Accepted manuscript version – full article published in New Media & Society 2021
(https://doi.org/10.1177/1461444820929319)

Hot air & corporate sociotechnical imaginaries: Performing and translating digital futures in the Danish tech scene

Michael Hockenhull

Marisa Leavitt Cohn

IT University of Copenhagen, Denmark

Abstract

This article analyzes the role of hype in performing and translating corporate sociotechnical imaginaries of digital technologies, into the context of Danish society. Drawing on ethnographic fieldwork of technology events in Denmark, the paper proposes "hot air" as a concept to describe how hype for the future performs these imaginaries. The paper describes the overlapping sociotechnical imaginaries that dominate these events and the performative effects of hype and its critique, in articulating and translating them. The paper makes an empirical and conceptual contribution to the study of sociotechnical imaginaries, in particular their socio-material performance, the role of corporations in articulating them, and how hype is central to their translation.

Introduction

This article explores how corporate sociotechnical imaginaries of digital and data-related technologies are translated into local contexts through promotional talks, conferences and events. By analyzing ethnographic material from fieldwork conducted at tech events in Denmark, a small welfare state in northern Europe, we put forward the concept of "hot air" to describe the dynamics of hype in performing and sustaining sociotechnical imaginaries.

Denmark is the most digitalized country in the world according to the United Nations (United Nations, 2018) and the EU (European Commission, 2017). Whilst studies (Greve, 2013; Jæger and Löfgren, 2010; Schou, 2018) have accounted for the central role of neoliberal and austerity financial policy in driving this development, the role of private corporate actors in advancing particular imaginaries of digitalization is less explored. We approach the role of the private sector in Danish digitalisation through an empirical analysis of tech events attended by both public and private sector actors.

The impulse for the present paper arose during fieldwork as we wondered what made these events work and why actors continued to attend them, despite frequent dismissals of their hype-saturated nature. Drawing on science and technology studies, the article examines the performative dynamics of such events and the future-making capacities of hype and sociotechnical imaginaries. We develop the concept of "hot air" to highlight the

dynamics of how hype and its critique function to perform and translate corporate imaginaries into a local Danish context.

Corporatized imaginaries of digitalisation and the performativity of critique

Sociotechnical imaginaries are defined by Jasanoff as "collectively held, institutionally stabilized and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology." (Jasanoff and Kim, 2015, 4). This definition extends Jasanoff's previous work with Sang-Hyun Kim (Jasanoff and Kim, 2009), and builds on a rich tradition within the social sciences of engaging with the imagination and imaginaries as an important site of study (Anderson, 2006; Castoriadis, 1997; Taylor, 2004). Whereas previous scholars such as Anderson and Taylor focused primarily on imaginaries as social phenomena, tied to topics of identity and nationalism, Jasanoff suggests that imaginaries are co-constituted through understandings of knowledge and technology, expanding the term with the 'sociotechnical' prefix. An important commonality between Jasanoff's and previous understandings of imaginaries, is that they are both factual and normative, meaning that they describe both how societies are thought to be, but also how they should be. Finally, as Jasanoff's definition points out, imaginaries are quite often publicly performed ideas of the future, highlighting the importance that performances such as demonstrations (Shapin and Schaffer, 2011) have always had in sociotechnical life.

Recent academic work has explored the role of social and sociotechnical imaginaries with regards to the phenomenon of (big) data (Lehtiniemi and Ruckenstein, 2019; Olbrich and Witjes, 2016; Ruppert, 2018), analytics (Beer, 2018), algorithms (Ben Williamson, 2016; Bucher, 2016) and smart cities (Mertia, 2017; Sadowski and Bendor, 2018). Ruppert argues that current imaginaries of big data are concerned with the "possibility of the commodification of data through its circulation and its infinite reuse…"(Ruppert, 2018, 21). She draws on her research into transnational statistical agencies to show how the imaginaries of big data affect expert knowledge and the epistemic authority of state institutions producing particular "data futures" through changes in practices of data production and analysis. Sadowski and Bendor similarly find that the notion of smart cities presents a certain vision of the future, in this case dominated by corporate narratives stemming from IBM and Cisco: that cities are beset by crises, and that corporate actors have the technical solutions to solve them (Sadowski and Bendor, 2018). Mertia finds the imaginaries of Indian smart cities still in the making, with uneven edges stretching from housing apps to GIS visualisations to open data activism (Mertia, 2017). Beer focuses on the private sector analytics industry, and how a "data imaginary" paves the way for the invasive gaze of the analytics industry (Beer, 2018) into what he calls the *data frontiers* of practices and organisations. He identifies the imaginary as being characterised by themes describing the data imaginary as speedy, accessible, revealing, panoramic, prophetic and smart.

We build on this interest in corporatized imaginaries of digitalization, through an ethnographic study of tech events hosted in Copenhagen. Rather than focus on a single industry or profession, we aim to describe the dynamics of hype in relation to an overlapping set of sociotechnical imaginaries present in the Danish tech scene. The focus of the paper is how hype (and its critique) does performative and translative work *for* these imaginaries, and how the events are crucial sites for this work. To dismiss big data and similar new "disruptive" technologies as mere hype "underestimate[s] the material and political effects of imaginaries as they are taken up in practices through which new paradigms or ways of thinking are propagated" (Ruppert, 2018, 19). We are therefore particularly interested in how these imaginaries come to be "taken up in practices" through translation into local contexts. The imaginaries are in many ways transnational, as the studies by Ruppert, Beer and others show, but for them to come into practice they must be made local. We argue that corporate actors play a unique and under-appreciated role in this dynamic, and that tech events are one of the venues through which they do so.

The role of corporations in the articulation of sociotechnical imaginaries is an understudied aspect of the literature. As Sadoswki and Bendor (2018) point out, the majority of this literature is concerned with the state and its role in establishing imaginaries (Sadowski and Bendor, 2018). Other than Sadowski and Bendor's own contribution, Smith's analysis of the role of corporations in the imaginaries of social responsibility and global governance (Smith, 2015) or Olbrich and Witjes (Olbrich and Witjes, 2016) examination of commercial satellite imagery, there are few other studies that focus on corporate actors. See however Williamson for a relevant contribution on Silicon Valley corporations' and the algorithmic imaginary (Ben Williamson, 2016).

