



## Odd couple or perfect pair? Tensions and recommendations for social scientist-industry partnerships in energy research

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### ABSTRACT

While academia-industry collaborations have primarily served to ensure ecological validity until recently, such collaborations are now seen as essential for solving wicked problems, such as the current transition of energy systems. Despite the upside potential, there are major challenges facing those who embark on academia-industry collaborations. Although applied researchers in general likely encounter similar challenges, this paper focuses on challenges of energy research collaborations between private industry and social scientists. We frame collaboration as an inherently social process, whereby a project is developed and proceeds, with errors made and successes achieved, within the context of social relationships. We argue that social breakdowns and different institutional values underlie most collaboration challenges, and that these issues need to be recognised and addressed to increase the chances of successful collaboration. We provide recommendations for improving industry-social science collaborations in energy research, concluding that like any other social relationship, given proper communication, agreed upon expectations, and shared values, industry and academia can make a perfect pair.

### 1. Introduction

Academic arrogance. Industry intransigence. While most agree these terms have negative connotations, do we agree on how they impact our work? We suggest that academic arrogance, defined here as the tendency of some academics to sometimes “talk down” to and consider their own views as superior to those of industry counterparts, is part of a larger system of (often unintentional) assumptions. Simultaneously, there can be a tendency in industry to focus on practical outcomes and dismiss fundamental theoretical knowledge enhancement as a goal; this is what we refer to as industry intransigence. We argue that both academic arrogance and industry intransigence can seriously hinder the communication between academia and industry (Blismas et al., 2009; Meeker, 1998) and negatively impact social interactions, particularly in collaborative research. We propose that changes in these areas are sorely needed to support and progress academia-practitioner collaborations.

Until recently, academia-practitioner research collaborations have primarily served to ensure ecological validity for scientists. However, such collaborations are now seen as essential for solving wicked problems, such as the transition of energy systems (Biggart, 2016).

Additionally, funding agencies increasingly demand that university researchers include industry partners, with the United States (U.S.) National Science Foundation requiring industrial collaborators in some instances (e.g., Partnerships for Innovation program) and the chances of funding from Horizon 2020 in the European Union increasing significantly with strong industry collaboration. Universities and governments also stimulate industry collaborations, for instance when changes in political regimes result in cuts to government science funding as observed recently in the U.S. (Yamaner, 2017).

The question remains if it's possible to have large-scale successful collaboration between academics and industry. Although academics study failures of all kinds, such as projects on software engineering (Ahonen and Savolainen, 2010; Kirby, 1996), development (London, 1993), and urban planning (Flyvbjerg, 1998), research projects are rarely the focus of academic evaluations. This is probably because failed research projects tend to be ignored, as people do not like to admit failures. Also, results of failed projects are rarely published due to non-significant results, known as the file drawer problem (Rosenthal, 1979).

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Based on our own experiences, grey literature, and conversations with colleagues, there are many research projects that have been less successful than expected, especially those involving industry partners. This leads to questions of if and how social scientists and industry can effectively work together, and under what circumstances such collaborations are useful. Even within the social sciences, individual disciplines approach collaborations differently, leading to lively ongoing debates (Shove, 2011; Whitmarsh et al., 2010).

Whereas previous papers have examined barriers that hinder academia-practitioner collaborations, this paper focuses on the factors underlying them. Specifically, we frame collaboration as an inherently social process— an ongoing interaction between two or more individuals who continuously adjust and readjust their patterns of thoughts, behaviors, and emotions as part of forming and growing the interpersonal relationship. In any collaboration, a project is developed and proceeds, with errors made and successes achieved, in the context of social relationships. We argue that many, if not most challenges, stem from fundamentally different values and/or social breakdowns. We focus on energy-focused research collaborations between private industry and social science researchers. Although many applied research(ers) likely encounter similar challenges, there is an urgent need for and building pressure on social scientists to get integrated in energy research (Clayton et al., 2016; Schuitema and Sintov, 2017; Sovacool, 2014; Steg et al., 2015).

Similarly, practitioners may work in the private sector, government/public policy, or non-governmental organizations, and whilst we acknowledge that collaborations between academia and these other sectors are important for energy research, academic-industry collaboration is in the spotlight at the moment. This is partly policy-driven as universities and governments stimulate academic partnerships with industry; for example, the European Commission and other major funders, such as the United States National Science Foundation and Department of Energy, require academic-industry collaboration for certain funding opportunities. Additionally, private industry develops and disseminates many consumer-facing energy technologies and programs. As a case in point, based on a collection of reports on smart grid projects conducted across Europe from 2005 to 2011, only 55 of 219 projects focused on consumer engagement, with the bulk of these occurring in 2010 or later. Further, of these consumer engagement projects, only 13% were led by university research centers or public organizations, with the remaining 87% led by industry (Ganagle et al., 2013). Hence, social scientists and industry are likely to intersect increasingly on energy research over the coming years.

