library as having reached a certain level. This is because the review process of the US National Library of Medicine Literature Selection Technical Review Committee (LSTRC) for journals that apply for MEDLINE listing emphasizes the highest level of publishing and research ethics. LSTRC members evaluate the quality of articles based on the originality of the research, the appropriateness of the research methods, and the contribution to the relevant academic field. In other words, the standard of the LSTRC for evaluating a journal is to see whether research was conducted in accordance with correct research ethics, whether academically high-quality studies were published, and whether the journal is published according to established publishing standards. These items ultimately coincided with directions of development that journals pursue, especially for DMJ, which has begun to emerge as a high-quality international academic journal.

Efforts to Make the Journal Eligible for Inclusion in MEDLINE

Originality

When we started to prepare for this process in 2018, there were already 29 MEDLINE journals on diabetes, and as northeast Asian journals, the *Journal of Diabetes* from China and the *Journal of Diabetes Investigation* from Japan had already been listed in MEDLINE. For a journal to be listed in MEDLINE, it is necessary to emphasize its uniqueness and to demonstrate that the MEDLINE database can be enriched by listing the journal. The prevalence of diabetes in Asia is increasing rapidly, and the proportion of individuals of Asian descent in the United States is also high. It is also known that Asians display different patterns in terms of the pathogenesis of diabetes and the reactivity of anti-diabetic agents compared to Western people. Among MEDLINE-listed journals, there are few top-tier journals covering high-quality research on metabolic diseases and diabetes from the Asia-Pacific region. Therefore, we emphasized that DMJ focuses on studies analyzing pathogenic characteristics of diabetes in Asians and on establishing diabetes guidelines for Asians. When analyzing the articles published in DMJ, a significant proportion described different metabolic characteristics between Asians and Western populations [2].

We also emphasized the fact that the readership of DMJ is very wide, and that it publishes a considerable amount of material with public interest that can be reflected in health care policies [3]. The scope of DMJ includes health policies and environmental considerations for improving the medical cir-

cumstances of patients with diabetes. Thus, we expect DMJ to be essential reading not only for researchers and clinicians, but also for health administrators and policy-makers who contribute to the healthcare environment for patients with diabetes. Furthermore, DMJ serves as a good information delivery vehicle for educators and students. Its importance to users, such as researchers, clinicians, educators, administrators, allied health professionals, students, and policy-makers, was another point to address in the MEDLINE journal selection process [4]. On the MEDLINE listing application, we also provided specific examples of original articles relevant to the metabolic characteristics of Asians [5], subjects that can be linked to health care policies [6], environmental issues such as endocrine disruptors [7], and next-generation artificial intelligence and new diabetes treatment technologies [8].

Ethical issues

Since MEDLINE attaches great importance to the ethical policies of academic journals, it was necessary to describe the ethics policy lucidly in the submission rules and on the website of the journal. First of all, in accordance with International Committee of Medical Journal Editors's 'Recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals' [9], we additionally revised the following points: regulations on the author's role and necessary procedures for changing authorship; a more concrete statement regarding conflicts of interest; the process of obtaining consent and the importance of including the institutional review board approval number; the processes for dealing with duplicate submission, plagiarism, data forgery, and tampering; the procedures for handling secondary publications; the clinical data sharing policy, and the procedure for handling authors' complaints and dissatisfaction. Furthermore, in the review process, individual papers are closely examined to ensure that all published papers comply with the above ethical regulations.

The journal's compliance with the 'Principles of transparency and best practice in scholarly publishing' co-declared by COPE (Committee on Publication Ethics), DOAJ (Directory of Open Access Journals), WAME (World Association of Medical Editors), and OASPA (Open Access Scholarly Publishers Association) is especially important in the MEDLINE review process. In particular, adherence to the Principles of Transparency and Best Practice in Scholarly Publishing is a prerequisite for the MEDLINE review process [10]. The Best Practice consists of 16 items (<https://doaj.org/bestpractice>), and compliance with each item of the Best Practice was described on the journal homepage.

Journal's Efforts to Maintain Its Quality after Being Indexed in MEDLINE

The National Medical Library regularly tracks whether MEDLINE journals adhere to the Best Practice. If there are negative changes in scientific quality or the editorial process, a journal may be removed from the MEDLINE database. For example, in August 2017, the United States National Library of Medicine excluded 78 academic journals from MEDLINE. Therefore, it is necessary to publish the journal in a consistent manner and to maintain high-level research content, with full compliance with research, review, and publication ethics standards. After receiving permission for MEDLINE listing, there was an additional process for maintaining eligibility. The LSTRC recommended clarifying the following points to improve the standing of the journal: the credentials of editorial board members, the role of editors, the type of peer review including single- or double-blind review, the process of handling editors' manuscripts, and the procedure for dealing with complaints or appeals. All recommendations were addressed after adding appropriate policies and instructions in the journal web site and the print version. Furthermore, documentation of institutional review board approval should be uploaded during the submission period for studies with human subjects to maintain compliance with research ethics. Funding statements and acknowledgments should also be separately described to clarify the funding more lucidly.

Conclusion

To be listed in MEDLINE and to maintain the listing, a journal must publish high-level research conducted through ethical processes. A fair and professional review process is required to guarantee a certain level of ethics and quality of each article. This may be considered to be the minimum requirement for all medical journals. The continuing effort to be listed in MEDLINE was worthwhile to pursue, and the application process to MEDLINE provides a good incentive to promote a journal to top-tier status. The application process also provided me with an excellent opportunity to see the journal's performance more precisely.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Reviewing a journal article with clarity and politeness: key language tips for non-native English-speaking reviewers

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Abstract

One of the important responsibilities of peer review in academic publishing is to help authors improve the quality of their manuscripts by providing clear, constructive comments that are neither unpleasant nor disparaging. However, non-native English-speaking reviewers sometimes have difficulties in complementing or criticizing with clarity. It can also be difficult for reviewers to write appropriate and inter-culturally sensitive reviews. Thus, the goal of this paper is to help reviewers (and authors) improve clarity and achieve politeness in their writing. This paper focuses on understanding information structure (how information is generally arranged in a given context), cohesion (how ideas or sentences are connected), and emphasis (how to control emphasis with sentence structure or linguistic devices); it also introduces various politeness strategies for writing compliments and mitigating criticisms. The specific strategies include the use of conditionals, hedging, and pairing good news and bad news. Examples of effective and ineffective reviewer comments and cases of potential miscommunication that might occur between reviewers and authors are also presented. Developing skills to write peer review comments more clearly and politely enhances communication between reviewers and authors, which in turn further improves the journal's overall quality.