Our paper also builds on a tradition in science and technology studies to study the performative effects of critique (Latour, 2004). Adopting this approach, we examine the effects of the events, rather than only the message they communicate, paying particular attention to the way that hype and its critique are invoked. We therefore follow a similar strategy to that of Jensen and Lauritsen in their study of IT reports (Jensen and Lauritsen, 2016) and "read with the text" rather than against it by performing a material-semiotic analysis of the events. Our aim is not to expose the inconsistencies or problematic aspects of the hype surrounding sociotechnical imaginaries and their rhetoric, but to understand how criticism of hype becomes productive. In doing so, we build on David Beer's point that "it is this ability to conjure such hype... that is actually central to facilitating the spread of data-led practices" (Beer, 2018, 15) and extend Jasanoff's point that performance is an important aspect of how imaginaries are enacted (Jasanoff and Kim, 2015, 9-14).

The next section of the paper describes the methodology of our ethnographic study. We then outline the concept of "hot air" and the corporate sociotechnical imaginaries present in the field before diving into our in-depth empirical analysis of the performative effects of hype. We highlight three dynamics of hype that we conceptualize as "hot air" and conclude with a discussion of how "hot air" serves to translate corporate imaginaries into the local Danish context.

Accepted manuscript version – full article published in New Media & Society 2021 (https://doi.org/10.1177/1461444820929319)

Ethnographic attention to hype

The empirical material for this paper derives from a wide range of technology events in the Copenhagen area attended over the course of a year, from 2017-2018. More than 30 events with formats such as workshops, conferences, masterclasses, seminars and courses were attended. Their topics ranged from smart city technology, data-driven innovation, export of Danish technology, big data, public digitalisation, sustainability, data visualization and more. These events were hosted by a mixture of actors in the Danish technology sector, including ministries, municipalities, lobby organisations, labor unions, universities, technology clusters and private companies. Attendants represented many different organisations and industries, from both the public and private sectors.

Meetings and professional gatherings have long been a topic of interest within management and business literature (Schwartzman, 2013), and have recently been given increasing attention in connection with anthropological and ethnographic work (Leivestad and Nyqvist, 2017; Sandler and Thedvall, 2017). We focus on a broad selection of events, ranging in size from small workshops to large-scale professional gatherings, in an effort to capture the hype surrounding corporate sociotechnical imaginaries in a variety of settings. Events were selected on the basis of a mixture of snowball sampling and following prominent tech media outlets and organisations in Denmark. This approach matches the social arena being studied, as actors themselves move through and are situated in different constellations of relations that routinely cross national and professional boundaries. In this sense these events are better characterised as a "widening gyre" (Zabusky, 2002) than "social" or "ethnographic fields" (Leivestad and Nyqvist, 2017) in that the site is not a delimited field but instead a churn of different sites and topics. In fact it is this churn that we identify as a feature of hype's performativity in our empirical analysis and conceptualize as "hot air".

These events provide a window into a scene in Denmark occupied by private companies and public institutions, developing, selling, purchasing or engaged in discussions of digital technologies and data-driven futures. The events, while often accessible through a public sign-up, were aimed at industry actors or those interested in learning more about new technological developments such as big data or smart cities who were already reading tech newsletters or blogs. Venues for the events were often luxurious, held in the glass and steel domains of industry or modernized medieval buildings of ministries. There was almost always free catering, and attendees wore suits, traded business cards and caught up with people they had met at similar events, performing what Nyqvist et al. call "an integral part of many professional's lives today" as it is through such social processes that knowledge is brokered (Leivestad and Nyqvist, 2017, 9).

Ethnographic material from participating in these events includes fieldnotes, photographs, power point slides, and other promotional materials collected during the events. Fieldnotes were a mixture of direct observations and transcripts of events, after-the-fact notes of conversations with other participants and short memos put together after the events were over. Interviews and multiple informal discussions with informants who frequent these events forms background knowledge for the study. This material was

coded using a semiotic clustering approach (Feldman, 1995), in which events were labelled according to type (workshop, conference, seminar, etc.), mode of communication (promotional, informational, case-study, community-oriented), topic (innovation, business models, smart city, big data, exports) and what sociotechnical imaginaries were articulated. On the basis of this high-level coding certain events stood out as particularly relevant for our purposes. Further analysis through memoing identified features that were associated with the production and critique of hype. These features were then again memoed about, and constitute three dynamics of hype which we call "hot air". These are *crafting publics*, *historization & projection* and *authentication*.

The performativity of sociotechnical imaginaries

I enter the building of glass and steel, the headquarters of the Danish Industry lobby, across from the brick and copper Town Hall. I am attending a conference entitled "Join the Data-Driven (R)evolution: Unlocking the Business Potential of Big Data." Those of us joining the conference are treated to breakfast; long but narrow tables of steel-cut oats, fresh orange juice, small croissants and more. The main conference hall is huge and professionally decked out with curved sound paneling along the walls and changing LED-lights. I sit, listen and take notes of reactions. The organizers and presenters say that the topic is really important. That there's a lot of talk and buzz words about it, but that ***there is something to it, despite that****. In fact, they say without blinking, the topics at hand are crucial for the future of industry and the country itself. The presenters mention projects about the cloud, digitalization, disruption, about data and about other conferences coming soon. The day finishes and there are drinks on the roof terrace with a view over the city. I empty my drink, and leave the data-driven revolution.*

As the above vignette illustrates, tech events are presented as important and substantial, despite being filled with hype and buzz words. We introduce *"hot air" as a concept to denote the dynamic of hype as a performative phenomenon, that is simultaneously vacuous and productive.* The concept points to how hype is vacuous when unsubstantiated, bloated and overpromising, but is simultaneously productive in generating effects. It is particularly the critique of hype, which is endemic to hype itself, that we argue creates many of these effects. The concept leans into the idiomatic sense of hot air, while also referring to the buoyancy created by hot air as in a balloon that carries us places.

