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RESEARCH ARTICLE



# Data as Relation: Ontological Trouble in the Data-Driven Public Administration

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**Abstract.** This paper examines how the intense focus on data in political digitalization strategies takes effect in practice in a Danish municipality. Building on an ethnographic study of data-driven management, the paper argues that one of the effects of making data a driver for organizational decision-making is uncertainty as to what data are and can be taken to mean. While in political discourse and strategies, data are considered as a resource for collaboration across organizational units as well as for optimization of their performance, in practice, data are not this straightforward entity. The paper presents a kind of data work that identifies data as part of different worlds (ontologies). The management task that results from this is nurturing organizational spaces that articulate data as relational. The paper argues that being attentive to the troublesome experiences public sector employees have when encountering data may help mitigate some of the risks of seeing data merely as a resource. The paper concludes that as public sector managers learn to nurture spaces where differences in data can be articulated, they also protect core values of welfare bureaucracies. Acknowledging that data work is about what we take to be real and what not (ontological work) is a first step in this direction.

**Keywords:** Data-driven management, Public sector, Digitalization, Ontological trouble, Ethnography, Denmark

## 1 Introduction

*Working Knowledge: How Organizations Manage What They Know* (Davenport and Prusak, 1998) – an oft-cited book on information management in organizations – describes what is needed for organizations to be able to make better use of their data. The writers define data as “discrete, objective facts about events” (ibid., p. 2) that address only a part of what happens and have little relevance or purpose in and by themselves. Despite the observation by these authors that data are fundamentally of two worlds (the world in which data were produced and the world in which data are used) they contend that if you have a large enough collection of data, they hold the key to objectively correct organizational decisions (ibid., p. 3). This is in line with contemporary notions that intensified use of data

is the key to organizational success because large enough data sets will allow managers to base future decisions on solid knowledge of the effects of decisions made in the past.

Considering the enormous definitional variety covered by the term ‘data’ and the practical difficulty of sharing them (Borgman, 2012) data are a complex object of research. In CSCW data have been problematized already decades before the data revolution was labelled as such (Kitchin, 2014). Schmidt and Bannon for example argued that to produce and use the same set of information, work is needed to agree on the meaning of this information (Schmidt and Bannon, 1992). Here human work figures centrally in descriptions of computing. Work that exposes a margin of uncertainty in all information sharing as interpretation is needed for information to be used collectively.

In Denmark, where the study that I report from in the following took place, data have been strategically considered a key driver for improvements in the public sector since 2002 (Taskforce, 2002). Trust in data is prevalent, both as a strategic resource in public organizations (Hoeyer, 2019) and as an export good (Snell et al., 2022). One explanation of the trust in data to assist in organizational decision-making is the high degree of digitalization, alignment across public authorities, and well-connected data infrastructures (Green et al. 2023). However, to fully understand why data is being championed as a resource in the Danish public sector, we need practice-based, observational, ethnographic studies that describe and analyze a broad range of data usage. This includes forms of data usage that cannot be neatly categorized as data collection, data analytics or data sharing. These forms are also not easily placed under the label ‘data work’, a popular concept within CSCW.

Research that focuses on data work has provided hard-needed, practice-based studies of how new technical possibilities of (re-)using data are enacted and resisted (Flügge et al., 2021; Bossen et al., 2019; Møller et al., 2020a, b; Langstrup, 2019; Petersen et al., 2021). These studies show that everyday work is transforming when organizations use data more intensely or seek to become ‘data-driven’ in the sense that they invent processes to establish evidence for future decisions through data. The studies also, however, call for analyses that allow for understanding the organizational effects of such new ways of using data in public organizations. To do so, I take inspiration from Sabina Leonelli’s relational framework in which she outlines a practice-oriented, philosophical lens to the question of what data is: “What counts as data depends on who uses them, how, and for which purposes. Data can therefore include experimental results, field observations, samples of organic materials, results of simulations and mathematical modeling, and even specimens” (Leonelli, 2015, p. 817). Leonelli highlights the material aspects of data rather than their representational qualities, e.g. in placing emphasis on the infrastructures that enable researchers to use data. “Researchers often produce data without knowing exactly which phenomenon

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they may document. Data production, particularly for high-throughput biological data, can and does happen simply because scientists have access to a given instrument and/or because they hope that consulting those data may yield new questions or insights on as-yet-unknown phenomena” (Leonelli, 2015, p. 818).