Keywords

Peer review; Clarity; Politeness; Information structure; Cohesion

Introduction

Journals are well aware that clear communication between the reviewers and authors is indispensable for successful manuscript publication. Sometimes communication fails because the author's main points were not expressed clearly in the paper, or because a reviewer's comments were not clear to the authors. Thus, improving clarity is an important issue for both authors and reviewers [1]. In addition, while non-native English-speaking (NNES) reviewers may have good intentions and a thorough understanding of their role as a reviewer, they may not be fully aware of common sociolinguistic norms in English. They may use inappropriate expressions

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or tone in their reviews, inadvertently offending or confusing the authors [2,3]. By strategically employing the strategies that are introduced in this paper, NNES authors and reviewers can improve their communication skills.

Improve Clarity

Writing with clarity is crucial for effective communication between reviewers and authors, but challenging to both. Authors endeavor to make their content easy to understand so that reviewers and readers clearly grasp the intended meaning, and reviewers strive to write their comments clearly so that authors know exactly what the reviewers expect to be revised or clarified. The following are some tips that could help writers and reviewers improve clarity in their writing.

Choose verbs carefully

When conveying a message in English, carefully chosen verbs affect the intended meaning [4]. To achieve the desired effect, NNES writers and reviewers are encouraged to examine the verbs closely (a dictionary can also be helpful) for specific meanings and nuances. Depending on the writer's intention (which is indicated in parentheses for the following examples), the appropriate verb should be selected, for instance: 1) Hyland (2017) *implies* (suggests indirectly) that other historians have misinterpreted the period; 2) Smith (2019) *claims* (firmly states that something is true; when used in the third person, this suggests that others may disagree with the statement) that the causes of Brexit are mainly economic.

Based on a thorough understanding of the relevant nuances, verb choice can also control the strength of claims. Below are two examples with the stronger verbs italicized: 1) The results indicate/*establish* that there is a link between smoking and lung cancer; 2) The test results *confirm*/suggest diagnosis and guide treatment.

Understand information structure

Information structure refers to how information is expected to be arranged in a given context [5] and cannot be approached intuitively by those who are from a different culture. Thus, NNES writers and reviewers must try to understand how information structure works in English because careful use of information structure in ways that naturally align with the readers' expectations increases readability and enables readers to better understand the author's intended meaning [6].

In this section, I will introduce three basic principles of information structure in English. First, important information is usually placed in the main clause instead of a subordinate clause. Second, new or important information is usually placed at the end of a sentence. For instance, consider these

two examples that convey the same message: 1) This study examined the relationship between A and B; 2) The relationship between A and B was examined in this study. Even though neither of these examples contains a grammatical error, example 1) is preferred. When summarizing or identifying the purpose of a research paper, some NNES writers or reviewers may think that placing "the relationship between A and B" at the beginning of a sentence would be more effective because the information would get more attention in the subject position. In English, however, information placed at the end of a sentence receives more attention. Third, long and complex information is placed at the end of a sentence. An author may write, "That most purposes can be more easily served through a group rather than through individual effort is a common assumption," or "A common assumption is that most purposes can more easily be served through a group rather than through individual effort." The reader will find the second of these two options easier to read. Placing long and complex information in the subject position of a sentence is usually less effective because in English, readers expect to see the main verb earlier in the sentence rather than later.

Achieve cohesion

Cohesion, which refers to how sentences or ideas are joined together, helps readers better understand the information flow. An important principle of information structure that helps achieve cohesion is the "given before new" principle, according to which given or familiar information is placed before new information [7]. By first providing readers information that they already know, it becomes easier for them to connect the familiar information to the newly introduced information that follows. This point is exemplified by the following two examples: 1) Nancy spends her Saturday nights at Sweet Bakery. Mr. Smith owns the bakery. He has been making pastries the French way since opening the bakery in 1995; 2) Nancy spends her Saturday nights at Sweet Bakery. The bakery is owned by Mr. Smith. He opened the shop in 1995 and has been making pastries the French way ever since. Although there are no grammatical errors in the examples above, native English speakers generally agree that due to the "given before new" principle, example 2) flows better. In example 2), the new information (Sweet Bakery) in the first sentence becomes given information, as expressed through the synonym that immediately follows (the bakery). Thus, example 2) is easier for native speakers to process than example 1), in which new information (Sweet Bakery) is followed with other new information (Mr. Smith).

Cohesion can also be achieved by using demonstrative pronouns [8]. Demonstrative pronouns such as *it*, *this*, *these*, or *those* are common linguistic tools used to connect sentences.

NNES authors and reviewers sometimes have difficulties choosing an appropriate pronoun as an effective connector. The following two basic principles clarify their usage: 1) If only a word or a phrase is being referred to in the following sentence, use *it*. 2) To refer to the entire content of the previous sentence(s), use *this*. Here is a sentence that can be used as an exercise: “Dating back to only the late 19th century, electrical engineering is one of the newer branches of engineering. (*This/It*) is the branch that deals with the technology of electricity.” The corresponding antecedent for *this* or *it* appears to be a phrase (electrical engineering). Thus, the appropriate transitional pronoun should be *it*. Here is another sentence for an exercise: “When first waking from anesthesia, you may feel confused, drowsy, and foggy. (*This/It*) usually lasts for just a few hours, but for some people, confusion can last for days or weeks.” Since the entire content of the previous sentence serves as the antecedent, the appropriate transitional pronoun should be *this*.

The use of pronouns such as *this* or *that* can be effective when it is clear what the writer or the reviewer is referring to, but using these connectors alone can sometimes be confusing to the readers. A possible way to avoid this confusion is to use *this (or these)+summary word* or *this (or these)+interpretive word*, as shown in the following examples: 1) The Faculty-Training Program Assessment site provides information about ENGG 101 assessment including its goals and rubrics, sample scoring, and assessment results. Beginning fall semester 2020, we will be assessing student work in ENGG 101. This *assessment* will be divided into three phases; 2) In recent years, the number of students applying to medical schools has increased steadily, while the number of places available has remained constant. This *situation* has resulted in intense competition for admission; 3) Data shows that incidence and mortality from tuberculosis have dropped tremendously over the last 50 years. This *improvement* can be attributed to enhanced access to health care services. A keyword that was used in the previous sentence(s), can be repeated (example 1); the whole message expressed in the previous sentence(s) can be summarized in one word (example 2); or the author’s attitude can be reflected by using an “interpretive word” (example 3).

Create emphasis

There are various ways to add emphasis to writing. One useful tip is to use an isolation strategy. When a transitional expression such as *however* or *therefore* appears between a subject and a verb, the subject inevitably receives more emphasis by being isolated from the rest of the sentence. Various linguistic devices such as *in regard to*, *as to*, or *so far as X is concerned* can also be used to isolate the word(s) that need emphasis. Here are some examples: 1) To become a board-certified

physician, one must complete a medical degree, and thereafter follow it up with a residency program. The path to becoming a physician, *however*, begins with earning a bachelor’s degree from an accredited university or college; 2) *In regard to heroes*, John says there are two kinds. The emphasis is placed on the phrase “*the path to becoming a physician*” in example 1) and on the word “*heroes*” in example 2).

