SJPA
25(2)

Towards a Data-Driven Public Administration: An Empirical Analysis of Nascent Phase Implementation

Heather Broomfield and Lisa Reutter*

Abstract

This paper aims to demystify the concept of data-driven public administration and lay bare the complexity involved in its implementation. It asks the overall research question of what challenges are encountered and problematised in a nascent phase of data-driven public administration implementation. The analysis is based on a multi-method research design, including a survey, follow-up interviews with practitioners and an analysis of key policy documents in the context of the Norwegian public sector. It highlights areas of both discrepancy and harmony between what has been prioritised at the policy level and the reality of implementation on the ground. In addition, unseen issues are discussed in order to broaden this perspective. Data-driven administrative reform touches upon everything from organisational culture to technical infrastructure and legal and regulatory frameworks. The complexity laid out in the analysis thus has implications for theory and practice. Nordic countries provide an interesting object of investigation, as they hold vast amounts of data and are highly digitalised, yet, in common with many other governments, they are still in a nascent phase of implementation. This paper should therefore be relevant to other jurisdictions and it provides a call to arms for civil servants and public administration scholars to engage more deeply in this phenomenon.

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Keywords:
public administration reform,
data-driven,
artificial intelligence,
policy implementation,
unseen issues

Introduction

The ambiguous, multifaceted and contested nature of data-driven public administration presents a serious challenge to practitioners, policymakers and scholars alike, ushering in a new and all-encompassing chapter in the extensive history of public administration reform (Bullock 2019). This paper aims to demystify the concept and provides a unique account of the Norwegian public sector's early endeavours to implement data-driven government. The paper asks the overall research question of what challenges are encountered and problematised in a nascent phase of data-driven public administration implementation. It identifies and discusses these challenges as experienced by practitioners. We highlight areas of both discrepancy and harmony between what has been prioritised at the policy level and the reality of implementation on the ground. The paper then goes on to discuss issues that are largely unseen by both policymakers and practitioners, but that scholarship has identified as potential unintended consequences caused by the utilisation of data-driven technology in the sector. We aim to both lay bare the complexity involved in implementation and convey the paradigm shift that this is bringing to public administration. This paper provides valuable insights for civil servants and policymakers embarking upon their own data-driven journeys. It also issues a

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Scandinavian Journal of Public Administration
25(2): 73 - 97

ISSN: 2001-7405
e-ISSN: 2001-7413

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The amount, granularity, immediacy and variety of data about subjects to be governed is unique for modern governments (Ruppert, Isin and Bigo 2017), and are resources in which the Nordic public sectors are deemed to be particularly rich. There is a palpable sense of urgency in Norway to utilise this data goldmine. It is prescribed as a treatment to alleviate the consequences of impending threats to the Norwegian welfare model caused by issues such as demographics, downswings in the oil sector and increasing immigration rates (Dølvik et al. 2014). Data-driven public administration aims to promote the idea of data as an asset that needs to be highly integrated into policy-making, service delivery, organisational management and innovation (van Ooijen, Ubaldi and Welby 2019). It carries with it the promise of effectiveness and improved services. As with many other governments, Norway is in the nascent phase of this transformation and is far from unique in its quest, as this idea is also highly advanced by the OECD and other transnational actors (Misuraca and van Noordt 2020; Sun and Medaglia 2019).

Industry and governments are enthusiastically embracing technological trends such as platforms, the cloud and machine learning, seeking to harness what is perceived to be a tremendous potential in technology and data (Yeung 2018). It appears that new technology and technology-related practices are sweeping over public administration without being critically assessed by the field. A significant amount of research has been conducted on the issue of becoming data driven, but this research is predominantly concerned with private sector actors and an outside perspective on the phenomenon. Where public administration research is emerging, it is dominated by UK and North American case studies. Scandinavian governments, however, operate in a different data context. They collect and manage vast amounts of detailed personal and nonpersonal data and experience relatively high levels of trust from citizens. This specific context requires empirical and theoretical attention. Information technology has long been neglected in public administration research, leading to the marginalisation of the discipline's influence on practical policy-making (Dunleavy et al. 2005). Despite the increasing dominance that both digitalisation and data-driven approaches have over public administration and in public policy, there is little to signify that the situation has improved much in recent years, with many researchers lamenting the relative dearth of research concerning this "new" era of data-driven government and expressing the urgent need to engage (Agarwal 2018; Brauneis and Goodman 2018; Redden 2018; Wirtz, Weyerer and Geyer 2019). This lack of research may also be contributing to the discursive context of data-driven public administration being significantly shaped by corporate technology companies (Andrews 2019).

