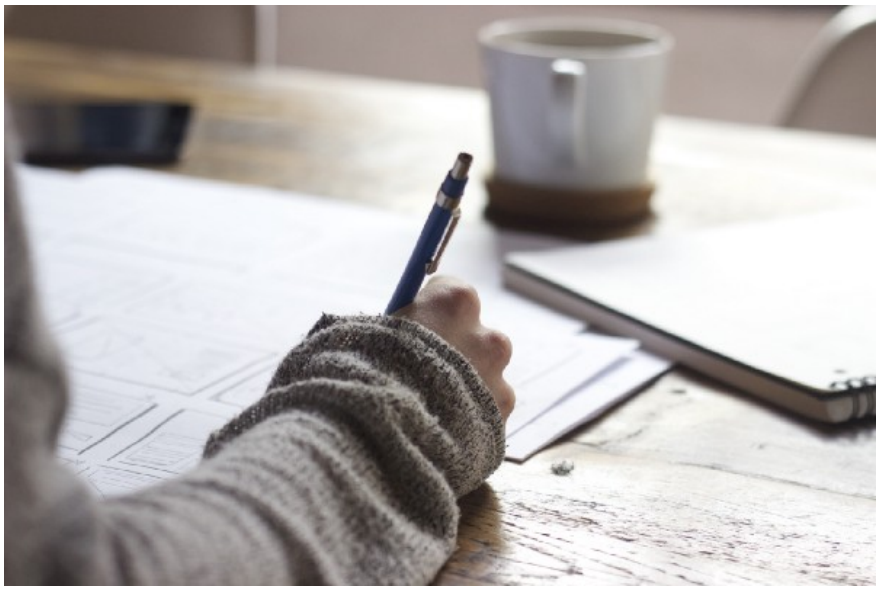
Kaveh Bakhtiyari
PhD Candidate in Artificial Intelligence | Data Scientist (Bakhtiyari.com)
Jun 20 · 18 min read

Does academic publishing require a significant reshape to promote science?

Researchers and academics disseminate and share their research findings with other scholars by publishing in a scientific venue (e.g. journal or conference proceedings). Despite the recent advances in the publishing industry and using the Internet as a medium of knowledge sharing, scientific publishing industry deals with many problems which slow down the knowledge progress and waste lots of time and money respectively. This article criticizes the scientific publishing industry for time and money costs, favoritism, political views interference, the vague share of authorship, barriers of having flexible and interactive contents, and not fulfilling the gap between research and development.



"A woman showing off her apple watch and the amazing display on the watch screen" by Green Chameleon on Unsplash

Researchers wish to contribute to science. They develop new concepts, new knowledge, and new findings. Once they have achieved a finding, they publish it as a scientific article in a scholarly journal or a relevant conference. Publication of scientific articles is an important step for every single scientist to have his/her research spread among the other scholars. There are quite a number of reasons that scientists like to publish their work. Firstly, the basic reason for publication is to share their findings to promote the worldwide knowledge. They publish their results with the detail description of how they have done the research. So that other researchers can replicate the same work and probably expand it accordingly to contribute new knowledge. Secondly, they would like to apply for grants or to graduate from university. Thirdly, they would like to get promotions in academia. Last but not least, they would like to be recognized and to increase their reputations (e.g. *h-Index*) which may end up with a higher salary or a better job position.

Besides the research work, most of the journals and conferences publish the scientific articles through a peer review process. When an editor of a journal finds the submitted manuscript interesting and valuable, he sends the manuscript to some experts known as a peer (reviewer, referee). They judge on the article from different aspects such as the methodology, the novelty, the achieved results, significance of the article, etc. Peer review dates back to 1665 by Robert Hooke, who published his research results for Royal Society. Royal Society published the first academic journal with a peer review process under the name of *"Philosophical Transactions of the Royal Society"*. This process of having experts (peers) judged on the manuscript is called

Peer Review. This process usually takes from a few weeks to 2 years. In some cases, it may take much longer. The current scientific journals vary differently from open-access to free journals; high-quality prestigious to fake journals; fast-reviewed to long-life lasting publications; and so many others.

Scientists start the research from an idea. They try to expand it by analyzing the problems and finding a solution. Once the methodology and framework of the solution are found, they need some funds to implement and run the research. The research findings would be written in a scientific report to be published in a journal. Then the peer review process begins for the publication. Figure 1 shows the process cycle of publication from when an idea is made to publishing and dissemination.

