Dogmas In Academic Research, And Research Article Publications That Needs Corrective Thinking And Measures In India

Suresh Borkar [1] and Aman Borkar [2]

1. Dr. Borkar's Laboratory and Research Centre, Endeavour Scientific Agriculture, 103, Prestige Point Building, In front of Nashik Road Police Station, Nashik, 422101, Maharashtra state, India.
2. Delhi Skill and Entrepreneurship University, Dwarka, New Delhi, India

Abstract

Research, inventions, development of technologies, and subject knowledge in any faculties has contributed tremendously to the progress and uplift of human being world-over. Most of the centres of higher education and research, add to the current knowledge on the subject through the research and research articles publications. One estimate puts the count at 108 million research articles published each year, in about 28,000 journals. These research papers are contributed by the research students and faculties in the universities, research institutes, and higher places of learning, and can be categorized as original research, contributory research, and Xerox research which are published in quality research journals or predatory research journals. The quality of research papers and publishing journals are issues nowadays discussed very widely among academicians in universities/institutes and in the selection boards at state and national levels.

The quality of research papers can be correlated with the university ranking world over. Quacquarelli Symonds (QS) world university ranking of 2023, based on 1500 institutions from around the world indicated that in the top 100 ranked universities of the world, the Indian universities/Institutes did not find a place. Among the top 200 universities/institutes, India has only 3 institutes, while the USA has 45, the UK 26, Australia 14, Germany 11, and Japan 9 indicating that India lacks far behind in the education and research standards though India is demographically bigger country with more number of universities/institutes than UK, Australia, Germany and Japan, and these countries have more number of yearly research publication than India. The reason to analyse this and the corrective measures are inevitable to uplift the research and research publication standard in the nation. There is a need to set up research publication cells with publication grants at individual university levels. Similarly, there is a need to have a national portal of important research problems for allocation to doctoral degree students at the national level, and a national portal for thesis titles submitted for higher degrees. All these are lacking in the nation at present.

In this paper, we summarized the dogmas in research, research article publications, and various terminologies used in the research article publication perspective. All these needs corrective thinking and measures in India, which have to be considered by academicians, universities, and policymakers, to make a competitive environment for the research and researcher and research article publication.

Keywords: Research Journal, Research article, national portal, parity in research quality, Original research, contributory research, Xerox research, Predatory journals, APC, Publication policies, and publication business politics.

Introduction

Why our universities don't stand among the first 100 universities in the world is a big question to many minds (Anonymous, 2022). When we compare the research programs and research articles of foreign universities with Indian universities, it is un-comparable most of the time. Even within the nation, there is a disparity in the nature and quality of research carried out among the different universities, particularly for the same degree in a given subject. The national institutes and premier institutions have better, original, or advanced research topics than the other universities for the same degree. However, at the national level, the same degree from all the universities is treated equally for their weightages, though the quality of the thesis work submitted to obtain it may be different. This disparity needs to be resolved at the national level. Before some decades, only good quality research was published in national and foreign journals. But nowadays sub-standard research is also published in several journals by charging money and research publication has become a business for some publication houses and the need to publish or peril by the scientific communities has fuelled this business. This is a serious issue in the academic and research field and needs immediate attention.

Writing a research paper for its publication is an art and skill of presentation of the research finding, and observations noted during the experimentations. These experimentation/experiments can be of 3 types. One is where you have your own idea/hypothesis/concept on which you have conducted the experiment and observed the result. To write the research article, in this case, you do not have any directly supporting references to quote in support of your finding and have to depend on some scanty far-off related references. This can be the original or basic research that gives direction to others in this research field. Second, where you use someone else finding to further research in that field and contribute further details on that topic. This can be termed contributory research. The third one is where you follow someone else research to approve his finding. Half of the research carried out in the country is of this type. This can be termed Xerox research.

The number of publications of a person in original/contributory/Xerox research shows the academic/scientific capabilities of the concerned person. An organization that produced mainly original and contributory research papers is always the best centre of teaching and learning in the world. Those centres which have genius academicians and manpower with them certainly excel in the development of science & Technology. The research papers from such institutions are always of a high standard and published in very reputable journals. These reputed journals are those that consider only original or contributory papers which are peer-reviewed by the world's renowned academician/scientist and approved for publication. Thus, the paper's quality can be assessed from the journal where it is published.

However, in recent years several publication houses and agencies entered in the research publication job making it a big market for money sprinting. One estimate puts the count at 108 million articles published each year, in about 28,000 journals. As of 2014, there were approximately 28,100 active scholarly peer-reviewed journals. Add to this the increasing number of predatory or fake scientific journals, which produce high volumes of poor-quality research, and you have a veritable jungle of journals to wade through. Arif Jinha (2010) at the University of Ottawa has estimated that the number of journal articles published since time began is about 50 million. This estimate is based on what has been published since 1665 when the journal Philosophical transactions of the Royal Society first started.

2. Case Studies

2.1. Research and Research topics for higher degrees

Under the top world universities list of 100 universities, no Indian university finds its place. Several parameters like academic staff, laboratories, instrument cells, libraries, student facilities, course curriculum, campus infrastructure, educational and research environment, research output, and its standard are considered in the assessment of the ranking of the universities. As these are the places of higher learning and research, the quality of research and research topics for higher degrees is always an issue in the nation. Different universities may be the central universities or state universities (under the aegis of the university

grant commission), the premier agricultural institutes or state agricultural universities (under the aegis of ICAR), the medical institutes (under the aegis of ICMR), the institutes of Science and Technologies (under the aegis of CSIR) or the institutes of engineering and technology (under the aegis of AICTE) award the master of Science and Doctorate of Philosophy degrees by such individual university/ institute based on the research completed in these universities. The individual university with the expertise of the research guide and board of studies approves the research topic of the student for the particular degree, many a time without assessing the contribution and need of such research topics for the science and society or nation. Sometimes, in the same university other faculty is unaware of the research topics in other departments for the degrees. The same type of research work is carried out by some departments for several years due to their restricted expertise which lacks good and quality thesis work.

It is a time to have a national portal by the respective central councils like UGC, ICAR, ICMR, CSIR, or AICTE to enlist the research topics to be worked on for the award of Master and Doctorate degrees by the aspiring candidates in the country. These topics should be suggested by the universities in the country and approved in the respective council by the committee of experts to enlist them on their national portal. Once such topics are selected by the aspiring candidates, they should be directed to register in the respective universities, that have given the topic, for their degrees. Those students who select the topics from the national portal should be given fellowships for their thesis work by the concerned councils. This system will bring parity in the quality of research at the national level to the same degree.

The research carried out on such important topics to the nation will have an outstanding contribution and some good quality research papers.

Research publications during 1970-2000

Some premier Indian institutes always have quality research and research publications. Research publication during these periods was mainly through printed journals of the concerned academic/scientific societies. No publication houses were involved in the publication of these journals and the university's printing press or some private printing press was hired by the scientific societies for the publication of their journals. During these periods, the author of the paper needs to be an annual member, or a life member of the concerned societies publishing such journals, and to become such a member one has to pay the membership fees. Some of the journals used to charge publication fees on the basis of pages or per-page charges. Besides, one has to pay for the reprints of the published paper, if the author needs it.

Research paper writing was a tedious job during this period, as the researcher has to sit in libraries for month-to-gather to collect the related references to be cited in their paper. No internet with ready references, as of today, was available during this period. Few abstracting journals, where one can find the abstracts, were available in a few well-known libraries, and students and researchers have to travel to such libraries for getting their references.

The research papers used to be typed on a type-writer, figures used to be prepared by the artist, photos by photographers, and the papers were despatched by registered post to the editors of the journals. All communications, corrections, and galley proofreading were through the post offices only and used to take a long period. Some journals were quarterly, others six monthly. Every month, there was no volume of the journal, besides a few western journals like Nature and Science.

There was no rating of the journal, impact factor of the journal and so many terminologies used in the journal publishing world as of today. There were only two kinds of publication i.e in Indian journals or in foreign journals. Good quality or advanced research papers were sought by the different scientists of far-off places by reprint request. Those who receive maximum requests for their reprints from foreign countries were thought to be good research workers.

With the advancement of computer education, and its utilization in universities, and in the publication sector, the research article publication is completely changed.

Research publication after 2000 onwards

Due to ease in the research article preparation and its publication, the quantum of published research articles and their availability on the internet has increased tremendously. The world's total number of scientific journal articles was estimated at 2.52 million in 2018 which increased in 2020 to 4.23 million (table 1). The top 5 countries (China, USA, UK, India, and Germany) account for 45 % of it, while the next 5 countries (Italy, Japan, Canada, Russia, and France) account for 14 % of it, and the rest 217 countries has only 41 % share in research article publication.

Table.1. List of countries by the number of scientific and technical journal articles in 2020.

Rank	Country	Number of scientific Publication (in millions)	Scientific publication Per capita(in ppm)
1	China	7,44,042	524
2	USA	6,24,554	1875
3	United kingdom	1,98,500	2959
4	India	191,590	138
5	Germany	1,74,524	2097
6	Italy	1,27,502	2159
7	Japan	1,27,408	1016
8	Canada	1,21,111	3184
9	Russia	1,19,195	819
10	France	1,12,838	1664
	227 countries of the World	4,23,6262	

Source: Scopus (1). www.scimagojr.com

These research articles are published in well-known journals or in a lesser-known journals of low quality or in so-called predatory journals.

Most of the research journals are published by well-known publishers of the world and the top five publication houses had a 40 percent share in the number of research journals (table.2) whose research articles are thought of as quality research publications.

