

Dr. Norbert Cheung's Lecture Series

Level 5 Topic no: 43

Scholarly Paper and Publication (part 1)

Contents

1. Consideration for Publication
2. Publication Process

Reference

Engineering Research: Design Methods and Publication, Herman Tang, Wiley, 2021.

1. Considerations for Publication

To publish or not to publish

As discussed in Chapter 8, reporting results is necessary for all research projects. Good results from a research project may have different types of outlets. If the outcomes of a research project are promising, for example, they can lead to additional tasks and/or projects. Table 9.1 lists these possibilities and corresponding efforts.

Table 9.1 Destinations of research outcomes.

	Outlet	Effort
Research outcomes to	Publication	Revise and submit
	Patent	Prep and file application
	Implementation or artifact	Develop process, plan, and act
	New base for next project	Review and propose
	In a “cold storage”	Do nothing (or forget)

Publication is encouraged and required for basic research conducted in universities and research institutes, particularly for government-sponsored and foundation-supported projects. Publications can build a better research credential to gain a competitive edge for future research opportunities. In applied research and engineering R&D, we implement the outcomes and may publish some of them, which will be further discussed in a following subsection.

Publishing in high-quality journals is a tough task for all and can be even more challenging for new researchers. Therefore, firmly understanding the objectives, process, requirements, and methods of publishing helps all researchers.

Objective of publication

The objective of research, particularly basic research and most applied research, is to further a body of knowledge and advance new technology. Publication means that research results are open and permanently accessible to the public and can be used and cited by anyone in the world. Therefore, the main purposes of publication are to contribute to an ongoing body of knowledge and share newest information with other professionals in the discipline.

Without access to completed and reported research, it is likely that other researchers would repeat the same or similar research efforts. In other words, publishing is vital to the effective advancement of science and technology. Many public funding agencies require researchers to disseminate their findings to broader audiences and research communities. Publications are also important for research work in the national laboratories and the R&D departments of large companies.

Table 9.2 Science and engineering articles in 2014.

Region or country	Quantity	Percentage (%)
World	2 290 294	100.0
United States	431 623	18.8
China	395 588	17.3
Germany	107 747	4.7
India	106 574	4.7
Japan	103 793	4.5
United Kingdom	101 536	4.4
France	74 269	3.2
Italy	70 453	3.1
South Korea	63 748	2.8
Canada	60 916	2.7
Spain	56 604	2.5
Brazil	53 152	2.3
Australia	52 269	2.3
Russia	43 487	1.9
Iran	36 539	1.6

Many researchers consider the H index a relative indicator of measuring the quality of scholarly publication based on the citation in other publications (Hirsch 2005). The H index is widely used but its accuracy has been debated by other researchers (Costas and Franssen 2018; Oravec 2019). There are several other indexes, and a study shows there exists weak correlation between various indices

(Raheel et al. 2018). Table 9.3 shows both the information of quantity and H index of engineering research papers, which were published in quality scholarly journals selected by SCImago.

Table 9.3 Engineering papers in scholarly journals selected by SCImago in 2018.

Country	Quantity	H index
China	188 249	475
United States	95 958	915
India	51 663	284
Germany	29 478	465
United Kingdom	28 291	494
Japan	27 824	417
Russian Federation	23 768	193
South Korea	22 569	346
Italy	20 369	357
France	19 345	392
Canada	16 530	403
Iran	15 237	175
Australia	14 242	340
Spain	13 516	316
Malaysia	11 821	160

Publication of R & D

For engineering R&D, outcomes may be important to keep the company competitive in the market. In such cases, research activities and results may be viewed as a type of trade secret. Thus, the publication of engineering R&D or industry-sponsored research carries some risks. In addition, revealing proprietary data may harm a company's competitiveness in the marketplace. Therefore, companies may not be willing to publish their R&D results. The reason for non-publication is obvious for military applied research.

Unless there are patents to protect their intellectual property (IP), many companies do not share their research information with the public. In other words, publications can be delayed by filing patent applications. Even if a company can share research information, the original proprietary data can be modified, such as using a ratio or different scales, to protect the original information.