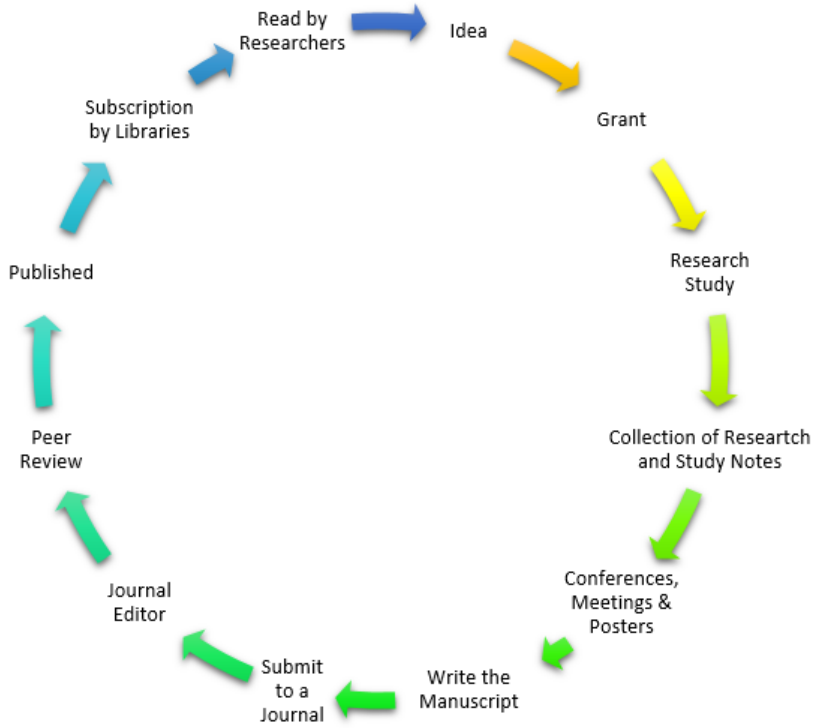


Figure 1. Research cycle from a research idea to making another idea

The scholarly journals are different from regular magazines. Usually, journalists write in magazines on already known items, findings, and knowledge. However, in journals, the scientists contribute completely new knowledge and something novel which has not been done by anyone else before. The style of writing in the articles published in a scientific journal is also different from those in a magazine. Usually, the public reads the magazines, whereas, scientists and researchers are the main audiences of the scientific journal articles.

Despite all these varieties, there are some main criteria which are important to the authors in order to choose a relevant journal/conference for their manuscripts. These criteria mainly include: 1) Reputation, 2) Being indexed in reputable databases; 3) Fast peer-review process; 4) Publication costs.

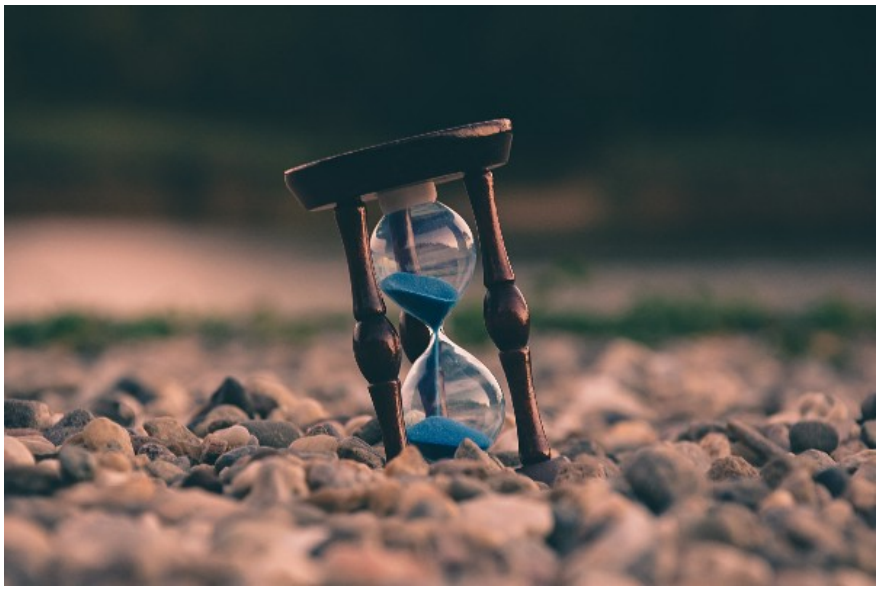
Journals and conference proceedings are usually indexed in many databases. Some databases are dedicated to specific topics, while some others are covering many areas. Some are prestigious, while some are unknown databases. Among those available databases, ISI by Thomson Reuters is the one known in indexing high-quality sources (e.g. journals, conference proceedings, magazines). And respectively, Scopus by Elsevier is the second most important database. Among all other databases, Google Scholar and Microsoft Academia cover almost all research articles from well-known to infamous resources.

These databases not only make searching facility for the articles but also compute the impact of articles by tracking the number of citations in the other papers. More papers and citations increase the authors' *h-index* and respectively the journal *impact factor*, which are known to be valid performance metrics for scholars and journals.