Table 2. Top 10 publishers of research papers

Rank	Publisher	No. of Journals	Predatory status
1	Springer	3,763	-
2	Taylor & Francis	2,912	-
3	Elsevier	2,674	-
4	Wiley	1,691	-
5	SAGE	1,208	-
6	OMICS	705	Yes
7	De Gruyter	513	-
8	Oxford University Press	500	-
9	InderScience	472	-
10	Brill	461	-

However, as per the available data, there are at least 30 publishers with 4486 research journals that are designated as predatory research journals (table 3), and publication in such journals is not considered as a research article in Indian universities, though both publishers (known to be non-predatory and predatory publishers) charges the publication fees for the online publication (open access journals) to the authors.

Table 3. Publisher with Predatory Nature

Sr. No	Publisher	No. of Journals	Country of Operation
1	OMICS	705	Hyderabad, India
2	Science Publishing Group	273	It has an address in New York City but is actually based in Pakistan
3	SCIRP	247	Wuhan, China
4	Austin Publishing Group	202	It has addresses in Irving, Texas, USA; in Amsterdam, the Netherlands; and in Tokyo, Japan. But is actually based in Hyderabad, India
5	Bentham	201	Originally incorporated in the Netherlands. Now a multinational operating in the USA, Netherlands, Spain, India, China, UK, and Pakistan.
6	Open Access Pub	198	Based in different countries
7	Longdom	190	Barcelona, Spain
8	Gavin Publishers	160	Hyderabad, India
9	iMedPub	163	London, United Kingdom
10	JSciMedCentral	147	Hyderabad, India
11	Hans Publishers	137	New Delhi, India
12	Advanced Research Publications	135	NCR region Delhi, India
13	Open Access Text (OAT)	134	Based in United Kingdom
14	Hilaris	125	Brussels, Belgium
15	Academic Journals	125	Lagos, Nigeria
16	Science and Education Publishing	125	Netherland
17	Sciencedomain International	122	Hooghly, Kolkata
18	Peertechz Publication	101	Hyderabad, India
19	Medcrave	93	Edmond, Oklahoma, USA
20	SciTechnol	92	London, United Kingdom
21	IOS Press	89	Headquarter in Amsterdam with satellite offices in the USA, Germany and China
22	Internet Scientific Publication	86	Texas, USA
23	International Scholars Journals	83	NY, USA; Lagos, Nigeria
24	Annex Publishers	82	Virginia, USA
25	Open Access Journals	81	Based in different countries
26	Herbert Publications	81	Secunderabad, India
27	Medwin Publishers LLC	79	Michigan, USA
28	Premier Publisher	78	New York, USA

29	Pulsus Group	76	Headquarter at London, UK with offices in Ontario, Canada and Hyderabad, India.
30	Scholarena	76	Warrensburg, USA
	Total	4,486	

Source: Nishikawa –Pacher, A. (2022); and Wikipedia.org

With the advancement of the research article publication business, there are several terminologies used in the research publication world, which need to be understood and analysed.

2.3.1. Terminology used for/in the research publication

2.3.1.1. Academic journal: An academic journal or **scholarly journal** is a periodical publication in which research articles relating to a particular academic discipline is published. Academic journals serve as permanent and transparent forums for the presentation, scrutiny, and discussion of research. They nearly universally require peer review or another scrutiny from contemporaries competent and established in their respective fields. Content typically takes the form of articles presenting original research, review articles, or book reviews.

The term *academic journal* applies to scholarly publications in all fields; The first academic journal was *Journal des sçavans* (January 1665), followed soon after by *Philosophical Transactions of the Royal Society* (March 1665), and *Mémoires de l'Académie des Sciences* (1666). The first fully peer-reviewed journal was *Medical Essays and Observations* (1733). The purpose of an academic journal, according to Henry Oldenburg (the first editor of *Philosophical Transactions of the Royal Society*), is to give researchers a venue to "impart their knowledge to one another, and contribute what they can to the Grand design of improving natural knowledge, and perfecting all Philosophical Arts, and Sciences

2.3.1.2. Scientific Journal: In academic publishing, a **scientific journal** is a periodical publication intended to further the progress of science, usually by reporting new research. Articles in scientific journals are mostly written by active scientists such as students, researchers, and professors instead of professional journalists. There are thousands of scientific journals in publication. Most journals are highly specialized, although some of the oldest journals such as *Nature* publish articles and scientific papers across a wide range of scientific fields.

Scientific journals contain articles that have been peer-reviewed, in an attempt to ensure that articles meet the journal's standards of quality and scientific validity. The publication of the results of the research is an essential part of the scientific method. If they are describing experiments or calculations, they must supply enough details that an independent researcher could repeat the experiment or calculation to verify the results. Each such journal article becomes part of the permanent scientific record.

2.3.1.3. **Electronic Journal**: An e-journal closely resembles a print journal in structure; there is a table of contents that lists the articles, and many electronic journals still use a volume/issue model, although some titles now publish on a continuous basis. Online journal articles are a specialized form of the electronic document; they have the purpose of providing material for academic research and study, and they are formatted approximately like journal articles in traditional printed journals. Often a journal article will be available for download in two formats - as a PDF and in HTML format, although other electronic file types are often supported for supplementary material. Articles are indexed in bibliographic databases, as well as by search engines. E-journals allow new types on content to be included in journals, for example video material, or the data sets on which research has been based.

With the growth and development of the Internet, there has been a growth in the number of new journals, especially in those that exist as digital publications only. A subset of these journals exist as Open Access titles, meaning that they are free to access for all, and have Creative Commons licences which permit the reproduction of content in different ways. High quality open access journals are listed in Directory of Open Access Journals. Most of these however continue to exist as subscription journals, for which libraries, organisations and individuals purchase access.

2.3.1.4. Article Type: There are several types of journal article; the exact terminology and definitions vary by field and specific journal, but often includes:

a. Letters (also called *communications*, and not to be confused with *letters to the editor*): Letters are short descriptions of important current research findings that are usually fast-tracked for immediate publication because they are considered urgent.

b. Research notes: Research notes are short descriptions of current research findings that are considered less urgent or important than *Letters*.

c. Articles: Articles are usually between five and twenty pages and are complete descriptions of current original research findings, but there are considerable variations between scientific fields and journals—80-page articles are not rare in mathematics or theoretical computer science.

I. Supplemental article: It contain a large volume of tabular data that is the result of current research and may be dozens or hundreds of pages with mostly numerical data. Some journals now only publish this data electronically on the Internet. Supplemental information also contains other voluminous material not appropriate for the main body of the article, like descriptions of routine procedures, derivations of equations, source code, non-essential data, spectra or other such miscellaneous information.

II. Scholarly article: There are two kinds of article or paper submissions in academia: **solicited,** where an individual has been invited to submit work either through direct contact or through a general submissions call, and **unsolicited,** where an individual submits a work for potential publication without directly being asked to do so.

Upon receipt of a submitted article, editors at the journal determine whether to reject the submission outright or begin the process of peer review. In the latter case, the submission becomes subject to review by outside scholars of the editor's choice who typically remain anonymous. The number of these peer reviewers (or "referees") varies according to each journal's editorial practice – typically, no fewer than two, though sometimes three or more, experts in the subject matter of the article, who produce reports on the content, style, suitability for publication and other factors, which form the editors' publication decisions. Though these reports are generally confidential, some journals and publishers also practice public peer review,   where the name of the peer reviewer is mentioned in the box at the beginning of the paper itself. The editors either choose to reject the article, ask for a revision and resubmission, or accept the article for publication. Even accepted articles are often subjected to further (sometimes considerable) editing by journal editorial staff before they appear in print. The peer review can take from several weeks to several months.

III. Review articles: This do not cover original research but rather accumulate the results of many different *articles* on a particular topic into a coherent narrative about the state of the available information in that field. Review articles provide information about the topic and also provide journal references to the original research. Reviews may be entirely narrative, or may provide quantitative summary estimates resulting from the application of meta-analytical methods.

Review articles, also called "reviews of progress," are checks on the research published in journals. Some journals are devoted entirely to review articles, like Annual Review of Phytopathology; some contain a few in each issue, sometimes Mini-Reviews, and others do not publish review articles. Such reviews often cover the research from the preceding year, some for longer or shorter terms; some are devoted to specific topics, some to general surveys. Some reviews are enumerative, listing all significant articles in a given subject; others are selective, including only what they think worthwhile. Yet others are evaluative, judging the state of progress in the subject field. Some journals are published in series, each covering a complete subject field year, or covering specific fields through several years. Unlike original research articles, review articles tend to be solicited or "peer-invited" submissions, often planned years in advance, which may themselves go through a peer-review process once received. They are typically relied upon by students beginning a study in a given field, or for current awareness of those already in the field.

IV. Data papers: These are articles dedicated to describe datasets. This type of article is becoming popular and journals exclusively dedicated to them have been established, e.g. *Scientific Data* and *Earth System Science Data*.

V. Video papers: These are a recent addition to practice of scientific publications. They most often combine an online video demonstration of a new technique or protocol combined with a rigorous textual description.

In addition to the above, some scientific journals such as *Science* will include a news section where scientific developments (often involving political issues) are described. These articles are often written by science journalists and not by scientists. In addition, some journals will include an editorial section and a section

for letters to the editor. While these are articles published within a journal, in general they are not regarded as scientific journal articles because they have not been peer-reviewed.

2.3.1.5. Copyright: Traditionally, the author of an article was required to transfer the copyright to the journal publisher. Publishers claimed this was necessary in order to protect authors' rights, and to coordinate permissions for reprints or other use. However, many authors, especially those active in the open access movement, found this unsatisfactory, and have used their influence to effect a gradual move towards a license to publish instead. Under such a system, the publisher has permission to edit, print, and distribute the article commercially, but the authors retain the other rights themselves.