Writers can even control different degrees of emphasis by using sentence structure strategically [9]. In the following examples, the same ideas are conveyed using different sentence structures. One particular sentence, however, can be selected over the others depending on the writer’s intended degree of emphasis. In a situation where an author wants to emphasize the information that the children were excited, the following options are available, arranged from the strongest to the weakest: 1) The children were excited. They could not contain themselves; 2) The children were excited, and they could not contain themselves; 3) Because the children were excited, they could not contain themselves; 4) The children, being excited, could not contain themselves; 5) The children, in excitement, could not contain themselves. The information that is intended to be emphasized (the children were excited) receives the strongest emphasis when it is included in a full sentence with no other information (example 1). The information receives the next strongest emphasis when it is presented in a compound sentence (example 2), where two ideas are presented in one sentence; the information obviously receives less emphasis in a compound sentence because the reader has to process two ideas instead of only one. The information receives the third strongest emphasis when it appears in a subordinate clause (example 3) of a complex sentence. In English, a subordinate clause is a dependent clause, and so it receives less emphasis than the main clause. The information receives the fourth strongest emphasis in a participial phrase (being excited), which originates from a verb (example 4). The information receives the weakest emphasis in a prepositional phrase (example 5). As can be seen in the examples above, the writer can control the degree of emphasis by employing different sentence structures in a given context.

Achieve Politeness

Being aware of how to complement and criticize in the appropriate manner (using politeness strategies) can help avoid unnecessary miscommunication between reviewers and authors. In order to optimize effective communication between reviewers and authors, some useful tips on politeness strategies are introduced [10], and corresponding examples of common English phrases and expressions are provided.

Avoid the second-person pronoun

As a general rule, the second-person pronoun *you* should be avoided in academic writing. Similarly, it is preferable for reviewers not to address the author directly using *you*, which is a command form in English. Here are some examples to compare: 1) “*You* need to include ...”; 2) “*This paper/The manuscript/The author* needs to include ...” If reviewers continue to use *you* to refer to the author (example 1) for each item requiring revision, the author may feel scolded. Using third-person terms instead, such as *this paper/the manuscript/the author* (example 2), helps make the comments sound more objective and less personal.

Use conditionals

Conditionals can soften criticism. For example, a reviewer might say, 1) “You need to include more recent literature to support your views,” or 2) “The discussion would have been somewhat more relevant if the paper had included more recent literature to support the author’s views.” The first example may sound too direct and imply that the reviewer’s comments are absolutely correct, which might generate a hostile reaction from the author. However, when conditionals are used, as in the second example, the criticism becomes softer and tends to convey much lighter dissatisfaction.

Use good news and bad news together

Giving and receiving criticism is difficult for both reviewers and authors. Instead of only offering criticism, including both good news and bad news together in a sentence could mitigate the negative impact of criticism, and the author might be more inclined to have room to accept the criticism with a positive attitude. When good news and bad news are presented together, a reviewer needs to choose whether to offer the good news or the bad news first, and this choice should be based on the reviewer’s intent and the principles of information structure. Compare the following pair of examples: 1) This study is an important contribution and warrants swift publication, but some points need attention; 2) Some points need attention, but this study is an important contribution and warrants swift publication.

Based on the “end-placement” principle, the emphasis is placed on the second point in each example. In example 1) negative aspects (*some points need attention*) receive more attention, whereas in example 2) the positive aspects (*this study is an important contribution and warrants swift publication*) receive more attention. Understanding this principle regarding where to put good news and bad news to achieve the intended effect also shapes the possible types of messages that can follow in the subsequent sentence. If a reviewer plans to add more specific criticisms, it would be preferable to use ex-

ample 1) above, which ends with bad news, thereby building a more effective connection to the specific criticisms that follow.

Use hedging

In academic settings, it is often considered professional for authors (and reviewers) to avoid making categorical statements or claims and to take a prudent and cautious approach, which is known as hedging [11]. Various hedging devices can be used to indicate degrees of uncertainty, and they are often used as politeness strategies. Some examples of these hedging devices are introductory verbs (e.g., seem, tend, appear to be, believe), modal auxiliary verbs (e.g., would, may, could), frequency adverbs (e.g., often, sometimes), probability adverbs (e.g., unlikely, probably). The following examples present some suggestions for using hedging expressions to soften common reviewer comments. One common comment, “The topic of the manuscript *is inappropriate* for the scope of this journal,” can be revised as “The topic of this manuscript *seems somewhat inappropriate* for the scope of this journal” or “The topic of the manuscript *may not be entirely appropriate* for this journal.” Another frequently found comment, “There is already considerable research in this area,” could be revised as “*To the best of my knowledge*, there is already considerable research in this area” or “*To our knowledge*, there is already considerable research in this area.”

Conclusion

Effective communication between authors and reviewers is very important in improving the quality of a journal. The overall impression an author receives of a journal is sometimes determined by the reviewer’s comments to their submission. In order to optimize effective communication, it is crucial for NRES reviewers to be clear and polite when writing comments. Reviewers can achieve better clarity by understanding how to position words and phrases within and between sentences and how to make transitions and place emphasis effectively. To avoid unnecessary miscommunication, it is also essential to be aware of the socio-pragmatic knowledge embedded in English. Offering regular training to reviewers should contribute to improving communication between authors and reviewers, and this, in turn, will ultimately advance the quality of a journal.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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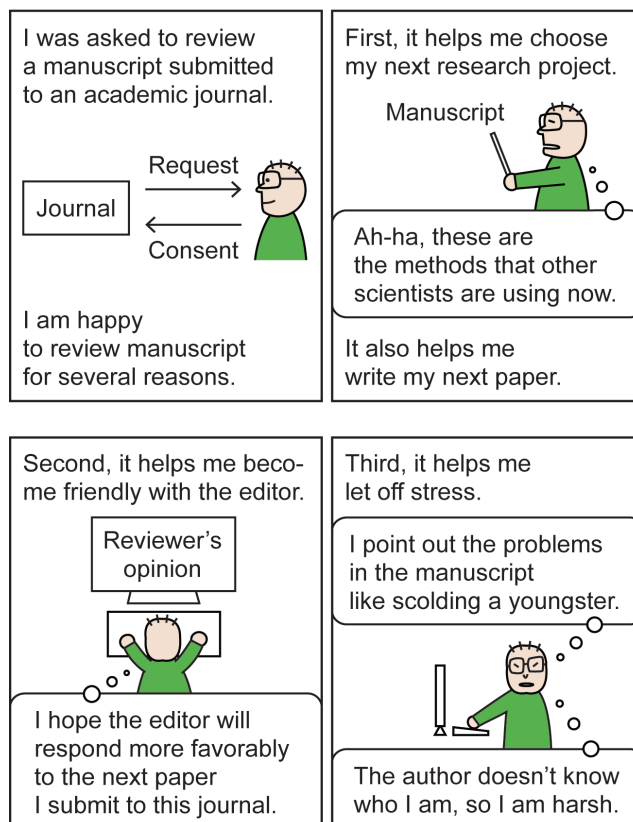
Volunteering as a reviewer