Hype has been studied through fields such as the sociology of expectations (Brown and Michael, 2010), but where Brown and Michael's influential piece focuses on how expectations *change* over time and the effects of this, we are more concerned with the immediate effects of hype and the dynamics of the performative and translative work it does. Others have worked extensively on the importance of hope for the future and anticipation, and we return to this work in the discussion.

Having outlined here what is meant by the concept of "hot air", we first describe the multiple and overlapping corporate sociotechnical imaginaries present at the various tech

events and then examine three different dynamics of hype and how this "hot air" articulates these imaginaries.

Sociotechnical imaginaries of Danish tech events

In this section, we examine the overlapping sociotechnical imaginaries articulated at the events studied. We describe these as *corporate* sociotechnical imaginaries both on the basis of the literature (Beer, 2018; Olbrich and Witjes, 2016; Sadowski and Bendor, 2018) but also following the observation that, even when the events were arranged by public sector actors, it was very often by corporate actors or with reference to corporate examples that these imaginaries were articulated.

It is difficult to delineate a single sociotechnical imaginary from the empirical material. Events ostensibly dealing with one topic, such as the data revolution, invariably invoked topics of disruption, self-driving cars, and smart cities–and vice versa. This messy, multiple and overlapping set of imageries is emblematic of the "gyre" (Zabusky, 2002) of the tech scene, in which topics, speakers, and audience are constantly crossing boundaries and recomposing the field. As the focus of this paper is on the role hype plays in performing and translating sociotechnical imaginaries, we are not concerned with distinguishing these multiple imaginaries from one another. Rather, we acknowledge this multiplicity and draw on already established research into the imaginaries surrounding digital technologies and data to account for them. Thus the imaginaries we find in the Danish tech scene are close to identical to those others have already identified, such as the value of data "as the new oil" or as a source of "disruptive innovation," and the attendant changes in temporality, epistemology and promotion of particular digital futures (Beer, 2018; Lehtiniemi and Ruckenstein, 2019; Olbrich and Witjes, 2016; Ruppert, 2018).

Imaginaries present at these events not only exemplify imaginaries of "data" but also often conjure specific techniques of "Big Tech" such as recommendation engines, newsfeeds or algorithms (Ben Williamson, 2016; Bucher, 2016). Within this narrative of "technological solutionism" (Morozov, 2013), the services offered by corporate actors like Facebook, Google, Amazon, or Apple become the default for imagining solutions to local challenges. For example, when building a data marketplace for Copenhagen from 2014 to 2016, the Hitachi corporation claimed to be building the "amazon of datasets." Such imaginaries of "Big Tech" emphasize the importance of novelty, innovation for innovation's sake, and technology as a panacea (Pfotenhauer and Jasanoff, 2017) and frame social problems as a deficit of innovation (Pfotenhauer et al., 2019) pointing to the inevitability of technological "disruption". Familiar corporate sociotechnical imaginaries of smart cities with their narratives of crisis and technical solutionism (Mertia, 2017; Sadowski and Bendor, 2018) are woven into these other imaginaries.

"Hot air": dynamics of hype

In this section we examine three instances of the dynamics of hype, showing how hype is both vacuous and productive within these tech talks. The performance of the corporate

sociotechnical imaginaries at the events rely on hype, but simultaneously involves critique and disavowal of hype.

Crafting Publics

An ever-present feature of these tech events was the sometimes subtle and sometimes overt addressing of a community or public[1]. The particular communities differed, depending on whether the event aimed primarily at engineers, public servants, businesses or a mix of these. Speakers made efforts to articulate these groups as somehow select or elite. It stands out in the material how organizers created an intimate or enclosed space where important information is imparted. The audience is made to feel special. This subtly boosts the persuasive power of the dynamics of the hype described in the following sections. Narratives about the past and future are given more weight, since they are related to a particular group who is told that they need to act now and within these intimate enclosures, examples and cases from other organizations, present all-the-more cutting-edge demonstrations of how they in particular can progress.

At an event hosted by the Danish Engineer Association (IDA), the chairman underlined how "IT… runs the world," and that, "You are the heroes of IT." This rhetoric is to be expected at a labor union for engineers, but in conjunction with other rhetorical devices it builds a much stronger argument for a given case. Following the chairman, the keynote, a representative from the tech evangelist organisation SingularityU[2], started his talk with a joke about the happiness of Denmark compared to the United States, based on how Danish power plugs look like a smiley face. This is a classic rhetorical ploy to make an audience laugh and build favorable sentiment. However, it crafts a public in the way it plays on the popular notion of Denmark as being the supposed happiest country in the world and joins that to a technological image, which the audience can laugh at together, establishing shared understandings and values.

The example with the power plug is innocent, but many of these rhetorical moves were made to describe publics as "elite" or using a national framing to make it about Denmark in particular. Thus publics are crafted in a particular vein, making the ground fecund for understanding a message in a certain way. At one conference the relative Danish-ness was articulated by both the host, one of the presenters and two government ministers. The message was that what was being communicated was relevant in particular to Danish industries and companies, for these actors to safeguard the wealth, growth and leadership position of Denmark within digitalization. Rather than to think about the presentations as opportunities to advance self-interest, the audience was crafted into a public that was both elite by being directly addressed by two ministers and as having a particular responsibility for Danish prosperity on a whole. This has the effect of crafting the audience as agents of change and technological progress. "Hot air" is here the productive effects of hype crafting a group into a specific public.

Historical Narratives, Future Projections

Figure 1. A collage fo projections or historical trends from slide shows at tech events.

A common and striking feature of many presentations at the events studied is the marshalling of historical arguments, and projections about the future on the back of these. The above collage shows five different slides from the empirical material. They feature a variety of graphs and make claims about how technology has developed and is developing now. A fieldnote recounts the comments of a professor giving a keynote at an event on "Digital Trends in the Built Environment": "Exponential Innovation -> disruptive development goes much faster than traditional development." This statement accompanied image 2 below, explaining with simple graphs and numbers how things were going faster now and creating a historical overview by detailing how fast a given "technology" reached 50 million users, stretching back to the telephone.

