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INTERVIEW

HOW CAN WE ESTABLISH SUSTAINABLE OPEN INNOVATION?

Short title	How can we establish sustainable Open Innovation?
Long title	Pitfalls and chances in creating optimal conditions for openness and collaboration in science.
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How can crowdsourcing foster innovations in science?

In general, the crowd's diversity and the sheer number of (potential) contributors have been found to increase the likelihood of finding a novel solution (e.g., Jeppesen & Lakhani, 2010) and the chances of finding the best solution (e.g., Boudreau, Lacetera & Lakhani, 2011) to an innovation-relevant problem. Compared to organization-internal problem solving, crowdsourcing can yield solutions with higher levels of novelty and user benefit (e.g., Poetz & Schreier, 2012). In the science context, in particular, crowdsourcing can contribute to "innovations in science" at different levels with respect to input, process and outcome. Crowdsourcing mechanisms enable researchers to integrate knowledge and skills from a much larger and more diverse group of external stakeholders compared to more traditional ways of inter- and transdisciplinary collaboration.

Subject to the scientific discipline, the type and nature of a research project, the research process stage/s crowds are involved, the level of crowd engagement (some form of consultation or completion of simple data collection/processing tasks vs. co-creation in one or more stages of the research process) or the type of crowd members (e.g., the general public, user crowds, expert crowds), crowdsourcing may yield different levels of research process and outcome innovation. We can expect variations in novelty, efficiency and/or potential societal/economic impact of specific research projects as well as differences in the broader implications related to, for example, the democratization of research processes, the motivation to (further) engage with, respectively support scientific research and/or increases in scientific literacy (cf. Vohland, Sauermann, Antoniou, Balázs, Göbel, Karatzas, Mooney, Perelló Ponti, Samson & Winter, 2019).

Together with colleagues at the Ludwig Boltzmann Gesellschaft's Open Innovation in Science Center and our international partners, we are currently experimenting with new forms of involving crowds into multiple and/or more complex stages of the research process, including the development of research questions, the design of research studies or the production of research publications. In a recent project, we, for example, investigate the effects of leveraging knowledge complementarities of user crowds and professional scientists in the process of developing research questions and test related facilitation mechanisms (Beck, Brasseur, Poetz & Sauermann, 2019).

Understanding "innovations in science" as the translation of scientific knowledge into new products, services or processes, crowdsourcing mechanisms can also contribute to (better) facilitating these late stages in the research process. Examples like the crowdsourcing platforms Marblar (not active anymore) or Innocentive show that crowdsourcing can contribute to finding novel and/or alternative application areas for scientific knowledge, and helps connect scientific knowledge to solving concrete innovation-relevant problems of companies.

You are the coordinator of the project “Crowdsourcing-based problem solving: The role and effect of collaboration among contestants” at the Copenhagen Business School. Could you tell us more about the aims of the project?

Crowdsourcing is defined as “the act of outsourcing a task to a crowd rather than to a designated agent in the form of an open call” (Afuah & Tucci, 2012: 355). It is often implemented through innovation tournaments where a hosting organization broadcasts a problem in the form of an open call and rewards the contestant(s) with the best solution(s), i.e., the winner(s) (e.g., Terwisch & Xu, 2008). In recent practice, such crowdsourcing approaches often integrate collaborative features like the ability to see and/or comment on other contestants’ contributions, which fundamentally changes the nature of the tournament. Hence, in this research project (funded by the Danish Council for Independent Research) we aim at studying how, why and under which conditions collaboration among contestants affects problem-solving processes and outcomes in crowdsourcing initiatives.

We are particularly interested in better understanding the boundary conditions involved in enabling individual crowd contributors to cooperate with each other. Along these lines, we investigate how the positive effects of re-combining diverse knowledge are affected by variations in problem complexity, incentives types, cooperation conditions and other relevant factors. Together with my colleagues at Copenhagen Business School, we are currently processing a number of experimental studies to shed light on these questions.

Opening up innovation processes towards the outside world can help to spread innovations among many companies and organizations. Can the research community also benefit from these processes?