This paper adopts a practice approach, focusing on the "perceived challenges to act upon" as identified by public service practitioners tasked with realising the promised riches from the "goldmine" of data. It focuses on the framing of this problem rather than its resolution (Andrews 2019). The data material consists of a survey, follow-up interviews with practitioners and analysis of key policy documents. As advocated by Veale, Van Kleek and Binns (2018), we conduct this research in collaboration with those at the coalface,

rather than working from afar, in order to endeavour to elicit new insights and understand aspects that may not be immediately apparent from the outside. We discuss data-driven public administration as a complex practice that challenges traditional public administration and therefore impacts upon everything from organisational culture to technical and data infrastructure and legal and regulatory frameworks.

The first part of the paper introduces and discusses the concept of data-driven public administration; it then proceeds to situate the phenomenon in implementation research in addition to providing a summary of the Norwegian data context. We then advance our mixed-method approach. The analysis provides an overview of the current state of Norwegian data-driven public administration and the challenges encountered in this nascent phase. As the invisible labour and ambiguity behind the grand ideas of data-driven government are laid bare, this may contribute to a more balanced and practice-based approach to the phenomenon.

What is data-driven public administration?

The realisation of the optimal modern, responsive, efficient public administration deemed to have evaded us thus far, is envisaged to be delivered by "data-driven government". A term popularised by the corporate sector and transnational actors and subsequently adopted by many governments. It is defined as follows by the OECD.

> *"A data-driven public sector recognises data as a strategic asset in policies and services design and delivery. It implies the development of sound data governance structures (including data strategies, institutional arrangements, rules) and related delivery mechanisms (data infrastructures, standards) to capitalise on the value of data to anticipate and respond to the needs of users, deliver better services and policies, and promote data integration, access, sharing and use across the public sector. A data-driven public sector also favours the use of innovative and alternative sources of data in the evaluation and monitoring of policies and services over time." (Ubaldi et al. 2020: 30)*

The modern state and data are already inevitably woven together (Desrosières 1998). New public management has, in addition, increased the focus on quantification in the sector (Muid 1994). Data is generated, managed, stored, processed and analysed in every aspect of public administration, the state being a key producer, provider and consumer of data (Kitchin 2014). Reform, redesign, reinvention and a perceived urgent need to adjust to rapidly changing circumstances in the sector are also not new, public sector innovation having become a professional default state (Wagenaar and Wood 2018). Information technology is now recognised as a key instrument of administrative reform (Kramer and King 2006; Margetts 2009). What, then, is new with this idea of a data-driven public sector?

The idea of data-driven public administration builds upon but goes far beyond current ubiquitous processes, such as digitalisation, e-government and evidence-based policy-making. It consists of two interwoven processes: the use of more and different data and more advanced methods to analyse this data (artificial intelligence [AI], machine learning, etc.) to feed it back into existing work processes. The calculative systems and techniques to process information have become ever faster, more comprehensive and more autonomous in recent years (Beer 2017). ICT once utilised for data entry are now capable of cognitive and analytical tasks, bringing with them the potential to automate many aspects of public sector work, such as policing, nursing and teaching (Bullock 2019; Busch and Henriksen 2018). They are moving from rule-based systems to finding patterns in data, allowing for automated decision-making and providing decision support tools. Knowing, data-driven and predictive technologies are part of a shift towards automated, anticipatory, and algorithmic forms of governance (Williamson 2014). This leads to profound changes to the way in which the public administration learns about, engages with and responds to citizens (Redden 2018; Hintz, Dencik, Wahl-Jorgensen 2019).