Studies of data work in CSCW place emphasis on how data are made, including their relational dependencies, and are often focused on the unacknowledged aspects of such work as well as the dilemmas involved in performing it (Nielsen et al., 2023, p. 25). We learn that data are dependent on the people who collected the data, cleaned it, standardized it, used it, as well as on the technologies that processed, stored, and shared them. We also learn that organizational functioning depends on alignment between technical systems and social and political elements, for example with respect to how decisions are made about what data to collect. What has been documented and analyzed to a far lesser extent is how data exist as part of different ‘worlds’ (ontologies, for an exception see Douglas-Jones, 2021). For CSCW and the field’s interest in collaboration a focus on how different data worlds connect in practice might be pertinent, as is the question of whether the bridging of worlds is a kind of data work.

As I will show in this article, one of the effects of the data-driven organization is the emergence of ontological trouble. *Ontological trouble covers the experience that within the organization data exist differently as part of different practices. These modes of existence are equally valid in the sense that one cannot be replaced by the other, but their incommensurability is nevertheless hard to contain for people in the organization, practically and emotionally, due to the way accountability is enacted.*

Data-driven management makes it clear that data are not one thing and that different data ontologies co-exist in the municipal organization in practice. Political strategies towards intensifying the use of data in management mean that ontological differences are being articulated in new ways. So while questions pertaining to the invisibility of much of the work that goes into making and using data in organizations are important, I will focus on the work that is needed to connect and keep separate different data ontologies in an organization seeking to become data-driven. I argue that this is important as managers in such organizations do not necessarily have the skills to identify ontological issues or know what to do when trouble occur. This lack means they will have difficulties in supporting employees in working collaboratively with data.

In the organization where I conducted fieldwork, data about citizens exist as part of different registers and databases. Data also existed in the everyday management discourse, where they were both talked about as stand-alone representatives of a corresponding reality and as contextual entities in need of interpretation. This resonates with the suggestion by Martin and Lynch (Martin and Lynch, 2009) that every count is a ‘count-as’ in the sense that every time something is turned into data it involves a classification of that which is counted or ‘datafied’.

Martin and Lynch suggest we focus on the work of identifying marks and criteria to establish the extent to which a unit is count-able and can be classified. My research shows that we can add a layer of attention to this, which is a focus on the daily efforts to establish similarity and difference between the worlds in which countable units might play a role.

The analysis can thus be seen as a study of data-driven management as a practice that involves the infrastructuring of different worlds within an organization (Parmiggiani, 2017). The study shows how ontological trouble emerges as new requirements towards municipalities to use data as resource and foundation for welfare delivery are developed. Seen thus, it is not just the data themselves that must be problematized (how they become workable, politico-epistemic entities), but also the worlding processes that make data come to life in several different ways in a welfare bureaucracy. These are ways that highlight data as always in some sense a relation.

In what follows, I first offer some background of the digitalized public administration in Denmark. I then describe the methods and analytical framework employed before presenting two ethnographic vignettes that offer insight into how data-driven management unfolded in practice in the municipality where the fieldwork took place. Based on the ethnographic vignettes I analyze and discuss the ontological trouble as a characteristic of the data-driven organization. The importance of the paper lies in showing the challenges posed by a dual data ontology for accountability in the public sector. The conceptual contribution of the paper to CSCW is to coin in situ collaboration work around data ontologies and gesture to possible new avenues for articulation work when data becomes infrastructure in the digitalized welfare state.

## 2 Framing data-driven management

According to The Digital Economy and Society Index (DESI), Denmark is at the absolute forefront of digital performance compared to other EU states (<https://digital-strategy.ec.europa.eu/en/policies/desi>). The areas that DESI measures are human capital, connectivity, integration of digital technology and digital public services. It is thus much broader than what is usually referred to as e-government (Greve and Ejersbo, 2016; Madsen and Kræmmergaard, 2015).