Types of Publications

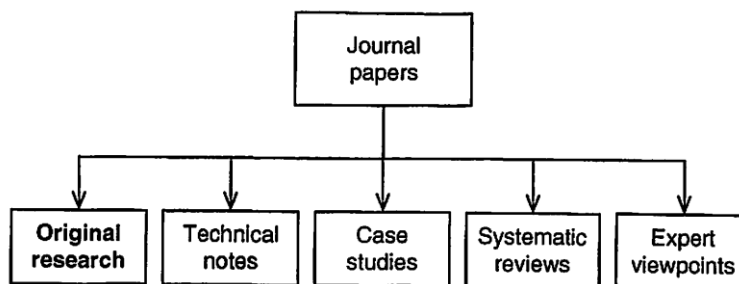


Figure 9.1 Types of scholarly journal publications.

Original Research Papers. These are the majority of papers published in scholarly journals. An original paper reports new study and results, which have an archival value to a professional community. The key feature of original papers is their originality and innovation of work. Discussed in Chapter 3 literature review, original research papers are innovative in terms of outcome, methodology, and/or approach in detail.

Technical Notes. Also called technical brief articles or letters, technical notes are based on preliminary results for quick publication, without including too much data or details. Thus, technical notes are short with approximately 2000 words.

Case Studies. This type of article is usually based on applied research and/or R&D and reports specific instances of phenomena. Instead of focusing on a new knowledge or theory, such application-orientated papers have an archival value on a new design, process, and/or development with technological implications.

Systematic Literature Reviews. A technology review article is often in a specific, emerging subject and based on over 100 recently published papers. The articles summarize others' research results that have relevance to a professional community, not necessarily providing new information and knowledge. A review article may provide critical and constructive analyses of existing literature and make some recommendations for future research, discussed in Chapter 3 as well.

Another type of review article is called *Expert Viewpoints*, where well-known domain experts offer such reviews with the invitation by a journal. Materials Science and Engineering: R: Reports (ISSN: 0927-796X) (R Reports n.d.), a top scholarly journal, states, "publishes invited review papers covering the full spectrum of materials science and engineering. The reviews, both experimental and theoretical, provide general background information as well as a critical assessment on topics in a state of flux."

Conference Papers

Conference papers are a publication at a professional association meeting, symposium, or similar gathering. Professionals present their latest, albeit preliminary results at conferences. There may be hundreds of conferences in a field. Attending conferences is also an excellent professional networking opportunity, as discussed in the previous chapter.

Some conferences go through a peer review or refereed process, while others do not. Thus, conference papers may or may not give the same reference value as journal papers, particularly if no formal proceedings are published after a conference.

However, a main advantage of conference papers is that they report new research and studies quicker than journal papers.

Other Publications

- *Authored Book*. This provides a broad treatment of a subject and is considered a significant professional accomplishment. Major publishers do rigorous reviews for book proposals on sample manuscript chapters before a publishing agreement. Clearly, composing a book manuscript can take a lot of time. For an academic book project with a good proposal, a two-year writing plan is a reasonable expectation working as a part-time writer.
- *Edited Book*. A collection of chapters or separate papers on a focused subject from different authors and compiled by an editor or editors. The editors are often significant figures in the field. One effective way to initiate a book project is to have a writer's workshop with the goal of a thematic edited volume in mind.
- *Book Chapter*. In many cases, it can be a summary of recent research projects. The authors of book chapters are often invited to an edited volume.

Paper Quality

There are several matrices to evaluate paper quality. Here is a brief list:

- Innovation (originality or contribution, etc.)
- Significance of findings (benefits, predicted impacts)
- Quality of scientific work (completion, assumptions, issue/error, etc.)
- Reference value (to the professional field, potential applications, future work, etc.)
- Acknowledgement (citation, relevant, etc.)
- Presentation (organization, clarity, language, format, etc.)

Example 2

* 1. Does the paper make a new and significant contribution to the Production Research literature?	No	▼
* 2. Does the paper provide evidence of real or potential application for Production Systems?	No	▼
* 3. Is adequate credit given to other contributors in the field and are references sufficiently complete?	Yes	▼
* 4. Does the paper appropriately compare the performance of proposed methodologies with those found in the published literature?	No	▼
* 5. Does the paper state what the author(s) propose to do in the future?	Yes	▼
* 6. Are the character and contents of the paper clear from the title and abstract?	Yes	▼
* 7. Is the paper clearly, concisely, accurately, and logically written?	No	▼
* 8. Could it benefit from condensing or expansion? If yes, please explain why in the comments to author section.	No	▼
* 9. Is the subject matter of relevance to Production Research and appropriate for IJPR?	Yes	▼
* 10. Are all references relevant? If not please indicate in your review not relevant references.	Yes	▼
Recommendation		
<input type="radio"/> Accept		
<input type="radio"/> Minor Revision		
<input checked="" type="radio"/> Major Revision		
<input type="radio"/> Reject but allow Resubmission		
<input type="radio"/> Reject		
Confidential Comments to the EIC		

