OPINION: There are plenty of societal challenges that require expertise across disciplines. But how does research collaboration work in practice? How is the funding distributed most efficiently? And how do we assess the quality of interdisciplinary research?

In recent years, a new research and innovation policy regime has emerged around the need to address the great challenges of contemporary society, such as the environment, energy, infrastructure, and security.

None of these challenges follow the traditional disciplinary boundaries. They are interdisciplinary in nature and call for solutions that cut across normal academic divisions. Yet, it is still to a large extent unclear what is meant by this ‘interdisciplinary turn’. How will interdisciplinary research and innovation change the organisation and evaluation of research?

Numerous initiatives have been launched throughout the EU and the US that are meant to inspire cross-disciplinary collaboration. Among the most prominent examples is the next European framework programme for research and innovation, Horizon 2020, with a total budget of €70 billion from 2014-2020.

In Denmark, the government has published an innovation strategy and a new grant programme, INNO+, with the intention to distribute more funds to interdisciplinary research collaborations and develop community partnerships for innovation across the public and private sectors.

Similar programmes for interdisciplinary collaboration exist in most countries, as collaboration and interdisciplinarity have become the new normal in the world of research.

**Humanities and social sciences are already interdisciplinary**

The humanities and the social sciences have taken on a central role in the interdisciplinary research environment.

Many research areas within the humanities and the social sciences are already interdisciplinary in nature. They are made up of approaches and methods across a variety of existing scientific disciplines.

Archaeologists are working closely with researchers in the natural sciences; research in anthropology and social psychology has become an integral part of management and organisational studies; models of citizen involvement have been integrated in engineering and transport research, and a number of new areas such as ‘medical humanities’, ‘digital humanities’ and ‘environmental humanities’ are experiencing an international boom.

**Science is becoming interdisciplinary**

Several studies indicate that the scientific landscape is becoming more interdisciplinary.
Loet Leydesdorff from the University of Amsterdam has, together with colleagues, studied how the various research fields increasingly cite and are cited by researchers in other fields.

An ongoing survey of Danish humanities has, for the first time, documented how research areas that were previously regarded as isolated are now starting to interact and collaborate with researchers outside of their niche.

No interdisciplinary method is recognised

In many ways, the interdisciplinary research landscape is already a reality. Just like when a glacier retreats, leaving a moraine of gravel and rocks, old disciplines break up and start taking on new shapes.

However, in at least one area our understanding of interdisciplinarity is deficient.

As the American philosopher Nancy Cartwright remarked in 1999, and which is still the case today, “we have no articulated methodologies for interdisciplinary work, not even anything so vague and general as the filtered-down versions of good scientific method. To me this is the great challenge that now faces philosophy of science: to develop methodologies, not only for life in the laboratory, but methodologies for life in the messy world that we inevitably inhabit.” (Cartwright N., The Dappled World, Cambridge University Press 1999:18).

Interdisciplinary research intensifies battle between disciplines

The question of interdisciplinarity is not just an abstract problem of scientific theory. The way we define and evaluate interdisciplinary research has far-reaching consequences in terms of how the various disciplines can make an impact in the future research landscape.

For example, trends within life sciences and social sciences raise doubts about whether the area that has traditionally formed the basis for the humanities, i.e. the study of man, is best described by disciplines such as history, comparative literature and linguistics, or whether human behaviour and culture should rather be regarded as reflections of a more fundamental reality, whether it be man’s biological or social reality.

New research fields such as neuropsychology, neuroethics and neuroaesthetics have emerged at the interface between the natural sciences and the humanities. Not all of these new research fields reflect a peaceful collaboration, as the battles for funding between the disciplines has intensified.

Interdisciplinarity raises important questions

Important questions are raised by this new research policy trend:

- How do we ensure that there is still room for academic diversity within an interdisciplinary research landscape?
- How do we ensure that interdisciplinarity is not just a cover for biological determinism and reductive approaches to research?

The general idea behind the new interdisciplinary paradigm is that the natural and technical sciences cannot provide answers to all the key questions. The most pressing societal challenges, such as the climate crisis and the financial crisis, cannot be solved by natural science or technological innovation; the challenges of contemporary society require insight into our psychological, cultural, institutional and economical mechanisms.
In short, there is a need for systematic reflection on how we can integrate evolutionary explanations with e.g. psychological, structural, institutional and historical explanations.

After 200 years of scientific specialisation, we cannot simply assume that the integration between scientific disciplines happens by itself – or that interdisciplinarity only means one thing.

Several forms of interdisciplinarity

There are several forms of interdisciplinarity that we need to know about:

1. **Multidisciplinary collaboration** in which researchers from two or more disciplines combine their expertise in a joint scientific collaboration. They work towards a common solution, but based on each of their specialist perspectives.

2. **Transdisciplinary collaboration** in which researchers from one or more disciplines coordinate their expertise with actors outside of academia. The participants work together on practical, social, political or economical issues.

3. **Interdisciplinary collaboration** is the most demanding form of collaboration. Here, researchers from different disciplines integrate existing approaches and methods in the creation of new autonomous fields of research and explanation strategies.

Interdisciplinarity requires new types of evaluation

If the new interdisciplinary research system is to be successful, more consideration needs to be given to the design and evaluation of collaborative research. We need to deal with challenges that arise in the peer review of interdisciplinary science, such as the challenge of assembling review panels of more than 10-15 reviewers to assess large, multi-institutional research projects.

If we want research to contribute more to the great societal challenges, we need to rethink the grant system and the established mechanisms for evaluation and assessment.

Scientific excellence in interdisciplinary collaborations cannot be assessed based on normal disciplinary indicators such as the number of publications, citations or patents. A broader, more holistic perspective is needed on the research process and the disciplines and partners involved. Developing effective cross-disciplinary partnerships includes the creation of a common ‘trading zone’ in which the researchers agree on fundamental principles, problem-definitions and theoretical and methodological assumptions.

Without a more profound understanding of research collaboration, we face a significant risk of interdisciplinarity ending up as a cliché.

Read the Danish version of this article at videnskab.dk [6]
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