This introduction was basically describing the ideal concept of the publication, journals, and indexing databases. However, the publishing industry has lost its primary aim of knowledge sharing. And it is becoming a money making industry, which has less impact on the knowledge as it is expected despite the amount of spent money on that. On the other words, in some cases, they can be called as a *money-wasting industry*. The next section discusses the challenges and problems of the current state of research article publications in details.

CRITICISM

Regardless of the benefits and positive aims of the publication of scientific articles, there are still loads of problems available. In this section, some of the existing problems in scientific publications will be discussed.



"Blue sand falls in an hourglass on a rocky beach" by Aron Visuals on Unsplash

1. TIME:

Time wasting publication is the first known problem for everybody who has some experience in article publishing. As it has been described earlier, the peer-review process generally takes from a few weeks to 2 years. If we even consider the average of 6 months to 1 year, it is still a very long time to wait for the final decision of the Editor. Finally, after the final notification, there are two possible cases. Either the manuscript is accepted or rejected. Let's imagine an optimistic average period of 6 months from submission of the manuscript to the final notice. Luckily, if the manuscript gets accepted, the authors should be lucky to have their words published as novel as it was at the time of submission. And unfortunately, if the manuscript gets rejected, they have to retouch the manuscript and send it to another journal. While a similar research topic might have been published elsewhere by someone else during this delay. Moreover, the references of the manuscript may get outdated and the authors need to update them.

Peer review process may also take longer than 2 years. For example, the article of "*Generators of matrix algebras in dimension 2 and 3*" got published in the Journal of *Linear Algebra and Its Applications* by Elsevier after more than 13 years of its initial submission to the journal. The latest reference of this paper refers to 1997. After 5 years (Jan. 2014), this article had been cited only 5 times. However, this article could have been more successful if it could get published much earlier than 13 years.

The irresponsibility of journal editors is another case of time wasting in publications. There have been so many cases that peers have reviewed and commented on the manuscripts on time, but the editor's decision has taken ages to be made. Usually, editors reject the manuscript at the early stages in first few weeks or months from the submission if they find it out of the journal's scope; or uninteresting. If the manuscript gets passed through the initial evaluation by the editor, he sends it for the referees (peers). In some cases, the editor has rejected the manuscript despite being accepted by all reviewers. This is a very rare case that editors are irresponsible to the manuscript and they decide individually regardless of the respect to the referees' comments. This kind of actions by editors only ends up with a huge amount of wasted time.

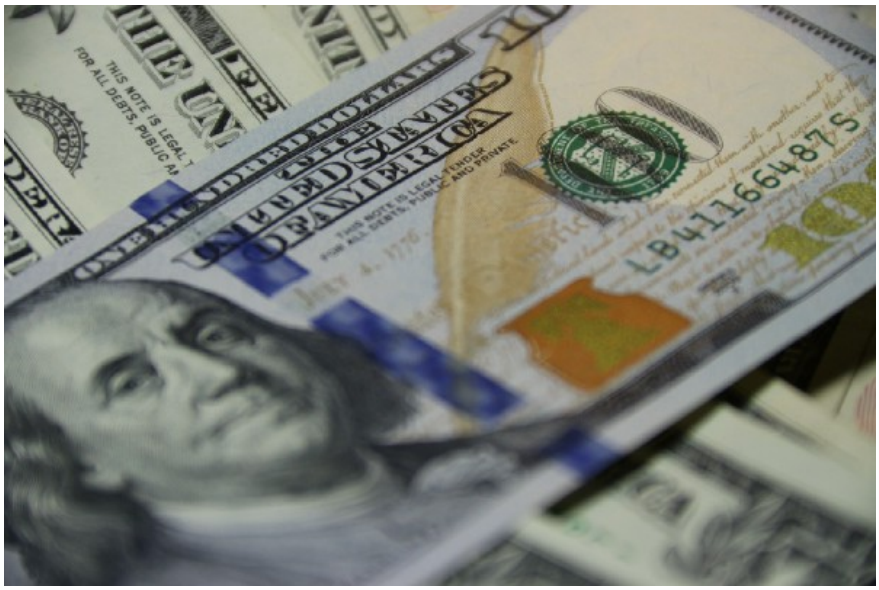


Photo by Vladimir Solomyani on Unsplash

2. MONEY:

Money is another very important factor in publications. As described before, there are two types of journal publication. 1) A free journal to publish, but it charges the users to download and read the articles. Articles' costs vary from one journal to another, but usually, they are sold from 30 to 50 USD per article. These journals and publishers hold the copyright of the article, and even the authors cannot distribute the paper without any written permission from the publisher. 2) An Open-Access journal charges the authors for publication, but it provides a publicly free access to the paper to download and read. Authors usually can keep the copyright and distribute the paper in public and private repositories. Open-Access journals are usually a good choice to increase

the visibility of the paper as it can be accessed publicly for free. This type of journals charge the authors from few hundreds to thousands of USD per article according to the journal ranking/reputation, indexing, impact factor and the publisher terms and conditions.