Even if they retain the copyright to an article, most journals allow certain rights to their authors. These rights usually include the ability to reuse parts of the paper in the author's future work, and allow the author to distribute a limited number of copies. In the print format, such copies are called reprints; in the electronic format, they are called post-prints.

2.3.1.6. Cost of publication / journals: Many scientists and librarians have long protested the cost of journals, especially as they see these payments going to large for-profit publishing houses. To allow their researchers online access to journals, many universities purchase *site licenses*, permitting access from anywhere in the university, and, with appropriate authorization, by university-affiliated users at home or elsewhere. These may be quite expensive, sometimes much more than the cost for a print subscription, although this may reflect the number of people who will be using the license—while a print subscription is the cost for one person to receive the journal; a site-license can allow thousands of people to gain access.

Publications by scholarly societies, also known as not-for-profit-publishers, usually cost less than commercial publishers, but the prices of their scientific journals are still usually several thousand dollars a year. In general, this money is used to fund the activities of the scientific societies that run such journals, or is invested in providing further scholarly resources for scientists; thus, the money remains in and benefits the scientific sphere.

Concerns about cost, the open access system of publication have led to the creation of free-access journals or open access journals such as the Public Library of Science (PLoS) family and partly open or reduced-cost journals such as the *Journal of High Energy Physics*. However, professional editors still have to be paid, and PLoS still relies heavily on donations from foundations to cover the majority of its operating costs; smaller journals do not often have access to such resources.

2.3.1.7. Open access (OA): Open access (OA) is a set of principles and a range of practices through which research outputs are distributed online, free of access charges or other barriers. With open access strictly defined (according to the 2001 definition), or libre open access, barriers to copying or reuse are also reduced or removed by applying an open license for copyright.

The main focus of the open access movement is "peer reviewed research literature". Historically, this has centered mainly on print-based academic journals, whereas non-open access journals cover publishing costs through access tolls such as subscriptions, site licenses or pay-per-view charges.

Open-access journals are characterised by funding models which do not require the reader to pay to read the journal's contents, relying instead on author fees or on public funding, subsidies and sponsorships. Open access can be applied to all forms of published research output, including peer-reviewed and non- peer-reviewed academic journal articles, conference papers, thesis, book chapters, monographs, research reports and images.

Since the revenue of most open access journals is earned from publication fees charged to the authors, OA publishers are motivated to increase their profits by accepting low-quality papers and by not performing thorough peer review.

On the other hand, the prices for OA publications in the most prestigious journals have exceeded 5,000 US$, making such publishing model unaffordable to a large number of researchers and researchers from developing countries. The hue and cry about increase in publishing cost has been called the "Open-Access Sequel to [the] Serials Crisis". The emergence of open science or open research has brought to light a number of controversial and hotly-debated topics.

Scholarly publishing invokes various positions and passions. For example, authors may spend hours struggling with diverse article submission systems, often converting document formatting between a multitude of journal and conference styles, and sometimes spend months waiting for peer review results. The drawn-out and often contentious societal and technological transition to Open Access and Open Science/Open Research, particularly across North America and Europe (Latin America has already widely adopted "Acceso Abierto" since before 2000) has led to increasingly entrenched positions and much debate.

The area of (open) scholarly practices increasingly see a role for policy-makers and research funders giving focus to issues such as career incentives, research evaluation and business models for publicly funded research. Plan S and AmeliCA (Open Knowledge for Latin America) caused a wave of debate in scholarly communication in 2019 and 2020.

There are different models of open access publishing and publishers may use one or more of these models particularly colour naming system. The most commonly recognised names are "green", "gold", and "hybrid" open access; however, a number of other models and alternative terms are also used.

a. Gold OA

In the gold OA model, the publisher makes all articles and related content available for free immediately on the journal's website. In such publications, articles are licensed for sharing and reuse via Creative Commons licenses (CCL). Almost all gold OA publishers charge an article processing charge (APC), which is typically paid through institutional or grant funding. The majority of gold open access journals charging APCs follow an "author-pays" model, although this is not an intrinsic property of gold OA.

b. Green OA

Self-archiving by authors is permitted under green OA. Independently from publication by a publisher, the author also posts the work to a website controlled by the author, the research institution that funded or hosted the work, or to an independent central open repository, where people can download the work without paying.

Green OA is gratis for the author. Some publishers (less than 5% and decreasing as of 2014) may charge a fee for an additional service such as a free license on the publisher-authored copyrightable portions of the printed version of an article. If the author posts the near-final version of their work after peer review by a journal, the archived version is called a "post-print". This can be the accepted manuscript as returned by the journal to the author after successful peer review.

c. Hybrid OA

Hybrid open-access journals contain a mixture of open access articles and closed access articles. A publisher following this model is partially funded by subscriptions, and only provide open access for those individual articles for which the authors (or research sponsor) pay a publication fee.[ ] Hybrid OA generally costs more than gold OA and can offer a lower quality of service. A particularly controversial practice in hybrid open access journals is "double dipping", where both authors and subscribers are charged.

d. Bronze OA

Bronze open access articles are free to read only on the publisher page, but lack a clearly identifiable license. Such articles are typically not available for reuse.

e. Diamond/platinum OA

Journals which publish open access without charging authors article processing charges are sometimes referred to as diamond or platinum OA. Since they do not charge either readers or authors directly, such publishers often require funding from external sources such as the sale of advertisements, academic institutions, learned societies, philanthropists or government grants. Diamond OA journals are available for most disciplines, and are usually small (<25 articles per year) and more likely to be multilingual (38%).

f. Black OA

The growth of unauthorized digital copying by large-scale copyright infringement has enabled free access to paywalled literature. This has been done via existing social media sites (e.g. the #ICanHazPDF hashtag) as well as dedicated sites (e.g. Sci-Hub). In some ways this is a large-scale technical implementation of pre-existing practice, whereby those with access to paywalled literature would share copies with their contacts.

2.3.1.8. Gratis and libre

Similar to the free content definition, the terms 'gratis' and 'libre' were used in the Budapest Open Access Initiative (BOAI) definition to distinguish between free to read versus free to reuse. Gratis open access refers to online access free of charge, and libre open access refers to online access free of charge plus some additional re-use rights. Libre open access covers the kinds of open access defined in the Budapest Open Access Initiative , the Bethesda Statement on Open Access Publishing and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities. The re-use rights of libre OA are often specified by various specific Creative Commons licenses; all of which require as a minimum attribution of authorship to the original authors. In 2012, the number of works under libre open access was considered to have been rapidly increasing for a few years, though most open-access mandates did not enforce any copyright license and it was difficult to publish libre gold OA in legacy journals. However, there are no costs nor restrictions for green libre OA as preprints

can be freely self-deposited with a free license, and most open-access repositories use Creative Commons licenses to allow reuse.

2.3.1.9. FAIR

FAIR is an acronym for 'findable, accessible, interoperable and reusable', intended to more clearly define what is meant by the term 'open access' and make the concept easier to discuss. Initially proposed in March 2016, it has subsequently been endorsed by organisations such as the European Commission and the G20.

2.3.1.10. Licenses

Subscription-based publishing typically requires transfer of copyright from authors to the publisher so that the latter can monetise the process via dissemination and reproduction of the work. With OA publishing, typically authors retain copyright to their work, and license its reproduction to the publisher. Retention of copyright by authors can support academic freedoms by enabling greater control of the work (e.g. for image re-use) or licensing agreements (e.g. to allow dissemination by others).

The most common licenses used in open access publishing are Creative Commons CC). The widely used CC BY license is one of the most permissive, only requiring attribution to be allowed to use the material (and allowing derivations, commercial use). A range of more restrictive creative commons licenses are also used. More rarely, some of the smaller academic journals use custom open access licenses. Some publishers (e.g. Elsevier) use "author nominal copyright" for OA articles, where the author retains copyright in name only and all rights are transferred to the publisher.

2.3.1.11. Funding

Since open access publication does not charge readers, there are many financial models used to cover costs by other means. Open access can be provided by commercial publishers, who may publish open access as well as subscription-based journals, or dedicated open-access publishers such as Public Library of Science (PLOS) and BioMed Central. Another source of funding for open access can be institutional subscribers. One example of this is the Subscribe to Open publishing model introduced by Annual Reviews; if the subscription revenue goal is met, the given journal's volume is published open access.

Advantages and disadvantages of open access have generated considerable discussion amongst researchers, academics, librarians, university administrators, funding agencies, government officials, commercial publishers, editorial staff and society publishers. Reactions of existing publishers to open access journal publishing have ranged from moving with enthusiasm to a new open access business model, to experiments with providing as much free or open access as possible, to active lobbying against open access proposals. There are many publishers that started up as open access-only publishers, such as PLOS, Hindawi Publishing Corporation, Frontiers in... journals, MDPI and BioMed Central.

2.3.1.12. Article processing charges (APC)

Some open access journals (under the gold, and hybrid models) generate revenue by charging publication fees in order to make the work openly available at the time of publication. The money might come from the author but more often comes from the author's research grant or employer. While the payments are typically incurred *per article published* (e.g. BMC or PLOS journals), some journals apply them *per manuscript submitted* (e.g. *Atmospheric Chemistry and Physics* until recently) or *per author* (e.g. Peer J).