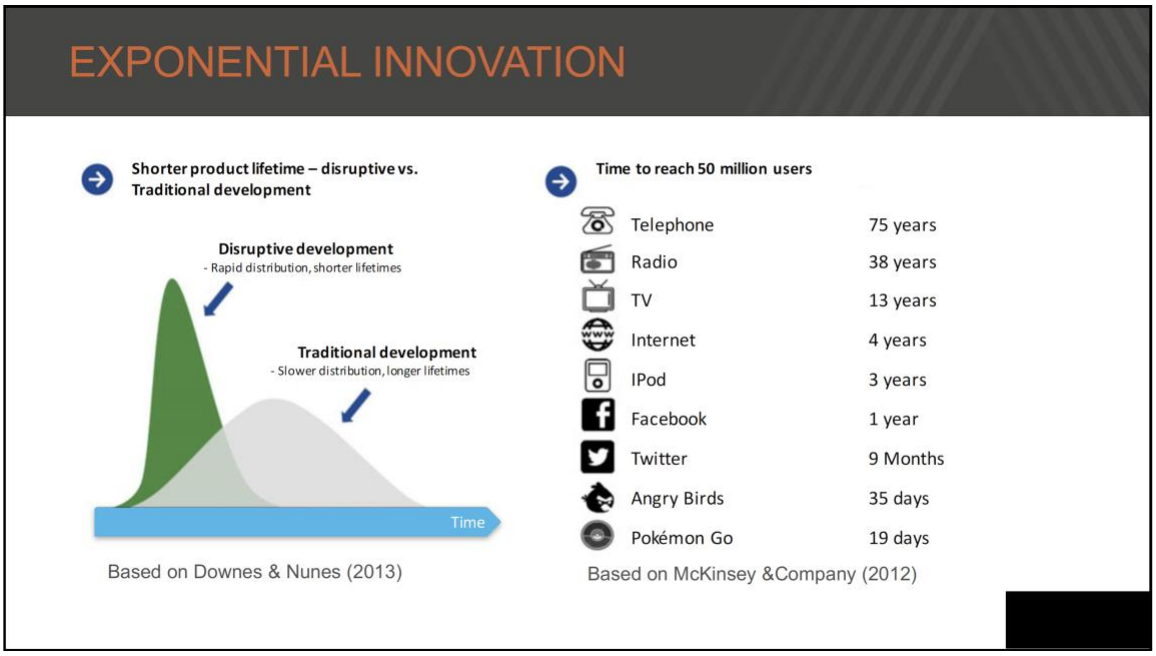

Figure 2. Exponential innovation and time to reach 50 million users.

At the events attended, such slides and arguments are usually made at the beginning of a talk or event. They set the stage by outlining what has come before, and what is yet to come. This came across as hype, in the way that such claims were often broad, undocumented, generic or reproductions of tropes of this type of statement, such as Ray Kurzweil's "Law of Accelerating Returns" (Kurzweil, 1999; 2001). These historical narratives create hype because they posit that the future necessarily will be better and more prosperous than the past or the present–if they are taken into account.

At one event, a slide with an image of an old Forbes magazine cover described Nokia as the mobile phone "king", implicitly showing how leading companies are quickly dethroned if we look to history. Such a slide plays on the common knowledge of how Nokia no longer is a business leader and leaves the 'why' of the loss of leadership ambiguous, while strongly indicating that Nokia failed to look ahead.

Figure 3. Slide showing an almost 10-year old cover of Forbes magazine, featuring a Nokia flip-phone and describing the company as the "Cell Phone King". The slide was used in a presentation on the way in which new technology challenge market incumbents.

At many other events the term “4th Industrial Revolution” was brought up, as part of a historical retelling of the three previous industrial revolutions. The 4th Industrial Revolution is a term coined by Klaus Schwab of the World Economic Forum (Schwab, 2017), who suggests that technologies such as artificial intelligence will change our societies as thoroughly as the previous industrial revolutions[3]. As can be seen in the collage of image 1 above, many of the graphs consist of lines curving upwards, showing the amount and type of data, connected units, market value, growth potential, or just abstract representations of technology, rising over time.

These histories present the viewer with historical narratives that show a uniform progression and rise. They provide the most simple and immediate description of the past, presenting these developments as self-evident history. Such histories frame the audience with naturalizing arguments that suggest that it could not have been otherwise. By stipulating a certain history, the presentations build up excitement and hype about the current moment and what is to come.

Such historization is often followed or conjoined with projections about the future. Graphs with trend-lines, claims about new technologies or changes happening to all industries make up the bulk of such projections. One presenter claimed that “in the 21st Century, if you aren’t a software company, you aren’t a company at all,” and another

speaker similarly said, "You will all be software companies very soon." Such claims impress upon the audience the need to act, and become software companies. It is difficult to dismiss such claims when they follow a graph showing that the top five publicly traded companies now all are in the tech sector. The ominous tone of the above quotes demonstrates how such rhetoric can almost have a threat-like quality, promising doom to whoever does not act in accordance. By placing trend-lines showing the rise of data or the potential future markets on the back of historical narratives, the projections gain weight and reality that belie their conjectural nature.

Taken together, historization and projections places the audience on the cusp of a great change. At one conference on data-driven transformations, a presenter said that changes based on digital technology were "happening around the world", and that while Denmark was doing well, it needed to get even better. This notion of "getting better" at working with data and new technologies becomes all the more pressing when sandwiched rhetorically between past trajectories and future projections. As a speaker claimed when discussing the market capture of Amazon: "This isn't a curve, this is evidence." As "evidence", it cannot be argued with.

Often these historical narratives and projections of trends are not even argued for, but presented as self-evident. When a speaker from Microsoft showed a graph of the growth of the amount of data from 1985 to 2025, he did not explain the graph, provide reasoning for the projection or any sources. What does the lack of argumentation signify? One interpretation is that the presenter's lack of explanation can be understood as an assumption that the statements are so commonsensical that there is no need to argue.

This dynamic of historization and projection constructs a simplistic history, projects an equally simple future, and positions the audience at crucial points in these trajectories, suffusing the tech events with hype for their naturalized narratives.