In all journals, either authors or readers pay for the publication. Basically, scientists spend lots of money, time and energy to come up with a contribution to science and to promote the knowledge. The next step is the knowledge sharing by publishing the research and its results. To publish in an open-access journal, why should they spend another huge amount of money to share the results for free? Can they not simply publish the research on their personal or institutional websites for free (or using other free repositories such as arXiv.org)? On the other hand, the other choice is to publish for free. But then the question is, why should they give the copyright to the publisher? Why should the publisher earn money from someone else research? What do the authors achieve by submission of their manuscripts?

Universities and institutes usually purchase the subscription to provide free and open access to some selected scientific databases. For example, in Malaysia, some databases sell their subscription approximately RM 500,000 (120,000 ~ 150,000 USD) annually. This money is spent by universities or governments and the whole is received by the publishers and databases.

The main concept of the publication is to share the knowledge among the scientists to move forward with something new in knowledge. However, the scientists and researchers spend lots of money to get access to the articles.

Many scientists think of two benefits of the current system of publishing. Firstly, the researchers who look for an article can be sure that the found manuscript is peer-reviewed and it has been checked by few experts before publication. The second benefit is to advertise the research and its results; therefore more citations and a higher h-index are expected. On the other hand, publishers and indexing databases store the full-text and maintain the server and accessibility of the papers. Still, a question here arises: Can the authors and researchers achieve these two benefits without journal publications?

Indexing database is a criterion for authors to choose a journal. A journal indexed in a more reputable database is more likely to be known as a high-quality journal. But how do these databases choose the journals? Do they run the quality assessment on journals only?

These indexing databases have many criteria to index a journal or a conference proceeding. But besides all, three criteria are mostly highlighted and common. 1) Journal/Conference history; 2) Quality of accepted manuscripts; 3) Money. Some databases require a journal/conference to be at least a minimum years old (e.g. 5 years) secondly, they review some published articles for eligibility process, and thirdly, charge fees to index the manuscripts.

There are many other questions related to the current situation of publication:

- Does the journal impact factor guarantee the quality of the articles?
- Does the indexing database guarantee the quality of the articles?
- Does the indexing database guarantee the quality of the journals?

There are many protests in academia against the databases and publishers. Many people believe that these money making machines should change their behaviors. For example, *The Cost of Knowledge* is a petition against Elsevier because of its high prices for journals. At the time of writing this manuscript, more than 14,000 researchers have signed this petition. These critics do not cover all databases. Google Scholar and Microsoft Academic services are two samples of the free databases which try to cover almost all manuscripts available on the Internet by academics.

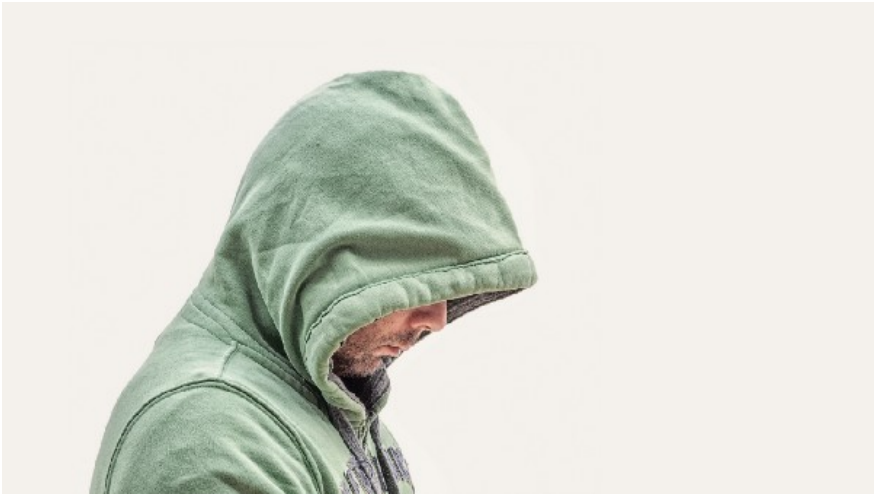


Photo by LoboStudio Hamburg on Unsplash

3. NEPOTISM (FAVORITISM):

Journal editors and reviewers should only consider the manuscript content quality in their decisions, not their personal preferences. But in reality, it is not happening as it should be. Author's name, reputation, and affiliation usually play a very important role in the editor's decision. A paper submitted by a famous professor from a world well-unknown university usually does not even peer-reviewed, and it would be published as soon as possible.