Data-driven public administration, nationally and internationally, promises endless opportunities, the rhetoric reflecting what Elish and Boyd (2018) describe as boundless, seasoned with a sort of magic. It provides the sector with a sense of being able to do more, better, faster and more cheaply through automation or augmentation and is perceived as a solution to respond to the growing complexity of society (Klievink et al. 2017; Maciejewski 2016). Examples of use areas include more personalised and context-based welfare (to ensure that state benefits go to the most vulnerable families) and autonomous vehicles to revolutionise public transport. Disease can be more accurately diagnosed and treated; control and fraud detection can be greatly improved; children most likely to be at risk from abuse can be identified and followed up upon; faster and richer images of evolving reality can be provided, allowing for natural disasters to be better predicted and managed; terrorist attacks can be prevented and traffic congestion relieved (Barth and Arnold 1999; Bullock 2019; Klievink et al. 2017; van Ooijen, Ubaldi and Welby 2019).

However, experience to date with data-driven technology in the public sector is peppered with examples in which this technology has had significant unforeseen and unwelcome consequences. Some examples here are errors in cancer screening in the UK (Andrews 2019). An automated system for detecting welfare fraud was found to violate human rights in the Netherlands (Henley and Booth 2020). Students taking the International Baccalaureate (Schei 2020) and the Leaving Certificate in Ireland (Lillington 2020) were assigned incorrect grades. Predictive policing in the US resulted in the racial targeting of black neighbourhoods due to biased data, and teachers have been unfairly dismissed and their competence undervalued due to algorithm scoring in schools (O'Neil 2016).

A number of negative, albeit often unintended, consequences have thus already been pointed out by research. These include impenetrable opaqueness, reinforcement of discrimination and the facilitation of surveillance (Alston 2019; boyd and Crawford 2012; Kitchin 2014; Pasquale 2015; van Dijk 2014). Concerns are raised that it is causing a change of power dynamics between state

and citizen, as data-driven public administration increases the ability to understand, predict and control citizens' behaviour (Hintz, Dencik, Wahl-Jorgensen 2019). These issues have, however, received little attention from policymakers, practitioners and public administration scholars alike.

Implementing data-driven public administration

Data-driven public administration is envisaged as an all-encompassing public administration reform, fundamentally changing the way democratic systems engage with and learn about citizens (Redden 2018). It is expected to be integrated into all aspects of public administration, from policy-making to service delivery, from organisational management to innovation (van Ooijen, Ubaldi and Welby 2019). It is not one concrete policy from which to neatly analyse but instead a more general latent trend of data-driven public administration. The increased influence of the imaginary of data-driven public administration must therefore be situated within the wider field of public administration research. Reformers are often over-optimistic, hold unrealistic expectations and fall into the many traps of implementation (Caiden 1999). Data-driven public administration is in the nascent phase of implementation, and it is therefore too early to assess or evaluate this reform; instead, we endeavour to illuminate and explain but not to affect what happens (Caiden and Puniha 2011; Hill and Hupe 2014). We therefore situate this paper within implementation research to expose "what happens between the establishment of policy and its impact in the world of action?" (O'Toole 2000: 266). This paper thus exposes the challenges and reveals the complexity involved by studying how the policy expectations of data-driven public administration are being implemented by practitioners on the ground, thereby embracing both a top-down and bottom-up perspective as advocated by De Leon and De Leon (2002).

The analytical framework focuses on current implementation challenges. We firstly identify the experience of practitioners and how policy is being put into action. We then situate these within the policy context, in order to identify areas of discrepancy and harmony between what has been identified and prioritised at the policy level and what is actually happening. As De Leon (1999: 322) points out, "The main problem with implementation is that the discrepancy between 'something' and 'that idealized thing' is often a matter of rose-coloured expectations". We then proceed to discuss some of the unseen areas that research has pointed to but that neither policymakers nor practitioners have prioritised.

A number of practical challenges in the implementation of data-driven public administration have already been identified by scholars. These involve issues at the system, organisational and individual levels (Pencheva, Esteve and Mikhaylov 2018). The challenges are therefore not limited to technical issues but also include ethics, processes, analytics and organisational and institutional change (Mergel, Rethemeyer and Isett 2016). Issues addressed in earlier research include uncertainty tied to fairness, accountability and discretion (Veale, Van Kleek and Binns, 2018); unrealistic expectations towards AI and a lack of interdisciplinary talent (Sun and Medaglia 2019); hidden costs produced by data-driven technology (Hagendorf and Wenzel 2019); and unanswered questions around ethics and democratic governance (Mergel, Rethemeyer and Isett 2016).