Charges typically range from $1,000–$3,000 ($5,380 for Nature Communications), but can be under $10 or over $5,000. APCs vary greatly depending on subject and region and are most common in scientific and medical journals (43% and 47% respectively), and lowest in arts and humanities journals (0% and 4% respectively). APCs can also depend on a journal's impact factor. Some publishers (e.g. e Life and Ubiquity Press) have released estimates of their direct and indirect costs that set their APCs. Hybrid OA generally costs more than gold OA and can offer a lower quality of service. A particularly controversial practice in hybrid open access journals is "double dipping", where both authors and subscribers are charged.

By comparison, journal subscriptions equate to $3,500–$4,000 per article published by an institution, but are highly variable by publisher (and some charge page fees separately). This has led to the assessment that there is enough money "within the system" to enable full transition to OA. However, there is ongoing discussion about whether the change-over offers an opportunity to become more cost-effective or promotes more equitable participation in publication. Concern has been noted that increasing subscription journal prices will be mirrored by rising APCs, creating a barrier to less financially privileged authors.

The inherent bias of the current APC-based OA publishing perpetuates this inequality through the 'Matthew effect' (the rich get richer and the poor get poorer). The switch from pay-to-read to pay-to-publish has left essentially the same people behind, with some academics not having enough purchasing power (individually or through their institutions) for either option. Some gold OA publishers will waive all or part of the fee for authors from less developed economies. Steps are normally taken to ensure that peer reviewers do not know whether authors have requested, or been granted, fee waivers, or to ensure that every paper is approved by an

independent editor with no financial stake in the journal. The main argument against requiring authors to pay a fee, is the risk to the peer review system, diminishing the overall quality of scientific journal publishing. Though the OA journals charges APC form the authors, a share of the amount is never transferred to the peer reviewer of the paper for his work. The peer reviewer in such case are freely available scientific labours.

2.3.1.13. Subsidized or no-fee

No-fee open access journals, also known as "platinum" or "diamond" do not charge either readers or authors. These journals use a variety of business models including subsidies, advertising, membership dues, endowments, or volunteer labour. Subsidising sources range from universities, libraries and museums to foundations, societies or government agencies. Some publishers may cross-subsidise from other publications or auxiliary services and products. For example, most APC-free journals in Latin America are funded by higher education institutions and are not conditional on institutional affiliation for publication.

Estimates of prevalence vary, but approximately 10,000 journals without APC are listed in DOAJ and the Free Journal Network. APC-free journals tend to be smaller and more local-regional in scope. Some also require submitting authors to have a particular institutional affiliation.

2.3.1.14. Archiving

The "green" route to OA refers to author self-archiving, in which a version of the article (often the peer-reviewed version before editorial typesetting, called "post-print") is posted online to an institutional and/or subject repository. This route is often dependent on journal or publisher policies, which can be more restrictive and complicated than respective "gold" policies regarding deposit location, license, and embargo requirements. Some publishers require an embargo period before deposition in public repositories, arguing that immediate self-archiving risks loss of subscription income.

2.3.1.15. Embargo periods

Embargoes are imposed by 20 to 40% of journals, during which time an article is pay-walled before permitting self-archiving (green OA) or releasing a free-to-read version (bronze OA). Embargo periods typically vary from 6–12 months in STEM and >12 months in humanities, arts and social sciences. Embargo-free self-archiving has not been shown to affect subscription revenue, and tends to increase readership and citations. Embargoes have been lifted on particular topics for either limited times or ongoing (e. g. Zika outbreaks or indigenous health). Plan S includes zero-length embargoes on self-archiving as a key principle.

2.3.1.16. Pay-Walls:
A paywall is a mechanism for restricting access to content, especially news and research papers, and offer it via purchase or paid subscriptions. More broadly, paywalls can also be seen as a form of value exchange between a publisher and its audience. Paywalls, which restrict access to content without a paid subscription, represent a common practice used by academic publishers to block access to scientific research for those who have not paid. The paywall is part of exploiting that monopoly of academic publisher to generate profits.

2.3.1.17. Readership

OA articles are generally viewed online and downloaded more often than pay-walled articles and that readership continues for longer. Readership is especially higher in demographics that typically lack access to subscription journals (in addition to the general population, this includes many medical practitioners, patient groups, policymakers, non-profit sector workers, industry researchers, and independent researchers). OA articles are more read on publication management programs such as Mendeley. Open access practices can reduce publication delays, an obstacle which led some research fields such as high-energy physics to adopt widespread preprint access.

2.3.1.18. Article impact

Since published articles report on research that is typically funded by government or university grants, the more the article is used, cited, applied and built upon, the better for research as well as for the researcher's career.

Some professional organizations have encouraged use of open access: in 2001, the International Mathematical Union communicated to its members that "Open access to the mathematical literature is an important goal" and encouraged them to "[make] available electronically as much of our own work as feasible" to "[enlarge] the reservoir of freely available primary mathematical material, particularly helping scientists working without adequate library access".

2.3.1.19. Citation rate

A main reason authors make their articles openly accessible is to maximize their citation impact. Open access articles are typically cited more often than equivalent articles requiring subscriptions. This 'citation advantage' was first reported in 2001. Two major studies dispute this claim, however the consensus of multiple studies support the effect, with measured OA citation advantage varying in magnitude between 1.3-fold to 6-fold depending on discipline.

Citation advantage is most pronounced in OA articles in hybrid journals (compared to the non-OA articles in those same journals), and with articles deposited in green OA repositories. Notably, green OA articles show similar benefits to citation counts as gold OA articles. Articles in gold OA journals are typically cited at a similar frequency to pay-walled articles.

2.3.1.20. **Citation index**: A citation index is a kind of bibliographic index, an index of citations between publications, allowing the user to easily establish which later documents cite which earlier documents. In 1961, Eugene Garfield's Institute for Scientific Information (ISI) introduced the first citation index for papers published in academic journals, first the *Science Citation Index* (SCI), and later the *Social Sciences Citation Index* (SSCI) and the *Arts and Humanities Citation Index* (AHCI). American Chemical Society converted its printed Chemical Abstract Service (established in 1907) into internet-accessible SciFinder in 2008. The first automated citation indexing was done by CiteSeer in 1997 and was patented. Other sources for such data include Google Scholar, Microsoft Academic, Elsevier's Scopus, and the National Institutes of Health's *iCite*.

The general-purpose, subscription-based academic citation indexes include:

- Web of Science by Clarivate Analytics (previously the Intellectual Property and Science business of Thomson Reuters)
- Scopus by Elsevier, available online only, which similarly combines subject searching with citation browsing and tracking in the sciences and social sciences.

Each of these offer an index of citations between publications and a mechanism to establish which documents cite which other documents. They are not open-access and differ widely in cost: Web of Science and Scopus are available by subscription (generally to libraries). In addition, CiteSeer and Google Scholar are freely available online.

Several open-access, subject-specific citation indexing services also exist, such as:

- INSPIRE-HEP which covers high energy physics,
- PubMed, which covers life sciences and biomedical topics, and
- Astrophysics Data System which covers astronomy and physics.

2.3.1.21. Peer review processes

Peer review of research articles prior to publishing has been common since the 18th century. Commonly reviewer comments are only revealed to the authors and reviewer identities kept anonymous. The rise of OA publishing has also given rise to experimentation in technologies and processes for peer review. Increasing transparency of peer review and quality control includes posting results to preprint servers, pre-registration of studies open publishing of peer reviews, open publishing of full datasets and analysis code, and other open science practices. It is proposed that increased transparency of academic quality control processes makes audit of the academic record easier. Additionally, the rise of OA mega-journals has made it viable for their peer review to focus solely on methodology and results interpretation whilst ignoring novelty. Major criticisms of the influence of OA on peer review have included that if OA journals have incentives to publish as many articles as possible then peer review standards may fall (as aspect of predatory publishing), increased use of preprints may populate the academic corpus with un-reviewed junk and propaganda, and that reviewers may self-censor if their identity of open. Some advocates propose that readers will have increased skepticism of preprint studies - a traditional hallmark of scientific inquiry.

2.4. Predatory publishing

Predatory publishers present themselves as academic journals but use lax or no peer review processes coupled with aggressive advertising in order to generate revenue from article processing charges from authors. The definitions of 'predatory', 'deceptive', or 'questionable' publishers/journals are often vague, opaque, and confusing, and can also include fully legitimate journals, such as those indexed by PubMed Central. In this sense, Grudniewicz et al. (2019) proposed a consensus definition that needs to be shared: "Predatory journals and publishers are entities that prioritize self-interest at the expense of scholarship and are characterized by false

or misleading information, deviation from best editorial and publication practices, a lack of transparency, and/or the use of aggressive and indiscriminate solicitation practices."

In this way, predatory journals exploit the OA model by deceptively removing the main value added by the journal (peer review) and parasitize the OA movement, occasionally hijacking or impersonating other journals. The rise of such journals since 2010 has damaged the reputation of the OA publishing model as a whole, especially via sting operations where fake papers have been successfully published in such journals. Although commonly associated with OA publishing models, subscription journals are also at risk of similar lax quality control standards and poor editorial policies. OA publishers therefore aim to ensure quality via auditing by registries such as DOAJ, OASPA and SciELO and comply to a standardised set of conditions. A blacklist of predatory publishers is also maintained by Cabell's blacklist (a successor to Beall's List). Increased transparency of the peer review and publication process has been proposed as a way to combat predatory journal practices.

2.5. Open irony

Open irony refers to the situation where a scholarly journal article advocates open access but the article itself is only accessible by paying a fee to the journal publisher to read the article. This has been noted in many fields, with more than 20 examples appearing since around 2010, including in widely-read journals such as *The Lancet*, *Science* and *Nature*.