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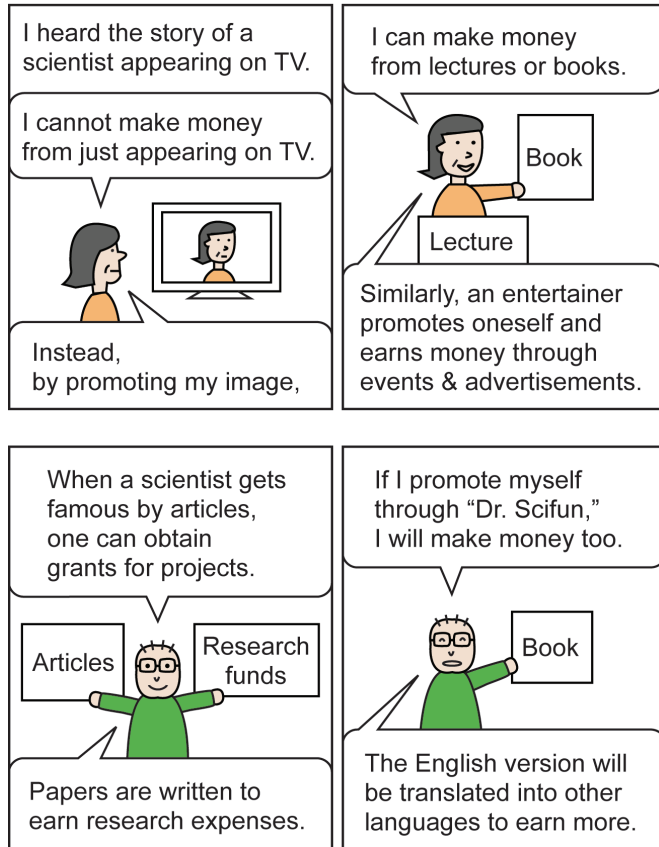
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Another reason why I review articles is that it is an honor to do so. Only well-acknowledged scientists are given the opportunity to serve as reviewers. Therefore, scientists usually agree to review articles unless they have a specific reason not to do so. It is worthwhile even if the reviewers are not paid by the journal or appreciated by the authors of the articles.

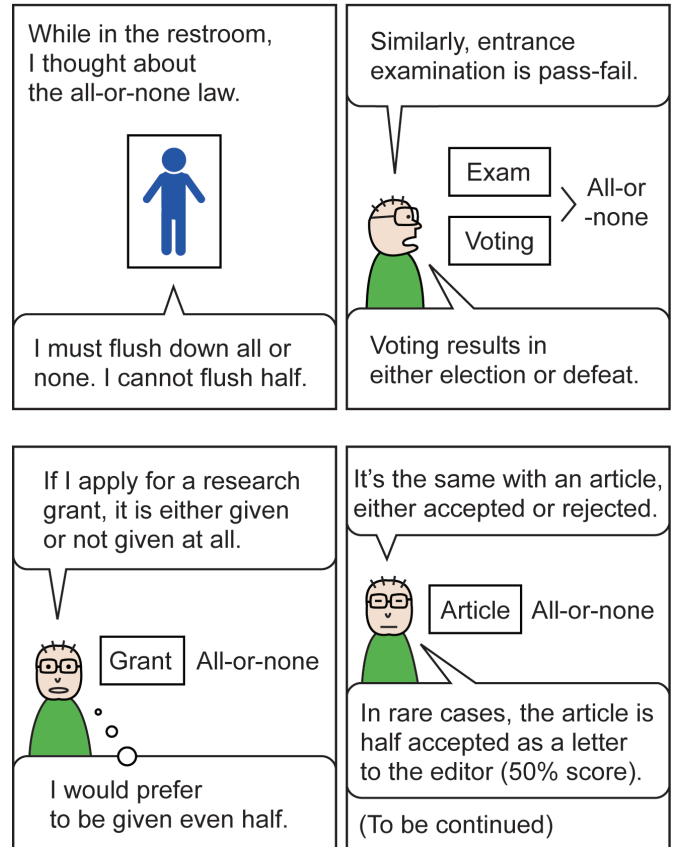
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Popularity and money



Dr. Scifun MS Chung (anatomy.co.kr)

All-or-none 1/2

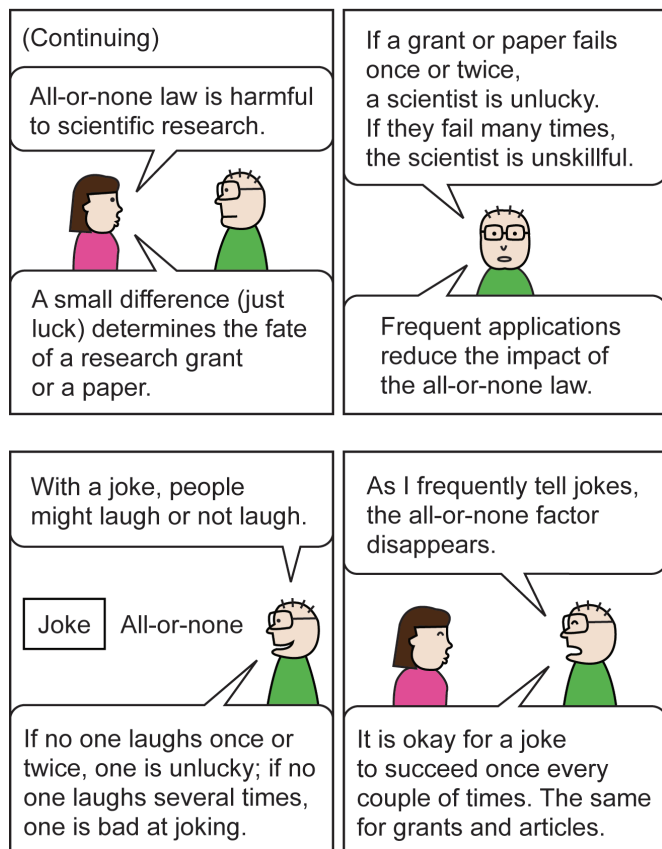


Unlike what the fourth frame of the comic strip implies, it is not easy to earn money by publishing a comic book. In my case, I submitted a book proposal for my English comic book to major American publishing companies and it was rejected. Therefore, I partnered with a Korean publishing company and we published an English comic book. However, we have not had much success selling the book. Nonetheless, I have not given up and I keep on trying. The harder it is to succeed, the more I am motivated.