Fredriksson et al.'s (2017) literature review on big data in the public sector identified three main challenges in data application, namely, the management of data, ensuring data quality and ethical and privacy concerns tied to the use and sharing of data. Redden's (2018) case study on the Canadian public sector employed a counter-mapping approach consisting of freedom of information requests, semi-structured interviews and document analysis to map issues raised by public administration in its work towards data-driven public administration. She identifies a variety of practical challenges, such as the technical infrastructure, access to data, privacy and security, skills gaps, organisational culture and data quality and accuracy. These challenges provided a foundation for the mapping of the Norwegian public sector. Practitioners and policymakers are often unaware of the full range of practices and related challenges (Wirtz, Weyerer and Geyer 2019). Studying this early phase of implementation provides many entry points for further research and a basis for public administration scholars, who are currently underrepresented, to engage in this field. As Barth and Arnold (1999: 349) find,

> *"the real danger of [data-driven technology] in government is represented by researchers who are divorced from the world of public administration scholars and practitioners who are engaged in discussions and making technological decisions, without understanding the implications for governance of the administrative state."*

Civil servants and policymakers who are embarking on the data-driven journey can also gain valuable insights for their context and can be inspired to look more deeply into how the problem may be framed going forward. As implementation is highly context dependent, it is, however, important to point out some distinctive characteristics of the Norwegian data context in order to provide a foundation to assess the relevance of our findings for other jurisdictions.

The Norwegian public sector data context

Recognition of the value of data as a resource for the entire public sector is not new in Norway or in the Nordics. The sector is characterised by a long tradition of systematic data collection. At a time when many other jurisdictions shied away from data collection, Norway and the Nordic region embraced it, deeming it necessary for the establishment and good functioning of the welfare state. A personal identification code unique identifier system, established in 1961, assigns everyone a number either at birth or upon immigration. Originally incorporated into the National Population Register, it is now used extensively in hundreds of registers, such as those of education, employment, health, tax, social welfare and crime to name but a few. These registers operate under a legal mandate, with organisations assigned the responsibility of managing them, resulting in a high level of quality (Tupasela, Snell and Tarkkala 2020). With few exceptions, such as the common contact register, citizens are not permitted to opt out, given the registers' central role in the functioning of the state. It is therefore impossible to avoid leaving traces in administrative registers (Hovde Lyngstad and Skardhamar 2011), thereby allowing for a continually growing

data archive of the entire population. The use of data from these personal registers is currently strictly regulated, and the data is siloed.

Data collection extends beyond individuals to many other aspects of the economy and society, such as an extensive company register, a road and traffic database and the ordnance survey. National archive data stretching back for centuries is currently being digitalised, and, due to many years of digital public service delivery, there are vast amounts of behavioural data stored by the public sector, which is commonly termed "data exhaust".

The Norwegian public sector is particularly sectoral and somewhat fragmented. It comprises 70 executive agencies, 16 national ministries and 358 municipalities. There is a high degree of autonomy, with strict boundaries at the organisational, sectoral and municipal levels, and decision-making is largely consensual. It is also highly digitised and experiences high levels of trust from citizens (OECD 2017).

There have been a number of initiatives to improve data coordination, evidenced by many documents stretching as far back as 1988 (NOU 1988:40). These had limited tangible success. There is now, however, a palpable sense of urgency amongst practitioners, politicians and policymakers alike, who are salivating at the prospect of breaking down the data siloes and tapping into this treasure trove of data for secondary uses.

Methodology

This study employs a practice approach, focusing not only on the practitioners engaged on a quest to produce data-driven practices but also on the institutions and policies guiding these approaches (Dencik 2019). To be able to answer the overall research question of what kind of challenges are encountered and problematised by practitioners and policy, we advocate for a multi-method approach. Data-driven public administration is still a contested concept within public administration and, therefore, challenging to operationalise. In order to be able to obtain concrete examples of and challenges to data-driven administrative reform, we chose to tie this to the development and implementation of AI and data science in a survey and interviews, as these concepts are well known to our informants.