We can use this index as a way of seeing how the use of digital data for management purposes in the municipalities is part of a much broader transformation of society. This transformation was previously coined as *digital era governance* (Dunleavy et al., 2006), which covers the idea that to provide better services a public sector must integrate digital technologies in all of its operations. In Denmark, prior to 2014 where digital post became mandatory for citizens, data about daily operations in the public sector and data about citizens was not considered a resource but rather a by-product of the increased use of digital infrastructures.

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In recent years, now that many IT-systems and platforms for collaboration have been put in place, the data themselves attract much interest as a resource for organizational self-reflection and optimization and as a way to stimulate public-private partnerships and innovation (Government, 2022). One way to do this is through a national digitalization partnership consisting of actors from the industry. A director from one of the big tech corporations have been appointed head of this advisory body to the government. For years already IT-governance has been a key focus and a constant challenge of the central administration as well as something the municipalities have been tasked to solve. Now a new challenge has emerged, which is the task of implementing data governance, ie. control the flows of data of which there are many, but also to 'set data free' so that they can become a management resource. An important element in the discourse around data governance in Denmark is that data must be enabled to travel across organizational entities (these entities are often referred to as 'silos'), for employees to communicate more smoothly about shared issues. Part of the discourse is that data must be used to stimulate innovation and learning at all organizational levels. The idea is that as managers free data from the usual routines and ways of working, they should be inclined to find ways to compare registrations made by and about citizens, for example how children perform in schools, with data on their social, cultural, geographical, and other demographic data, and find ways of combining child performance with organizational data such as teachers' absences, use of substitute teachers etc. Similar examples are to be found across all welfare sectors within health care, social work, and law enforcement in addition to education.

Equally noticeable compared to the successes of technical implementations of new systems that have put Denmark at the forefront in international monitoring of digitalization in Denmark is the eagerness, whereby public managers are taking on digital solutions and the new requirements of 'setting data free' (Plesner and Raviola, 2016). Until recently it was both bad practice and, in many instances, also illegal to combine citizen data across databases and registers, but with the advent of AI signature projects, Danish authorities now encourage the intensification of data use across sectors and within local authorities. Thus, data can now be combined across registries using citizens unique personal identifier as infrastructure and new visualization techniques mean data that can be taken out of the context in which they were produced to allow for organizational optimization and improved welfare services. Attempts to implement algorithms that can automate decision-making processes accelerate attempts to produce a bigger and more varied data base to be used for future automation.

At the same time as these developments are taking place, discussions that center on the extent to which data can be seen as a resource or not, and under which conditions. As part of fieldwork at a conference in 2018 organized by the Association of Danish Municipalities KL entitled *When Data Creates Welfare*

(*Når Data Skaber Velfærd*) a panel of politicians and municipal managers discussed the promises of data. All the panelists were more than willing to consider more varied data sources for future decision-making. Interestingly, the discussion centered on the very nature of data as well as on the question of what data sources to use. To the panel data were clearly much more than just ‘a resource’. The panelist said: “ We really should not faint over data”, “data are not just data, they are an entry point for negotiation”, “there are so much data, and things we would like to measure, so sometimes you find yourself in front of a dashboard ‘from hell’, it’s so confusing”. This indicated to me that we are truly in a ‘data moment’, (Maguire et al., 2020), which is an epoch of technological governance dedicated to progressivist and solutionist imaginaries of data, but also a moment in time rife with social, political, organizational, and ethical dilemmas (ibid., p. 12). In the where I conducted fieldwork, there was a strong desire to move away from a past with New Public Management and into a future characterized by co-creation and networked forms of governance and management. Data-driven management was one way in which an imagined shift towards a future with more collaborative modes of working could be articulated. I saw this in the strategies as well as in the efforts to digitalize basically everything around the administration of welfare, including information about citizens. In the department, conversations gravitated toward the notion that making better use of data was a management task that had to focus on getting *everyone* in the organization – from home care workers to case workers and middle managers – to both produce and use more data.