Authentication: Examples & Cases

We sit in the semi-circle of the amphitheater-like presentation space, nestled in the middle of the campus of the Danish Technical University. The professor asks "How do we make money with big data?" and answers his own question with a claim: that unlocking the value of the digital is possible. He shows us models, talks mindset, and ultimately gives examples to make his point: the slide shows the image of a metal box, a rat trap, we are told, and a company logo. The company figured out that their pneumatic rat-killing devices were producing so much data, they could sell it to the city, helping them monitor sewer water levels. Or the other company that had transformed to doing filter-replacement-as-a-service. Or the other company that had… and so the list of examples went on.

The use of numerous examples at events is another dynamic of hype as "hot air". Presenters make claims about technology that are abstract, arguing for the importance of disruption, innovation and the value of data. To make these claims more concrete, examples which marvel with their ingenuity, unexpected value creation or weirdness are crucial. At a conference on "Smart Living" a representative of the Municipality of

Copenhagen described how they optimized the city's street sweeping machines by using an algorithm that was originally developed to devise the most efficient route for pub-crawls. This algorithm could incorporate citizen-reported debris such as broken bottles or even less savory "leavings" of late-night carousers into a route, and then efficiently merge the route back into the unit's original path. Such an example serves multiple purposes: being both entertaining, weird and showcasing the potential improvements of specific technologies or digitalization in general.

Converse to the weird ingenuity on display in the above example, many presentations fall back on rehashing old examples. An instance of this is the well-known Target example, wherein it made headlines that American retail store Target accidentally alerted a father to his daughter's pregnancy by sending the household gravidity-tailored offers. Target had determined this on the basis of her purchasing habits, which matched their data profile of a pregnant person. This was first covered by the New York Times in 2012 (Duhigg, 2012), but the case is from several years before that. Though old, this example is still used to demonstrate the power of big numbers.

While at first stimulating, many examples are repeated and circulate, as with Target, or lack the explanatory and revelatory power that their presenters introduce them with. The aforementioned Target-example is by now overused, and adds little new. At one talk attended during the fieldwork, a Danish government minister referenced it, but prefaced it by saying that it was an old and well-known example. In order to make a point with the example, he had to tacitly acknowledging its worn-out nature.

Examples build hype by showcasing and promising innovative new business models or technologies. They are stories that exemplify an abstract concept and make it concrete and actionable for the audience. When a senior Microsoft representative shows a video of how their Cortana Cognitive Services allow McDonalds to use speech recognition to receive orders in their drive-through restaurants, it is to sell a technology, but also sell the wonder of what can be achieved with modern technology. This is hype, in that it showcases what can be done with a technology but does so without the messiness of actual business practices and what is needed to make this technology run reliably. This shows something that is genuinely exciting in what the technology can achieve, but which lacks context. Similarly, when a computer science professor describes the shift in the business model of the Danish windmill producer Vestas, from primarily producing and selling physical windmills to seeing a 30% increase in their "aftersales services", this is an example given to showcase how digitalisation of the economy is happening and that such business transformation is possible for other companies. While this example demonstrates how a business has transformed itself so that others might emulate it, most if not all of the context and details have been removed, leaving the audience to wonder what exactly such transformation means in terms of lay-offs or reskilling and whether it even is possible in the industry they occupy.

Examples drive the narratives about digital transformation at tech events. The fact that they are often used repeatedly or come from a different sector or organisational context does not stop presenters from using them, as they are instead assembled as clichés to be

surpassed or disregarded. In one talk, a senior editor from the magazine The Economist described the coming impacts of artificial intelligence, and began by asking the audience what three examples all talks on AI must include. It turned out that mentioning the then-recent victory of AI AlphaGo against the Go world champion, the AI Skynet from the Terminator movies and the psychedelic images composed by the AI software DeepDream were "clichés". In distinction to this, the presenter insisted that he would talk about "ideas". Such a distinction and disavowal show that hype is acknowledged by actors themselves, and that they attempt to distance themselves from it. The speaker in question went on to use multiple examples, two of which we had encountered earlier at a different event and one which was a reference to George Orwell's "1984", to preface a discussion of authoritarian surveillance. This is not to make aesthetic or moral judgements about the talk in question, but to emphasize how references to clichés or disavowals of "buzz words" are done selectively, in order to acknowledge the hype yet still proceed to do it.

Examples are thus central to presentations on tech, in that they showcase abstract principles in a concrete manner, making it possible for the audience to become excited, interested and see an application for their own situation. They create hype for a given technology, business model or overall trend by pointing to the ways in which it is promising, without demonstrating the difficulties it might present. The use of examples can be repetitive as certain examples are reused and become clichés. Reference to this cliched nature shows how hype is acknowledged and places emphasis on their iconic status. At the same time, we distinguish these examples from cases which are used to ground or "anchor" grand narratives of technological progress. These cases, which we describe next, provide deep dives into the difficulties of real-world digital transformation opening up a space for participation in the imaginaries.

Cases as anchors

A massively broad screen occupies the innovation lab. The woman takes the stage, joining the man in the suit. She explains how their company, an unassuming electricity and water supplier, have taken the journey of data-driven digitalization. She's not a CEO, CTO or jumped-up consultant. Her accent and choice of words are down to earth. She jovially says, almost without second thought, "We know when people are home, and whether the husband is cheating…", and people laugh at the joke. She describes their journey and references the course they took: "Much of what we took home with us from [the course] was to go back and get our own processes and data under control." There is a banality to her tale, emphasizing organizational communication, leadership visions, trial and error. She points out all the ways in which they are lacking as an organisation. But also all the ways that they have succeeded–how they have, in some senses, made it.

In order to make the sociotechnical imaginaries authentic the vacuous hype is accompanied by a variation of the example which we call the "case". Rather than the superficial and circulatory qualities of the example described earlier, a "case" is an example that is instantiated and made personal. An individual from a company or research project will be given time and will explain how they have, in one way or another, "made it" or provide a deep dive into a particular technology. What having "made it" means will vary. The point is that a presenter goes into depth with sharing how

they have successfully achieved some sort of ideal. In the vignette above, this was done by describing how a Danish utilities supplier, driven by leadership decisions and upcoming EU-law on remote-readings of electricity consumption, took a masterclass course, reviewed their work processes and through trial and error developed new aspects of their business model based on data of usage patterns. This deep dive into the case had time dedicated to explaining the context of the company, the steps they had taken, and for queries from the audience. This meant that the presentation came across as authentic and useful. It was something real and not just a small element in a slick presentation.