Clearly, these factors are not equally important. For example, academic publication emphasizes the originality and significance of research work. For originality, a submitted manuscript should be created by the researchers and have not already been published. It should also not be under consideration for publication elsewhere. If a manuscript is not original, it may not be acceptable to publish regardless of other aspects.

The reference value of a paper is very important as well. The value may be judged on its innovation, significance, completeness, etc. The reference value of a paper may be measured by the number of citations after publication.

Many academic professionals do not consider a specific application or case study appropriate for publication because such a study may be exclusive to a particular situation. However, the academic value of a case study may not always be specially limited to the case. The research procedure, method, and findings can have a good reference value to other professionals in the field or even to those in other areas.

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Reviewer Confidential Comments to Editor:

For each statement, please place an x in the space provided next to relevant answer:

RELEVANCE

Is this paper relevant to actual manufacturing systems or manufacturing processes problems? If the relation to current problems is weak, does it at least have future potential?

Highly Relevant Possibly Relevant Has Future Potential No Clear Relevance

CONTRIBUTION

To Theory (specify area) _____
High Average Low Not Sure

To Practice (specify application)
High Average Low Not Sure

To Synthesis (tutorial, review)
High Average Low Not Sure

Other (specify) _____
High Average Low Not Sure

ORIGINALITY

High Average Low Not Sure

QUALITY OF WRITING AND WRITTEN PRESENTATION

High Average Low Not Sure

Comments on Writing/Grammar _____

DETAILED EVALUATION

EVALUATION OF CONTENT

Title
Good Adequate Poor Not Sure

Abstract
Good Adequate Poor Not Sure

Introduction and Motivation
Good Adequate Poor Not Sure

Review of Related Work
Good Adequate Poor Not Sure

Technical Soundness of Body of Paper
Good Adequate Poor Not Sure

Have you checked the equations? _____

Conclusions

Good Adequate Poor Not Sure

EVALUATION OF PRESENTATION

Quality of Writing/Language
Good Adequate Poor Not Sure

Figures (incl. captions and legends)
Good Adequate Poor Not Sure

Tables (incl. captions and legends)
Good Adequate Poor Not Sure

References
Good Adequate Poor Not Sure

Length
Good Adequate Poor Not Sure

Indicate Suggestions:

Shorten Sections _____

Expand Sections _____

2. Publication Process

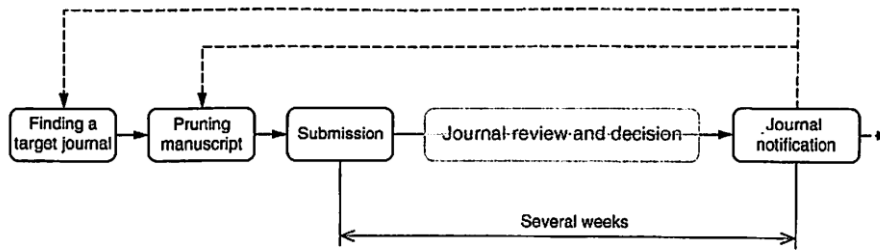


Figure 9.5 Author's work for paper publication.

After receiving a paper manuscript, a journal editor team takes several steps to evaluate the manuscript. Figure 9.6 shows a typical process of (a) refereed conference publication and (b) refereed journal. The main steps include:

1. Authors to submit a manuscript (to an electronic edit management system)
2. Editor-in-Chief (EIC) to scan suitability and overall quality, if fits, assign Associate Editor (AE)
3. AE to review the manuscript and select reviewers
4. Reviewers to review and submit review results
5. AE to summarize review results and make a recommend to EIC
6. EIC to make the final decision and notify authors

Normally, EIC's decision is final. No higher governing body exists to investigate or change EIC's decisions. If a manuscript is rejected, authors may communicate with the EIC. However, it is rare that EIC would reconsider their decision.