To the managers it was exciting to work in more agile ways than what had been good practice in the traditional bureaucracy as well as in the New Public Management era. My gate-keeper in the municipality, the head of digitalization, was quite taken with the co-creation approach of New Public Governance (Klijn and Koppenjan, 2016) and often emphasized the importance of pooling together different kinds of resources, including data, to be able to manage in a more agile, and thus less mechanical and pre-formatted than required by NPM ways of working. I could observe a more agile approach to management during data-sharing events, where new formats were experimented with to ‘free data’ from the shackles of their everyday categorical identities. But as I shall show, there were many more things going on than just freeing data.

### 3 Methods

Taking a strong interest in how data would help realize the visions of a better public sector geared towards the future sketched out in the strategies, I began my ethnographic fieldwork by asking a pragmatist-inspired (Star and Strauss, 1999) and hence open question: What do municipal managers do when they carry out data-driven management? The fieldwork was part of a collaborative agreement



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between the municipality and my university in which several researchers from the research project *Data as Relation: Governance in the Age of Big Data* participated. The purpose was to study the hopes, possibilities, barriers, and dilemmas connected to big data in the Danish public sector, a topic of interest to organization and information studies, social studies of data work and practitioners and decision-makers.

My part of the fieldwork took place between October 2018 and February 2020 and consisted of recurring periods of observations during management meetings and workshops on the one hand and interviews and document studies on the other. Interviews were organized through snowballing and through the help of an administrative employee, who had the designated task of helping with organizing the interviews and securing that the managers would slot in times for the fieldwork in their very busy agendas. In total, 17 semi-structured, face to face interviews lasting between 30 min and 1.5 h, 6 phone interviews lasting between 15 and 30 min, and observation of 30 events (24 meetings and 6 workshops) were conducted. The materials have been recorded and transcribed and thematically coded by the author using NVivo software.

Studying public administrators' management practices is inevitably also a study of governance mechanisms as explained in the section above. To understand governance ethnographically, philosopher of science Helen Verran suggests we pay close attention to the physical stuff that is present in the ethnographic encounter, recognizing this stuff as a lively participant in governance (Verran, 2021). To grasp data-driven management as embedded in governance as practice I attended very closely to the physical set-up of meetings and the ways in which various technologies, language included, shaped the social interactions. I paid particular attention to moments of disconcertment that occurred in the field.

Attending to such moments is a technique, also introduced by Verran (1999), to help the ethnographer situate his or her epistemic-analytical work in the embodied encounter (see also Ballestero and Winthereik, 2021; Simonsen, 2021). In my fieldwork moments of disconcertment occurred when research participants were called by managers to put data 'on the table' and were scrutinizing them collaboratively hoping that data could somehow become a resource for organizational action. The orchestration of joint data analysis did not include notions of data as ontologically different (working in and being of different worlds) which resulted in awkward moments.

These moments were disconcerting and therefore resourceful for the ethnography. They sometimes felt like a punch in the guts, a sense of awkwardness around what it was that participants saw as knowledge and how they would go about communicating their knowledge to others. It was especially by observing how managers, decision-makers and employees in the municipality went about their 'data knowledge' that oriented me to the various kinds of 'ontological trouble' that emerged around data work (Verran, 2021, p. 238). This trouble was mainly



about how to make data perform as resource for knowledge claims, but people were engaged in it without any recognition that they were engaging in epistemic work. In outlining the analytic that she calls ‘unearthing ontological troubles’, Verran suggests that this lack of acknowledgement need not be a problem as ethnographic work is always already both analytical and conceptual. I would argue, however, that while it may not be a problem to the ethnographer, it should be a concern of the managers working inside and across co-existing data ontologies and they must learn to articulate ‘knowing what they know’ in the situation (ibid., p. 242).

Knowing what they know or experiencing what they experience is a form of interference that is not only a by-product, but a pre-requisite of ethnographic knowledge-making. As I intend to show, this is a skill that managers of data-driven organizations might nurture.

