Interventions and Dissonance in Industrial Research

Dressing the Emperor in New Clothes?

Stang Våland, Marianne ; Pallesen, Trine; Møller, Camilla Hedegaard

Document Version
Final published version

Published in:
Journal of Cultural Economy

DOI:
10.1080/17530350.2024.2376628

Publication date:
2024

Journal of Cultural Economy

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/rjce20

Interventions and dissonance in industrial research: dressing the emperor in new clothes

Marianne Stang Våland, Trine Pallesen & Camilla Hedegaard Møller

To cite this article: Marianne Stang Våland, Trine Pallesen & Camilla Hedegaard Møller Aug 2024): Interventions and dissonance in industrial research: dressing the emperor i clothes?, Journal of Cultural Economy, DOI: 10.1080/17530350.2024.2376628

To link to this article: https://doi.org/10.1080/17530350.2024.2376628

Published online: 26 Aug 2024.

JOURNAL OF CULTURAL ECONOMY
https://doi.org/10.1080/17530350.2024.2376628

Routledge
Taylor & Francis Group

Interventions and dissonance in industrial research: dressing the emperor in new clothes?

Marianne Stang Våland[a], Trine Pallesen[b] and Camilla Hedegaard Møller[c]

[a]Department of Marketing, Copenhagen Business School, Copenhagen, Denmark; [b]Department of Organization, Copenhagen Business School, Copenhagen, Denmark; [c]Department of Architecture and Design, Royal Danish Academy – Architecture, Design, Conservation, Denmark

ABSTRACT

This article describes the efforts of an ethnographically trained architect, employed as an industrial researcher in an architectural firm, as she tests ways of being relevant to both scholarly and business audiences. Drawing on the STS-inspired concept *sorting attachments*, the study illustrates how the industrial researcher aims to handle implicit friction inherent in the industrial research framework, while at the same time introducing frictions by her interventions in the firm's practices. While frictions may simply be disruptive to this type of collaboration, they also hold the potential for creating what Stark calls a *sense of dissonance* – moments in which competing criteria of worth allow the firm to create new business opportunities. We investigate the industrial researcher's efforts in three specific moments of interventions, in which she tests different ways of engaging with the diverging agendas and interests present in the firm. The study demonstrates that it is when the industrial researcher joins a design team and adopts their task, their purpose and problems, while at the same time mobilising conceptual tools from her own academic practice that we can observe the creation of new ways of working in architectural practice and new ways of conducting ethnographic fieldwork.

ARTICLE HISTORY
Received 7 October 2023
Accepted 31 May 2024

KEYWORDS
Industrial research; ethnography; interventions; sorting attachment; dissonance

Introduction

Strong relations between universities and industry are usually assumed to bring about economic growth as well as critical solutions to societal challenges (OECD 2010). However, for a number of reasons beyond the scope of this study, the process of aligning academic knowledge production and industry needs remain a problematic endeavour (Vedel and Irvin 2017). To bridge the divide between universities and industry, Denmark and other European countries have developed various policies aimed at establishing cross-sectoral collaborations. The main character of this study, whom we call the *industrial researcher*, is occasioned by such a policy instrument: the Danish Industrial Research Programme that co-finances collaborations between companies and universities. Established as a public-private policy instrument, the programme strives to strengthen the business performance and capacity for innovation of an industrial collaboration partner by means of academic research (Innovation Fund Denmark 2024). In other words, the programme is formed around the ambition to further the translation of research into new products or services (Innovation Fund

CONTACT Marianne Stang Våland msv.marktg@cbs.dk Department of Marketing, Copenhagen Business School, Solbjerg Plads 3, 2000 Frederiksberg

Denmark 2018). While the programme predominantly supports collaborations formed around the technical or natural sciences, industrial research projects do also take place within the social sciences and humanities.

The collaboration established under the industrial research programme that we explore here, involves an architect trained in actor-network theory (ANT) and ethnographic methods during her doctoral studies[1] and Archfirm,[2] a mid-size architectural office in Copenhagen. In 2017, the architect joined Archfirm as an industrial researcher and postdoc fellow affiliated with the Royal Danish Academy (School of Architecture). For Archfirm, the purpose of the collaboration was to explore a niche part of the market for construction in which the firm had limited experience, namely the early phases of social housing renovation. The industrial researcher's engagement was driven by her interest in social housing and more specifically in the organisation of the many and diverse interests involved in the renovation of such housing projects.

To a business partner of an industrial research collaboration, such as Archfirm, we could expect the answer to the question raised by this Special Issue: 'Do ethnographers make markets?' to be affirmative. After all, that is the very raison d'être of the Industrial Research Programme. To the industrial researcher trained in ANT and ethnographic methods like the one involved in our study, however, the expectation that research can, will or should make markets produces challenges that are practical as well as epistemic (see also Geiger and Gross 2022, this issue; Roscoe and Loza 2019). Below, we unfold how the industrial researcher struggles to develop her research ambition while at the same time being useful to Archfirm. As her scientific approach and sense of rigour is challenged, new ethnographic trajectories are made possible, through which research and the role of the researcher are performed in ways that may disclose important opportunities for knowledge production and application.

To explore the situation of the industrial researcher and her potential for contributing to market making by means of her ethnographic work, we draw on David Stark's notion *sense of dissonance* (2009). A sense of dissonance may emerge, Stark claims, in organisational settings when competing evaluation and performance principles coexist and productive frictions are encouraged (Stark 2009). Intimately connected to the organisation's ability to search for new solutions to undetermined practices, Stark suggests that dissonance 'exploits the indeterminate situation by keeping open diverse performance criteria rather than by creating consensus about one set of rules' (2009, 17). In this way, the innovative capacity of an organisation refers to its ability to organise friction, to recombine different forms of knowledge within the organisation, and to stimulate collaboration between employees whose evaluative standards differ. The architectural office that makes up the ethnographic site of this study is itself a place of frictions, where 'uncertainty regarding design decisions comes into play […], as architects need to take account of the diverse evaluation criteria of clients and of a large number of specialists involved in an architectural project' (Farías 2015, 275). In this study, we do not provide an ethnography of the possible dissonance produced by 'natives' as we see in Stark's empirical studies of engineering, new media and financial firms, or in Farías' study of architectural design practices. Instead, we study the ways in which the industrial researcher herself, by way of the *interventions* she undertakes and that become part of her ethnographic study, introduces, promotes and organises different types of friction in the architectural office.

To move beyond the general observation that the interventions of the industrial researcher produce friction in the wider organisation of her study, and to unpack the specific ways in which such interventions produce and organise dissonance, we turn to parts of the STS literature that challenges the so-called descriptive–normative divide within the social sciences (Zuiderent-Jerak and Bruun Jensen 2007). This literature tends to see ethnography and intervention as interwoven practices and the intrinsic, reciprocal relationship between researcher and field as an opportunity to explore new layers of practice (Mesman 2007). The question is therefore not whether or not to intervene, but rather what types of interventions are possible and relevant (Hauge 2021; Jensen 2007), as well as how interventions can contribute to the organisation of dissonance. We draw on the concept of *sorting attachments* (Jensen 2007) to understand how interventions involve

practically engaging in collaboration with specific organisations or agendas (sorting) and becoming attached to concrete political, cultural or economic projects through such collaboration (attachment). Sorting attachment implies a performative stance to the industrial researcher's continuous struggle to make her academic interest cohere with the practices of her empirical field.