A case grounds the hype of examples, making it productive. Attendees can hear how it is not only Google, Facebook and Amazon that can benefit from the digital economy. Instead, a small Danish company has been successful in harnessing the power of data to build a new business model, or a public institution has successfully disrupted its procurement procedures by using a new type of public-private agreement. However a common refrain is that while they have achieved some success, there is more work to be done and many more processes to digitalize or change. Authenticity is created not only by the personal presentation, but also by the admission of lack, the acknowledgement that there is a long way to go. At another masterclass course, a consultant presented on the development of a new national model for determining the price of real estate. This was a highly politically charged topic that had often been debated in the media, and so the case both afforded a sense of privilege to the audience, at being given a peak and also as something tangible that dealt with a real problem. The consultant discussed the conceptual and technical difficulties of the assignment, addressing data quality, privacy issues, how algorithms needed to weigh multiple variables and the difficulties of managing the processes and workflows of such a large project. This case showcased the many complicated aspects of working with big amounts of data and also showcased what technology such as algorithms could do, grounding the hype of other presentations of the day into a more realistic assessment that such projects are neither easy nor guaranteed success.

There is a tension however, between examples, cases and hype-laden presentations. Whether something is an example or functions as a case is an open question, and there are instances where what was a genuine case in one context becomes the kind of hype-laden rhetoric that it was a reprieve from. At a later conference, the woman in the vignette above was present once more to tell the story of her company again. However this was a bigger audience, and some time had passed. While many beats were the same, one of the final slides was entitled “the future” and featured an image (image 4 below) of a group of children, standing with yellow safety vests at an industrial site. The text of the slide juxtaposes this very literal representation of the future, with the company’s future plans for machine learning. They intend to do “thermographic flyovers with drones to detect possible leaks in the heat-net” and use “robotically controlled visual inspections of the sewer network.” The soundness of these ideas for the business is hard to determine, however it appears in the presentation as an afterthought tacked on to say something that sounds futuristic and exciting. While it was still a presentation of a case, it was less authentic and rather than be interesting, it appeared as yet another “smart” idea.

Figure 4. Slide from the presentation "Case Supply: A common language creates the framework for data-driven digitalisation." The slide reads, "The Future. Utilize Machine Learning: thermographic fly-over by drones to detect possible leakages in the heating network. Robotically controlled TV-inspections of the sewer network. Realtime data on leakages and breakages on the water network." Translations by the authors.

Where hype is built and constitutes the many examples–of the potential of data, the digital, smartness, disruption and more–cases provide an anchor for the hope that such transformations are possible for the attendees. Authentication is a dynamic of hype as "hot air" concerned with the performative and translative work of hype. As we have seen, presentations are filled with hyped up examples, but also of cases which act as a counterpoint to the hype. The corporate sociotechnical imaginaries are performed both through the various examples, and through the cases which allow for an authentic and practical understanding of the imaginaries. The dynamic and contrast between examples and cases is an instance of hype as "hot air".

Discussion: Translating futures through "hot air"

Much has been written both in the popular press (Bartlett, 2018; Bridle, 2018; Foer, 2017; Taplin, 2018; Zuboff, 2016) and in academic publications (Ball and Snider, 2013; Flyverbom et al., 2017; Poon, 2016; Srnicek, 2017) about the domination of data and digital technologies by so-called "Big Tech". Attention has been directed at explicating the politics of the new technologies they employ (Ruppert et al., 2017), providing the possibility of a new type of governance (Dunleavy et al., 2006; Fishenden and Thompson, 2013) or as representing an entirely new epistemological phenomenon (Anderson, 2008; boyd and Crawford, 2012; Mayer-Schönberger and Cukier, 2013). In this paper we have focused instead on the corporate sociotechnical imaginaries tying together Big Tech, data and digital technologies in the context of Danish society, and the

role that hype as "hot air" plays in performing these imaginaries. In the following we discuss how "hot air" may play a role in the translation of global imaginaries into local contexts, such as the Danish one.

The tech talks we have studied are sites that offer a pedagogy of digitalization (Irani, 2015) through the dynamic of "hot air". Many others have pointed to how technoscientific futures position subjects temporally, through regimes of anticipation, hope, and speculation (Adams et al., 2009; Halpern, 2015; Mackenzie, 2013; Miyazaki, 2006). As Adams et al. describe, "anticipation is the palpable effect of the speculative future on the present" and one of the dimensions of anticipation is how it creates a "moral imperative" to orient towards a particular future, demanding "action in the face of ongoing contingency and ambiguity." Steinhardt and Jackson (2015) show how what they call "anticipation work" is involved in building and maintaining big data infrastructures. Local actors tack back and forth between local concerns and the broader sociotechnical imaginaries of a digital future. While these talks often promise what the audience knows cannot be delivered, they still provide a space in which people draw together to coordinate and calibrate local concerns to these larger narratives of technological advancement. "Anticipation work traces [this] real-time work and adjustments that underwrite any master narrative about the future" (Steinhardt and Jackson, 2015).

In the dynamic of "hot air," hype has implications for how it positions the subject temporally in relation to the past as spectacle, futures that disappoint, and an uncertain present that technological anticipation carries us through. The events fail, but they fail in a way that is sustained through repetition forming part of what Winthereik calls the "knowledge economy's zones of discomfort" (Winthereik, 2011) in which subjects are installed into a "ritualistic present" (citing Miyazaki) through the "temporal disjuncture between creating and completing." In the specific encounters of these tech talks, attendees "face in a sustained way" the promises and failures of digital solutions, while still opening up a sense of rapport between the examples and cases laid before them and the local practices they hope to bring into alignment with the broader sociotechnical imaginary (Winthereik, 2011).