#### **4 Ethnographic Illustrations of Data-Driven Management**

I now present two examples of data-driven management. The first is an observation of a meeting in which top-level managers from across the administrative unit that we conducted fieldwork in – around 25 people in total – who are called in for a cross-departmental meeting ‘to look at data about citizen complaints together’. The meeting, a senior manager explains, takes place for the managers to ‘get into the habit of working jointly with data’. It is occasioned by a steep rise in citizen complaints and the differences in number of complaints across organizational units are discussed with the intention that the units collaborate to get the numbers down. The second example illustrates the introduction of a collaborative format to let data support the imaginaries of a more agile public administration. The immediate purpose of the hackathon was, comparatively to the cross-going management meeting, to spark an interest among employees in relation to using data and to gain hands-on experience with it by combining data sources. In both situations differences occurred as to what the participants thought data could be taken to mean, which led to in situ negotiations about data as a source of knowledge and insight.

##### **4.1 The Management Meeting: Data as Truthful and in need of Social Context**

At the cross-going (*tværgående*) management meeting, twenty-five top level managers are gathered. They sit in a horseshoe and face a screen with power-points on it. The topic of the meeting is complaint-driven innovation (*klagedreven innovation*), which is a translation of an American concept used in the private sector. The idea is that any customer complaint should be considered an opportunity rather than a problem, as an employee from the legal department had explained to me. The managers hope to improve performance in the realm of citizen

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complaints, of which there are way too many, by using data. Three units have been selected and the unit manager are taking turns to present their numbers. The power point graphics that they have brought with them visualize the ups and downs in complaints within different areas. The speakers present their data chronologically and according to changes in 'formal' versus 'reality' complaints (*formalitets-* and *realitetsklager*). After the presentations the participants begin discussing the figures and what they might indicate. In this discussion the numbers are very much taken at face value.

This goes on for some time until a participant, a manager of a citizen center, raises his hand and asks with a gesture toward everyone in the room: 'but do we agree on what a complaint is? I mean there are quite significant differences in reporting cultures, for example.' He repeats, 'Do we even know what a complaint is?' As opposed to data work and forms of governance where management authority is formalized and information processes are standardized, what now emerges is a sense that data do not only mean 'one thing'. The sense is shared by some of the managers, who begin discussing how data, to become meaningful, need to be put into context. An agreement is established that to understand data one must try to understand how they came into being. Thus, understanding data is not only a matter of being able to read them, of having 'data literacy' or be great with numbers, it is also a matter of knowing what their social relations are, to properly interpret them.

The manager who raised the question offers an example: A young woman living in a residential institution was surprised when an employee entered her room without knocking, as she was half-naked and did not wear a blouse. The employee is very sorry and informs the young woman that she should file a complaint. The manager compares this example, where a complaint is filed partly to safeguard the employee against later criticism if other residents would hear about the episode, with examples where residents' rights have been violated in other ways. Does 'complaint' mean the same thing here, he asks? Can you even compare the two data points?

The concern is one of what it is that data represents, to what exactly a data point relates and whether it can be compared with other data points. When differences between what complaints are in the social realm are made invisible in data how can the managers use data to drive organizational decisions? However, while the relationality of data emerged during the meeting, after the meeting one of the organizers (a middle manager) settled the problem. She told me that 'data never lie, but you've got to relate to them to understand what they are saying.' This statement was puzzling to me considering what had happened at the meeting. Especially the ease whereby she connected two distinct ways of knowing data that emerged at the meeting. She claimed that you should acknowledge that data can truthfully represent a world 'out there', but to understand the representation, you need to work with them, visualize them in different way, discuss them, and

interpret them ‘in here’. The manager sought to reconcile the different data realities discussed at the meeting by making a distinction between data ‘out there’ and data ‘in here’, but otherwise not make any distinction between what data ‘were’ in different situations.