JOURNAL INSTRUCTIONS

Reviewers are recommended have access to the blind version of papers; however, in many cases, they can find the authors' name list in the manuscript. The names and affiliations might have an influence on the reviewer's decisions. For example, in almost all instructions to the authors of journals, and books about writing the scientific manuscripts have written some certain requirements for the *abstract* of an article. They usually have mentioned that an abstract should have a minimum and a maximum number of words. In addition, it should cover background, methodology, and results briefly. However, Sir *Michael Victor Berry*, a professor in Mathematical Physics at University of Bristol, publishes his paper entitled "*Can apparent superluminal neutrino speeds be explained as a quantum weak measurement?*" in 2011 with a two-word abstract of "*Probably not*." Another example is Prof. Leon Knopoff, an internationally distinguished UCLA scientist, has his research article about "*Is the sequence of earthquakes in Southern California, with aftershocks removed, Poissonian?*" with a one-word abstract of "*Yes*.". Even though, we still believe that the peer-review process and journal restrict instructions on the manuscripts of such world-class famous professors is not necessary.

FAKE AFFILIATIONS

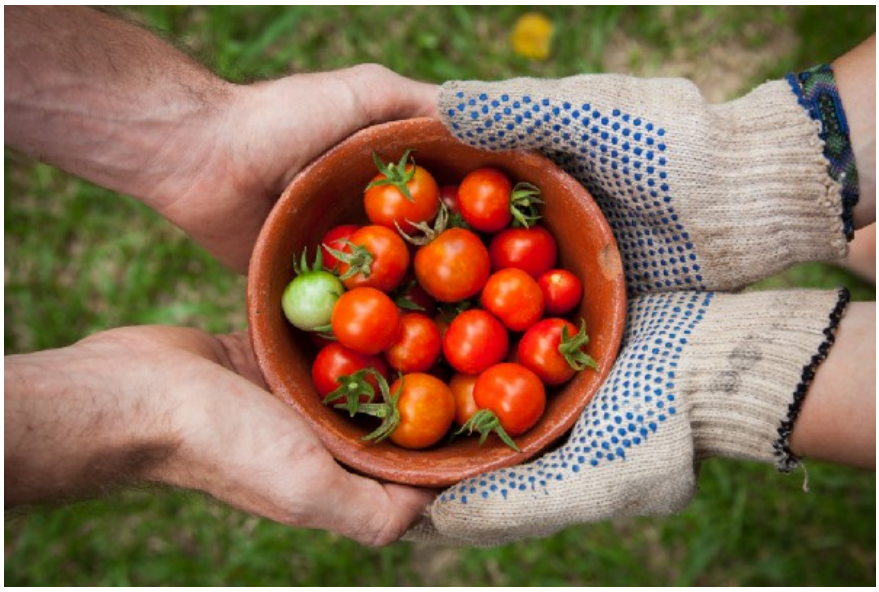
Authors are able to have multi-affiliations on their manuscripts. Some of them put the names of famous universities, in order to deceive editors and reviewers.

RETRACTIONS

Retraction is a public notice published by the publisher/journal to announce the withdrawal, cancellation or rejection of a published statement or manuscript. This action is done by the journal editor in chief and it can be requested by the editors, authors or the institutions. Retraction is applicable in many situations: 1) error; 2) fraud or misconduct; 3) possible fraud or misconduct (ongoing investigation); 4) political reasons. When a case is raised against a manuscript, the

editor in chief of the journal is responsible to handle the case and to make a final decision.

There have been many cases around that the editors did not retract because the authors were his/her friends or colleagues. For example, a professor plagiarized an article from two students' manuscript (names are removed for privacy concerns) which was rejected in a journal. He published the article in an Elsevier journal, without the students' names and permissions. His students informed the editor in chief of the journal. All the strong evidence and earlier submitted copies of the manuscript to the other journals were also attached to support their claim. But since the professor is one of the editors of that journal, the editor in chief refused to take any action against this author. While the editor in chief initially promised to retract the manuscript, the article got published (Update: The final publication of that paper was canceled years after the incident).