Our analysis is constructed around three moments of interventions, in which the industrial researcher engages in (re)sorting attachments. While doing so, she produces friction and suggests ways of ordering these at the same time. To unfold this, we draw on the industrial researcher's fieldnotes, research essays and communications with her academic supervisor, produced over the course of her two-year engagement with Archfirm. Before we describe the three moments of intervention, however, we first explain the theoretical framing of our study as well as the empirical context and methods. Following our findings organised around the three moments, we return to the question of the industrial researcher's market making capacity, including the ways in which she tests her usefulness to the firm by means of her interventions.

Ethnographic interventions through sorting attachments

Many of the dilemmas occurring as the industrial researcher struggles to find a way to frame her academic contribution *and* be useful to Archfirm are well-known and debated in contemporary anthropology, as well as in disciplines where ethnography is a central methodology, including organisation studies, science and technology studies, and sociology (Neyland 2008). One such challenge is ' … to figure out a way to be useful for scholarly [and] more practical and pragmatic audiences' (Neyland 2016, 183). In recent years, scholars have experimented with the repertoires and boundaries of the so-called participant-observer position occupied by the ethnographer. Think for instance of Annelise Riles 'inside out' ethnography (Riles 2001), Paul Rabinow and colleagues' collaborative anthropology (Rabinow and Bennett 2012; Rabinow and Stavrianakis 2014), or Douglas R. Holmes and George E. Marcus para-ethnography (Holmes and Marcus 2006), more recently summarised as post-reflexive ethnography (O'Doherty and Neyland 2019).

In this study, we draw on a 'neighbouring' literature, namely STS-inspired work. STS has a long tradition for debating its research practices as intervention (Bijker, Hughes, and Pinch 1989; Hacking 1983; Knorr-Cetina and Mulkay 1983; Latour 1990; Pels 2003; see also Wouters and Beaulieu 2007 for an overview). Zuiderent-Jerak and Jensen, for instance, suggest that STS research may contribute to solve practical problems and that the dichotomies of the otherwise 'rather bland either-or debates: either critical or descriptive, either theoretical or practical, either political or scientific can be overcome by investigating the notion of "intervention"' (2007, 229). Ethnography and intervention are instead seen as interwoven practices, constituted by the intrinsic, reciprocal relationship between researcher and field, 'in which many agents constantly negotiate and influence each other in order to achieve multiple conflicting goals' (Zuiderent-Jerak and Bruun Jensen 2007, 232). Mesman, for instance, in her study of professional practice in a neonatology ward, discusses how practical, moral and collaborative issues of her role as participant observer becomes a key to discover new aspects of the practice itself (Mesman 2007). As such, ethnographic interventions become a way of exploring new practices.

In a recent contribution, Hauge (2021) develops a typology around three modes of intervention, namely ethnography as political activism, ethnography as organisational development and ethnography as intervening description. Though her typology is catered for contemporary ethnographic literature on how to manage positionality, we find these modes relevant for discussing the relationship between researcher and field. The first mode, ethnography as political activism, is openly ideological with the explicit agenda to transform the field under study. Ethnography as organisational development proposes a shift from the study *of* organisations to a combination *of* and *for* the organisation (Neyland 2008, 2016) – a development that Hauge proposes as 'organizational development [that] explicitly and deliberately contributes to the organisation it studies' (Hauge 2021, 100). This mode usually builds on formalised agreements between researcher and host organisation (Neyland

2008). Ethnography as intervening description, in contrast, maintains a line between researcher and the researched, instead to insist on the usefulness of ethnographic descriptions. Upholding a reflexive stance (Ybema and Kamsteeg 2009), the ethnography provides what we may call a stranger's description of a social practice. Importantly, though, as Vikkelsø succinctly puts it, 'a descriptive research practice does not necessarily entail withdrawal from practical relevance' (2007, 300).

While Hauge's typology is informative, it leaves the idea of intervention still to be unpacked. As Bruun Jensen notes:

> It is striking, however, that notions such as usefulness and intervention are themselves left rather untouched […] whenever interventionist agendas are presented as a step forward for social research. Rarely are these terms given the same critical scrutiny as other important terms from science or technology (e.g. 'truth,' 'rationality,' 'efficiency,' 'standardization,' 'facts'). (Jensen 2007, 238)

Keeping with a performative stance, Jensen suggests understanding intervention as *sorting attachments* through which the researcher attempts to make elements 'cohere' in theory and practice. Sorting is the practical activity of finding ways to 'engage with other organisations, institutions or agendas as part of conducting research.' Attachment, in turn, underlines that this engagement is always formatted in some way or other, packaged 'with sets of cultural, political and economic relationship' (Jensen 2007, 239). Sorting attachments points to the concrete ways in which researchers manage different and often competing agendas, institutions and organisations that eventually perform different forms of usefulness:

> Sorting attachments, thus, refers to the processes through which researchers, by affinity or implication, become tethered to institutional and political 'machines,' which may be quite different from their own but nevertheless shape their research questions, methods and conclusions in multiple ways. (Jensen 2007, 239)

Running as an undercurrent across the STS literature on interventions is the idea of friction between different valuation registers in the observed practices. In fact, one thing ethnographers may productively do is to make different, sometimes conflicting, valuations visible to practitioners and those with attachments to the practice (e.g. Mesman 2007). We turn here to David Stark's work on dissonance to add to the idea of intervention as sorting attachment. Stark draws on Boltanski and Thevenot's seminal work on regimes of worth (Boltanski and Thévenot 2006) as a means to bring together value and values, relating to economic calculations or the social relations in which economic actions are embedded (Stark 2009). His claim is that innovation comes from the organisation of dissonance that is best supported by the organisational form he calls a heterarchy. Allowing and even mobilising multiple orders of worth, the task of the heterarchical organisation is to (re)define what constitutes as valuable. In a study of design development in architectural practices, Farías (2015) builds further on Stark's notion of evaluative dissonance, proposing instead epistemic dissonance as a type of friction that occurs, not *across* professional cultures but rather in collaboration between architects who work together, and whose internal controversies and perceptions may lead to unexpected design solutions.

This attention to multiple, coexisting orders of worth, and the constant process of (re)defining what constitutes as valuable is often implied, we argue, in studies of intervention. It is well illustrated for example in Hauge's study of the Danish Medicines Council and their work of prioritising expensive medicine, including conflicts regarding the valuation of longer or better lives against societal costs (Hauge 2021), and in Bruun-Jensen's study of the introduction of wireless technology in a hospital ward where competing concerns, for instance for efficiency versus quality, collide (Jensen 2007). Importantly, however, we need to distinguish between friction and what Stark refers to as a sense of dissonance. Frictions are likely to occur, in some form at least, in most settings, like the Medicines Council. To become a sense of dissonance, however, requires an organisational component that makes the coexistence of different value registers possible (Stark 2009).