The dynamics of hype as "hot air" affords actors the opportunity do this work of alignment, translating (Callon, 1984) the abstract imaginaries into local practice. Rather than accept them wholesale, the vacuous aspects of the hype allow for subjects to criticize or disavow parts of the imaginaries, whilst accepting others. This can be seen when hype normalizes and internalizes disavowal, with claims that it is not all buzz words and hype. Disavowal becomes part of the "hot air" itself, and subjects thus learn to deflate or ignore critique of the imaginaries–either through the act of disavowal itself, or by countering that there is a greater truth to it despite the hype. If "hot air" was performative in this way, these tech events would be sites for not just the performance of the corporate sociotechnical imaginaries, but also their translation. Like the IT reports discussed by Jensen and Lauritsen (Jensen and Lauritsen, 2016), these tech talks "travel" into different practices, establishing links to local contexts along the way. And as Jensen and Lauritzen also point out, critique is part of how such grand visions are specified, transformed, and made material. The visions "can only become more material, concrete,

local, and real by becoming more mundane and compromised in contrast to 'grand ideas'" (Jensen et al, 2016)

The "hot air" we have described is in this sense related to other kinds of ongoing technoscientific anticipation work, through which subjects are challenged with aligning global corporate sociotechnical imaginaries with local practical realities. Tech events, we believe, are therefore important sites through which sociotechnical imaginaries are not only performed, but also translated. "Hot air" denotes one of the central dynamics of this translation process, namely the recuperation of critique and the "making mundane and compromised" of these imaginaries.

Conclusion

In this paper we have described how Danish tech scene events feature the performance of multiple and overlapping corporate sociotechnical imaginaries. This performance, we showed, relies on hype as "hot air"–the dynamics of hype and its critique, and how hype can be simultaneously vacuous and productive.

We follow Jasanoff's suggestion that the concept of sociotechnical imaginaries needs to be "refined and extended in order to justify the myriad ways in which scientific and technological visions enter into the assemblages of materiality, meaning and morality that constitute robust forms of social life" (Jasanoff and Kim, 2015). We suggest just such an extension by focusing on how particularly corporate sociotechnical imaginaries are performed, and discuss how this allows for translation of these imaginaries into wider publics and sociomaterial configurations.

By using "hot air" as a concept, we draw attention to the way in which corporate sociotechnical imaginaries are performed, the dynamics of hype in this performance and the translations it enables, thus illustrating how such rhetoric and atmosphere is not mere bullshit (Frankfurt, 2009). Rather, it works in complex ways, crafting publics, reinforcing commonsense notions of history and trends, suspending disbelief, using disavowal of buzz words to create rhetorical ethos, and building authenticity by gathering examples and taking deep dives into cases. "Hot air" describes the dynamics that exists as these different articulations of hype play out together, lifting the audience out and up above the everyday and positioning them in relation to new technologies and attendant corporate sociotechnical imaginaries.

The events analyzed featured many overlapping sociotechnical imaginaries, some already described in research, some yet to be fully studied: they invoke notions of disruption, describe data as a resource of great importance, point to the techniques of big tech, invoke smart cities or just generally trumpet novelty as being important. We suggest that these events should be considered as staging grounds for such imaginaries, where they are articulated, performed and translated. If we were to simply dismiss the rhetoric of such events as only empty hype, we would lose an important part of the explanation for why these corporate sociotechnical imaginaries are as pervasive as they are.

Accepted manuscript version – full article published in New Media & Society 2021 (https://doi.org/10.1177/1461444820929319)

Acknowledgements

We would like to thank the anonymous peer reviewers and the editors of the special issue for their constructive and helpful comments. We would also like to thank colleagues in the Technologies in Practice research group at the ITU, and the Science, Technology and Culture unit at Osaka University. In particular we would like to thank Brit Ross Winthereik, James Maguire and Jannick Schou.

Notes

1. We kindly thank our reviewers for suggesting the classic work of Walter Lippman, *The Phantom Public* (2017) as an addition to this section. It was unfortunately not possible to engage with the work in this article, but we direct any reader interested in the making of the "public" or "publics" to it.
2. Also known as Singularity University.
3. See Schiølin (2019) for recent scholarship on the sociotechnical imaginaries of the 4th Industrial Revolution, which unfortunately was published too late to be included in the present paper's argument.

References

Adams V, Murphy M and Clarke AE (2009) Anticipation: Technoscience, life, affect, temporality. *Subjectivity*, Palgrave Macmillan UK 28(1): 246–265.

Anderson B (2006) *Imagined Communities*. Verso Books.

Anderson C (2008) The End of Theory: The Data Deluge Makes the Scientific Method Obsolete. *wired.com*.

Ball K and Snider L (2013) *The Surveillance-Industrial Complex*. Routledge.

Bartlett J (2018) *The People Vs Tech*. Random House.

Beer D (2018) *The Data Gaze*. SAGE.

boyd D and Crawford K (2012) CRITICAL QUESTIONS FOR BIG DATA. *Information, Communication & Society*, Routledge 15(5): 662–679.

Bridle J (2018) *New Dark Age*. Verso Books.

Brown N and Michael M (2010) A Sociology of Expectations: Retrospecting Prospects and Prospecting Retrospects. *Technology Analysis & Strategic Management*, Taylor & Francis Group 15(1): 3–18.

Bucher T (2016) The algorithmic imaginary: exploring the ordinary affects of Facebook algorithms. *Information, Communication & Society*, Routledge 20(1): 30–44.

Callon M (1984) Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay. *The Sociological Review*, SAGE PublicationsSage UK: London, England 32(1_suppl): 196–233.

Castoriadis C (1997) *The Imaginary Institution of Society*. MIT Press.

Duhigg C (2012) How companies learn your secrets. *New York Times*, 19 February.

Dunleavy P, Margetts H, Bastow S, et al. (2006) *Digital Era Governance*. Oxford University Press.

European Commission (2017) The Digital Economy and Society Index. DG Connect (ed.), *ec.europa.eu*. Available from: https://ec.europa.eu/digital-single-market/desi (accessed 16 August 2017).

Feldman MS (1995) *Strategies for Interpreting Qualitative Data*. SAGE.

Fishenden J and Thompson M (2013) Digital Government, Open Architecture, and Innovation: Why Public Sector IT Will Never Be the Same Again. *Journal of Public Administration Research and Theory* 23(4): 977–1004.

Flyverbom M, Deibert R and Matten D (2017) The Governance of Digital Technology, Big Data, and the Internet: New Roles and Responsibilities for Business. *Business Society*: 1–17.