#### 4.2 The Hackathon: Play and Politics

Towards the end of fieldwork, we, the researchers in the project, organized a hackathon in cooperation with the municipality. The hackathon was prepared by a small task force consisting of a PhD student in the project, four thesis students from the university, and a project manager at the municipality. The task force jointly planned the day and prepared data sets from the municipality’s own databases as well as from Denmark’s Statistical Bureau. The hackathon took place in the building of the municipality’s own IT department in central Copenhagen (KOMBIT). The 60 participants were employed in methods units, administrative units, and IT units, and all had been invited with the promise that the day would offer an opportunity to ‘play with’ and explore a variety of datasets using new analytical and visualization tools and to work across organizational units. The participants were divided into thematic groups based on questions prepared by the task force. These questions revolved around transitions in the social services across groups of welfare recipients, from child to adult, for example, or around citizens at risk of committing crime. The hackathon was another situation in which data-driven management unfolded in practice. One of the take-aways was that the notion of data representational both clashed and co-existed with the on-site work of data interpretation. The tension between these two ways of relating to data was felt in the task force already prior to the hackathon. The researchers were generally worried about the notion among people in the municipality that data would be able to ‘speak’ to them as if through some kind of magic. At the same time, they worried that the data would not actually say anything at all, in which case we, the researchers who were responsible for the day, would have wasted everyone’s time.

We had labeled the day a Data Exploration event, rather than a Hackathon. However, while the label indicated *our* belief about what we would be able to achieve with data, explore them, our municipal collaborators had higher hopes. For them it was important that the hackathon would mimic the creative, playful, nerdy atmosphere in a Silicon Valley type of hackathon that have become a model for digital innovation globally. The project manager therefore arrived armed with lots of sweets and soft drinks to facilitate an innovative and playful atmosphere, if only for one day. The head of digitalization was eager to find answers in the data and not just new questions, which was what we had promised. She wanted to relay to the Board of Directors that the Department’s ‘strategy of data-driven management is indeed a great idea’, a conclusion we could not guarantee would be the outcome of the day, since this

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way of working with data was a first-time experience for all participants, who were also not familiar with the digital methods to be used. Her expectation was that the participants would be able to ‘see new patterns in the data’ and make data valuable through acquiring new knowledge this way. We, the researchers, did our best to lower expectations, as we were not sure the datasets were of a sufficient quality to generate the kind of evidence hoped for; we were also aware that the data from the statistical bureau were personal data that could only be used, because we were taking part as researchers and had researcher access. To introduce interpretation and dialogue around data we had organized the day around a series of sprints (Munk et al., 2019), and introduced a variety of digital methods and techniques to open the field of data analysis as much as possible.

The participants approached the exercises in different ways. Some accepted that this was an exercise characterized by openness as to what the data could be taken to mean. Others found it extremely difficult not to be able to query the data in the ways they were used to, but such queries were not possible due to the mixing and mashing-up of data sources. One of the ambitions of organizing a hackathon was to have the participants leave their data analytical and professional comfort zones and be curious about emerging ‘patterns’ in data using visualization techniques such as Gephi and Tableau. Most groups tried their best to come up with a question and curiously explore what might be found in the data about this topic. However, discussions soon revolved around whether the data would in fact speak truthfully about the topic and concerns were raised about how the data exploration would be used and by whom. As the following transcription from a discussion in one of the groups shows, some participants also worried that data would speak too loudly and with too much certainty.

Participant A: 10.000 children out of 15.000 who receive social benefits have a criminal father, someone who was charged and punished.

Everybody around the table agrees that this is a significant finding. Participant N: But can this really be true?

Participant S: Perhaps instead we could explore what *types* of criminality they have committed, is it just an incident in traffic or more serious things and what type of punishment did they get?

Later in the day, as the group is preparing a presentation that they have been asked to hold in the plenary.

Participant S: To be honest, I am slightly worried about what might happen after our presentation, what if the numbers we present become “final numbers”? What if the panel hears something they can’t forget?

Researcher A: Is it good the directors are not allowed to take the presentation home? Participant N: Indeed, it is just that it’s a “municipality classic”: Suddenly we see a policy proposal saving on criminal fathers because

someone saw a presentation and thought “if you have that many children, they you are automatically a criminal” (everybody laughs). Participant K: So we should make a note during the presentation that playing was fun, but please don’t use the numbers for anything serious.

Researcher A presents the Gephi-map. She proposes making screen shots to downplay the power of data, but the group wants to use the animated presentation, as they agree the animation would be popular among the panellists.

Participant K: Did you make a note that they cannot use the numbers for anything? Participant N: Yes, I have written a disclaimer in font size 54.