Our interest in this paper is twofold. First, we study the distinct ways in which the industrial researcher strives to be relevant as a researcher in an academic institution, an employee in a private organisation, and a member of a design team. Second, we are interested in what her interventions produce – sometimes adding to and sometimes dissolving potential organisational frictions in the practice. Our study reflects a formalised collaboration and as such falls into Hauge's (2021) category of ethnography as organisational development, through which the industrial researcher does ethnography *of* and *for* the organisation. We suggest, however, that this double purpose – *of* and *for* – does not exist as two parallel and detached streams going on in the case. Instead, they constantly interfere and impose new frictions in the organisation as well as in the endeavours of the industrial researcher.

Methods

Analytically, we are interested in the industrial researcher's interventions in Archfirm's practices. We have selected three types of interventions that are of particular relevance to the theme of this special issue, that is ethnographers' possible roles in market making. Drawing loosely on Antal, Hutter, and Stark's (2015) *Moments of Valuation – Exploring Sites of Dissonance*, we refer to these as moments of intervention. Interventions, like valuation, are spatially and temporally situated, they take place in specific sites, and have a beginning and an end. The three moments of intervention we address differ significantly according to these dimensions. While the first moment contributes to setting up the industrial research collaboration and securing its funding, thus preceding the actual project, the second moment entails the early efforts of the industrial researcher to embark on the collaboration. During this second moment, the industrial researcher starts investigating Archfirm's possible entry into the early phases of the market for social housing renovation and the role of her research in that respect. The third moment takes place in the context of the central case of the industrial researcher's postdoc project, the renovation of 28 high-rises in Copenhagen, of which Archfirm is the lead architectural consultancy on five of these houses (from hereon referred to as the renovation case). During each of the three moments of intervention, the industrial researcher actively sorts and re-sorts different attachments that reflect the collaborative conditions. By this she produces and orders frictions by different (strategic) means, sometimes developing new tactics through which she experiments with her role and work.

To study the three moments of interventions, we draw on different data sources. One source is the industrial researcher's primary data from her post doc project (2017–2019). These data portray work practices in Archfirm, the firm's engagement in the early phases of social housing renovation, as well as data from the renovation case presented as the last part of our analysis (see Moment of intervention 3). The data is produced through fieldwork at Archfirm (a total of 12 months spread over two years), at the housing organisation involved in the renovation case (two weeks) and at the municipal administration acting as the public authority in the renovation case (one week), 33 interviews with informants from Archfirm and the other organisations involved in the renovation case, as well as documents from Archfirm's daily practices and documents, also related to the case.

The main data informing our study, however, reflects the industrial researcher's troubles and experimentation with her work and role. While her initial approach when entering Archfirm was to describe in detail the organisation of social housing renovation projects, her encounter with the field soon disclosed that Archfirm's managers held a variation of expectations to her research that did not match her own plans. These discrepancies engendered frictions, and she eventually adjusted her approach to cover roles and tasks that she had not anticipated – adjustments that affected her epistemological assumptions. To explore these reflections and experiments, we draw on documents in a broader sense. Amongst others, we activate documents predating the formal partnership between the industrial researcher and Archfirm, for example the funding application. Other documents include four booklets produced by the industrial researcher as a result of her experimentation with her role. With titles like *Analytical tools* and *Perspectives on knowledge and collaboration*, the industrial researcher presents actor-network theory (and other practice theories)

and the role and value of knowledge in a business perspective, to a non-academic, practitioner audience. Also, we draw on the industrial researcher's diaries as well as on the email correspondence between her and her academic supervisor. In particular, this latter category of documents represents the industrial researcher's reflections vis-à-vis her role, responsibilities, and actions.

In the following section, we present the three moments of intervention chronologically, as they occur during the collaboration. This is not to suggest that the story should necessarily be understood chronologically. What we want to explore with this division is rather the different epistemological challenges that result from the encounter between the industrial researcher and Archfirm, while she engages in re-sorting her attachments, e.g. in relation to the funding organisation, Archfirm's management, and the design team of the renovation case. As such, our accounts are less concerned with the industrial researcher's development over time than with the effects engendered by the work of sorting attachments and the concrete ways in which usefulness is performed.

Findings: three moments of intervention

In what follows, we present the three moments of intervention. Each moment reflects the industrial researcher's attempts at handling the collaboration's implicit frictions, exploring ways to study the organisation's practices while at the same time testing ways of being useful to Archfirm.

Moment of intervention 1: making distinctions between business and research interests

The first moment of intervention takes place before the industrial research collaboration is formalised. As the industrial researcher prepares her project description for Innovation Fund Denmark, she defines her project's purpose and potential effects in dialogue with Archfirm and her academic supervisor. An industrial research collaboration comprises a complex set of objectives, in which the funding body outlines the distribution responsibilities already in the program's guidelines: the industry partner is responsible for making results profitable, while the industrial researcher is responsible for the academic quality, seeking knowledge production as an overall purpose (Innovation Fund Denmark 2024).

While preparing an application around the parties' mutual interest in social housing renovation, the industrial researcher and her academic supervisor discuss the possible epistemic differences between herself and Archfirm. Based on the supervisor's experience with industrial PhD projects and the sense of mixed purposes in such collaborations, the industrial researcher formulates a hypothesis for Archfirm. In doing so, she tries to capture the assumptions and expectations of her collaboration partner. Archfirm has substantial experience from the later phases of construction projects (illustrated in the middle and right part of Figure 1), and the hypothesis is that the firm's

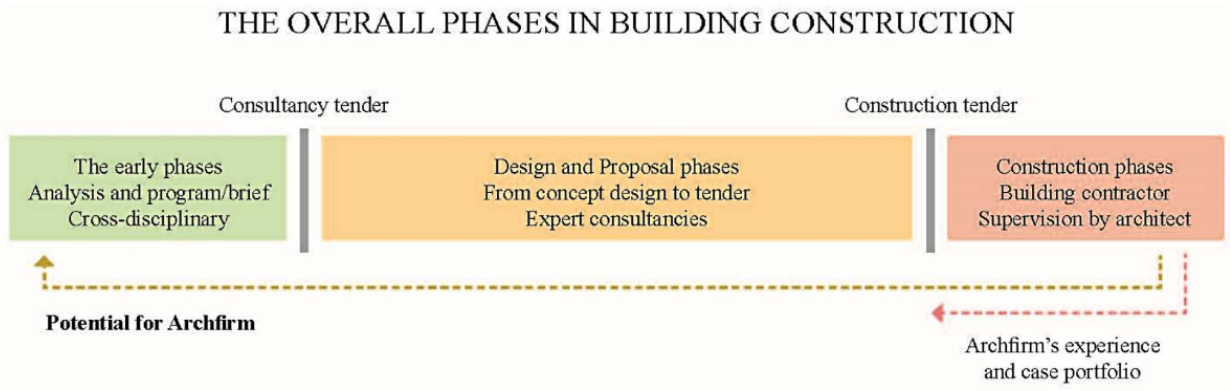

Figure 1. Illustrates the business hypothesis, reflecting the overall stages of Danish construction development, which was applied in the industrial researcher's funding application. The arrows indicate Archfirm's current and potential roles.

expertise from these phases can become a business opportunity if made available in the early phases of a project (the left part of Figure 1). While the first phases involve the client's strategic definitions, user involvement, settling the brief and the process of concept design, the later phases involve the design development, its technical aspects and constructability as well as the actual construction. It is Archfirm's experience that ideas and expectations established during the early stages often prove difficult to fulfil in the later, technical stages. The hypothesis implies that Archfirm's expertise from the later phases can be mobilised to qualify the initial project development, allowing them to widen their market.