"All-or-none" is an important law in electrophysiology. Electrophysiologists explain this concept using example like flushing a toilet. This is where I got the idea for drawing this comic strip. The all-or-none law is found in many places around us. For an example, it is common in Korea that one person pays the entire bill after a group of people have lunch (or dinner) together.

Dr. Scifun MS Chung (anatomy.co.kr)

All-or-none 2/2



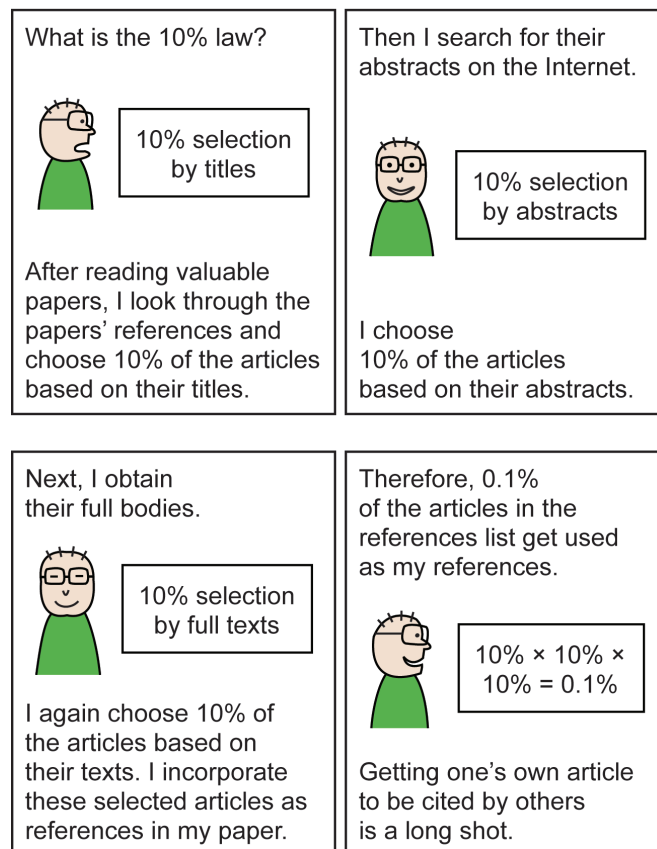
The comic strips I draw may be low-quality, but I draw a lot of them, which makes them valuable. Not all comic strips can be funny. If 1 out of 3 is funny, it is not a bad batting average. The more I draw, the more possibilities I have for making my readers laugh. Sometimes quantity matters.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Dr. Scifun MS Chung (anatomy.co.kr)

The 10% law of article



A scientist expects other scientists to read his or her articles. In order for this to happen, the title is very important as the first impression. One aspect of an attractive title is being neat and concise. It is like the sign of a store or the brand name of a company.

Acknowledgments

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Instructions to Authors

Enacted January 1, 2014

1st revised August 20, 2018

Recently revised February 20, 2019

1. General information

Science Editing (Sci Ed) is the official journal of the Korean Council of Science Editors (KCSE) and Council of Asian Science Editors (CASE). Anyone who would like to submit a manuscript is advised to carefully read the aims and scope section of this journal. Manuscripts should be prepared for submission to *Science Editing* according to the following instructions. For issues not addressed in these instructions, the author is referred to the International Committee of Medical Journal Editors (ICMJE) "Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals" (<http://www.icmje.org>). It also adheres completely to the Principles of Transparency and Best Practice in Scholarly Publishing (joint statement by COPE, DOAJ, WAME, and OASPA; <http://doaj.org/bestpractice>) if otherwise not described below.

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A submitted manuscript, when published, will become the property of the journal. Copyrights of all published materials are owned by KCSE. The Creative Commons Attribution License available from: <http://creativecommons.org/licenses/by/4.0/> is also in effect.

3. Research and publication ethics

The journal adheres to the ethical guidelines for research and publication described in Guidelines on Good Publication (<http://publicationethics.org/resources/guidelines>) and the ICMJE Guidelines (<http://www.icmje.org>).

1. Authorship

Authorship credit should be based on 1) substantial contributions to conception and design, acquisition of data, and/or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; 3) final

approval of the version to be published; and 4) agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Every author should meet all of these four conditions. After the initial submission of a manuscript, any changes whatsoever in authorship (adding author(s), deleting author(s), or re-arranging the order of authors) must be explained by a letter to the editor from the authors concerned. This letter must be signed by all authors of the paper. Copyright assignment must also be completed by every author.

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2. Originality, plagiarism and duplicate publication

Submitted manuscripts must not have been previously published or be under consideration for publication elsewhere. No part of the accepted manuscript should be duplicated in any other scientific journal without the permission of the Editorial Board. Submitted manuscripts are screened for possible plagiarism or duplicate publication by Similarity Check upon arrival. If plagiarism or duplicate publication is detected, the manuscripts may be rejected, the authors will be announced in the journal, and their institutions will be informed. There will also be penalties for the authors.

A letter of permission is required for any and all material that has been published previously. It is the responsibility of the author to request permission from the publisher for any material that is being reproduced. This requirement applies to text, figures, and tables.

3. Secondary publication

It is possible to republish manuscripts if the manuscripts satisfy the conditions of secondary publication of the ICMJE Recommendations (http://www.icmje.org/urm_main.html).

4. Conflict of interest statement

The corresponding author must inform the editor of any potential conflicts of interest that could influence the authors' interpretation of the data. Examples of potential conflicts of interest are financial support from or connections to companies, political pressure from interest groups, and academically related issues. In particular, all sources of funding applicable to the study should be explicitly stated.

5. Statement of human and animal right

Clinical research should be done in accordance of the Ethical Principles for Medical Research Involving Human Subjects, outlined in the Helsinki Declaration of 1975 (revised 2013), available from: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>. Clinical studies that do not meet the Helsinki Declaration will not be considered for publication. Human subjects should not be identifiable, such that patients' names, initials, hospital numbers, dates of birth, or other protected health-care information should not be disclosed. For animal subjects, research should be performed based on the National or Institutional Guide for the Care and Use of Laboratory Animals, and the ethical treatment of all experimental animals should be maintained.

6. Statement of informed consent and institutional review board approval

Copies of written informed consent documents should be kept for studies on human subjects, which includes identifiable information or sensitive information. For clinical studies of human subjects, a certificate, agreement, or approval by the Institutional Review Board (IRB) of the author's institution is required. If necessary, the editor or reviewers may request copies of these documents to resolve questions about IRB approval and study conduct.