A Flickr group collected screenshots of examples. In 2012 Duncan Hull proposed the Open Access Irony award to publicly humiliate journals that publish these kinds of papers. Examples of these have been shared and discussed on social media using the hashtag #openirony (e.g. on Twitter). Typically these discussions are humorous exposures of articles/editorials that are pro-open access, but locked behind paywalls. The main concern that motivates these discussions is that restricted access to public scientific knowledge is slowing scientific progress. The practice has been justified as important for raising awareness of open access.

2.6. Databases and repositories

Multiple databases exist for open access articles, journals and datasets. These databases overlap, however each has different inclusion criteria, which typically include extensive vetting for journal publication practices, editorial boards and ethics statements. The main databases of open access articles and journals are DOAJ and PMC. In the case of DOAJ, only fully gold open access journals are included, whereas PMC also hosts articles from hybrid journals.

There are also a number of preprint servers which host articles that have not yet been reviewed as open access copies. These articles are subsequently submitted for peer review by both open access or subscription journals, however the preprint always remains openly accessible. A list of preprint servers is maintained at Research-Preprints.

For articles that are published in closed access journals, some authors will deposit a post-print copy in an open-access repository, where it can be accessed for free. Most subscription journals place restrictions on which version of the work may be shared and/or require an embargo period following the original date of publication. What is deposited can therefore vary, either a preprint or the peer-reviewed post-print, either the author's refereed and revised final draft or the publisher's version of record, either immediately deposited or after several years. Repositories may be specific to an institution, a discipline (e.g.arXiv), a scholarly society (e.g. MLA's CORE Repository), or a funder (e.g. PMC). Although the practice was first formally proposed in 1994, self-archiving was already being practiced by some computer scientists in local FTP archives in the 1980s (later harvested by CiteSeer). The SHERPA/RoMEO site maintains a list of the different publisher copyright and self-archiving policies and the ROAR database hosts an index of the repositories themselves.

2.6.1. Representativeness in proprietary databases

Uneven coverage of journals in the major commercial citation index databases (such as Web of Science, Scopus, and PubMed) has strong effects on evaluating both researchers and institutions (e.g. the UK Research Excellence Framework or Times Higher Education ranking). While these databases are primarily selected based on process and content quality, there has been concern that their commercial nature may skew their assessment criteria and representation of journals outside Europe and North America.

2.7. Copyright policies of academic publishers

Academic publishers fall broadly into two categories: subscription and open access, which take different approaches to copyright.

Subscription publishers typically require transfer of copyright ownership from the authors to the publisher, with the publisher monetising articles behind paywalls. The final version of an article as copyedited and typeset by the publisher is typically called the version of record. Such publishers sometimes allow certain rights to their

authors, including permission to reuse parts of the paper in the author's future work, to distribute a limited number of copies. In the print format, such copies are called reprints; in the electronic format, they are called post-prints.

Open access publishers allow authors to retain their copyright, but attach a reuse license to the work so that it can be hosted by the publisher and openly shared, reused and adapted. Such publishers are either funded by charging authors article processing fees (gold OA) or by being subsidised by a larger organisation (diamond OA).

2.7.1. **Pre-prints**

A "preprint" is typically a version of a research paper that is shared on an online platform prior to, or during, a formal peer review process. Preprint platforms have become popular due to the increasing drive towards open access publishing and can be publisher- or community-led. A range of discipline-specific or cross-domain platforms now exist.

The academic publishers will not publish work that has already been published elsewhere, so a key issue has been the interpretation of a pre-print server. Traditionally, academic have circulated pre-submission copies of their articles for informal feedback. However, open preprint servers since the 1990s increased the scale and visibility of this process and raised the question as to whether this constituted 'prior publication' or merely 'sharing'.

The majority of academic journal publishers now accept submission of articles that have already been shared as preprints, with copyright of this version remaining with the author by default. Such published research papers are generally considered as a book chapter by some publishers for their edited book, and further these publishers ask for the publication fees from the authors itself.

2.7.2. **Post-prints**

The sharing of post-prints (the last version of an article after peer review but before copyright is transferred to a publisher) has become increasingly permitted by academic journal publishers, typically after an embargo of 6-18 months. Journal policies are consolidated in the SHERPA/RoMEO database.

2.7.3. **Published articles**

The copyright of the final published version of record may reside with the authors or the publisher depending on the publisher's business model. For journals following a subscription model, where articles are accessed via a paywall, copyright is transferred from author to publisher. Sharing of the final formatted article is therefore typically never permitted.

The rise of 'gold' open access academic journals stands in contrast to this, where copyright is retained by the author and a reuse license (typically a creative commons variant) is applied.

2.8. **Mega Journal**:

A mega journal is a peer-reviewed academic open access journal designed to be much larger than a traditional journal by exercising low selectivity among accepted articles. It was pioneered by *PLOS ONE*. This "very lucrative publishing model" was soon emulated by other publishers.

It has the defining characteristics like broad coverage of different subject areas; accepting articles for publication based on whether they are technically sound rather than selecting for perceived importance; and using article processing charges to cover the costs of publishing.

Other less universal characteristics of mega-journals are an accelerated review and publication process; fast turnaround time; academic editors; even a large editorial board of academic editors, (instead of professional editors); and value-added services such as reusable graphics and data through Creative Commons licenses.

Mega journals are also online-only, with no printed version, and are fully open access, in contrast to hybrid open access journals. Some "predatory" open access publishers use the mega journal model.

Mega journals has certain influence in the publication business. It has been suggested that the academic journal landscape might become dominated by a few mega journals in the future, at least in terms of total number of articles published. Mega journals are also disrupting the market of article processing charges. Their business model may not motivate reviewers, who donate their time to "influence their field, gain exposure to the most current cutting edge research or list their service to a prestigious journal on their CVs. Finally, they may no longer serve as "fora for the exchange ... among colleagues in a particular field or sub-field", as traditionally happened in scholarly journals. To counter that indiscrimination, *PLOS ONE*, the prototypical mega journal, has started to package relevant articles into subject-specific collections.

2.9. Impact Factors of the Journal and Criteria of its determination

2.9.1. Citation Impact: Citation impact is a measure of how many times an academic journal article or book or author is cited by other articles, books or authors. Citation counts are interpreted as measures of the impact or influence of academic work and have given rise to the field of bibliometrics or scientometrics, specializing in the study of patterns of academic impact through citation analysis. The journal impact factor, the two-year average ratio of citations to articles published, is a measure of the importance of journals. It is used by academic institutions in decisions about academic tenure, promotion and hiring, and hence also used by authors in deciding which journal to publish in. Citation-like measures are also used in other fields that do ranking, such as Google's PageRank algorithm, software metrics, college and university rankings, and business performance indicators.

2.9.2. Citation index: A citation index is a kind of bibliographic index, an index of citations between publications, allowing the user to easily establish which later documents cite which earlier documents. A form of citation index is first found in 12th-century Hebrew religious literature.

Citation indexes allow researchers to trace the impact of an article upon later publications. Besides including the bibliographic information about an article (author, article title, journal title, date, etc.), citation indexes also provide each article's references or bibliography (the list of sources cited).

2.9.3. Journal ranking: Journal ranking is widely used in academic circles in the evaluation of an academic journal's impact and quality. Journal rankings are intended to reflect the place of a journal within its field, the relative difficulty of being published in that journal, and the prestige associated with it. They have been introduced as official research evaluation tools in several countries.

2.9.4. Eigenfactor: The Eigenfactor Score measures the number of times articles from the journal published in the past five years have been cited in the Journal Citation Reports (JCR) year. Like the Impact Factor, the Eigenfactor Score is essentially a ratio of number of citations to total number of articles.

To find a journal's Eigenfactor, Article Influence, or Normalized Eigenfactor score, go to the Journal Ranking Search page on the Eigenfactor website. From the Journal Ranking search page, you can search for a journal name, ISSN, publisher, year, ISI category or exact journal name.

2.9.5. h-index: The h index is a metric for evaluating the cumulative impact of an author's scholarly output and performance; measures quantity with quality by comparing publications to citations. The h index corrects for the disproportionate weight of highly cited publications or publications that have not yet been cited.

2.9.6. Journal Impact factor (JIF): The simplest journal-level metric is the journal impact factor (JIF), the average number of citations that articles published by a journal in the previous two years have received in the current year, as calculated by Clarivate. Other companies report similar metrics, such as the CiteScore (CS), based on Scopus.

However, very high JIF or CS are often based on a small number of very highly cited papers. For instance, most papers in *Nature* (impact factor 38.1, 2016) were only cited 10 or 20 times during the reference year. Journals with a lower impact (e.g. *PLOS ONE*, impact factor 3.1) publish many papers that are cited 0 to 5 times but few highly cited articles.

Journal-level metrics are often misinterpreted as a measure for journal quality or article quality. However, the use of non-article-level metrics to determine the impact of a single article is statistically invalid. Moreover, studies of methodological quality and reliability have found that "reliability of published research works in several fields may be decreasing with increasing journal rank" contrary to widespread expectations.

Citation distribution is skewed for journals because a very small number of articles is driving the vast majority of citations; therefore, some journals have stopped publicizing their impact factor, e.g. the journals of the American Society for Microbiology. Citation counts follow mostly a lognormal distribution, except for the long tail, which is better fit by a power law.

Some journals to increase their JIF, ask the research paper submitting authors to cite at least two references from their journal in the submitted paper so as to accept it. This practice is mainly to increase the Journal Impact Factor of their journal.

Other journal-level metrics besides Eigenfactor, include the SCImago Journal Rank.

2.9.7. **SCImago journal rank**: The SCImago Journal Rank (SJR) indicator is a measure of the prestige of scholarly journals that accounts for both the number of citations received by a journal and the prestige of the journals where the citations come from.