Based on her interest in the complexities of social housing indicated in the hypothesis, the industrial researcher defines her project around two questions: a broad and open *research* question representing her academic interests, and a *business* question representing Archfirm's commercial aspirations. Her research question, *How are the early phases of developing marginalised residential areas organised from the perspective of the client?,* stresses the need to understand the organisation of the complex work involved in renovating social housing. The client highlighted in the question is the social housing organisation and municipalities who act as the central public authority administering social housing, while other central stakeholders are the residents seen as end users. The business question instead foregrounds the firm's need for knowledge to act as consultants in such a setup, and marks the distinction between different forms of knowledge: *How, and with what types of knowledge, can we as architectural consultants provide strategic and holistic consultation in the early phases of developing marginalised residential areas?*

As the industrial researcher writes up the application for funding, she formulates the (business) interests of Archfirm as distinguishable from her own (research) interests. By establishing two categories, she formulates a dual purpose, signalling co-existing attachments. The dual purpose is in turn connected in at least two ways: as a mutual interest in the complex societal phenomenon of social housing renovation and through an emphasis on the role of knowledge in the field. While her solution provides a practical way to honour the parties' different objectives in the project, thus securing the establishment of the collaboration and in this way bringing the parties together, it concurrently underlines that their interests are kept apart. By doing so, she introduces friction as an implicit structural condition in the collaboration: each question implies different evaluation criteria, different expectations vis-à-vis the outcome, as well as the types of knowledge produced.

Moment of intervention 2: mapping epistemic positions

In 2017, the industrial researcher receives a positive reply from Innovation Fund Denmark, and begins her fieldwork at Archfirm. Trained as an ethnographer during her doctoral work, she approaches the organisation as a participant observer. She gets her own desk in Archfirm's open office and joins the daily practice.

During her initial time at Archfirm, the industrial researcher conducts interviews, informal conversations and observations of meetings related to the renovation case. While doing so, she is struck by the many different, often competing, expectations for and interests in her work. These interests appear to be accompanied by individual epistemological positions, constituting what knowledge is and representing different expectations for the results of her research. She observes a first indication of such differences during a group-interview with management representatives and core staff of the case project. After the interview, she notes in her field diary (November 2017):

> It seems that manager A and B expect the [research] results to make up a tool or device, however this has never been discussed as an intention of the research. I also think it is hard to establish what a tool is. Also, just before the group interview, manager D said to me that if the project doesn't produce results, it is 'The emperor's new clothes.' I don't think it was meant as an insult, but it has made me ponder.

As her note suggests, some of the managers expect the project to result in tools applicable in their daily practices, while the industrial researcher questions what such a 'tool' may even be. Manager

D's comparison of the project's result to the folktale, *The emperor's new clothes*, polemically brings the matter to the fore. What the industrial researcher understands from this association is that she, the researcher, may potentially be seen as the swindler, representing esoteric findings far removed from the daily practices, and eventually leaving Archfirm fooled and exposed as the naked king. Instead, a (good) result, she understands from the exchange, needs to be applicable and have material representation.[3] These implicit assessments of possible outputs contradict not only her research question, but equally so the business question, which both frame the result as knowledge production.

After an interview with another manager she adds to her notes (Diary, June 2018):

> [Manager E] apparently sees the value of my research as the methodological approach I take as a researcher […] To him, the main focus is not the research findings, but rather my way of working and the academic research procedure that is attractive to the firm.

Rather than producing knowledge to form tools for application in practice, manager E's interest in the project is mainly the process of doing research, expecting the outcome to involve procedures and ways of thinking he finds missing within architectural practice and organisation. From this position, the task of the industrial researcher is not so much to provide insights that unfold the case, but instead to unfold her work as researcher and to translate this approach into the architectural practice. Intrigued by the different epistemic positions among the managers, she begins to map the managers' expectations and the distinctions they seem to draw between result and knowledge, gradually making the internal epistemic friction she observes part of her object of analysis (see her map in Table 1). The positions she identifies among the managers is summarised in an email to her academic supervisor (December 2018):

> The conception of research is indeed diverse at Archfirm. Manager E finds that ethnographic research is a part of a necessary, new business model, which is important as 'the fees are heading towards zero.' Manager C finds I have contributed well on project X, supporting a development of a new, integrated strategy for research and business. […] Manager B wants concrete tools and sales material, emphasising that my presence in the firm needs to be justified through my contributions to the development of such tools. Manager A wants services for application in the early phases of the [renovation] projects. Adding it all up, I guess they find it hard to respect my methodological approach.

Mapping epistemic positions, we could say, is a prerequisite for sorting attachments. Only when recognising the various agendas can she find practical ways of engaging in the collaboration. However, doing so, she finds that the managers' different positions make her own role and work contested. She is faced with, at the same time, evaluative friction, reflecting different normative expectations for *good* research, and epistemic friction, representing the managers' different attitudes to what knowledge is and what role it should play in the business. While her attempts at exhibiting these frictions could be seen as an opportunity for the managers to clarify their strategic ambitions for the firm – and thus a way for the industrial researcher to be useful – it also leaves her in an

Table 1. Industrial researcher's own mapping of the positions. It illustrates the managers' different expectations in relation to the format of research results, its application, her role as researcher, and the overall role ascribed to knowledge in the firm.

Manager	Expected result	Process	Industrial researcher role	Role of knowledge
A	Visible product	Fast	Researcher as producer or manufacturer	Product, device, or commodity
B	New method	Fast	Researcher as process-designer	Basis to form method
C	Consultation work	Fast	Researcher as team-member	Insights inside the researcher
D	Branding	Fast	Researcher as trophy	Not relevant
E	Research-based knowledge	Slow	Researcher as investigator	Connected to scientific process
F	None	None	Researcher as persona non grata	Not relevant
G	New skills and qualifications	Slow	Researcher as teacher	Formed in collaborative processes

unsettled position, challenged to navigate her role, tasks and deliverables in new ways. Meanwhile, manager D's reference to *The emperor's new clothes* brings the industrial researcher to question whether she can prove useful at all, or if her interventions rather leaves the king naked, so to speak? While she is left unsettled by these frictions, she decides to start experimenting with new ways of conducting her role.

