Open Scientific Research is Imperative in the Future World

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When I was a child, I was educated to share. However, from the day I entered the academic world, I was not encouraged to share. Blocking the work I publish in well-known journals and carrying my experimental data with me, my mentor, my peers and I developed a competitive rather than a cooperative relationship. Every day, we may get amazing discoveries, some of which can even save lives or change the world. However, we lock the information in the journal and most people can't read it. After all, in many areas of the world, journal subscription is still too expensive. E-subscription of a high-quality journal may have expenditure equal to the annual salary of a researcher. Hence, research institutions in some countries often have to make choices between hosting research projects, paying researchers, and buying e-journals. The result is often abandoning subscriptions.

The lack of access to information hinders learning, stifles innovation and slows the research process. I have witnessed my colleagues working on public health issues racked their brains to get papers on the latest developments in their field. I also saw anxiety from students who wanted to know more about a new topic when he/she encountered one after another payment threshold. I also have to face these paid pages every day. Eventually, I have the ability to read some of the authors' articles that I want to track through e-mail or social media. But there are still some articles that I cannot read. And I wonder every day whether I missed a lot of information related to my research. As a researcher who is still in the early stages of the career, I am committed to ensuring that my work can be made public and I give up publishing in closed reading journals. My mentor and some peers told me that this behavior is suicide in my career. But I believe not. After publication, whether it is through open-reading journals or not, it can bring more comments and suggestions on the work. And this is important especially for new researchers who are trying hard to let people remember their names.

Since last decade, it has been initiated a series of academic movements aimed at overcoming the drawbacks of traditional scientific research. These movements highlighted the concept of "freedom, openness, cooperation, and sharing". So called "open scientific research movements" formed a stark contrast with the closure of traditional scientific research. The FOSTER research report mentioned that open scientific research includes open source software, open data, open access, open research methods, open peer review, and open educational resources, etc. Among them, open access and open data play important roles in the open scientific research movement. They allow scientific research to be shared, copied, displayed, and published in a fast and efficient manner. "Because of the ability to share good scientific research results and to spread and exchange knowledge in an unrestricted way, you can increase mutual understanding, encourage each other, and promote

healthy competition," said Dr. Ed Gerstner, Head of Open Research, Greater China, Nature Publishing Group. Open access can not only expand the dissemination ability of traditional academic journal papers, but also be beneficial to the mutual encouragement, cooperation and progress of scientific research in the future. Through data sharing and other people's evaluation and analysis, the sharers can know the credibility of their data and research direction and many "rejected" data can be used. At the same time, sharing data can also help expand the possibility of scientific research cooperation and promote multidisciplinary cooperation, which is also conducive to the enormous potential of scientific research community.

With the advent of Science 2.0, pre-printing, open peer review, open data repository, and innovation driven by the socialization of scientific research through the use of internet, promote the diversification of scientific exchanges and provide a breeding ground for the birth of an open scientific era. The OECD report "Making open science a reality" pointed out that network and online platforms provide new opportunities for the organization and publication of research projects, scientific literature, and large data sets. Information and communication technologies make it possible to collect large-scale data and information as the basis of scientific experiments and research, making science more and more driven by data. And online storage makes it easier to obtain and use scientific research information. All these have accelerated the transfer of knowledge between researchers and fields, opened up new ways of cooperation and new research methods, and led to the rapid development of "open scientific research".

As global scientific and technological cooperation has become increasingly widespread and science and technology innovation organizations in different countries have infiltrated each other, open scientific research is becoming a national strategy. "Open Science and Research Roadmap 2014-2017" released by The Finnish Ministry of Education and Culture, clearly stated that Finland should become the leader country of open research in 2017. Horizon 2020 proposed publicly-funded research in Europe to ensure and promote open access to scientific publications and scientific data. A series of reports concerning the "European Union's 7th Framework Programme" issued by the Council of the European Union pointed out that with open scientific research as a link, it constantly expands innovative research and further realizes the ideal state of "Open to the World".

Accompanied by opportunities and challenges, the openness still needs to be broadened to cover every area of scientific research. And open scientific research should not be confined to researchers engaged in scientific work, but involve publishers, enterprise and the entire public worldwide. Moving toward open scientific research brings new interests, new models, new rules, new policies, and new mechanisms emerged in knowledge creation, information dissemination, results sharing, knowledge application, scientific research organization, and performance evaluation. Even though there are still certain problems under discussion in the aspects of policies, intellectual property and information security, open scientific research is imperative in the future world.