

Why does Europe need open science policies?

Prof. Dr. Jean-Claude Burgelman

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So we started working on this in 2014 we were actually looking before that on the impact of digital technologies on the scientific world and bringing all the elements together we realized that the classical lifecycle of science from, you get your idea, you do your data gathering and you do your analysis and so forth. So that's the classical way of doing the life cycle, which will not change in the future. That it was changing from a closed system, which it used to be, to an open system. That's all the blue things you see there, it is. And every part of our life cycle we have new ways, new open, new collaborative ways of doing research. And that was an important insight because up till then the debate about Open Science was mainly a debate about green or gold open access, to be honest.

Now if you start realizing that Open Science is actually not only open access, it's also open code. It is lab books; it is collaborative analysis; it is pre-print view and post sprint review. It's about data sharing and so forth. If you put all that together, you have this insight, at least that's what we had at least, is that there is a systemic change going on from a closed environment of doing research and science to an open environment.

And when then we saw the third layer appearing all these new initiatives, new companies, public, private, or a mixture of them both. That's where we went to our commissioner and said, "Well this is a systemic change which is affecting our scientific industry." So not only the research, but actually the whole industry around it. And that was actually the starting point for coming up with the policies which I will just tell you in a second.

First of all, Open Science leads to a better return of investment for the public money invested in science. It's quite evident if you can do the experiments again without having to do the same investment for collecting the data, well you have a better use of your money, that is self-evident. And I always like to quote this example from the human genome to tell you to, to show how deeply impactful it can be for the return of investment of public money in science. And by the way, in Europe we invest, depending on how you count, between 120 and 140 billion per year, which up till let's say 15 years ago, was a system whereby there was an enormous amount of redundancy and lack of reuse or simply impossibility to do the reuse.

Secondly, very important, something we tend to forget, it is quite logical that if you open up your knowledge base, because that's what science is, you create knowledge on X, Y, Z to the socioeconomic system that can use it. It is quite logical to assume that out of that you will get more innovation. And now, let's say 10, 15 years ago, for the 22 million SMEs that Europe has, the access to the latest state of the knowledge on topic X was simply closed or behind paywalls or not intelligible.

Now, if you open that up and you assume that out of those 22 million 1% will go to these open knowledge bases, and 1% of that 1% will create a start-up because of they found a new idea in your open knowledge system, you have created 22,000 companies per year, simply by opening it up.

The lack of open data in Europe lead to a situation whereby if you want to redo the experiments again, you would need 10 billion per year to be able to do it. So, to put it the other way around, the opportunity cost is 10 billion, only for science.

The opportunity cost for innovation is figured out by that study up to be 17 billion. These figures are models. There is a lot of modeling. As all models it is speculation. The order of magnitude is in itself, revealing.

Thirdly, and that goes back to the topic of your day of course, is that it is also a no brainer that if you open up your scientific knowledge process, in this case the data, that it gets you, you have much more transparency, you can see how it is gathered, you can see what is gathered, the method with which it is gathered.

So as a result of that you get a system which is much more responsible and thus, I would say, much more ethical. Now if you want to address a cross disciplinary challenge, you need to be able to cross the data.

If these data cannot be crossed because they are not available, or they are stored in forms that you cannot combine them, you cannot address these challenges in a proper way. So it is also Open Science is first of all, good for science and for the investments, good for innovation, good for the whole transparency, ethical dimension of science, and finally good for addressing the challenges which we need to address. I mean, an example I give a lot here is that if for example, you want to study the impact of CT pollution on lung diseases, asthma, in the 28 capitals of Europe, you simply cannot do it because you need to combine three sets of data, medical, environmental and transport data, which are first of all, not compatible. If they are compatible, you don't get the authorization. If they are compatible and you get the authorization, they are in a form that you cannot read, by the way. So to go on, you can simply not do it.

Digital innovation goes very fast. So if you accept the argument that science is now the subject of quite deep digital innovation. Mendeley is actually a Facebook for the scientist, if you want to see it that way. Well these things are going very fast. So this is an old graph, but still it is very telling. What happens in one internet minute, 1 million log in the world. 1 million log ins in Facebook, 60 million text messages, and so on, you just go on. So it is enormous. Two things here that didn't exist, so if you would have predicted these kinds of figures 15 years ago, they would have declared you completely crazy. Secondly, none of these companies is a European.

Now that whole thing, the rationality behind the Open Science, the fact that we have a systemic shift, the fact that these things are going very fast and that we tend to be out of the picture in Europe, that led us to, in the end, propose eight priorities for Open Science policy in Europe.