Moment of intervention 3: experimentation with well-known tools

As the previous section illustrates, the industrial researcher maps the managers' diverging expectations for her research, while retaining an approach that does not distinguish between useful and descriptive. However, acknowledging the frictions reflected in these different expectations, she decides to leave her familiar research position, instead to adopt a more active role in the local knowledge production, in the renovation project that becomes her main case.

The case is the renovation of a group of high-rises in a marginalised area established in 1956, which has recently been reviewed to become listed; buildings that are preserved because of their distinct cultural heritage. Being listed involves numerous restrictions in relation to maintenance and renewal of the building and has distinct implications – not only for residents and the administrative housing organisations, but also for the architects working on a design proposal (see also van der Schoor, van Lente, and Peine 2024). As part of this nomination process, the Danish national cultural heritage agency provides a *construction brief* to support their assessment and the architects' design development in relation to listing regulations.

Below we follow the industrial researcher as she explores new forms of interventions in the daily practice of the renovation case. She embarks on a collaboration with the architect Peter[4], responsible for the design of the façade of two of the high-rises. Aiming to balance technical, social, preservative, architectural and economic concerns dictated by the abovementioned construction brief, Peter and his team struggle to handle its constraints on the design solution. The brief defines three instructions:

(1) The buildings must keep their original geometry (slim and elegant, not widened)
(2) The existing façade must be demolished
(3) The new façade must resemble the original

As the team begins to test options that comply with the brief, they find that it does not meet current Danish rules for renovation. With these findings, they start exploring alternative solutions for the façade, solutions that, in turn, challenge basic instructions in the brief (e.g. instruction 1 and 2 in the above). Instead of stripping down the original façade to replace it with insulation and a new front similar to the original as the brief indicates, the team suggests sustaining the original façade and adding an extra layer to it: a new front on top of the original. This solution solves problems with damp and mould as well as technical issues in relation to the indoor climate, and it reduces costs. While the brief accepts a widening of the building of 95 mm, however, the team's design proposal will add 150–165 mm to the original. As the buildings are famous for their proportions, the extension may affect the distant view from a cultural heritage perspective. When Peter presents this alternative proposal, the cultural heritage agency asks for documentation of the design's implications. It is into this process of producing arguments for an alternative façade design that the industrial researcher enters, and when she decides to test new ways of enacting her role.

Putting ANT to use in practice

Based on their mutual involvement in the project, Peter invites the industrial researcher to comment on his findings and ideas. These exchanges take place during interviews and informal conversations, over email and in meetings with other team members and project participants. In April 2019, the industrial researcher notes in her field diary:

> Today, I have transitioned into a type of action-researcher, taking active part in the discussions and sharing parts of my [ANT] analysis of the situation with the others [the project participants]. I asked questions and provided readings and interpretations, and was mutually engaged in considering the situation, the actors and potential strategies for action.

During the meeting referred in her notes, which involves Peter and his team, a client representative, the engineer, a manager at Archfirm and the industrial researcher, they discuss the design challenges produced by the cultural heritage agency's construction brief. Engaging directly in the activities of the field as part of her data collection, the industrial researcher asks the group for permission to participate in the discussion. She introduces the project team to the basic ideas behind ANT and a few of its key concepts: non-human actors, heterogeneous networks, spokesperson and obligatory passage point (see Akrich and Latour 1992). Equipped with these concepts, she invites the team to do a collective analysis of the design situation. The concepts allow the group to discuss the production and distribution of power in the project and to consider how the cultural heritage agency becomes an unpredictable and powerful actor, difficult to handle in the design process. The industrial researcher illustrates how the construction brief's requirements for a façade solution work as an obligatory passage point for everyone to pass through for the project to materialise. Likewise, she unfolds the notion of spokesperson as a concept to help understand renovation projects, in which many actors speak on behalf of others. The discussion results in a collective map through which the industrial researcher and the team explores the actor-network of the project, to identify and problematise its complex power structures.

Based on their ANT-analysis, the team and the industrial researcher begin problematising the design conditions defined by the brief. They debate and contest their prior consensus that led to the alternative façade, which challenges the criteria of the brief. Collectively, they realise the tension between these criteria and the role and focus of the cultural heritage agency, on the one hand, and the alternative façade solution and the existing buildings, on the other. Both represent strong networks, and as the group unfolds their shared analysis, they recognise that both the criteria and the design solution are up for discussion. The meeting exemplifies the industrial researcher's experimentation with her role. By introducing parts of her theoretical research framework to the project participants – her informants – she provides them with an approach to map actors and dilemmas in the projects, making these easier for them to handle in practice.

Building complex arguments in practice

The industrial researcher continues to explore her role in the context of the renovation case. Further developing her collaboration with Peter, she assists him in developing arguments for his façade proposal. As the cultural heritage agency asks for a *memorandum* explaining the proposal, the industrial researcher decides to help Peter to develop this document. The collaboration triggers new ways of working for both: for her as a researcher under pressure to make her research useful, for him as an architect under pressure to explain and argue for his design.

The collaboration begins during an interview when the industrial researcher asks Peter for a status on the memorandum, to which he replies there is little or no progression. In reply, she suggests they meet the following day to work on it together. Peter accepts and sends her his current draft, acknowledging her interventions as 'great sparring' (email, April 2019).

At their meeting the following day, the industrial researcher brings a diagram of Toulmin's model of argumentation[5] and introduces Peter to the basic constructs of claim, grounds, warrants, backings, and qualifiers. She explains that the model can be used as a means to explore his arguments by mapping their components. For each step in Peter's argumentation, she asks: 'How do you know that?' With the model of argumentation and this simple question, the industrial researcher and Peter start producing the memorandum. At this point, his document draft consists of four accounts explaining the proposal for an alternative façade:

(1) Indoor climate: the brief provides conditions for an attractive façade but a poor indoor climate.
(2) Financing: demolition of the existing façade will cause an approximate 30% cost increase.
(3) Resettlement: demolition will have implications for the tenants, many of whom are vulnerable.
(4) Technical construction: demolition may put the buildings' stability at risk, and stripping the buildings is problematic as it may expose moisture to the construction. Conversely, the alternative proposal produces a thicker façade that may change the buildings' character.

As part of her fieldwork, the industrial researcher has conducted several interviews with representatives from the cultural heritage agency in relation to the renovation case, data she employs as she and Peter discuss the memorandum. During their discussion and with the agency as main audience, they rearrange the above accounts (1-4) and rewrite an instructive text that makes up the argument. They then review the memorandum together and consider each claim, its grounds and warrants, using Toulmin's concepts to structure the argument. Peter writes (version 1, April 2019):

> The constructions of the buildings are challenged if the façade is demolished. To take down the existing façade leaves a great risk that may compromise the stability of the buildings. This is the central reason why we advise against a partial demolition of the building envelope.