7. Process for managing research and publication misconduct

When the journal faces suspected cases of research and publication misconduct such as redundant (duplicate) publication, plagiarism, fraudulent or fabricated data, changes in authorship, an undisclosed conflict of interest, ethical problems with a submitted manuscript, a reviewer who has appropriated an author's idea or data, complaints against editors, and so on, the resolution process will follow the flowchart provided by the Committee on Publication Ethics ([\[ethics.org/resources/flowcharts\]\(http://publication-ethics.org/resources/flowcharts\)\). The discussion and decision on the suspected cases are carried out by the Editorial Board.](http://publication-</p></div><div data-bbox=)

8. Process for handling cases requiring corrections, retractions, and editorial expressions of concern

Cases that require editorial expressions of concern or retraction shall follow the COPE flowcharts available from:<http://publicationethics.org/resources/flowcharts>. If correction needs, it will follow the ICMJE Recommendation for Corrections, Retractions, Republications and Version Control available from:<http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/corrections-and-version-control.html> as follows:

Honest errors are a part of science and publishing and require publication of a correction when they are detected. Corrections are needed for errors of fact. Minimum standards are as follows: First, it shall publish a correction notice as soon as possible detailing changes from and citing the original publication on both an electronic and numbered print page that is included in an electronic or a print Table of Contents to ensure proper indexing; Second, it shall post a new article version with details of the changes from the original version and the date(s) on which the changes were made through Crossmark; Third, it shall archive all prior versions of the article. This archive can be either directly accessible to readers; and Fourth, previous electronic versions shall prominently note that there are more recent versions of the article via Crossmark.

9. Editorial responsibilities

The Editorial Board will continuously work to monitor and safeguard publication ethics: guidelines for retracting articles; maintenance of the integrity of the academic record; preclusion of business needs from compromising intellectual and ethical standards; publishing corrections, clarifications, retractions, and apologies when needed; and excluding plagiarism and fraudulent data. The editors maintain the following responsibilities: responsibility and authority to reject and accept articles; avoiding any conflict of interest with respect to articles they reject or accept; promoting publication of corrections or retractions when errors are found; and preservation of the anonymity of reviewers.

4. Author qualifications, language requirement, and reporting guideline

1. Author qualifications

Any researcher throughout the world can submit a manuscript if the scope of the manuscript is appropriate.

2. Language

Manuscripts should be submitted in good scientific English.

3. Reporting guidelines for specific study designs

Research reports frequently omit important information. As such, reporting guidelines have been developed for a number of study designs that some journals may ask authors to follow. Authors are encouraged to also consult the reporting guidelines relevant to their specific research design. A good source of reporting guidelines is the EQUATOR Network (<http://www.equator-network.org/home/>) and the United States National Institutes of Health/National Library of Medicine (http://www.nlm.nih.gov/services/research_report_guide.html).

5. Submission and peer review process

1. Submission

All manuscripts should be submitted via e-submission system available from: <https://submit.escienceediting.org/>. If any authors have difficulty in submitting via e-submission system, please send a manuscript to kcse@kcse.org by the corresponding author.

2. Peer review process

Science Editing reviews all manuscripts received. A manuscript is first reviewed for its format and adherence to the aims and scope of the journal. If the manuscript meets these two criteria, it is checked for plagiarism or duplicate publication with Similarity Check. After confirming its result, it is dispatched to three investigators in the field with relevant knowledge. Assuming the manuscript is sent to reviewers, *Science Editing* waits to receive opinions from at least two reviewers. In addition, if deemed necessary, a review of statistics may be requested. The authors' names and affiliations are removed during peer review (double-blind peer review). The acceptance criteria for all papers are based on the quality and originality of the research and its scientific significance. Acceptance of the manuscript is decided based on the critiques and recommended decision of the reviewers. An initial decision will normally be made within 4 weeks of receipt of a manuscript, and the reviewers' comments are sent to the corresponding author by e-mail. The corresponding author must indicate the alterations that have been made in response to the reviewers' comments item by item. Failure to resubmit the revised manuscript within 4 weeks of the editorial decision is regarded as a withdrawal. If further revision period is required, author should contact editorial office through form mail available from: <https://www.escienceediting.org/about/contact.php>. A final decision on acceptance/rejection for publication is forwarded to the corresponding author from the editor.

3. Peer review process for handling submissions from editors, employees, or members of the editorial board

All manuscripts from editors, employees, or members of the editorial board are processed same to other unsolicited manuscripts. During the review process, submitters will not engage in the selection of reviewers and decision process. Editors will not handle their own manuscripts although they are commissioned ones.

6. Manuscript preparation

1. General requirements

- The main document with manuscript text and tables should be prepared in an MS Word (docx) or RTF file format.
- The manuscript should be double spaced on 21.6 × 27.9 cm (letter size) or 21.0 × 29.7 cm (A4) paper with 3.0 cm margins at the top, bottom, right, and left margin.
- All manuscript pages are to be numbered at the bottom consecutively, beginning with the abstract as page 1. Neither the author's names nor their affiliations should appear on the manuscript pages.
- The authors should express all measurements according to International System (SI) units with some exceptions such as seconds, mmHg, or °C.
- Only standard abbreviations should be used. Abbreviations should be avoided in the title of the manuscript. Abbreviations should be spelled out when first used in the text—for example, extensible markup language (XML)—and the use of abbreviations should be kept to a minimum.
- The names and locations (city, state, and country only) of manufacturers should be given.
- When quoting from other sources, a reference number should be cited after the author's name or at the end of the quotation.

Manuscript preparation is different according to the publication type, including original articles, reviews, case studies, essays, training materials, editorials, book reviews, correspondence, and video clips. Other types are also negotiable with the Editorial Board.

2. Original articles

Original articles are reports of basic investigations. The manuscript for an original article should be organized in the following sequence: title page, abstract and keywords, main text (introduction, methods, results, and discussion), conflict of interest, acknowledgments, references, tables, figure legends, and figures. The figures should be received as separate files. Maximum length: 2,500 words of text (not including the ab-

stract, tables, figures, and references) with no more than a total of 10 tables and/or figures.

- **Title page:** The following items should be included on the title page: 1) the title of the manuscript, 2) author list, 3) each author's affiliation, 4) the name and e-mail address of the corresponding author, 5) when applicable, the source of any research funding and a list of where and when the study has been presented in part elsewhere, and 6) a running title of fewer than 50 characters.
- **Abstract and keywords:** The abstract should be concise content of equal to or less than 250 words in an structured format including purpose, methods, results, and conclusion. Abbreviations or references are not allowed in the abstract. Up to 5 keywords should be listed at the bottom of the abstract to be used as index terms.
- **Introduction:** The purpose of the investigation, including relevant background information, should be described briefly. Conclusion should not be included in the Introduction.
- **Methods:** The research plan, materials (or subjects), and methods used should be described in that order. The names and locations (city, state, and country only) of manufacturers of equipment and software should be given. Methods of statistical analysis and criteria for statistical significance should be described.
- **Results:** The results should be presented in logical sequence in the text, tables, and figures. If resulting parameters have statistical significance, P-values should be provided, and repetitive presentation of the same data in different forms should be avoided. The results should not include material appropriate for the discussion.
- **Discussion:** Observations pertaining to the results of the research and other related work should be interpreted for readers. New and important observations should be emphasized rather than merely repeating the contents of the results. The implications of the proposed opinion should be explained along with its limits, and within the limits of the research results, and the conclusion should be connected to the purpose of the research. In a concluding paragraph, the results and their meaning should be summarized.
- **ORCID (Open Researcher and Contributor ID):** ORCID of all authors should be described.
- **Conflict of interest:** Any potential conflict of interest that could influence the authors' interpretation of the data, such as financial support from or connections to companies, political pressure from interest groups, or academically related issues, must be stated.
- **Acknowledgments:** All persons who have made substantial contributions, but who have not met the criteria for authorship, are to be acknowledged here. All sources of

funding applicable to the study should be stated here explicitly.