The conversation illustrates the understanding among participants of data as simultaneously representing facts about ‘criminal fathers’ (a rather problematic label) and their offspring (potentially criminal children?) and data as something that must be handled and interpreted with care. Data are both considered flexible and a powerful instrument in the wrong hands, and the work of visualizing data is supplemented by disclaimers and other techniques to downplay what the data might be saying.

At the end of the day all the groups are to present their findings in front of a panel consisting of the mayor, a member of the municipal Board of Directors and a manager from a different department. After the presentations, the mayor was enthusiastic about the event and stated that the municipality should establish a Data Lab where private companies could offer technical platforms and support in return for access to public data. ‘We have the data, they have the technologies’, the mayor said, whereby she performed the fear that some employees had expressed earlier in the day that decision-makers would tend to take data at face value.

## 5 Discussion

Data have gained status as a business product, and in the public administration are data now considered an asset, too. It took me by surprise to see how in a Danish municipality data was far from an unproblematic resource for counting things and people. Instead, complexities unfolded as managers and employees sought to establish the value of data in practice (Birch and Muniesa, 2020 refer to such processes as assertization). Specifically, I observed that to make data valuable, ie. actionable and prone as evidence for decision-making, their way of being in the world, their ontological status, had to be established first. In the first case example, two data ontologies emerged: Data as truthful, a representation, or a fact, and data as contextual, lively, and in need of interpretation. The manager then added another world of data based on data’s location (outside versus inside the organization) as a way of solving the problems that she observed the employees were

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having when discussing the complaints. Might there be other ways of attending to the ontological trouble occurring when data are ‘put on the table’?

Martin and Lynch showed that to make data say anything, to make them count, is a process of turning data into a member of a class. It is through data’s membership of classes that accountability can be established: ‘To count something is to make it *accountable* as a member in a class of relevant objects. In this sense of the word, “counting” is both a calculative operation in which numbers are used, and a case-by-case determination of *what* to count and, correlatively, of what *counts as* something to be counted’ (Martin and Lynch, 2009).

At the hackathon data’s truthfulness were surrounded by uncertainty, partly due to a general fear that insights could (too) easily be drawn from the data and be taken at face value. The participants had experiences with politicians that would take data about complex social problems and make them count without establishing accountability. The participants therefore invented a categorical identifier in the shape of a disclaimer to avoid that ‘not yet analyzed’ data would provide an occasion to ‘say something politically’. Despite the availability of time for analysis and data visualization techniques presenting data as ‘data’ or ‘error’ was a daunting task because accountability measures were not in place. At the end of the day the mayor responded to the fear that employees in the municipality had by suggesting that private companies could make use of citizen data in a data lab.

Anthropologist and STS scholar Klaus Hoeyer, in his research on the intensified use of health data, points out that data use can be characterized by ‘promiscuity’ when data are taken to serve several purposes: ‘Health data can be used by the social services, for credit assessment, or potential employees and vice versa’ (Hoeyer, 2020, p. 6). To avoid promiscuity in data, at the management meeting, data were both representations of complaints on powerpoints and ‘multiple and unstable objects’ (ibid., p. 7). In my research, employees experiences ontological trouble as managers and decision-makers tended to want to settle data as one thing at a time. It was unnerving for people at the managers’ meeting and at the hackathon to be forced to have to ignore data’s different modes of existence by being forced to focus on one single data ontology disregarding other data worlds. During the management meeting, connecting data ontologies happened as an employee offered what we may call *analogue metadata*, in the shape of a narrative from an episode at a residential youth home, to connect the different data worlds.

The analysis shows that pre-established definitions of what data are or what they can be taken to mean, even though a traditional way of working with information, is not the best way forward for organizational decisions. In the examples presented here, people account for data in different ways, and use these modes of accounting as a way of establishing certainty around data. I identified several ontological registers used for in situ accounting efforts. While interesting in and

by themselves, this also leads to the question of what it can tell us about data-driven management in the public bureaucracy more generally.