Here, the industrial researcher underlines the claim 'constructions are challenged' with a yellow marker. What does Peter know about the 'great risk'? They unfold the team's concrete experiences (grounds) as well as knowledge established in the case (warrants). Several of the backings they mark refer to material from the engineer, who bases his notes on reports (warrant) and the Danish building regulations (warrant). Going through the memorandum, the industrial researcher notices the absence of illustrations, which she considers unhelpful vis-à-vis an audience like the cultural heritage agency that consists of architects and conservators. To meet the audience, she and Peter collectively start to sketch how the team's alternative proposal differs from the design conditions proposed by the brief, resulting in the first of four diagrams that explain the design development (see Figure 2).

The industrial researcher describes the situation in her field diary (May, 2019):

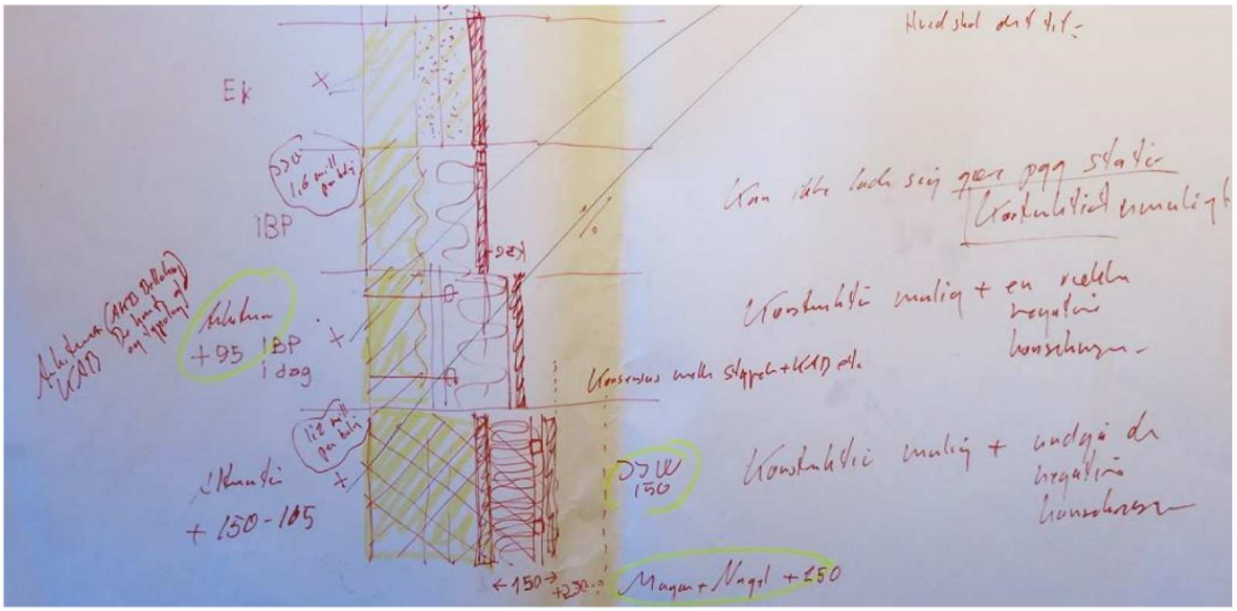

Figure 2. Shows early drafts of Peter and the industrial researcher's mutual work on creating an illustration to support the argument for the alternative design solution for the façade. The different façades are represented in the pillar middle-left of the picture (Source: CHM).

> [Before this] I didn't fully understand the façade solutions. […] In this session, Peter and I started to sketch up the diagrams currently at play. […] It is the first time I really get it. Peter is now making an A3 photocopy of our sketch and we can put things like estimated costs onto it. The four diagrams work as a kind of mapping. […] The diagrams are my entry to understand Peter's work.

The note illustrates the dual character of the industrial researcher's interventions. The development of the memorandum is based, at least partly, on her direct involvement and better understanding of the practice that forms a central part of her research project. After several rounds of rewriting the memorandum, it is sent for approval to Archfirm's manager, the engineer, and the client. In the final version, they include some of Peter's illustrative sketches of the façade proposal, with the industrial researcher's explanatory texts as guides. The link between texts and sketches provides an opportunity for Peter to formulate and explain – to rephrase his argument – allowing Archfirm to make progress in the project. To the industrial researcher, in turn, it allows for a better understanding of the tacit knowledge involved in the design development of social housing renovation, which is the type of knowledge Archfirm wants to lift from the later phases to the initial part of such projects (see Figure 1 for an explanation). In this way, the case exemplifies the dilemma Archfirm explores in the business hypothesis, outlined as the *business question* in the proposal for funding.

In this moment of intervention, we see how the industrial researcher reframes her research position. She engages directly in the development of the renovation project by deploying the analytical concepts she usually reserves for her data analysis, making them available for the design team to grapple with and solve project dilemmas in new ways. These interventions represent a significantly different way of sorting attachments than the industrial researcher performed in the previous two moments. Rather than upholding the distance between interests – hers and Archfirms – as observed in the previous moments, she decides to engage with the tasks of the design team. By doing so, the assignment of the team is transformed.

Discussion

We opened this paper suggesting that one way in which the industrial researcher could possibly contribute to making markets – via her interventions in Archfirm's practices – was by introducing, promoting or reorganising some of the friction emerging from the industrial research collaboration. Approaching interventions through the lens of sorting attachment, we then studied three moments in which the industrial researcher practically engaged with specific agendas and actors, while at the same time entering relations that were differently configured than in traditional academic collaborations. While the analysis described the interventions and the frictions they produced vis-á-vis Archfirm's daily practice, we now turn to the potential innovative effects of these frictions. Frictions may generate what Stark optimistically calls a sense of dissonance. However, they may also simply result in noise – or even facilitate strife (Holm 2010). Below, we discuss the characteristics of the three moments of intervention at hand, which we call *juxtaposition*, *representation* and *tasking*, and their potential for producing a sense of dissonance.

Embarking on new fields, Jensen points out (2007), often implies entering domains where many attachments are already sorted. For instance, as demonstrated in the first moment of intervention, applying for funding through the Industrial Research Programme depends on a formalised relationship between a firm, a researcher and an academic institution; funding is only granted following thorough assessment of an applicant's proposal, which requires careful attention to the conditions of the program, including a description of the project's commercial significance for the involved industry partner (Innovation Fund Denmark 2024). To accommodate the interests of the programme, the industrial researcher intervenes by *juxtaposition*. Her formulation of two questions – a research question and a business question – provides a practical way to honour the involved parties' different interests and objectives in the project. Rather than identifying a shared interest, she delineates the industrial and the academic interests as clearly separate. While juxtaposition

helps her secure funding, and thus the establishment of the collaboration, it also underlines that interests are kept apart. Juxtaposition, as observed here, hardly produces a sense of dissonance: each question implies that the evaluation criteria, the expectations of results and the types of knowledge produced remain separated rather than in direct relation – or even competition. The separation suggests that responsibilities for the two questions are distributed rather than shared; that they may be pursued and evaluated independently.

