

# 19 Science Should Not Be Kept Behind Paywalls

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Access to knowledge is basic human right, according to the United Nations Declaration of Human Rights. But we should ask ourselves: Does everyone have equal access to knowledge? No, they do not. The majority of today's world knowledge is archived in many science journals. Those journals form Alexandria's library of our time. And most of the shelves in that library are locked. They are behind a paywall. If you would like to read/download/print some of their articles, you (or your institution/government) have to pay. Subscription fees are high (both for individuals and institutions) so not everyone has the possibility to read about the newest scientific discoveries. There are assumptions that the profit of scientific publishers goes up to 40%. That's more than the profit of the oil industry, which is considered highly profitable.

Science has passed through radical transformation in the last several centuries, from an activity of curious, sometimes bored, wealthy individuals to the system that engages many stakeholders: scientists, research institutions, governments, publishers, etc.

Until recently, the dominant model of publishing scientific results was:

1. countries fund the research with public money (collected through taxes);
2. scientists do the research and write their results in the form of a journal article;
3. scientists submit their article (for free) to a journal;
4. scientific publishers accept and publish articles in journals but demand transfer of researcher's copyright to the publishers;
5. as a consequence of copyright transfer, publishers demand from us to pay subscription fee (individual or institutional) in order to access those journal articles.

In this process, countries pays twice—when they finance the research and again for accessing journal articles. Who benefits the most in this business model? The publishers. This explains the 40% profit margin. And that's not the end of the story—in past 30 years subscription fees have risen by 250% [1]! That represents an unsustainable and greedy business model, in which even rich universities (e.g., Harvard, the richest of them all) are unable to pay for access to the scientific literature.

As a response to this business model of scientific publishing, twenty years ago an open access movement was born. Open access “refers to online research outputs that are free of all restrictions on access and free of many restrictions on use (e.g., copyright and license restrictions)” [2]. In simpler words, open access means that people (scientists or laymen) from all around the world can freely read, print, send, download and use scientific articles for analysis and creation of new knowledge. In the very core of this movement is scientific and cultural progress of human civilization. Open access is tightly connected with open research, which is equal to open science. Open science “is consisted of six commonly accepted pillars: open data, open access, open methodology, open source, open peer review and open education” [3].

## **Benefits of Open Research**

### *Better and Transparent Science*

Open research will allow that many of the proposed hypotheses and published discoveries can be tested and verified/opposed. The reproducibility potential will be increased. Science makes sense only when its theories are submitted to various tests. In that way, the best theories can stand out as valid and correct and misleading ones can be discarded. With open data any interested party can reassess previous findings and conclusions or find some other valid conclusion. There will be fewer scientific hoaxes when data are open and can be analyzed by other colleagues.

### *Wider Impact and Citation of Published Results*

Results published in open access journals are available to all. All you need is a computer connected to the Internet and nowadays the Internet is present in almost all parts of the world. The results will be available to the professionals outside academia (schools, hospitals, etc.) but also to small businesses and Non-Government Organizations (NGOs). It can result in new innovations and can boost entrepreneurship.

### *Decreasing the Difference in Science Between Developed and Developing Countries*

The world is still fighting with poverty and if we want to help low and middle income countries to escape from the claws of poverty and misery, we should endorse open science. In a time where we have this divide into the Global North and the Global South, it is unacceptable and unimaginable to keep science closed. Right now there is a big gap between developed and developing countries in any aspect,

including science. Open research can help to bridge that gap, through open articles but also through potential collaborations that can be established once the existing paywalls are down. From that collaboration both poles, South and North, can benefit.

Predatory publishers and practices will become less problematic than they are now, because scientists will choose well-known and established open access publishers. Libraries and governments could allocate some amount of money they give for journal subscriptions to some other activities.

In these times where global inequalities are on the rise, it is certainly not fair that governments invest public money into scientific research which will be published in journals where scientists have to pay again to access them. In that way, the inequality gap becomes wider and deeper and in the end just a few dozen people have benefits from the work of millions of researchers. Science is (in most cases) financed with public funds and its results should be available to the public. Science behind paywalls is in the interest of journal/publisher owners. We don't need another case of an unfortunate Aaron Swartz to prove that.

It is important to adopt a new business model that redefines the current state of scientific publishing. That model should take care of interests of all stakeholders. Science is based on previous discoveries. You have to "stand on the shoulders of giants" (Sir Isaac Newton) in order to see further. Those giants are scientists and their research. And in order to see scientific research, they should be free and open. It's that simple. Open science strives towards and is a path towards a more equal society. And we cannot have an equal society if we have any walls, including paywalls.

## References

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3. Watson, M. When will 'open science' become simply 'science'? *Genome Biol.* **2015**, *16*, 101. [CrossRef] [PubMed]



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