"One person wearing gloves and another person holding a bowl of red cherry tomatoes" by Elaine Casap on Unsplash

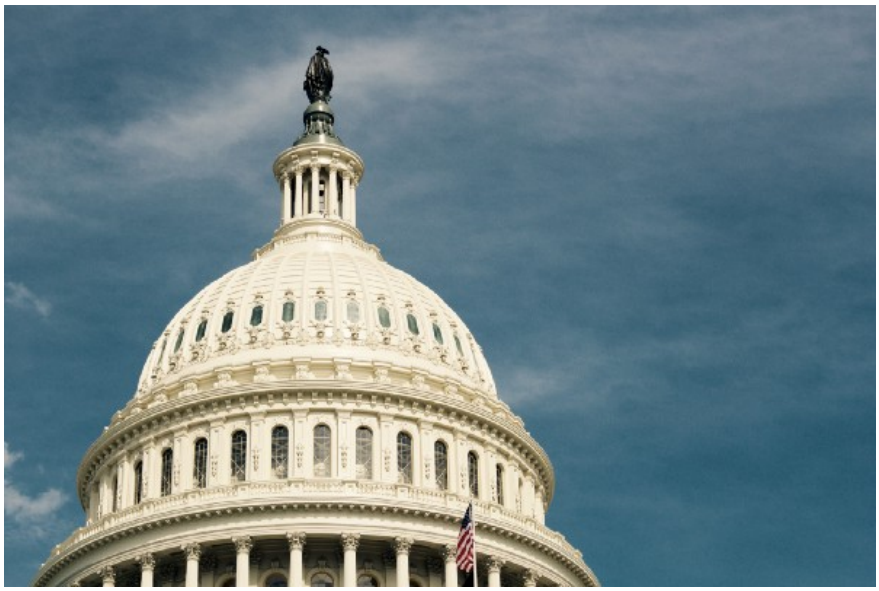
4. AUTHORSHIP SHARE:

A published article is similar to a registered company. Whatever happens to a company, all the stakeholders will get or lose benefits according to their shares. For a published paper, the same things happen. A published article may have many authors listed on the paper. Each author has a specific share on that manuscript. If a paper gets retracted, the reputation of all the names listed on the paper might be jeopardized. If the paper gets cited, the h-index of all authors would be affected and increased. Although, the amount of share is completely

definite in a registered company, the share of authors are separated equally or nearly equally among the authors.

For example, a friend of mine, an archaeologist, wrote a manuscript in a collaboration with a colleague from chemistry. They did a joint research on some historical goods with the chemical analysis of the items. Each of these two researchers did not have any knowledge of the each other's research area. What would happen if one of them fail in their research when their manuscript gets published? Should both of them be responsible or only the person who fails his own part of the research? How can the contributions be specified in an article?

At the current system of manuscript writing, it is not clear that which author has written which section. Also for those manuscripts that only one person is in charge of writing, the share of the authors in that scientific contribution is not usually indicated.



"A close-up of the dome of Capitol Hill in Washington D.C." by Jomar on Unsplash

5. POLITICS:

Knowledge sharing and publishing are known to be available for all the people around the world. Every researcher should have a chance of having his/her research contribution published. But there are some political reasons which banns some people and nationalities from publications. Prof. Dr. Eric Dietrich is the Editor-in-Chief of Journal of Experimental & Theoretical Artificial Intelligence. He has posted the following on his personal Facebook wall on September 20, 2013:

> *"Dateline: Iran — & Phone call from the Office of Senator Gillibrand.*
>
> *As many of you know (from reading earlier posts), I run a computer science journal that publishes scientific papers from researchers around the world (journal is called JETAI). Recently, the Obama administration issued a decree forbidding my journal from publishing papers from Iran scientists. Why? B/c the US has sanctions against Iran. I hope it is obvious to all how immoral this is (I realize I'm being wildly optimistic here). It is immoral b/c the truth (which is what science produces) and knowledge and research should not be used in politics to achieve any desired agenda — every human has a right to the truth.*
>
> *Be that as may, I just got off the phone with Senator's Gillibrand's office. The nice woman on the other listened politely. Then said "There's nothing the senator can do about your case. However, perhaps the general problem of using journals as weapons in the ongoing sanctions can be generally addressed. I will bring the matter to the senator's attention." So I said thanks (and I am thankful). But Iranian scientists and my journal are being profoundly harmed by Obama's and his government's usurpation of truth-making.*
>
> *Consider the set of happy-campers. I'm not in it."*

The above Facebook post from an Editor-in-Chief shows clearly that the US is trying to impose sanctions on Iranian scientists' publications. This sanction is not announced officially in the media.

Due to the similar sanctions on Iranian scientists by the US government, Elsevier is not providing them with new research articles on selected research topics (e.g. Nuclear energy). Subsequently, in 2011 few Iranian public universities banned their scientists from

submitting their manuscripts to Elsevier. Then Iran's Ministry of Higher Education supported this action. These kinds of political affairs are not limited to the case of Iran.