- **Appendix:** If any materials are not enough to be included in the main text such as questionnaires, they can be listed in the Appendix.
- **Supplementary materials:** If there are any supplementary materials to help the understanding of readers or too great amount data to be included in the main text, it may be placed as supplementary data. Not only text, audio or video files, but also data files should be added here.
- **References:** In the text, references should be cited with Arabic numerals in brackets, numbered in the order cited. In the references section, the references should be numbered and listed in order of appearance in the text. The number of references is limited to 20 for original articles. All authors of a cited work should be listed if there are six or fewer authors. The first three authors should be listed followed by "et al." if there are more than six authors. If a reference has a digital object identifier (DOI), it should be supplied. Other types of references not described below should follow *The NLM Style Guide for Authors, Editors, and Publishers* (<http://www.nlm.nih.gov/citingmedicine>).

Journal articles:

1. Jeong GH, Huh S. Update: Bibliometric analysis of publications from North Korea indexed in the Web of Science Core Collection from 1978 to July 2018. *Sci Ed* 2018;5:119-123. <https://doi.org/10.6087/kcse.135>
(In case number of authors is over 6)
2. Seo JW, Chung H, Seo TS et al. Equality, equity, and reality of open access on scholarly information. *Sci Ed* 2017;4:58-69. <https://doi.org/10.6087/kcse.97>

Books and book chapters:

3. Morris S, Barnas E, LaFrenier D, Reich M. *The handbook of journal publishing*. New York, NY: Cambridge University Press; 2013.
4. Cho HM, editor. *KOFST journals 2011*. Seoul: The Korean Federation of Science and Technology Societies; 2012. http://dx.doi.org/10.5082/Kofst_J_2011
5. Booth BA. Peer review. In: Coghill AM, Garson LR, editors. *The ACS style guide*. 3rd ed. New York, NY: Oxford University Press; 2006. p. 71-6.

Online sources:

6. Committee on Publication Ethics. Guidelines for retracting articles [Internet]. Committee on Publication Ethics; 2009 [cited 2013 Sep 20]. Available from: <http://publicationethics.org/files/retraction%20guidelines.pdf>
7. Testa J. *The Thomson Reuters journal selection process* [Internet]. Philadelphia, PA: Thomson Reuters; 2012 [cit-

ed 2013 Sep 30]. Available from: <http://wokinfo.com/esays/journal-selection-process/>

Conference papers:

8. Shell ER. Sex and the scientific publisher: how journals and journalists collude (despite their best intentions) to mislead the public. Paper presented at: 2011 CrossRef Annual Member Meeting; 2011 Nov 14-15; Cambridge, MA, USA.
9. Kim HW. Challenges and future directions on journal “perspectives in nursing science” in Korea. Poster session presented at: Asia Pacific Association of Medical Journal Editors Convention 2013; 2013 Aug 2-4; Tokyo, Japan.

Scientific and technical reports:

10. Kim SN, Park JR, Bae HS, et al. A study on the meta evaluation of Korean university evaluation. Seoul: Korean Educational Development Institute; 2004. Report No.: CR 2004-45.

News articles:

11. Kim R. SNU ranked 51st in university evaluation. Korean Times [Internet]. 2007 Nov 8 [cited 2013 Sep 25]. Available from: http://www.koreatimes.co.kr/www/news/nation/2007/11/117_13423.html

Dissertations:

12. Kim K. Quantum critical phenomena in superfluids and superconductors [dissertation]. Pasadena, CA: California Institute of Technology; 1991.

- **Tables:** Tables are to be numbered in the order in which they are cited in the text. A table title should concisely describe the content of the table so that a reader can understand the table without referring to the text. Each table must be simple and typed on a separate page with its heading above it. Explanatory matter is placed in footnotes below the tabular matter and not included in the heading. All non-standard abbreviations are explained in the footnotes. Footnotes should be indicated by ^{a)}, ^{b)}, ^{c)}, Statistical measures such as standard deviation (SD) or standard error (SE) should be identified. Vertical rules and horizontal rules between entries should be omitted.
- **Figures and legends for illustrations:** Figures should be numbered, using Arabic numerals, in the order in which they are cited. Each figure should be uploaded as a single image file in either uncompressed EPS, TIFF, PSD, JPEG, and PPT format over 600 dots per inch (dpi) or 3 million pixels (less than 6 megabytes). Written permission should be obtained for the use of all previously published illustrations (and copies of permission letters should be includ-

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3. Reviews

Reviews are invited by the editor and should be comprehensive analyses of specific topics. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), conflict interest, acknowledgments, references, tables, figure legends, and figures. There should be an unstructured abstract of no more than 200 words. The length of the text excluding references, tables, and figures should not exceed 5,000 words. The number of references is limited to 100.

4. Case studies

Case studies are intended to report practical cases that can be encountered during editing and publishing. Examples include interesting cases of research misconduct and publication ethics violations; experience of new and creative initiatives in publishing; and the history of a specific journal development. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), conflict interest, acknowledgments, references, tables, figure legends, and figures. There should be an unstructured abstract of 200 words maximum. The length of the text excluding references, tables, and figures should not exceed 2,500 words. The number of references is limited to 20.

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Essays are for the dissemination of the experience and ideas of editors for colleague editors. There is no limitation on the topics if they are related to editing or publishing. They are to be organized as follows: title page, main text (introduction, text, and conclusion), conflict interest, acknowledgments, references, tables, figure legends, and figures. The length of the text excluding references, tables, and figures should not exceed 2,500 words. The number of references is limited to 20.

6. Training materials

Training materials are for training editors or publishers. If there are new standards, policies, technologies, guidelines or trends, they can be submitted for training editors or publishers. It may be unsolicited or commissioned. This publication type will be able to provide the practical information for the journal advancement. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), conflict interest, acknowledgments, references, tables, figure legends, and figures. There should be an unstructured abstract of 200 words maximum. The length of the text excluding references, tables, and figures should not exceed 2,500 words. The number of references is limited to 20.