## 2. Benefits and opportunities

Prior work has identified numerous perceived benefits of academia-industry collaborations. Although these are not the focus of this paper, we provide a snapshot here as background for our arguments.

Briefly, for scientists, opportunities to test theory in real-world settings, insights into real-world problems that lead to new research questions and enhance real-world “impact” (D’Este and Patel, 2007; de Fuentes & Dutrenit, 2012), access to new technologies (Dooley and Kirk, 2007), internship and job opportunities for students, and a competitive edge in funding proposals (D’Este and Patel, 2007; de Fuentes & Dutrenit, 2012) are among the chief benefits. Interestingly, academics who collaborate with the private sector have superior performance in terms of numbers and impact factors of publications to those who do not (Abramo et al., 2008), up to a certain point (Banal-Estanol et al., 2015). For industry, among the most valued opportunities are personnel recruitment (de Fuentes & Dutrenit, 2012), vetting products in development, or troubleshooting technical issues (de Fuentes & Dutrenit, 2012), the ability to market themselves as engaging in independent scientific research, cost-effectiveness (Dooley and Kirk, 2007; Oyelaran-Oyeyinka and Adebowale, 2012), and opportunities for continuing education (Dooley and Kirk, 2007). Benefitting both parties

are developing new ideas, intellectual property and patents (and thus status, prestige, and pecuniary benefits), and impact (which may vary across settings). Notably, collaborations often bring together experts with different disciplinary backgrounds, thereby presenting an opportunity for interdisciplinary research, which is widely seen as a key element in energy research (Abramo et al., 2008).

## 3. Challenges and recommendations

Despite these benefits and opportunities, there are major challenges facing social scientists wishing to partner with industry in energy research. One largely under-researched aspect is that collaboration is a social process. Viewed from this lens, and based on existing literature, we find that most challenges stem from two key factors: (1) different value systems (Barnes et al., 2002; Bjerregaard, 2010; Dooley and Kirk, 2007), and (2) social breakdowns. As an organization, industry tends to value its own products, private knowledge (Bruneel et al., 2010; Dasgupta and David, 1994; Dooley and Kirk, 2007; Perkmann and Schildt, 2015) and practical implications that can be implemented in their businesses, often in the short term. On the other hand, social scientists value the theoretical implications of research, public knowledge, and generalizable results (Bruneel et al., 2010; Dasgupta and David, 1994; Dooley and Kirk, 2007). Social breakdowns that might occur in any team may be more pronounced among parties with such divergent values. Below we highlight how social breakdowns and value differences underpin project challenges, and provide recommendations for overcoming these issues. As challenges manifest in different ways throughout a project, we present challenges per the 3-stage model of collaboration proposed by Crepon et al. (1998) and De Fuentes and Dutrenit (2012).

### 3.1. Stage 1 challenges: Establishing the partnership

The initial stage of a project involves assembling the team and establishing project objectives. Common challenges observed here stem from the project management triple constraint, or trade-offs between scope, budget, and schedule (Atkinson, 1999). One party (often industry) may have overly ambitious expectations, for instance expecting fast turnarounds a large-scale project with a limited budget. The other partner (often academics) may initially agree, only to later realize that expectations cannot be met. At this point, without open discussion about what is realistic given budget, scope, and timeline, academic arrogance or industry intransigence can spawn disappointment and frustration.

A related challenge involves divergent project objectives and outcomes. Whereas social scientists may focus more on theoretical problems, industry is often seeking practical solutions. More specifically, academic incentive systems tend to prize scholarly publications in top (often theory-centric) scientific journals, focusing on “impact factors” which do not measure social nor practical impacts of work (Biggart, 2016). On the other hand, industry often faces pressing internal challenges to keep up with competition, which may be unrelated to longer-term development of new products and services, an ideal space for academics to help with R&D (Oyelaran-Oyeyinka and Adebowale, 2012). Using building energy efficiency projects as an example, industry often prioritizes technology- or infrastructure-focused solutions in energy projects, which can leave little room for social science theory (Diamond and Moezzi, 2002). As another example, a U.K. study of collaborative projects found that only 10% focused on basic research, with the remainder focusing on applied research, development, or commercial production (Chen, 1996). Hence, these differing institutional values can act to disincentivize social scientists, particularly those early in their careers seeking tenure and promotion, from collaborating with parties who do not share their objectives of theoretical advancement (Schuitema and Sintov, 2017). All of this implies a challenge for social scientists to pursue theoretical interests in industry

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