This study was conducted in 2019, a time when interest in AI adoption and data-driven public administration by the Norwegian public sector blossomed, catalysed by the initiation of work on a national AI strategy. The initial aim was to obtain a general understanding of how diverse entities engage in new data practices and the challenges that practitioners meet. This resulted in a practical report on the challenges of AI and data science, which is available online[1]. The empirical account given in this paper is thus based on an in-depth secondary analysis of the data material, which consists of a survey answered by practitioners (n=35) in 26 public organisations, follow-up interviews with 12 of the entities and a document analysis of relevant policy documentation (See Appendices A and B for the survey template and interview guide.) It is thus a two-phase explanatory research design (Creswell and Clark 2011). The practitioners who provided input to this study are system-level designers, not street-level bureaucrats, as most data-driven efforts can be observed at this level.

The survey aimed to map the status in the sector and provide the project with descriptive statistics, asking what projects were being initiated, what the data-driven practices were intended to be used for and which challenges the practitioners perceived as important to act upon. The participants were recruited from the Norwegian public sector AI forum, a meeting place for practitioners engaged in data-driven practices. This forum had 46 member organisations at the time, all of which were invited to participate. The response rate was 56%. The forum comprises agencies that are either planning data-driven practices or have already deployed them. The sample, therefore, consciously consists of already quite digitally advanced entities within the Norwegian public sector. This, of course, could indicate that the organisations may have already overcome some obstacles. Seventy-three percent of the responding organisations had fewer than 500 employees in total. The sample is small in size, unfit for quantitative analysis beyond a descriptive overview. Several practitioners reported that they responded to the survey in groups of two to three in order to discuss their responses with colleagues. The participants were guaranteed anonymity to encourage openness. Leadership was not included. The main question of the survey consisted of 13 general challenges when working with data-driven public administration; these were inspired by challenges identified in earlier research. The practitioners were asked to rate each challenge on a Likert scale from 1, "no challenge at all", to 5, "a very big challenge". The study was not limited to these, as 73% of the respondents either elaborated upon or reported other challenges in the free text field provided. The survey answers varied significantly and provided a unique composition of experiences and challenges for each of the public entities.

In the survey, invitations were offered for a follow-up interview. Forty-six percent of the organisations accepted; 33.3% of these had more than 500 employees and can therefore be categorised as large public entities in the Norwegian context. The interviews served to contextualise and advance our understanding of the practitioners' experiences and were conducted approximately three months after the survey. The interviews were conducted in a semi-structured manner with either individuals or small groups. How many participated in the actual interview was left to their discretion. The interviews lasted between 60 and 90 minutes. They were recorded, transcribed and anonymised.

This project has not interviewed or surveyed policymakers. Instead, the public sector digitalisation strategy (Kommunal-og moderniseringsdepartementet 2019) and the concept phase analysis (Difi 2018) were analysed as key policy documents, as these are regarded as the main guiding documents by practitioners due to their relevance for the public sector and their topicality. We identified issues as "Highly prioritised by policymakers" both by looking at the number of times these issues were mentioned in policy documents and by considering the emphasis that was placed on the issues, both discursively and through asking for concrete actions in the policy documents.

Whilst the survey provided the project with a general overview of efforts and challenges, the follow-up interviews further contextualised these and linked these challenges within the practitioner's discourse and experience. The

interviews were analysed inductively according to meaning, and the interviewees were thus treated as respondents. The policy analysis then allowed us to identify how the expectations at the policy level were being implemented on the ground by focusing on the conceptualisation and prioritisation in our discourse analysis of the documents. Combining the practitioner and policy perspectives also provided us with an overview of unseen issues at both levels. Together, the survey, interviews and policy provided this research project with a unique insight into the inner workings of the implementation of data-driven public administration at the system, organisational and individual levels (Pencheva, Esteve and Mikhaylov 2018).

Towards a data-driven public sector

The results of the analysis show that the approaches, status and perceived challenges to the realisation of data-driven public administration differ significantly amongst practitioners, reflecting the fragmented nature of public administration more generally.

Data-driven public administration is regarded as central across the sector, capable of transforming all aspects of public administration. It is regarded as the inevitable future. As one interviewee stated,

> *"We think about automation, we think about efficiency, we think about getting rid of all routine tasks, which we do not need to do. Let's get a machine to do it." (Interview 7, small public entity)*

The sector is, however, very much in the nascent phase. There are few data-driven technologies in production, with most still in the planning or piloting phase. Just four out of the 26 organisations had systems in production. Control and risk assessment in case work, the automation of routine work and the potential for new predictive services are the predominant use areas being considered. Opportunities for predicting citizen and organisational needs were particularly highlighted. Decision-support tools and fraud control are the most common areas of application. Most of the organisations are working towards the integration of data into service delivery and organisational management rather than towards its contributing to policy planning in this early phase.