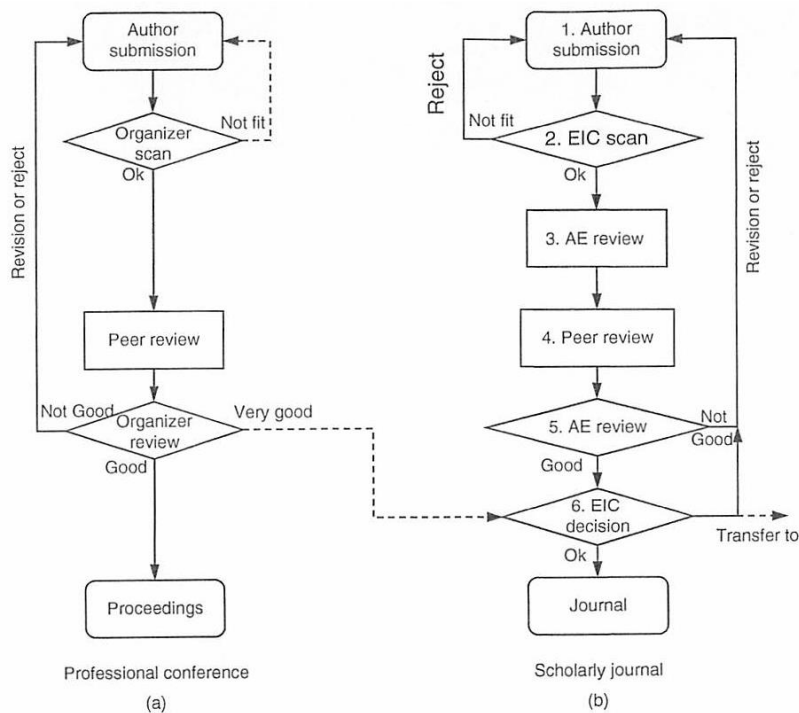


Figure 9.6 Overall review process of paper publication. (a) Professional conference. (b) Scholarly journal.

Peer Review Process

We know who assesses our paper quality. For student research reports, the advisors normally decide based on academic requirements; for journal publication, the quality evaluation is based on peer review.

Almost all scholarly journals require peer reviews, also known as refereed journals. The most important and time-consuming function in a journal publication process is the peer review. To authors, it is a blind process. However, understanding the overall process can help us prepare manuscripts.

A peer review is a process to obtain referee's viewpoints on manuscripts. Peer reviewers help editors determine the merit and quality of a paper in terms of originality, validity, significance, and writing. With reviewer's feedback, authors can revise and improve a manuscript.

Due to limited time and resources, reviewers normally focus on study design, methods, and how reported data supporting author's assertions. Reviewers are not able to determine whether data are accurate. Therefore, routine peer review is not effective in detecting possible research misconduct (Vastag 2006).

It is recommended that new researchers become a reviewer after they have published a couple of papers. Being a reviewer is not only a voluntary contribution to a professional community but also a learning opportunity from reviewing papers.

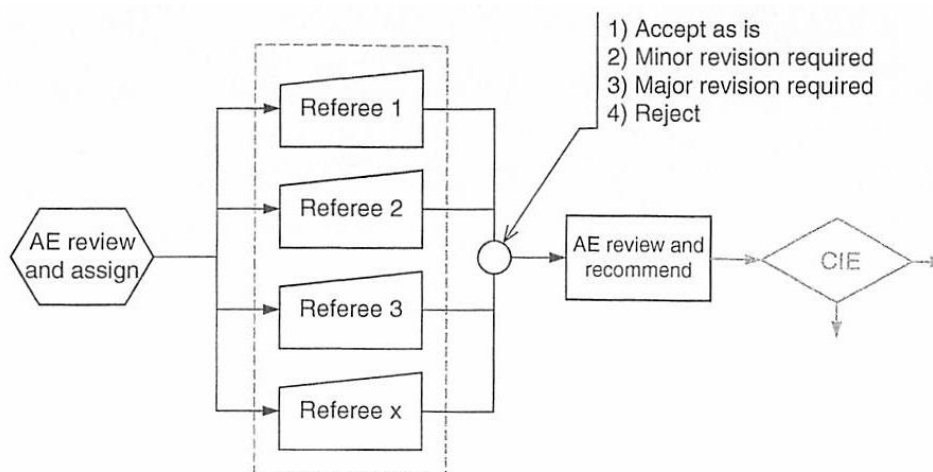


Figure 9.7 A peer review process managed by AE.

