

Science meeting Society? The Old, the New and the Uncertain in-between

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(Numbers in brackets correspond to slides)

I am very pleased to be here at this conference, to contribute the insights that I have gained in designing tools for the management and communication of uncertainty first, and then in the development of Post Normal Science

The title of my presentation paraphrases the characterisation of the crisis of the 1930s by the Italian philosopher and politician Antonio Gramsci's (2). I will use the three states he describes to frame the conversation that we are having today.

First, I will illustrate the old order that it is dying. Then I describe the morbid symptoms resulting from the changes to a new governance regime. Finally, I will provide some ideas about what can we do in order to help the new to emerge.

An instance of the old that is dying is the belief that all practical issues can be resolved by reducing them to techno-scientific problems (3), which have universally accepted solutions, independent of values, ideology or politics.

The reductionist hypothesis is foundational to the world order that emerged at the Peace of Westphalia in the mid-seventeenth century. Then the State was stripped of its divine legitimacy. A purely secular educated culture soon became dominant, leading to the period of the Enlightenment. With this, the legitimacy of the social order came to depend on

reductionist science and eventually democracy. With this dual legitimacy, the modern state is dependent at its core on modern reductionist science and its methods. This a basic feature the old order that in Gramsci's image, is dying

The description of this plenary session (4)

(<https://conference.efsa.europa.eu/event/sessions/efsa-2018/where-science-meets-society-putting-risk-assessment-in-context>)

shows that this arrangement is now being increasingly challenged. In many circles, this challenge comes as a total surprise. However, the awareness of the problem is not new. For example, in the early 70s, Alvin Weinberg coined the term trans-science to describe societal issues (like many instances of safety) that resist scientific reduction (5).

Bill Ruckelshaus, first head of the US Environmental Protection Agency, and author of "Risk, science and democracy", admitted that several issues handled by EPA were trans-scientific: they can be expressed scientifically but cannot be solved by science. You can see in the same slide, the reference to Harvey Brooks, who extended trans-science to complex policy questions.

Complex issues are characterised by ambiguity, with a plurality of legitimate perspectives, which cannot be reduced one to another. A recent correspondence in Nature illustrates this property of complexity in a case relevant to our discussions, showing potential morbid consequences.

"Complexities in scientific evidence allow several contrasting but equally valid interpretations. In such cases, there is a risk that privileged stakeholders associated with one way of thinking might unduly influence the particular values and interests prioritized in that synthesis." (6). It also alerts on the consequences to decision-making if "scientific disciplines and organizations deny or become complacent about their own forms of bias" (7).

Bernard Url, in an article in Nature, also recognises multiple legitimate interpretations. He correctly argues

"That the agencies reached different conclusions is not surprising: each considered different bodies of scientific evidence and methodologies." (8)

Moreover, it is not only evidence and methodologies that influence conclusions; agencies have different remits and missions, and are embedded in different political organisations.

In many cases, the multiplicity of contrasting results is erroneously interpreted as a scientific controversy where there is none. This confusion is facilitated by the reductionist hypothesis. Thus although the reductionist hypothesis is dying it is still able to produce morbid effects.

In the same issue of Nature mentioned before (6 & 7), there is another relevant correspondence in which societal trust is conflated with sound science (9 & 10). This is not unusual, and it is also inspired by the reduction hypothesis.

An important part of our conversation should be: can we still maintain the convergence of trust with sound science in

"a world in which values are becoming more influential than facts in shaping public opinion. Science is increasingly mistrusted; discussions about risks are often polarised and politicised; scientific arguments serve as proxies for differences in values"

as described in the introduction to this plenary session (11).

I used Antonio Gramsci to introduce my story about the old dying and the morbid consequences. I will now provide some suggestions on what can we do help the emergence of the new.

In order to do that, I will divide the tasks in three levels: the technical, the institutional and the constitutional. There is nothing sacred in this classification; it is one possible way to address the challenges.

On the technical level, there is ongoing work to fix now well-known morbid conditions. For instance, on statistical inferences, reproducibility, peer review, transparency, and conflict of interests. There is nothing original in saying that this technical work has to be encouraged and sustained. However, we are entitled to ask whether, at its present scale and its present level of understanding, it is adequate to the task of cleaning up the gigantic enterprise of science. We might understand it best as leading to the sort of deeper transformation that will be necessary.

For almost 40 years, the subject of my research has been the management and communication of uncertainty, and the quality assessment of policy-relevant science. In the EFSA website I found some documents, related to uncertainty, in which my work is mentioned (12).

On the institutional level, Sir Peter Gluckman, in a recent presentation on “Principles and Structures of Science Advice” (13), illustrates well the present challenges. Each of his bullet points imply important institutional changes; responding directly to the old dying and the morbid consequences.

There is no easy technical fix to change institutions, and I cannot even assume universal agreement on his proposals; some are quite controversial in many circles. I believe that a broad debate on the challenges and the eventual implementation of changes is necessary. Then Gluckman’s principles might contain the seeds of the new.

Finally, there is what I labelled the constitutional level. This is the most complex task, involving a fundamental change of our governance regime for the production and use of knowledge. Everybody seems to support engagement, participation, inclusion and diversity. This is justified not only because it is ethically just and politically correct, but because it sustains and enhances the quality of the knowledge base.

The practical question is how to incorporate those values (engagement, participation, inclusion and diversity) into a constitutional order for science that has not been designed for the current understanding of those values. Technical and institutional improvements are necessary but not sufficient, and they can only be fully implemented if they are embedded in new governance and legitimacy arrangements. The change of consciousness that enabled the growth, diffusion and success of our modern reductionist science occurred within a generation, around the time of the peace of Westphalia. Is a similar transformation occurring now?