The participants regarded the main aim of a data-driven public administration to make the sector more effective, which translated to resource allocation and an improved response to user needs. There appears to be a consensus that most aspects of public administration can be standardised and data-driven and that data-driven public administration is not a substitute for but, instead, a supplement to traditional case work. Most do not consider AI and data science as goals in themselves but rather as necessary tools for realising the bigger idea of data-driven public administration. Several participants seem highly influenced by the private sector, referencing conferences and industry reports as their source of inspiration.

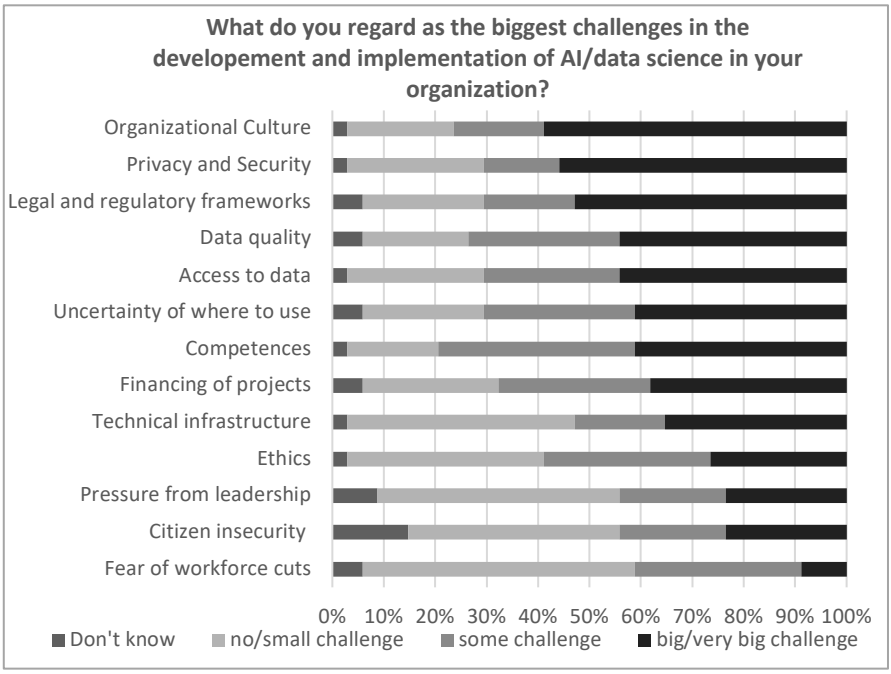
There is concern that there is a lack of appreciation at both the policy and organisational level around the level of investment necessary to realise data-driven public administration. Many struggle to sufficiently finance their efforts.

Initiatives change work processes; resources are therefore necessary to incorporate these into the organisation. The public sector is predominantly project oriented, but data-driven public administration is a process that does not fit neatly into short-term project thinking. This is a common challenge in policy implementation in the Norwegian context and far from unique to data-driven public administration (Dille and Söderlund 2013). Often, small projects are initiated and evaluated but halted when they need scaling up, which is a contributory factor in many projects' continuing to be in a pilot phase. Despite the excitement at the policy and leadership level, the reality is that the goals of data-driven projects are often unclear and unpredictable and therefore incompatible with current performance management regimes. Many struggle to understand how they can and should apply data-driven public administration and lack a clear understanding of what it actually means in practice, questioning whether their organisation is actually mature enough to adopt it. Aligning reality to expectations is difficult.

Perceived challenges to act upon

Data-driven practices introduce both challenges and opportunities to public administration. An overview of perceived implementation challenges, ranging from the most to least important as perceived by practitioners in their survey responses, can be found in Figure 1. The primary concern was organisational culture, followed closely by privacy and security and regulatory challenges. The interviews revealed that each of the identified challenges includes a subset of issues and that interpretation varies widely. In addition, the perceived importance differs across entities.