7. Editorials

Editorials are invited by the editor and should be commentaries on articles published recently in the journal. Editorial topics could include active areas of research, fresh insights, and debates in all fields of journal publication. Editorials should not exceed 1,000 words, excluding references, tables, and figures. References should not exceed 10. A maximum of 3 figures including tables is allowed.

8. Book reviews

Book reviews are solicited by the editor. These will cover recently published books in the field of journal publication. The format is same as that of Editorials.

9. Correspondence

Correspondence (letters to the editor) may be in response to a published article, or a short, free-standing piece expressing an opinion. Correspondence should be no longer than 1,000 words of text and 10 references.

In reply: If the Correspondence is in response to a published article, the Editor-in-Chief may choose to invite the article's authors to write a Correspondence Reply. Replies by authors should not exceed 500 words of text and 5 references.

10. Video clips

Video clips can be submitted for placement on the journal website. All videos are subject to peer review and must be sent directly to the editor by e-mail. A video file submitted for consideration for publication should be in complete and final format and at as high a resolution as possible. Any editing of the video will be the responsibility of the author. *Science Editing* accepts all kinds of video files not exceeding 30 MB and of less than 5 minutes duration, but Quicktime, AVI, MPEG, MP4, and RealMedia file formats are recommended. A legend to accompany the video should be double-spaced in a separate file. All copyrights for video files after acceptance of the main article are automatically transferred to *Science Editing*.

11. Commissioned or unsolicited manuscripts

Unsolicited manuscript with publication types of original articles, case studies, essays, training materials, video clips, and correspondence can be submitted. Other publication types are all commissioned or invited by the Editorial Board.

Table 1 shows the recommended maximums of manuscripts according to publication type; however, these requirements are negotiable with the editor.

Table 1. Recommended maximums for articles submitted to *Science Editing*

Type of article	Abstract (word)	Text (word) ^{a)}	References	Tables & figures
Original article	250	2,500	20	10
Review	200	5,000	100	No limits
Case study	200	2,500	20	10
Training material	200	2,500	20	10
Essay	No	2,500	20	10
Editorial	No	1,000	10	3
Book review	No	1,000	10	3
Correspondence	No			
Letter to the editor	-	1,000	10	3
In reply	-	500	5	3
Video clip	No	30 MB, 5 min	-	-

^{a)}Maximum number of words is exclusive of the abstract, references, tables, and figure legends.

7. Final preparation for publication

1. Final version

After the paper has been accepted for publication, the author(s) should submit the final version of the manuscript. The names and affiliations of the authors should be double-checked, and if the originally submitted image files were of poor resolution, higher resolution image files should be submitted at this time. Color images must be created as CMYK files. The electronic original should be sent with appropriate labeling and arrows. The EPS, TIFF, Adobe Photoshop (PSD), JPEG, and PPT formats are preferred for submission of digital files of photographic images. Symbols (e.g., circles, triangles, squares), letters (e.g., words, abbreviations), and numbers should be large enough to be legible on reduction to the journal's column widths. All of the symbols must be defined in the figure caption. If the symbols are too complex to appear in the caption, they should appear on the illustration itself, within the area of the graph or diagram, not to the side. If references, tables, or figures are moved, added, or deleted during the revision process, they should be renumbered to reflect such changes so that all tables, references, and figures are cited in numeric order.

2. Manuscript corrections

Before publication, the manuscript editor may correct the manuscript such that it meets the standard publication format. The author(s) must respond within 2 days when the editor

contacts the author for revisions. If the response is delayed, the manuscript's publication may be postponed to the next issue.

3. Galley proof

The author(s) will receive the final version of the manuscript as a PDF file. Upon receipt, within 2 days, the editorial office (or printing office) must be notified of any errors found in the file. Any errors found after this time are the responsibility of the author(s) and will have to be corrected as an erratum.

8. Page charges or article processing charges

No page charge or article processing charge applies. There is also no submission fee.

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NOTICE: These instructions to authors will be applied beginning with the February 2019 issue.

Compliance of *Science Editing* to the Principles of transparency and best practice in scholarly publishing

(joint statement by COPE, DOAJ, WAME, and OASPA; <http://doaj.org/bestpractice>)

Posted in July 7, 2018 and printed in February 20, 2019

1. Website:

- i. The URL address of official journal web site: <https://www.escienceediting.org/>
- ii. 'Aims & Scope' statement: It is described at the masthead page.
- iii. Readership: It is primarily for scientific journal editors and personnels who works for scientific journals. Its readership can be expanded to other positions: Researchers on journal publishing and bibliometrics can get the recent topics of journal publishing and editing; Professors on communication can access and adopt a variety of data for education; Students can understand the recent trends of the journal publishing and editing; Policy makers are able to reflect the results of the articles to the nation-wide science promotion policies; The scientists are able to read the advancement in the journal to be submitted so that they have a better knowledge on the journal selection.
- iv. Authorship criteria: It is described at the Instructions to authors.
- v. Duplicate submission and redundant publication: It is described at the Instructions to authors.
- vi. pISSN: 2288-7474 eISSN; 2588-8063

2. Name of journal

The official journal title is *Science Editing*. Abbreviated title is Sc Ed.

3. Peer review process

It is described at the Instructions to authors. We adopts double-blind peer review.

4. Ownership and management

- i. Information about the ownership: This journal is owned by the publisher, the Korean Council of Science Editors (<https://www.kcse.org/>).
- ii. Management team of a journal
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- Journal Manager: Kihong Kim, Ajou University, Korea
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- Ethics Editor: Cheol-Heui Yun, Seoul National University, Korea
- Statistics Editor: Yong Gyu Park, The Catholic University of Korea, Korea
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- Website and JATS XML File Producers: Minyoung Choi M2community, Korea; Jeonghee Im, M2community, Korea
- Administrative Manager: Jisoo Yoon, Korean Council of Science Editors, Korea

5. Governing body

The governing body is the journal's editorial board.

6. Editorial team and contact information

- i. Editorial team is available from Editorial Board page at the front part of the journal.
- ii. Contact information
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 - Administrative Manager
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8. Author fees

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9. Process for the identification of and dealing with allegations of research misconduct

When the journal faces suspected cases of research and publication misconduct such as redundant (duplicate) publication, plagiarism, fraudulent or fabricated data, changes in authorship, an undisclosed conflict of interest, ethical problems with a submitted manuscript, a reviewer who has appropriated an author's idea or data, complaints against editors, and so on, the resolution process will follow the flowchart provided by the Committee on Publication Ethics (<http://publicationethics.org/resources/flowcharts>). The discussion and decision on the suspected cases are carried out by the Editorial Board.

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ii. How the journal will handle complaints and appeals; The policy of the journal is primarily aimed at protecting the authors, reviewers, editors, and the publisher of the journal. If not described below, the process of handling complaints and appeals follows the guidelines of the Committee of Publication Ethics available from: <https://publicationethics.org/appeals>

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