In the second moment of intervention, the industrial researcher performs what we call intervention by *representation*. Arriving at Archfirm and embarking on her research, the industrial researcher realises that her presence creates epistemic friction. To the managers and employees of Archfirm, she represents academic knowledge: a type of knowledge that is unfamiliar and thus possibly inaccessible to the organisational members. Accessible or not, their engagement in the industrial research collaboration may in itself mark the emergence of a different role for knowledge in the future practice of Archfirm. To better understand the managers' varied reactions and expectations to her possible contribution – her usefulness – she carefully elicits and maps their diverging positions (Table 1). While her mapping undoubtedly indicates the presence of significant epistemic frictions, it is not obvious in the case that these are in any way productive. The map is a tool to support her own handling of the strained collaborative situation, and the different beliefs and conceptual schemes (Madsen, Munk, and Soltoft 2023) remain implicit as the tool develops: it is not as such used to form mutual confrontation between the industrial researcher and Archfirm's managers nor further development of their collaboration. In this way, the frictions never transform into organisational dissonance. While her intervention by representation may not produce a sense of dissonance, however, this second moment of intervention becomes productive for the industrial researcher after all. It makes her realise that there is no single vantage point from which she can be useful vis-à-vis the many diverging expectations put to her. Instead, she decides to increase her focus on the epistemic frictions produced by her presence, and to make knowledge an object of inquiry in itself. In this way she not only reframes her research agenda, she also takes a step towards the aspiration reflected in Archfirm's business question. To pursue this new venture, she engages in interventions by different means.

In the final moment of intervention, the industrial researcher tests a type of intervention we call *tasking*. Here, she engages directly in the renovation project, making the tasks, problems and objectives of the design team, at least partly, her own. She does so by introducing analytical concepts from her practice as an academic researcher as 'tools' for the team to grapple with and solve project dilemmas in new ways. Toulmin's argumentation model is activated in the process of developing the memorandum to the cultural heritage agency, in this way transforming Peter and the design team's unproductive design situation into one of producing solid argumentation for the façade design. To the team, the model represents an alternative approach to their so far unsuccessful attempts at convincing the agency of the workability of their design. Likewise, ANT is introduced to grasp the power structures in which the project is situated, identifying hidden actors and dominant obligatory passage points, using these insights to help the team reorganise their work. Intervention as tasking, we could say, involves a dual movement in which the researcher enters the practitioners' domain, while at the same time inviting them into hers. In this way their objectives blend – producing transformations on both sides. It is here – when intervention takes the form of tasking – we find the likely production of a sense of dissonance. Of course, frictions already exist in the project long before the industrial researcher's arrival, reflecting contrasts implicitly present in every case of social housing renovation (or any other project within construction), in which the balance between social and political concerns are important drivers in the project development. This is even more pertinent in the case under study here as the high-rises in are under review for listing. As she leaves her familiar position as participant observer to join the design team, the industrial researcher adopts their tasks and employs her own tools at the same time. Intervention as tasking is an integrated practice that adds new criteria of worth and contributes to reordering existing frictions.

Concluding remarks

Can we conclude, then, that the industrial researcher contributes to market making? Maybe not exactly, but what we do learn from the case is that Archfim's specific business interest, the early phases of developing marginalised residential areas, may indeed become accessible by means of the industrial researcher's interventions. Entering new markets, and this is particularly true for businesses that renovate buildings listed for conservation, requires the establishment of new types of knowledge and ways of working. To grasp the power structures of the institutions and regulations that organise work on listed buildings, ANT-concept prove helpful as a way to investigate what design venues are left open under the strict instructions of the construction brief and what 'playing field' is left for the architects to activate their expertise. The ANT-concepts helped the architects better understand the market, its institutions and actors, and how to navigate this otherwise unfamiliar territory. Toulmin's argumentation model, on the other hand, helps the team to 'make their case.' Of course, there are diverging views on whether or not the making of complex practical arguments in support of findings and design solutions is – or should be – a key part of the practice and education of professional architects (Schön 1983; Yanik and Hewitt 2000). Interestingly, however, it is exactly such skills that are gradually developed through the collaboration between the industrial researcher and the architect Peter. Our study illustrates that entering the early phases of construction projects on the market for social housing renovation is not simply an opportunity to bring Archfirm's expertise from the later phases into play earlier in the design process and thus to access new markets. It also creates a need for developing new forms of expertise, which may, at least in many cases involving listed buildings, be developed with the assistance of analytical tools such as those introduced by the industrial researcher.

Usefulness in industrial research collaborations may, as illustrated through the industrial researcher's struggles, come as a series of trials that involve the continuous and varied sorting and re-sorting of attachments. While our discussion suggests that a sense of dissonance – the creative tension produced when conflicting registers of worth are allowed to coexist and compete – only occur in the third moment of intervention, the case also illustrates that the previous interventions may be important stepstones for *tasking*: that tasking occurs as a possibility for cross-sectoral collaboration following from other forms of engagement. If we consider the industrial researcher's interventions – in their own right and in concert – we may say that they provide important accounts to bridge the divide between universities and industry. In this way they represent new openings for industrial research collaboration. The implied role of an industrial researcher, however, is far from the 'heroic-transformational academic' described by Butler and colleagues (2018). Instead, it is a role that involves a modest and tentative approach, which often feels uneasy and even straining (for a similar account, see also Ossandón and Pallesen, submitted manuscript).

Notes

1. The postdoc fellow is the third author of this paper and is referred to as *the industrial researcher* throughout the text. The first author was part of the project under study as a member of the industrial researcher's advisory board, while the second author holds a research interest in ethnographic approaches to studying practice.
2. The architectural firm has been anonymized.
3. Early 2018, the market for construction slows down, and Archfirm has only few assignments in the pipeline. As a result, manager A asks the industrial researcher to develop sales material and participate in promoting activities. Instead of focusing on data collection and analysis in project, she is to provide tools for immediate implementation, e.g. producing diagrams to support dialogue with clients.
4. Peter is not the real name of the architect.
5. Stephen Toulmin's model of argumentation is a classic approach to the exploration and establishment of practical arguments. Toulmin suggests six interrelated constituents for analysing an argument: claim (conclusion), ground (evidence), warrant (connection between claim and ground), backing (supporting the warrant), rebuttal (reservation vis-á-vis the claim) and qualifier (phrases to endorse the claim) (Toulmin 1958).

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by Innovationsfonden.

References

Akrich, A., and B. Latour. 1992. "A Summary of a Convenient Vocabulary for the Semiotics of Human and Nonhuman Assemblies." In *Shaping Technology/Building Society: Studies in Sociotechnical Change*, edited by W. Bijker, and J. Law, 259–264. Cambridge: MIT Press.

Antal, A. B., M. Hutter, and D. Stark, eds. 2015. *Moments of valuation: Exploring sites of dissonance*. New York: Oxford University Press.