A journal's SJR indicator is a numeric value representing the average number of weighted citations received during a selected year per document published in that journal during the previous three years, as indexed by Scopus. Higher SJR indicator values are meant to indicate greater journal prestige. SJR is developed by the Scimago Lab, originated from a research group at the University of Granada.

2.9.8. **Almetrics:** An alternative approach to measure a scholar's impact relies on usage data, such as number of downloads from publishers and analyzing citation performance, often at article level.

As early as 2004, the *BMJ* published the number of views for its articles, which was found to be somewhat correlated to citations. In 2008 the *Journal of Medical Internet Research* began publishing views and Tweets. These "tweetations" proved to be a good indicator of highly cited articles, leading the author to propose a "Twimpact factor", which is the number of Tweets it receives in the first seven days of publication, as well as a Twindex, which is the rank percentile of an article's Twimpact factor.

In response to growing concerns over the inappropriate use of journal impact factors in evaluating scientific outputs and scientists themselves, Université de Montréal, Imperial College London, PLOS, eLife, EMBO Journal, The Royal Society, *Nature* and *Science* proposed citation distributions metrics as alternative to impact factors.

2.9.9. **Article-level metrics:** One of the most basic citation metrics is how often an article was cited in other articles, books, or other sources (such as theses). Citation rates are heavily dependent on the discipline and the number of people working in that area. For instance, many more scientists work in neuroscience than in mathematics, and neuroscientists publish more papers than mathematicians, hence neuroscience papers are much more often cited than papers in mathematics. Similarly, review papers are more often cited than regular research papers because they summarize results from many papers. This may also be the reason why papers with shorter titles get more citations, given that they are usually covering a broader area.

2.9.10. **Author-level metrics**: Total citations, or average citation count per article, can be reported for an individual author or researcher. Many other measures have been proposed, beyond simple citation counts, to better quantify an individual scholar's citation impact. The best-known measures include the h-index and the g-index. Each measure has advantages and disadvantages, spanning from bias to discipline-dependence and limitations of the citation data source. Counting the number of citations per paper is also employed to identify the authors of citation classics.

Citations are distributed highly unequally among researchers. In a study based on the Web of Science database across 118 scientific disciplines, the top 1% most-cited authors accounted for 21% of all citations. Between 2000 and 2015, the proportion of citations that went to this elite group grew from 14% to 21%. The highest concentrations of 'citation elite' researchers were in the Netherlands, the United Kingdom, Switzerland and Belgium. Note that 70% of the authors in the Web of Science database have fewer than 5 publications, so that the most-cited authors among the 4 million included in this study constitute a tiny fraction (Fossum, 2021).

2.9.11. **Scientiometric**: It is the study of measuring and analysing science, technology and innovation. It concerns itself with measuring and analysing scientific literature. Scientometrics is a sub-field of bibliometrics. Major research issues include the measurement of the impact of research papers and academic journals, the understanding of scientific citations, and the use of such measurements

2.9.12. **Acknowledgement index**: An acknowledgement index is a scientometric index which analyzes acknowledgements in scientific literature and attempts to quantify their impact. Typically, a scholarly article has a section in which the authors acknowledge entities such as funding, technical staff, colleagues, etc. that have contributed materials or knowledge or have influenced or inspired their work.

Like a citation index, an acknowledgement index measures influences on scientific work, but in a different sense; it measures institutional and economic influences as well as informal influences of individual people, ideas, and artifacts. Unlike the impact factor, it does not produce a single overall metric, but analyses the components separately. However, the total number of acknowledgements to an acknowledged entity can be measured and so can the number of citations to the papers in which the acknowledgement appears. The ratio of this total number of citations to the total number of papers in which the acknowledge entity appears can be construed as the impact of that acknowledged entity. The first automated acknowledgement indexing

was created in the search engine and digital library, CiteSeer. However, that feature is no longer supported. Another acknowledgement extraction and indexing system for acknowledgement was AckSeer, and that indexing system is also not available today as well.

. **2.9.13**. **Bibliometrics**: Bibliometrics are the statistical analyses of books, articles, or other publications. The analyses are used to track author or researcher output and impact. This can help in promotion and tenure, as well as aiding in funding and grants. Bibliometrics are also used to calculate journal impact factors, which can help you decide into which journal to publish in.

2.9.14. **h5-index** – this metric, calculated and released by Google Scholar, is based on the h-index of all articles published in a given journal in the last five years.

2.9.15. **Expert survey** – It is a score reflecting the overall quality or contribution of a journal and is based on the results of the survey of active field researchers, practitioners and students (i.e., actual journal contributors or readers), who rank each journal based on specific criteria.

2.9.16. **Publication power approach (PPA)** – It is the ranking position of each journal that is based on the actual publishing behaviour of leading tenured academics over an extended time period. As such, the journal's ranking position reflects the frequency at which these scholars published their articles in this journal.

2.9.17. **diamScore** – It is a measure of scientific influence of academic journals based on recursive citation weighting and the pairwise comparisons between journals.

2.9.18. **Source normalized impact per paper (SNIP)** – a factor released in 2012 by Elsevier based on Scopus to estimate impact. The measure is calculated as SNIP=RIP/(R/M), where RIP=raw impact per paper, R = citation potential and M = median database citation potential.

2.9.19. **Page Rank** – in 1976 a recursive impact factor that gives citations from journals with high impact greater weight than citations from low-impact journals was proposed. Such a recursive impact factor resembles Google's Page Rank algorithm, though the original paper uses a "trade balance" approach in which journals score highest when they are often cited but rarely cite other journals; several scholars have proposed related approaches.

2.9.20. DOI: A DOI, also known as Digital Object Identifier, is a string of numbers, letters and symbols used to permanently identify an article or document and link to it on the web. A DOI will help your reader easily locate a document from your citation. A DOI is a unique identifier for a digital document. DOIs are important in academic citation because they are more permanent than URLs, ensuring that your reader can reliably locate the source. Journal articles and ebooks can often be found on multiple different websites and databases. A DOI can appear as either an alphanumeric string of digits or as a webpage URL: DOI: 10.1080/15588742.2015.1017687 or http://dx.doi.org/10.1080/15588742.2015.1017687.

2.9.21. ORCID: ORCID's name was formed from the acronym "**Open Researcher and Contributor IDentifier**" – but is just known as "ORCID"! The vision is a world where all who participate in research, scholarship, and innovation are uniquely identified and connected to their contributions and affiliations across time, disciplines, and borders.

The ORCID is a non-proprietary alphanumeric code to uniquely identify authors and contributors of scholarly communication as well as ORCID's website and services to look up authors and their bibliographic output. ORCID is a global, not-for-profit organization sustained by fees from their member organizations.

Your ORCID iD is a unique, open digital identifier that distinguishes you from every other researcher with the same or a similar name to you. ORCID provides a persistent digital identifier (an ORCID iD) that you own and control, and that distinguishes you from every other researcher.

2.9.22. #CanHazPDF : #CanHazPDF is a hashtag used on Twitter to request access to academic journal articles which are behind paywalls. It began in 2011 by scientist Andrea Kuszewski. The name is derived from the meme I Can Has Cheezburger?

Users request articles by tweeting an article's title, DOI or other linked information like a publisher's link, their email address, and the hashtag "#ICanHazPDF". Someone who has access to the article might then email it to them. The user then deletes the original tweet. Alternatively, users who do not wish to post their email address in the clear can use direct messaging to exchange contact information with a volunteer who has offered to share the article of interest.

The practice amounts to copyright infringement in numerous countries, and so is arguably part of the 'black open access' trend. The majority of requests are for articles published in the last five years, and most users are from English-speaking countries. Requests for biology papers are more common than papers in other fields, despite subscription prices for chemistry, physics, and astronomy being, on average, higher than for biology. Possible reasons for people to use the hashtag include the reluctance of readers to pay for article access and the speed of the process compared to most university interlibrary loans.

2.10. Agencies rankings the journals.

Different agencies/councils/academies in different countries has rated the research publication journals with certain scores. These agencies includes:

2.10.1. **ERA Australia journal lists** Australian Research Council ranking of journals worldwide

2.10.2. **CORE ranking**, issued by the Computing Research and Education Association of Australasia (CORE, Inc.).

2.10.3. Brazil's **Qualis**

2.10.4. Colombia's **Publindex**

2.10.5. Denmark Danish Ministry of Higher Education and Science (2014)

2.10.6. Finland's **Julkaisufoorumi (JUFO)** Publication Forum

2.10.7. **Norwegian Scientific Index** Norwegian Register for Scientific Journals, Series and Publishers – Advanced Search.

2.10.8. Germany **VHB Index** (business).

2.10.9. France **CNRS ranking** (economics).

2.10.10. Italian **ANVUR ranking** ANVUR Class A journals.

2.10.11. The Chartered Association of Business Schools Academic Journal Guide.

2.10.12. Pakistan List of **HEC Recognized Journals**

2.10.13. Indian National Academy of Agricultural Sciences **NAAS Score** of Science Journals

2.10.14. Polish ranking of journals.

2.10.15. **DHET List** of Approved South African Journals.

They have been introduced as official research evaluation tools in several countries. The scores given by the respective ranking agency to different journals in their country are considered a tool to assess the research paper quality for the author and are given weightage accordingly to the research paper. The marks allocated for such journals score are sum up to decide the total marking in selection/ promotion of the candidate for particular post.