Figure 1. Mapping of perceived challenges to act upon



This section groups and discusses the perceived implementation challenges and prioritisations at both the practitioner and policy levels. We examine where practitioners and policymakers are aligned, where they diverge and where issues are rarely mentioned in the discourse. We begin with "Infrastructure, Access and Quality", which are highly prioritised at the policy level but less so at the practitioner level. We then take "Law, Privacy and Security", where the parties are aligned, before proceeding to discuss "Organisation, Internal Culture and Competence", which practitioners are particularly concerned with. Finally, we look at what we term the "unseen": issues that are rarely discussed but are of concern to researchers in the field.

Infrastructure, access, and quality: the policy darlings

National policy is increasingly focused on the potential for a data-driven public sector. The sharing of public sector data and investment in infrastructure are deemed central to the achievement of this goal, the expectation being that releasing this "raw material" will automatically realise transformation. It will usher in a more efficient administration, make citizens' and businesses' lives easier and simultaneously increase value creation in the private sector (Kommunal-og moderniseringsdepartementet 2019). Current actions and plans profess that a legal and technical infrastructure facilitating the sharing of high-quality data will transform Norway into a data-driven leader.

Data-driven public administration is predominantly perceived by policymakers as a technical issue, requiring technical infrastructure to provide access to high volumes of good quality data. This manifests itself in the prioritisation of the material aspect of the task, such as the purchasing of cloud solutions and building national data and API catalogues and data lakes. Our findings show that access to data and technical infrastructure are, however, considered less important by practitioners than the current policy assertions and general discourse would lead one to expect. It would be remiss to assert that it is not an issue, as instead it is one of a myriad of challenges that organisations face. Practitioners often actually uttered a sigh of "enough data already", as it is not necessarily the technical solutions and availability of data that are hindering their progress. The sheer existence of data and an infrastructure to access it thus does not magically enable a transformation of practices.

Data quality is also highly prioritised at the policy level, based on the assertion that bad data produces bad results. As is the case with data access, quality is an issue amongst practitioners, but it does not reflect the dominant position that it enjoys at the policy level. Again, this is not to assert that it is unimportant but instead that, when using data for data science purposes, many other factors also need to be considered that go beyond quality. These issues include but are not limited to contextualisation, data bias, suitability for secondary purposes and downstream issues (Veale, Van Kleek and Binns 2018). Data can be technically correct with high quality yet still be problematic. These challenges are complex and interdependent. The interviewees were equally concerned with these issues as with the actual quality of the data.

The emphasis on access, infrastructure and quality being the fundamental requirements to realise the holy grail of data-driven government seems to be oversimplified and reflects a deterministic view of the issue. Our findings show

that there is a discrepancy between policymakers and practitioners here. Data-driven public administration is far more than a technical issue. As the complexity of the task is discussed in the following sections, it becomes apparent that many of the other issues are less tangible, less measurable and cannot be as easily communicated as investment in a technical infrastructure, in which the number of data sets shared can be counted and individual organisations' "progress" can be measured.

Law, privacy and security: the bothersome -where policy and practitioners align

Practitioners and policymakers alike are particularly concerned with legal and privacy and security issues. Both scored high in survey responses and were much discussed in interviews. Data-driven practices are considered to be inhibited by current law; many respondents indicated that getting permission to access much of the register data for secondary purposes is particularly challenging. The current legal regime is perceived to be outdated and not fit for purpose to realise data-driven reform. Several entities are taking action to create more general legal mandates to allow for greater public sector data sharing and use. One interviewee even suggested that the prospect of establishing the public sector as one entity under GDPR, to enable free sharing of personal data, is being openly discussed within the public sector legal community. There is the utmost respect given to the notion that access must be balanced to protect privacy and security. Many struggle to design adequate privacy impact assessments for their work and argue that there are insufficient guidelines that consider how data should flow within and between organisations. They request assistance on issues such as the anonymisation and synthesisation of data, and many mentioned the need for regulatory safe spaces to experiment and gain experience with advanced technologies, highlighting that such "regulatory sandboxes" could form the basis for intersectoral cooperation.

Legal issues were also set within the interpretation context, framed around the individual behaviour of internal lawyers. Those taking a broad interpretation that allows for leeway in the law for the use of data were predominantly considered as progressive, and those who were stricter were described as conservative and as hampering progress. This distinction was particularly apparent and frustrating for the less-experienced organisations. The more experienced seem to have a mutual respect and cooperation with their lawyers. Regardless, the absence of common, streamlined interpretations of the law contributes to unpredictability across the sector. The general lack of competence amongst lawyers to understand the technical capabilities of how data-driven practices work was also identified as a weakness by all.