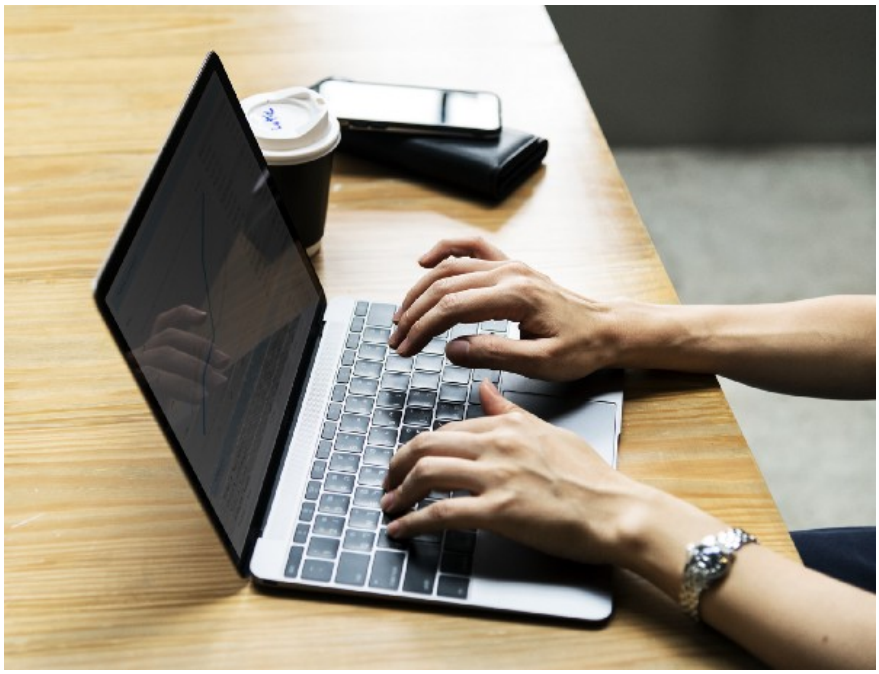


Photo by rawpixel on Unsplash

6. FLEXIBLE AND INTERACTIVE CONTENT:

Once the paper is published in a journal, the journey is almost finished (except for advertising the paper to get more citation). If anybody comes up with a different result to support or to reject your idea, then they can cite the published paper and discuss their own research. In some cases that a researcher intends to challenge or make a comment on the methodology, results or structure of the manuscript, they can write a critical letter to the editor. This letter can be published by the same journal along with the original authors' response. This direct *question and answer* on a manuscript should be arranged and accepted by the Editor in Chief of the journal.

Except for the above situation which is not really common, there is no other flexibility in the discussions related to a paper. Other researchers who would like to criticize an article should discuss it in a separate paper and cite the original one. As the original and critical paper should be prepared in a style of scientific articles according to the journal styles, they have lots of similar introductory sections which are not really required. A forum-like platform for researchers to discuss freely without the unnecessary requirements is the lack of available

publications. Currently, some scientific social media websites, such as ResearchGate has provided a platform to fill this gap.

Usually, a paper is prepared and available in a PDF format. Today, researchers rarely refer to the printed materials and journals, and they all prefer searching over the Internet and downloading their references and resources. Due to this fact, many journals only publish the manuscripts online and they do not have any hard-copy version. However, these online journals, still follow the hard-copy style of the PDF files. PDF is capable of being interactive and having sounds and movies embedded. Using some animated pictures, soundtracks, and interactive graphs and tables are extremely useful to improve the understanding of the research.

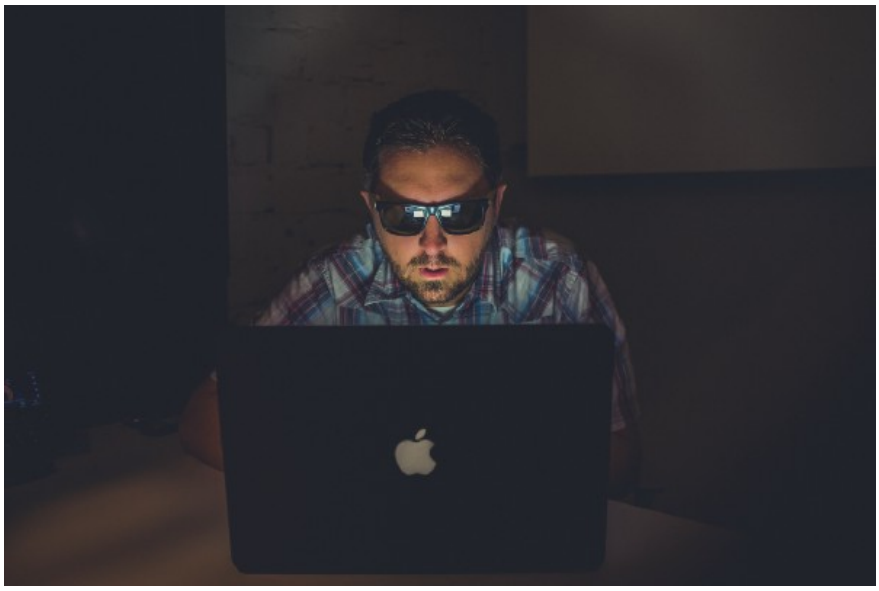


Photo by NeONBRAND on Unsplash

7. SPAM:

Email addresses are usually mandatory to be written on the manuscript. When the paper goes online, email spider applications crawl the web and look for the email addresses. Since then, the authors would receive many promotional emails about the conferences and other journals every day. SPAM is a serious issue in journal and conference publication that everybody who has published a manuscript, has experienced it.