2.11. Search engine and Tools

2.11.1. **Sci- Hub:** Sci-Hub is a shadow library website that provides free access to millions of research papers and books, without regard to copyright, by bypassing publishers' paywalls in various ways. Sci-Hub was founded in Kazakhstan by Alexandra Elbakyan in 2011, in response to the high cost of research papers behind paywalls (a case of Serials crisis). The site is extensively used worldwide. In September 2019, the site's owners said that it served approximately 400,000 requests per day. Sci-Hub has been estimated to contain 95% of all scholarly publications with issued DOI numbers. Sci-Hub reported on July 15, 2022, that its collection comprises 88,343,822 files.

Sci-Hub has been lauded by some in the scientific, academic, and publishing communities for providing access to knowledge generated by the scientific community, which is usually funded by taxpayers (government grants) and with zero royalties paid to the authors. Publishers have criticized it for violating copyright, reducing

the revenue of publishers, and potentially being linked to activities compromising universities' network security, though the cybersecurity threat posed by Sci-Hub may have been exaggerated by publishers. Elbakyan responded by questioning the morality of the publishers' business and the legality of their methods in regards to the right to science and culture under Article 27 of the Universal Declaration of Human Rights, while maintaining that Sci-Hub should be "perfectly legal".

Since 2021, regular new content uploads to the site have been frozen and some new articles are not available except for some batch releases of content. Elbakyan made the decision to freeze new uploads as a requirement of the court case Sci-Hub is defending against Elsevier in India.

2.11.2. Google Scholar: Google Scholar is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines. Released in beta in November 2004, the Google Scholar index includes peer-reviewed online academic journals and books, conference papers, thesis and dissertations, preprints, abstracts, technical reports, and other scholarly literature, including court opinions and patents.

Google Scholar uses a web crawler, or web robot, to identify files for inclusion in the search results. For content to be indexed in Google Scholar, it must meet certain specified criteria. An earlier statistical estimate published in PLOS One using a mark and recapture method estimated approximately 80–90% coverage of all articles published in English with an estimate of 100 million. This estimate also determined how many documents were freely available on the internet. Google Scholar has been criticized for not vetting journals and for including predatory journals in its index.

The University of Michigan Library and other libraries whose collections Google scanned for Google Books and Google Scholar retained copies of the scans and have used them to create the HathiTrust Digital Library.

2.11.3. Aminer: AMiner is a novel online academic search and mining system, and it aims to provide a systematic modeling approach to help researchers and scientists gain a deeper understanding of the large and heterogeneous networks formed by authors, papers, conferences, journals and organizations. The system is subsequently able to extract researchers' profiles automatically from the Web and integrates them with published papers by a way of a process that first performs name disambiguation. Then a generative probabilistic model is devised to simultaneously model the different entities while providing a topic-level expertise search. In addition, AMiner offers a set of researcher-centered functions, including social influence analysis, relationship mining, collaboration recommendation, similarity analysis, and community evolution. The system has been in operation since 2006 and has been accessed from more than 8 million independent IP addresses residing in more than 200 countries and regions.

2.11.4. BASE: BASE (Bielefeld Academic Search Engine) is one of the world's most voluminous search engines especially for academic web resources. BASE provides more than 300 million documents from more than 10,000 content providers. One can access the full texts of about 60% of the indexed documents for free (Open Access). BASE is operated by Bielefeld University Library.

Base is indexing the metadata of all kinds of academically relevant resources – journals, institutional repositories, digital collections etc. – which provide an OAI interface and use OAI-PMH for providing their contents (see Golden Rules for Repository Managers).The index is continuously enhanced by integrating further sources / content provider (Become a content provider). They are working on several new features like a claiming service for authors within the ORCID DE project.

BASE is a registered OAI service provider. Database managers can integrate the BASE index into their local infrastructure (for example. meta search engines, library catalogues).

2.11.5. CORE: CORE is an Aggregator of open access research papers for researchers and repositories. It works closely with digital libraries and institutional repositories and offers a number of ways to access and manage open data through a set of services. It hosts the world's largest collection of open access full texts, which are used and referenced by people globally, including researchers, libraries, software developers, funders and many more. Its aggregated content covers all research disciplines and comes from thousands of institutional and subject repositories and journals. CORE Search enables users to search and access research papers via an online faceted search interface while CORE Discovery is a web browser plugin which allows users to discover the open access version of a paper when faced with a paywall.

CORE Recommender is a plugin that can be installed in repositories and journal systems to recommend articles to read based on past activity. A recent study conducted by University of Strathclyde showed that users spend 58% longer time in the repository after installing the CORE Recommender. CORE Repository Dashboard provides control over the aggregated content and helps in the management and validation of the

repository collections and services. It is a tool designed specifically for repository managers and research outputs administrators who are CORE data providers. For example, you are able to see the percentage of missing DOIs in your repository to assess your Plan S compliance, see when CORE harvests and track any technical issues that happen in the process, and monitor compliance with metadata standards such as RIOXX. CORE Repository Edition is a premium package containing (1) a premium version of the Repository Dashboard for data enrichment and funder compliance monitoring and (2) guaranteed support for your repository from the CORE team.

CORE API provides an access point for those who want to develop applications that need to interrogate the large collection of open content. CORE Dataset enables users to download all aggregated content from their global network of data providers. The dataset is frequently used in computationally intensive processes for the analysis of research information including the development of AI models. CORE FastSync provides third parties with fast content synchronisation capability with CORE.

2.11.6. Semantic scholar: Semantic Scholar is an artificial intelligence–powered research tool for scientific literature developed at the Allen Institute for AI and publicly released in November 2015. It uses advances in natural language processing to provide summaries for scholarly papers.

Semantic Scholar is an AI-powered academic search engine that allows you to search millions of scholarly articles for academic content relevant to your research topic. Unlike other academic search engines, Semantic Scholar combines the power of artificial Intelligence, machine learning, language processing with semantic analytic search enabling users to get more accurate search results.

Semantic Scholar is a good alternative to Google Scholar, however, its content is mainly focused on journal articles. The way Semantic Scholar works is simple. Enter your search query in the site's search box and start navigating your search results. You can conduct your search by topic, paper, keyword, or author. You can further filter your search by field of study, date range, PDF availability, publication type, and more.

Once you find the paper you are interested in, you will be able to read its abstract, check the references it includes, how many citations it has, and with one click generate a citation in various formats including BibTex, MLA, APA or Chicago.

While you do not need an account to access research literature on Semantic Scholar, however, creating an account provides you with the added benefits of creating email alerts for new research, generating research feeds for new paper recommendations, saving papers to the library for later reference, claiming author pages, and more.

Creating a personal library in Semantic Scholar allows you to instantly save papers you would like to revisit later on. You can organize your papers into customized folders, bulk export citations, and create 'AI-powered Research Feeds based on a Library folder to keep you up to date on the latest research.'

2.11.7. Scopus: Scopus is an abstract and indexing database with full-text links that is produced by the Elsevier Co. The name, Scopus, was inspired by the bird, Hammerkop (Scopus umbretta), which reportedly has excellent navigation skills. Scopus uniquely combines a comprehensive, expertly curated abstract and citation database with enriched data and linked scholarly literature across a wide variety of disciplines.

Scopus is Elsevier's abstract and citation database launched in 2004. Scopus covers nearly 36,377 titles from approximately 11,678 publishers, of which 34,346 are peer-reviewed journals in top-level subject fields: life sciences, social sciences, physical sciences and health sciences.

Scopus quickly finds relevant and authoritive research, identifies expert and provide access to reliable data, metrics and analytical tools. Be confident in progressing research, teaching or research direction and priorities, all from one database and with one subscription.

2.11.8. Web of Science: Web of Science, previously known as Web of Knowledge, is a database of bibliographic citations of multidisciplinary areas that covers the various journals of medical, scientific, and social sciences including humanities.

The Web of Science is a paid-access platform that provides access to multiple databases that provide reference and citation data from academic journals, conference proceedings, and other documents in various academic disciplines. It was originally produced by the Institute for Scientific Information.

2.12. Predatory vs Non-Predatory Journals: What is the Truth?

In Biological sciences, the term predatory is used for those living agent who feed on other living agent for their subsistence and survival, without giving any advantage to their prey. The term predatory journals is given to those journal who charge the publication fees to the author in lieu of the publication of the research articles as done by the non-predatory journals too. However, due to their substandard quality, dubious peer-review process, and lack of expertized professional editorial board, such journals are termed as predatory journals and papers published in such journals are not considered and given weightage in many evaluation committees/boards in the academic institutions/government establishments. The only advantage of publishing on-line in either journals (so called predatory/non-predatory) is that your paper in available on internet and can be read by others who find interest in the topic.

The basic interest of publication of research paper is to bring it in the public domain so anybody can read it on internet. Whether, it is a predatory journal or non-predatory journal, all the papers published in these are now available on internet in public domain, fulfilling the main purpose of publication of the researcher/ authors of the publication. It can be observed (table 4) that both so called predatory and non-predatory journals of reputed publication houses charges the research article publication fees.

Table.4. Research article publication fees charged by non-predatory and predatory journals.