Overall, the study shows that data-driven management is a management regime that may well accept that a data point is not a truthful representation of a corresponding reality, but which largely ignores the situated knowledges of people working in the organization. These people work with data as well as with citizens and part of their daily work is grappling with the question of what data can be taken to mean, when to use data, what data are needed for, and when they are not needed for. Data-driven management takes place in a space characterized by negotiation and sense-making oriented towards stitching together data worlds and keeping them separate. The hackathon group's writing a slide in font 54 was an attempt at keeping a world of playing separate from a world of politics. Employees were worrying of the harmful effects of instrumentalizing data to achieve certain political goals.

As I relate to the complications showcased here of data-driven management I take it to be a case of ontological trouble because the question of how to make a boundary between data in one sense and data in another sense is present and how to solve it is up for grasp. In the data-driven organization data are 'a foundation', evidence to act upon, and dynamic entities whose context must be established for data to be trusted, entities that are not always trustworthy, but can be of interest, nevertheless.

Despite documentation of adverse effects, public authorities in digitalized welfare states are committed to intensifying the use of data (Mann, 2020; Ranchordás, 2022). My studies show that to consider data as *the foundation* of managing and governing welfare delivery is a risky strategy, since data can then be used promiscuously as 'fact' or as 'in need of context'. To avoid that managers slide between the two registers as they seek to both involve employees in data work and live up to national digitalization strategies, they must learn to identify differences between data ontologies (worlds) that emerge as data are 'put on the table' and made 'actionable'. Concretely, this could involve articulation of the different worlds that employees engage with to engage them in a discussion about their experiences with making, using and sharing data. Over time this might allow managers to integrate protocols, tools and techniques for data analysis and interpretation in the daily practice that embeds an understanding of data as relational and ontologically troublesome (Hockenhuil and Cohn, 2021). This is especially important as data are increasingly expected to perform in algorithmic processing of citizen requests and in solving complex problems such as whose request to treat first. Thus, much responsibility is placed on managers to ensure that the data to make decisions that are not just representative, but also fair and just. This could involve that managers take it on themselves to involve employees in articulating what this might mean given data's ontological complexities. It is urgent that uncertainties around data are taken seriously



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and not either black-boxed or used strategically to promote neoliberal economies and administration practices from the top down as this might harm citizens. As (Thylstrup et al., 2021) show is the case for big data archives, uncertainty in data can harness new kinds of accountability, but only if uncertain data are taken as an invitation to develop new vocabularies for speaking about and dealing with data in ways that do not shy away from accepting that data work means working through ontological trouble.

## 6 Conclusion

I have shown how in the context of data-driven management in a municipality in Denmark, a front-runner in public sector digitalization, data work is much more than simply making data useful. Data work is also the work of identifying and managing differences in what data 'are' and can be taken to mean. This unearths a host of troubles, and these troubles are ontological as they concern how data exist in the employees' everyday practices and in the welfare bureaucracy at large.

In 2015 the Association of Municipalities in Denmark (KL) argued that to use data to optimize organizational performance, municipal management culture must change. As this paper has shown there have been attempts among municipal managers at establishing a culture change in how data are handled, analyzed and acted upon. At the same time, we see how the introduction of new organizational formats aimed to create a change in attitude towards data among employees (data meeting, hackathon), surfaced a fundamental problem in relation to data: Very rarely, if ever, can data be taken to mean just one thing, which is because they relate to a host of other things, including the people, who interpret them. Data's relationality displays itself 1) when they are made, 2) when they are cleaned, organized, systematized and made readable, and 3) when they are interpreted and made actionable. Data present themselves as relational and this does not go away through changing how people work with them. If data, whose ontological status is uncertain to begin with because they can easily be moved from one categorical identity to another, are used as a foundation for decisions about welfare and who is entitled to what citizen rights and organizational accountability are put at risk.

Rather than creating an evidence base for organizational decisions, ignoring the co-existence of data worlds means that data-driven management will undermine current principles and established practices meant to ensure accountability upheld by different professional groups. If on the other hand, differences in data are taken as an occasion for learning and managers articulate that differences exist as a way of involving employees in sorting out the boundaries of different worlds as well as the frictions when combining them, data-driven management would take a leap in protecting citizens' legal rights and core values of the bureaucracy.

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## Declarations

**Conflicts of Interests** The author declares no conflict of interest regarding the publication of this paper.

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