Before discussing how the research community can benefit from Open Innovation practices, I would like to emphasize that these practices embrace different inbound and outbound processes for facilitating knowledge flows and collaboration across companies, users, universities or suppliers for the purpose of generating new products, services, processes or business models. Such practices include but are not limited to co-creating innovation with lead users and user innovation communities, open-source software/hardware, crowdsourcing, crowdfunding, patenting and licensing, R&D collaborations or technological competence leveraging (Dahlander and Gann, 2010; Grimpe and Kaiser, 2010; Jeppesen and Frederiksen, 2006; Keinz and Prüggl, 2010; Laursen and Salter, 2006; Pisano and Verganti, 2008; Poetz and Schreier, 2012).

Although Open Science practices continue to evolve beyond the open dissemination of scientific knowledge and increasingly include the development of scientific knowledge through collaborative networks or citizen engagement (e.g., Vicente-Saez and Martinez-Fuentes, 2018), I believe that applying the concept of Open Innovation to the science context holds great potential. It enables us to broaden the possibilities of leveraging openness and collaboration along the entire process of generating and disseminating new scientific insight, better understand and consider relevant boundary conditions and based on this, design more impactful ways of sourcing knowledge from external stakeholders and/or co-creating research together with relevant external knowledge holders. To this end, openness and collaboration are not ends

but rather potentially powerful means for improving scientific research in terms of novelty, efficiency and societal impact.

Better integrating existing insights on Open Innovation, Open Science and (partly) related concepts also enables the scientific community to have a richer and more nuanced discussion around the role and value of openness and collaboration in science, and by doing so shape the science of science. Along these lines, we currently invite contributions to a [Special Issue on Open Innovation in Science in Industry and Innovation](#).

What can researchers do in order to make their work interesting for innovators?

Translating scientific discoveries into innovation can happen via academic entrepreneurship, i.e., the scientists themselves engage in commercializing their inventions (or put them to use in a non-for-profit approach) or some form of university-industry collaboration including, but not limited to processes of patenting and out-licensing. In the paper “Attraction at First Sight?: Exploring and Categorizing Determinants that make Scientific Knowledge Attractive to Innovators.” (see Beck et al., 2018) we investigate how, in the latter case, innovators, i.e., decision makers in innovating organizations such as R&D managers in incumbent firms or SMEs identify the scientific discoveries they are interested in further developing towards innovative new products, services or processes. By applying a client-centric perspective commonly used in market for technology and marketing research, this paper considers innovators as clients in the transfer process of scientific knowledge. In a mixed-method approach, we first identified determinants of innovators’ perceived attractiveness of scientific discoveries using insights from existing literature and a qualitative interview study, and structured them along six categories (source of knowledge, knowledge characteristics, transfer channel, recipients’ characteristics, expected outcome, and context). Based on this, we assessed different preference bundles for seizing scientific discoveries in an adaptive choice-based conjoint analysis (ACBC). First results from analyzing this ACBC data indicate a couple of novel insights into what makes scientific discoveries attractive to innovators at first sight. For example, we find that innovators in one of our two main clusters highly value options for long-term collaboration to jointly explore solutions for complex future problems. Over and above other factors such as the quality of the scientific knowledge, they consider the scientist’s willingness to actively engage in the innovation process as critical and penalize more than all other things if the scientist(s) reject any engagement. Knowledge transfer efforts by universities or funders might therefore need to refocus from incentivizing patenting and top-journal publications only to additionally investing in building scientists’ capabilities to collaborate with innovators and incentivize using these capabilities.

Companies often organize crowdsourcing projects in a competitive manner. Would it be more innovative if the contestants collaborated, rather than competed with each other?

In collaboration-based crowdsourcing, self-selected crowd members work together to collaboratively solve a particular challenge and come up with one solution (Afuah & Tucci, 2012). To give an example, the translation of Facebook’s web content from English to other languages was collaboratively completed by a self-selected translator crowd in record time. Both, collaboration- and contest-based approaches to crowdsourcing hold advantages related to

leveraging knowledge recombination effects vs. benefitting from sheer numbers and diversity as well as the potential to generate extreme-value outcomes. In my view, the question is not whether contributors to crowdsourcing initiatives should collaborate, rather than compete. More interesting is to evaluate the appropriateness of one or the other, or a combined approach (as discussed as part of my answer to question 1) subject to relevant contingencies like the complexity of the problem, the desired novelty of the solution/s or other relevant innovation goals.

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