Bijker, W. E., T. P. Hughes, and T. Pinch. 1989. *The Social Construction of Technological Systems*. Cambridge, MA: The MIT Press.

Boltanski, L., and L. Thévenot. 2006. *On Justification: Economies of Worth*. NJ: Princeton University Press.

Butler, N., H. Delaney, and S. Spoelstra. 2018. "Risky Business: Reflections on Critical Performativity in Practice." *Organization* 25 (3): 428–445. https://doi.org/10.1177/1350508417749737.

Farías, I. 2015. "Epistemic Dissonance: Reconfiguring Valuation in Architectural Practice." In *Moments of Valuation: Exploring Sites of Dissonance*, edited by A. B. Antal, M. Hutter, and D. Stark, 271–289. New York: Oxford University Press.

Geiger, S., and N. Gross. 2022, this issue. "Leaning in or Falling Over? Epistemological Liminality and the Knowledges That Make a Market." *Journal of Cultural Economy*, 1–14. https://doi.org/10.1080/17530350.2022.2058057.

Hacking, I. 1983. *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. Cambridge: Cambridge University Press.

Hauge, A. M. 2021. "How to Take Sides: On the Challenges of Managing Positionality." *Journal of Organizational Ethnography* 10 (1): 95–111. https://doi.org/10.1108/JOE-06-2019-0023.

Holm, P. 2010. "Review of Stark, D, Beunza, D., Girard, M., and Lukács, J. The Sense of Dissonance: Accounts of Worth in Economic Life." *Administrative Science Quarterly* 55 (2): 332–334. https://doi.org/10.2189/asqu.2010.55.2.332.

Holmes, D. R., and G. E. Marcus. 2006. "Fast Capitalism: Para-Ethnography and the Rise of the Symbolic Analyst." In *Frontiers of Capital: Ethnographic Reflections on the New Economy*, edited by M. S. Fisher and G. Downey, 33–57. Durham: Duke University Press.

Innovation Fund Denmark. 2018. *Guidelines for Industrial Postdoc*. https://innovationsfonden.dk/sites/default/files/2019-08/guidelines-for-industrial-postdoc-06-07-2018.pdf, 01092023.

Innovation Fund Denmark. 2024. https://innovationsfonden.dk/en/p/industrial-researcher.

Jensen, C. B. 2007. "Sorting Attachments: Usefulness of STS in Healthcare Practice and Policy." *Science as Culture* 16 (3): 237–251. https://www.tandfonline.com/doi/abs/10.1080/09505430701568636.

Knorr-Cetina, K., and M. Mulkay1983. *Science Observed: Perspectives on the Social Study of Science*. London: Sage Publications.

Latour, B. 1990. "Drawing Things Together." In *Representation in Scientific Practice*, edited by M. Lynch, and S. Woolgar, 19–68. Cambridge, MA: MIT Press.

Madsen, A. K., A. K. Munk, and J. I. Soltoft. 2023. "Friction by Machine: How to Slow Down Reasoning with Computational Methods." *EPIC Proceedings*, 82-105, ISSN 1559-8918.

Mesman, J. 2007. "Disturbing Observations as a Basis for Collaborative Research." *Science as Culture* 16 (3): 281–295. https://doi.org/10.1080/09505430701568685.

Neyland, D. 2008. *Organizational Ethnography*. London: Sage.

Neyland, D. 2016. "Challenges of Organizational Ethnography: Reflecting on Methodological Insights." In *Ethnographic Research in Maternal and Child Health*, edited by F. Dykes, and R. Flacking, 179–198. London: Routledge.

O'Doherty, D., and D. Neyland. 2019. "The Developments in Ethnographic Studies of Organising: Towards Objects of Ignorance and Objects of Concern." *Organization* 26 (4): 449–469. https://doi.org/10.1177/1350508419836965.

OECD. 2010. *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*. Report: OECD. Accessed 30 April 2024. https://www.oecd.org/sti/inno/theoecdinnovationstrategygettingaheadstartontomorrow.htm.

Ossandón, J., and T. Pallesen, T. (submitted manuscript). "The New Economic Sociology: The Market Intervention Test."

Pels, D. 2003. *Unhastening Science: Autonomy and Reflexivity in the Social Theory of Knowledge*. London: Routledge.

Rabinow, P., and G. Bennett. 2012. *Designing Human Practices: An Experiment with Synthetic Biology*. Chicago: University of Chicago Press.
Rabinow, P., and A. Stavrianakis. 2014. *Designs on the Contemporary: Anthropological Tests*. Chicago: University of Chicago Press.
Riles, A. 2001. *The Network Inside Out*. Ann Arbor: University of Michigan Press.
Roscoe, P., and O. Loza. 2019. "Theography of Markets (or, the Responsibilities of Market Studies)." *Journal of Cultural Economy* 12 (3): 215–227. https://doi.org/10.1080/17530350.2018.1557730.
Schön, D. A. 1983. *The Reflective Practitioner. How Professionals Think in Action*. New York: Basic Books.
Stark, D. 2009. *The Sense of Dissonance: Accounts of Worth in Economic Life*. Princeton: Princeton University Press.
Toulmin, S. 1958. *The Uses of Arguments*. Cambridge: Cambridge University Press.
van der Schoor, T., H. van Lente, and A. Peine. 2024. "Contested Commensuration: The Case of a Valuation Instrument for Historical Buildings." *Valuation Studies* 11 (1): 138–161. https://doi.org/10.3384/VS.2001-5992.2024.11.1.138-161.
Vedel, J. B., and A. Irvin. 2017. "This is What We Got, What Would You Like? Aligning and Unaligning Academic-Industry Relations." *Social Studies of Science* 47 (3): 417–438. https://doi.org/10.1177/0306312716689346.
Vikkelsø, S. 2007. "Description as Intervention: Engagement and Resistance in Actor-Network Analyses." *Science as Culture* 16 (3): 297–309. https://doi.org/10.1080/09505430701568701.
Wouters, P., and A. Beaulieu. 2007. "Critical Accountability: Dilemmas for Interventionist Studies of e-Science." *Journal of Computer-Mediated Communication* 12 (2): 583–599. https://doi.org/10.1111/j.1083-6101.2007.00339.x.
Yanik, J. V., and B. L. Hewitt. 2000. "An Argument for Argument in Architectural Education." *Journal of Architectural Education* 54 (1): 60–63. https://doi.org/10.1162/104648800564752.
Ybema, S., and F. Kamsteeg. 2009. "Making the Familiar Strange: A Case for Disengaged Organizational Ethnography." In *Organizational Ethnography: Studying the Complexities of Everyday Life*, edited by S. Ybema, D. Yanow, F. Kamsteeg, and H. Wels, 101–119. London: Sage.
Zuiderent-Jerak, T., and C. Bruun Jensen. 2007. "Editorial Introduction: Unpacking 'Intervention' in Science and Technology Studies." *Science as Culture* 16 (3): 227–235. https://doi.org/10.1080/09505430701568552.