Foer F (2017) *World Without Mind*. Penguin.

Frankfurt HG (2009) *On Bullshit*. Princeton University Press.

Greve C (2013) Ideas in Public Management Reform for the 2010s. Digitalization, Value Creation and Involvement. *Public Organization Review*, Springer US 15(1): 49–65.

Halpern O (2015) *Beautiful Data*. Duke University Press Books.

Irani L (2015) Hackathons and the making of entrepreneurial citizenship. Science, Technology, & Human Values, 40(5), pp.799-824.

Jæger B and Löfgren K (2010) The history of the future: Changes in Danish e-government strategies 1994–2010. Information Polity, IOS Press 15(4): 253–269.

Jasanoff S and Kim S-H (2009) Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea. *Minerva*, Springer Netherlands 47(2): 119–146.

Jasanoff S and Kim S-H (2015) *Dreamscapes of Modernity*. University of Chicago Press.

Jensen CB and Lauritsen P (2016) Reading Digital Denmark: IT Reports as Material-Semiotic Actors. *Science, Technology, & Human Values*, Sage PublicationsSage CA: Thousand Oaks, CA 30(3): 352–373.

Kurzweil, R. (1999). The Age of Spiritual Machines. Viking Press.

Kurzweil, R. (2001, March 7). The Law of Accelerating Returns. Retrieved October 2, 2019, from https://www.kurzweilai.net/the-law-of-accelerating-returns

Latour B (2004) Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. Critical Inquiry, The University of Chicago Press 30(2): 225–248.

Lehtiniemi T and Ruckenstein M (2019) The social imaginaries of data activism. *Big Data & Society*, SAGE PublicationsSage UK: London, England 6(1): 205395171882114.

Leivestad HH and Nyqvist A (2017) *Ethnographies of Conferences and Trade Fairs*. Høyer Leivestad H and Nyqvist A (eds), Cham: Palgrave Macmillan.

Lippmann W (2017) The Phantom Public. Routledge.

Mackenzie A (2013) Programming subjects in the regime of anticipation: Software studies and subjectivity. *Subjectivity*, Palgrave Macmillan UK 6(4): 391–405.

Mayer-Schönberger V and Cukier K (2013) *Big Data*. Houghton Mifflin Harcourt.

Mertia S (2017) Socio-Technical Imaginaries of a Data-Driven City: Ethnographic Vignettes from Delhi. *The Fibreculture Journal*, The Fibreculture Journal (FCJ-217).

Miyazaki H (2006) *The Method of Hope*. Stanford University Press.

Morozov E (2013) *To Save Everything, Click Here*. Hachette UK.

Olbrich P and Witjes N (2016) Sociotechnical Imaginaries of Big Data: Commercial Satellite Imagery and Its Promise of Speed and Transparency. In: Bunnik A, Cawley A, Mulqueen M, et al. (eds), *Big Data Challenges*, London: Palgrave Macmillan UK, pp. 115–126.

Pfotenhauer S and Jasanoff S (2017) Panacea or diagnosis? Imaginaries of innovation and the 'MIT model' in three political cultures. *Social Studies of Science*, 47(6): 783–810.

Pfotenhauer S, Juhl J and Aarden E (2019) Challenging the 'deficit model' of innovation: Framing policy issues under the innovation imperative. *Research Policy*, North-Holland 48(4): 895–904.

Poon M (2016) Corporate Capitalism and the Growing Power of Big Data. *Science, Technology, & Human Values*, 41(6): 1088–1108.

Ruppert E (2018) *Sociotechnical imaginaries of different data futures: an experiment in citizen data*. 3e Van Doornlezing.

Ruppert E, Isin E and Bigo D (2017) Data Politics. *Big Data & Society* 4(2): 205395171771774.

Sadowski J and Bendor R (2018) Selling Smartness: Corporate Narratives and the Smart City as a Sociotechnical Imaginary. *Science, Technology, & Human Values*, SAGE PublicationsSage CA: Los Angeles, CA 44(3).

Sandler J and Thedvall R (2017) *Meeting Ethnography*. Routledge.

Schiølin K (2019) Revolutionary dreams: Future essentialism and the sociotechnical imaginary of the fourth industrial revolution in Denmark:. Social Studies of Science, SAGE PublicationsSage UK: London, England https://doi.org/10.1177/0306312719867768

Schou J (2018) *Remaking Citizenship*. Hjelholt M (ed.), IT University of Copenhagen.

Schwab K (2017) *The Fourth Industrial Revolution*. Currency.

Schwartzman HB (2013) *The Meeting*. Boston, MA: Springer Science & Business Media.

Shapin S and Schaffer S (2011) *Leviathan and the Air-Pump*. Princeton University Press.

Smith E (2015) Corporate Imaginaries of Biotechnology and Global Governance: Syngenta, Golden Rice, and Corporate Social Responsibility. In: Jasanoff S and Kim S-H (eds), *Dreamscapes of Modernity*, University of Chicago Press, pp. 254–276.

Srnicek N (2017) *Platform Capitalism*. John Wiley & Sons.

Steinhardt SB and Jackson SJ (2015) *Anticipation Work: Cultivating Vision in Collective Practice*. *Proceedings of the 18th ACM Conference of Computer Supported Collaborative Work – CSCW '15*.

Taplin J (2018) *Move fast and break things*. Little, Brown and Company.

Taylor C (2004) *Modern Social Imaginaries*. Duke University Press.

United Nations (2018) *United Nations E-Government Survey 2018*.

Williamson Ben (2016) Silicon startup schools: technocracy, algorithmic imaginaries and venture philanthropy in corporate education reform. *Critical Studies in Education*, Routledge 59(2): 218–236.

Winthereik BR (2011) Hopeful comparisons on the brink of the grave. *Common Knowledge* 17(1): 77–81.

Zabusky SE (2002) Ethnography in/of Transnational Processes. In: *Ethnography in Unstable Places*, Following Gyres in the Worlds of Big Science and European Integration, Duke University Press, pp. 113–145.

Zuboff S (2016) The secrets of surveillance capitalism. *Frankfurter Allgemeine*, Frankfurter Allgemeine Zeitung. Download March.