

# 5 Benefits of Open Research: My Own Stories

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As a Ph.D. student for a few years in the field of computing science, I have come to realize the benefits of making research globally accessible. I come from a small third-world country where most research publications are not available. In my undergraduate university, we were only able to access IEEE Xplore Digital Library [1] in my 4th year of college, and that access was only available until the institution encountered some budget issues and ended its IEEE subscription. Later, when I joined my Ph.D. program in the US, I realized the benefits of having subscriptions of major publication organizations in my field. Researchers in the under-developed world often do not have access to the current and upcoming trends in certain research areas. When any research work is not made openly accessible, its impact both on that country's policy makers and on the wider research community is limited. Most importantly, in the developing world, open research raises the profile of research performed both locally and globally. In my understanding, greater access to global scientific studies and their results can improve the effectiveness of research work in four ways: increase research efficiency, reduce costs by preventing duplicate work, enable the transfer of knowledge and the reuse of datasets to produce more research work, and increase the connectivity among researchers for national and worldwide participation in the research process. In this essay, I am going to share my understanding of the global dividends of open research through some of my personal experiences.

Primarily, the efficiency of a research project is vastly increased if it is open to all other research communities. For instance, one day my Ph.D. supervisor called a meeting with another research group to discuss a tentative collaborative work scenario. Surprisingly, during our discussion, we found that both groups were pursuing the same goal and were using a similar approach. If these works had already been open to all, we could have ended up helping each other and would have avoided repetitive workloads. If the research work is open and well-advertised, any further studies could directly use the open study to extend the topic even further. In this way, any drawbacks of an original work can be diminished and we can also avoid unnecessary repetition. Openly accessible scientific findings and resources (e.g., evaluation procedures, datasets, and so on) offer the opportunities for rigorous evaluations and scrutiny by the scientific community all over the world, which

allows a more optimized replication and widely acceptable validation of the research work. In this process, it is easier to find incompetence in research work at a very early stage, and set an example for the scientific community to avoid any scientific misconduct and preserve scientific integrity. In this sense, openness to data helps to maintain science's self-correction principle. In addition, there is a significant increase in citations when the research works are made openly available to more researchers.

In a more connected world, the greater access to scientific innovation offers opportunities to share the risks in future research. First, open innovation can reduce the cost of reproducibility. No researcher would waste time and effort conducting a study if the researcher knows it has already been accomplished. However, duplication of effort is all-too-possible and all-too-probable when researchers cannot effectively communicate with one another and make results known to others in their field and beyond. Second, open research helps to increase the collaboration between different research groups who would together share the risks with the rewards, and this would create more innovation. This approach has realized notable benefits in many areas, including IT, healthcare, public policy, and so on.

Open research and increased access to research results can foster innovation and creativity more broadly. For example, sharing acquired knowledge with others can be useful in making the knowledge more robust, diverse, and applicable in scenarios that are more practical. I like the idea used in the machine learning field called the "transfer learning approach" where researchers use a previously trained machine learning model in different scenarios. In this way, the researchers can skip pre-training the model which costs hours of computation resources. Open research enables re-using the research finding and large-scaled datasets by individuals and research organizations. In most circumstances, openly accessible research promotes a swifter path from idea generation to product development by reducing the delays. In my last research paper, I benefitted by using an open source traffic dataset from an organization. This saved the time I would have needed to collect and pre-process raw data, and it added extra value to my research as the used dataset is very large-scale.

As a student, I certainly realize how open source work can increase the connectivity among researchers and collaborators. Due to the staggering price of journal subscriptions, many well-established institutions cannot always provide their students with the complete scholarly record. Even though I am attending a well-established university, I have found that I do not have access to some publications from some journal publishing organizations that require an especially high subscription rate. I can imagine that students from the smaller or less well-funded universities have to face the challenges to fully utilize the limited

access to research work their libraries can afford. I also have found that some of my post-graduate lab mates cannot access some prestigious publications after their graduation while they are working in the university in conjunction with industry. This is a hindrance for their enthusiasm towards research. Open research can globally connect many researchers all over the world and they can share their ideas in achieving a better future for humankind.

From the above discussion, I can simply conclude that the global benefits of open research are not constrained only to the scientific communities or researchers themselves. They also serve to benefit the whole society, including individual citizens and the public and private sectors.

## Reference

1. IEEE Xplore Digital Library. Available online: <https://ieeexplore.ieee.org/Xplore/home.jsp> (accessed on 10 October 2018).



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