Reviewing a paper manuscript, referees or reviewers recommend how a paper suitable for the journal and rate a paper in one of four levels to AE:

1. **Accept as is**
2. **Minor revision required**
3. **Major revision required**
4. **Reject**

The “accept as is” is rare for high-quality journals but may be common for some conferences. With both “minor revision requested” and “major revision requested,” a manuscript is to return to the authors for revision consideration. For minor revisions, AE reviews the manuscript revision and the responses from the authors and makes publishing recommendation to EIC. A second round of peer review, preferably by the original reviewers, is often required for the situations of a major revision.

AE mainly relies on the recommendations from peer reviewers. Usually, an AE makes a publication recommendation to the EIC for decision if all reviewers reach a consensus, even though they may not be in a perfect agreement. It is uncommon that an AE’s publication recommendation is against the results from peer reviewers. In addition to the four ratings, AE may also suggest that a manuscript transfer to a more suitable journal.

There are three types of peer review processes:

1. *Double-blind Review*: The identities of both reviewers and authors remain anonymous throughout a review process.
2. *Single-blind Review*: The author does not know reviewers; but the reviewers know authors’ names and affiliations.
3. *Open Review*: The identities of the reviewers and the authors are not concealed.

Peer Review for Conferences

The publication process of a professional conference is similar to but often simpler than the process for a scholarly journal. The top-rated papers based on peer reviews of a conference may be transferred to a journal for consideration (Figure 9.6a). Sometimes, this path is called a “fast track.” It is often the case when a conference belongs to the same association or organization of a scholarly journal. Most reputable conferences, such as those organized by ASME, IEEE, International Academy for Production Engineering (CIRP), and Society of Manufacturing Engineers (SME), publish their proceedings of full-length manuscripts.

Review Comment and Response

Recommendation This paper is Acceptable (Suggested changes (changes not mandatory)) , for publication as Full research paper. The quality of the paper is Average .
Recommendation This paper is Not Acceptable (Revision required; resubmit as Tech. Brief) . The quality of the paper is Inferior .

Outcomes from the peer review

- This research work is well done experimentally. However, there are a few typos in the manuscript. For example, Table 4 is mistakenly captioned as Table 3.
- I cannot recognize the necessary details in Figure 3. Probably the author can add or extend the figure to show the detail, which may be helpful in understanding the equipment actions.
- In equation (2), how did the authors decide the values of the parameters k and n ? Are the test results sensitive to these values?
- The numerous spelling and grammar mistakes in the manuscript made it difficult to read.
- In the literature review, the authors cited several papers relating to one of the subjects. However, the reason for doing so and the relation to the work is not clearly established.
- Authors should describe how the outputs are compared with an appropriate interpretation.
- Did you match the theoretical way of optimization with some experiments to validate the results? Please round up your work.

Obviously, authors must carefully analyze feedback and think about how to respond the reviewers' comments and questions.

- Revise the manuscript based on the agreed comments
- Stick to the facts and avoid blaming reviewers when rebutting

Even if we agree to revise, we do not need to agree with all of the reviewers' viewpoints and suggestions. If we disagree with a referee on one point, we should politely explain and justify our position to convince the editor the validity of our viewpoint. We may say, "Thank you for your time and comments. However, we are afraid that we do not fully agree with your second comment because ..."

We must make sure all the comments received from the journal have been addressed, either incorporated into the revision or explained as a rebuttal with a point-to-point responsive correspondence or rebuttal to the reviewer's comments.

Rejected Paper

Discussed above, a paper acceptance decision is mainly based on the results of peer reviews. It is fair to say that a peer review can be subjective and related to reviewer's background, in addition to their limited information about the research reported in a paper. In other words, we should not expect reviewer's viewpoints to be perfectly correct.

If we feel that our manuscript was unfairly or carelessly treated by reviewers, we may send an email to EIC to explain and politely request for a second run review with different referees. AE and/or EIC will review the situation again and respond with their decision.

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If a manuscript is not fully in line with the aims and scope of the journal, the manuscript can be rejected from the editor without being sent out for peer review, which is called desk rejection. For example, an EIC may say, “Albeit in an area of great importance and interest, your paper is not well aligned with the scope and the areas of interest of the readership of the journal.” More than one-third of manuscripts are rejected before peer review for high-quality journals. A desk rejection is not necessarily related to the manuscript quality but can be due to the type or focus of the research reported.

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