Sr. NO	Name of publication house (without predatory tag)	Article processing Fees charged	Sr. NO	Name of publication house (with predatory tag)	Article processing Fees charged
1	Springer		1	OMICS	USD 279 to 2200
2	Taylor & Francis	USD 600 to 4800	2	Science publishing Group	USD 120 to 1670
3	Elsevier	USD 190 to 9900	3	SCIRP	USD 399 to 1199
4	Wiley	USD 3000	4	Austin Publishing Group	USD 1800 to 3600
5	SAGE	USD 3000 to 4000	5	Open Access Pub	C$ 150 to 6000
6	De Gruyter	Euro 1000 to 2000	6	Gavin Publisher	USD 560 to3500
7	Oxford University Press	USD 1000 to 2250	7	Academic Journals	USD 550 to 750
8	Inderscience	USD 3000	8	Science & Education publishing	USD 160 to 390
9	Brill	Euro 2295 to no charge	9	Med Crave	USD 366 to 500
10			10	IOS Press	USD 400 to 750

Some of the clever publication houses who entered in the business of scientific research publication have attached themselves to some of the national/ international subject specific scientific societies, so as to use the scientific expertise manpower available with such societies, as a peer reviewer for their journal. By doing so, they maintained the quality of their paper and journal. Publication with such journals also cost a fairly high amount. Some of the agencies, who charge a fairly minimal amount does not have the rigorous screening and peer-review system, and such papers are published without any changes with major scientific errors in presentation. Some of the journals only make grammatical correction in the English language without touching the subject, and publish the erroneous presentation. Such journals are really harmful to the young academician and education system. There is a need for such journals to declare their editorial board and peer-review team of expert in the concern field (anybody can check their expertise on the internet before submitting their paper to give justice for their peer-review).

Some on-line journals promise to publish paper within 48 hrs. They don't have editorial board or reputed peer reviewer to review the paper and largely depend on some retired teachers in their places of publishing agencies. These are also harmful to the young academician and education system.

Some very clever publishing houses charges the publication fees and also if someone want to read the paper on-line have to pay the fees for reading or downloading the article. This is the real business in research publication. Those students who do not have the money, are deprived from reading such papers and use them in their further studies. It is also an unlawful retention of scientific information from public domain, in the absence of money. Many student and academician in developing and poor countries can-not afford such system of knowledge sharing.

2.13. A System to categorize Research Articles in the Present Context

Well, you have published a research paper, it is available in print journal or online on internet, seen by academicians and used it as reference. Is that all you expect from a research paper. When we want to have a larger impact of our paper in society, we needs their specific categorization. At present our research papers are categories as scholarly papers, research articles, short communications, review papers, letter to Editors etc and we don't find their impact directly in the government and human societies.

Our daily news tabloids have marked certain pages for specific stories like sports, cinema and entertainments, politics, advertisements but none of our news tabloid have ever earmarked a page for the science and technology, though everyone use it in their life without knowing the inventor or researcher of the technology and their research.

Therefore, a need arise to categories all these research papers in different categories like policy matter research papers, Technology advancement research papers, Industrial product based research papers, Farming technology research papers, Fundamental scientific papers, and papers for advancement of science. Unless we categories all our scientific and scholarly papers in these categories and give them a page in our new tabloids or give them a slot in TV programs, the dissemination of science and scientific knowledge, awareness, and its conceptual use in the society would not be achieved.

2.14. A concept to evaluate and weightage of research articles for Indian researcher

While evaluating the academic performance of the student and staff for their selection to a particular position, certain marks are allocated for individual degrees. The same marks are given for a particular degree say for example M.SC or Ph.D degree, irrespective of the institution from where it is obtained. The marks obtained for degrees of premier institutes like Indian Institutes or other low rank universities are the same and never different. Then why, the marks of research papers published in high score journal and low score journals are different and not the same. The paper published in a high score or low score journal is available online on internet, read by the students and staff working on the same or related topic and cite it as reference. Whether it is a high score journal or low score journal, if the research paper is not useful as reference, nobody is going to cite it as reference. So giving higher mark to high score journal paper is biased.

In Indian Scenario the journal rating agency particularly NAAS has rated all the scientific journal giving these a particular score, and the paper published in journals having score of 6 and above are considered good. Those journal which do not appear in the list of NAAS rated journals, and the papers published in such journals does not get any marks during academic evaluation, thought these papers are cited by different authors. Thus, there seem to be apparent discrepancy in the evaluation and allocation of marks to papers published in different journal.

At present our system do not give any marks for the citations, read and recommendation obtained for an individual research paper. These are the valuable tools to determine to quality and significance of a research article in the current scenario. Therefore, we propose the following tabulation form for allocation of marks to the publications (table 5).

Table 5. Allocation of marks for publications.

Sr. No.	Publication	Marks for 1 B/RA	Citation for research paper	Read for research paper	Recommendation for research paper
1.	**Published Book(B) with ISBN** 1.Foreign publisher 2.Indian publisher 3.Edited	5 3 2	Maximum 10 marks in this section 0.1 Mark for each citation, and 0.05 mark for each read/recommendation of Book in this section besides the regular marks allocated.		
2.	**Research article (RA)** 1.short communication 2.Research articles 3. Review article	1 2 1	0.1Mark for each citation, and 0.05 mark for each read/recommendation of RA in this section, besides the regular marks allocated. Maximum 20 marks for this section		
3.	Institutes Bulletins/ publications	1.5	Maximum 3 marks for this section		
4.	Extension bulletin papers	0.5	Maximum 2 marks for this section		

Total marks for the academic, research and extension publication is 35.

The above system of evaluation for publication will remove the discrepancies among the publications either in high score or low score journal. Instead of classifying these journals as high score and low score; predatory and non-predatory journals by rating agencies, these agencies should see that the academic and publication houses improve the publication quality and standard of the journals. It is very easy to rate someone, but the respective academies/ councils/universities should work to increase the standard of the research and research publications in the nation.

3. Discussion

Research in Indian universities, Institutes and places of higher learning are carried out through the Masters, and doctorate programs and some sponsored research projects. However, during carrying out these research program, in most of the institutions, there is a prejudice mind-set to get the positive results and getting a negative result is always discourage, though the results may be right. There seems to be an inability of the concern researcher or his supervisor to interpret such results, which can be useful for the science. We hardly see the thesis, where negative results are given equal weightages and discussed properly.

Further, the quality of thesis research is not the same in all the universities, for the same degree. In some universities, one can get a doctorate degree for routine research, while in other university it is hardly possible.

At present we do not have a national portal where all the research topics in particular faculty or subject are listed and students for the particular degree are made it compulsory to select the topic from these portals only to work for their degrees. Academician from different universities can contribute the important, original and advanced research topics for this portal. May be this system will improve our research standard and parity among the research for degrees at national level.

Further, we lack a national portal where all the thesis titles on which a particular degree is awarded are mentioned, for a particular subject in a given year, for the nation. Such national portal will update the student and researcher to select the new topics for their research and avoid the duplication of research at national level.

Research always requires a monetary support which can be either from the budgetary allocations of governments expenditure, or from different foundations or trusts or financial institutions which expects to give solutions and recommendation on the existing problems for which research projects is being sanctions with financial allocations. How much of these research results and quantum of research articles are used by the governments in planning, or by public in their enrichment of knowledge is a question, except the researcher who work on the related topic in their academic and research field uses these articles as a cited reference.

To use these research papers at a larger extent for the benefit of nation and society, there is a need to categories all these research papers in different categories like policy matter research papers, Technology advancement research papers, Industrial product-based research papers, Farming technology research papers, Fundamental scientific papers, and papers for advancement of science. Unless we categories all our scientific and scholarly papers in these categories and give them a page in our new tabloids or give them a slot in TV programs, the dissemination of science and scientific knowledge, awareness, and its conceptual use at national level and in the society would not be achieved.

Research publications are the most demanding and closed-to-heart paper documents for the researcher, not only for entry into the universities/ institutions for their teaching/ research career, but also for the career upgradation of an individuals in place of higher learning and research. Interestingly, most of these research papers are from the thesis work of Masters and doctoral students. The research and research publication derived from these work can be divided into three categories viz. original research, contributory research and Xerox research based on their originality, concepts, importance to science and society, and the purpose to conduct such research. Most of the research go without research article publication or sometimes with low quality research articles that are published in non- peer reviewed or predatory journals. Exorbitant and non-affordable cost of publication seems to be the reason for non-publication of research articles by most of students and academicians in the absence of any financial support of their respective institutions. Due to exorbitant publication cost, many a times these research articles are published in low quality or low fees charging journals.

Due to low quality publications, nowadays, in most places the quality of articles published and publication journals is talked about as several publication journals are termed as predatory journals with low quality of article publication. Some on-line journals promise to publish paper within 48 hrs. They don't have editorial board or reputed peer reviewer to review the paper and largely depend on some retired teachers in their places of publishing agencies. These are also harmful to the young academician and education system.

However, how these low-quality journals are allocated their ISSN by the concern national agency without ascertaining the aspects of quality maintenance by these journals and further having the regular checks on the quality aspects which needs certification from the respective national journal rating agency. Therefore, there is a need at national or international level to set up an agency to tackle these quality maintenance issues by the registered research journals. The respective governments should work on this issue.

Some very clever publishing houses charges the publication fees and also if someone want to read the paper on-line have to pay the fees for reading or downloading the article. This is the real business in research publication. Those students who do not have the money, are deprived from reading such papers and use them in their further studies. It is also an unlawful retention of scientific information from public domain, in the absence of money. Many students and academician in developing and poor countries can-not afford such system of knowledge sharing.

At present our system do not give any marks for the citations, read and recommendation obtained for an individual research paper whether published in quality or low- quality journal. These are the valuable tools to determine the significance of a research article in the current scenario.

Research publication is a costly business for students and academician too, where they do not have the publication grants. Each institute/university should have a corpus fund for publication for the research papers from their university without making bias in this activity. For those students and academician, who do not get publication funds from their respective institutes, the university grant commission or the respective

council should have the financial provision for this research papers publication activity. This will bring us at par with other countries who have more number of scientific and social sciences publications

Most importantly, there is need to form an organization at national/ international level who govern the quality and standard of these journals. While allocating the ISSN to these journals, the editorial boards, the academic qualification of members, their specialization in the respective subject, standing in their respective field, their academic position in university/institute should be checked, so that the quality papers will be published by all the journals.

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