"A group of people brainstorming over a laptop and sheets of paper" by Štefan Štefančík on Unsplash

8. RESEARCH VS. DEVELOPMENT:

To close this section, a fact might be interesting to be noted. According to the SCImagoSJR, the numbers of journals in 2012 for some selected countries are listed in Table 1. In this example, the countries of US, Germany, Japan, India, Malaysia, and Iran are selected randomly among developed and developing countries.

Country	# of Journals	Relative Publication Production in 2002	Relative Publication Production in 2012	The Difference of Relative Production
US	5,605	90.458%	88.887%	-1.571%
Germany	1,213	21.755%	21.161%	-0.594%
Japan	459	40.733%	15.475%	-25.258%
India	369	11.731%	12.779%	1.048%
Malaysia	68	0.635%	2.716%	2.081%
Iran	119	8.4%	32.462%	24.062%

Table 1. Number of journals and relative production for each country in 2002 and 2012

Table 1 shows that the developed countries (DDC), US, Germany, and Japan, have less *Relative Publication Production* rate (negative) in 10 years from 2002 to 2012. In contrast, the developing countries (DGC) such as Iran, India, and Malaysia have higher (positive) *Relative Publication Production* rate. This table may imply that the developed countries are more interested in business and money (development in nutshell). There is a question here: Why are the developing countries which have a positive relative publication production rate, not developed yet? The answer to this question might also be found in Table 1. Developing countries produce the knowledge, they pay money to publish it in the journals of (probably-mostly) developed countries. And then respectively, developed countries known as industrialized countries use the research findings for further development.

To summarize, DGC does the research and pay money to DDC to publish. DDC will implement and develop their research and sell it back to DGC. Developing countries have focused more on *Research* and developed countries have concentrated on *Development* the most. This means that DGC is considered a cheap facility to do the research and send the research result for free (or even pay) to DDC. Which party is winning this game? Developing Countries (DGC) or Developed Countries (DDC)? However, both parties are achieving their benefits, the developed countries (DDC) are still the winners of the game.

SUMMARY OF THE PROBLEMS

As elaborated earlier in the previous section, there are many problems in the publication process in scientific journals. All of these problems slow down the process of knowledge advances. Many researchers have wasted a long time, resources and money as a result of facing these problems. Discussed the problems can be listed as follows:

- Scientists waste a lot of time in order to find a suitable and relevant journal which covers the research topic in the journal's scope.
- Publication process takes a very long time and sometimes it gets the article outdated or similar to other researchers' work.
- Human decisions, as an Editor in Chief, Editor, or a peer, may not be neutral and impartial in many cases.
- The current state of comments on the published papers are usually unpublished or published sporadically.
- The impact factor of a journal is not a good criterion to measure the quality of a paper.
- Researchers have to buy the other scientists articles despite the nature of publication is based on knowledge sharing and not business running.
- Scientists do not earn money from their research impact, however, publishers earn a lot.
- Email spamming is very common and usual on the published email address of the authors.
- Political restrictions have been imposed on many scientists and nationalities.

- The authorship share of the published contribution is not clearly identified.

The published content of the manuscripts is not flexible and interactive.

CONCLUSION

The existing problems in scientific publishing industry is clear crystal for many people, and these are not news. But no serious action is taken to fill these gaps and benefit the authors more instead of benefiting the publishers exclusively. Some ideal suggestions and objectives can be as follows:

- To accelerate the publishing process as fast as possible
- To provide a platform to the scientists to publish their works as soon as possible
- To persuade authors in earning money from their research
- To remove the criterion of *journal impact factor* in order to measure the quality papers and to replace the paper impact factor (number of citations) individually
- To remove the human factors in personalized decision makings
- To judge articles independently from the authors' names, affiliation or research background (blind peer review)
- To hide author's contact information from the audience and to build an indirect access option.
- To remove unnecessary requirements of the journals
- To able the authors to promote animated pictures, videos, sounds and other interactive elements in their manuscripts
- To clarify the authorship shares in the manuscripts
- To provide a social scientific network among the researchers to exchange their knowledge easily

I personally wish someday the academic publishing industry would be improved along with all those advancements in the other science and technology areas.