These findings echo those at the policy level. The digitalisation strategy calls for clear and digitalisation-friendly regulation and for a resource support centre to increase the sharing of data (Kommunal- og moderniseringsdepartementet 2019). This alignment is driven primarily from the perspective of data sharing and the protection of personal data. However, many other fundamental issues relevant to regulation and many classic dilemmas for the public sector come into play when embarking on data-driven practices. Examples include the public sector definition of fairness and explainability, bias, transparency,

accountability, discretion and broader challenges in the safeguarding of basic values in the Norwegian model, such as universality and the protection of vulnerable groups. Whilst these are not completely missing from the discourse, it is fair to say that a deep consideration of these issues in the legal and regulatory context is lacking.

Organisation, internal culture and competence: practitioner obsessions

Organisation, internal culture and competence are major issues for practitioners. Organisational culture itself encompassed a variety of ideas, with many respondents deeming that the realisation of data-driven public administration is hampered by internal resistance to change. Many references were made to age profiles, with older members of staff considered reluctant to embrace data-driven public administration and resistance attributed to a traditional mindset amongst both domain experts and leadership. One interviewee described it as follows.

> *"Organisational culture is still a challenge. I see it as a huge challenge. That's because we have less time than natural retirement will help us with, so we have to make changes. In fact, we must initiate great change in the entire organisation." (Interview 5, small public entity)*

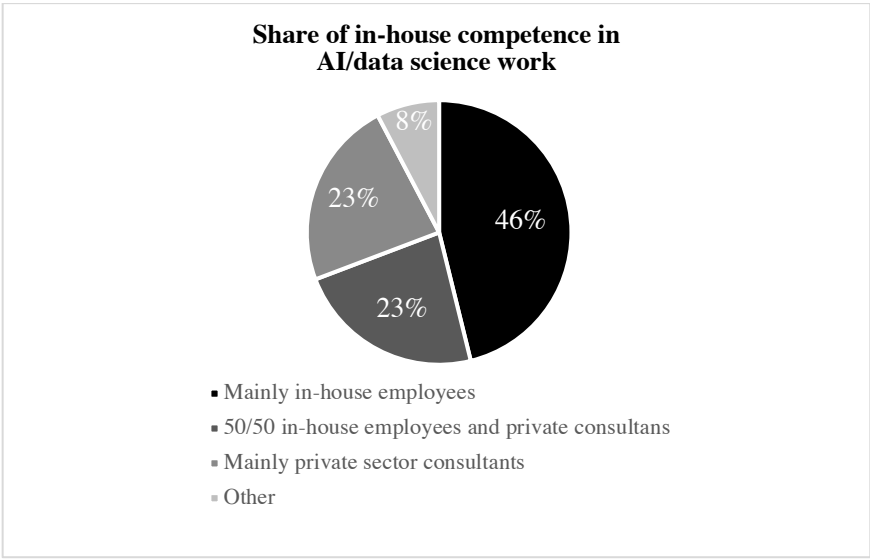
This was also observed in the Canadian case, where Redden (2018) expressed concern that the designation of internal reluctance as a "culture clash" is lamentable, as it may silence legitimate concerns. What also might be missed here is that it is easier to assign blame for slow progress on reluctant bureaucrats than to acknowledge the complexity of the process.

Each organisation asserted the necessity for multi-disciplinary cooperation, with all noting the significance of involving domain knowledge, in addition to data science and IT competence, from the outset. However, there is a spectrum here. The more experienced the organisation, the greater the emphasis on involving domain experts seemed to be. Bringing this multi-disciplinary cooperation from an assertion to a reality is fraught with difficulty. Many attributed this to different perspectives, the absence of a common understanding and lack of internal experience with multi-disciplinary cooperation. A further observation is that "multi-disciplinary" translated to involving technical, legal and domain knowledge competencies. Few advocated for the need for public administration and social science competencies, which Mergel, Rethemeyer and Isett (2016) point out is necessary, given their substantive depth on research methods and theory and the understanding of potential unintended consequences.

Many practitioners, whilst agreeing on the importance of data science competence, also expressed concern regarding the need for data competence within leadership, legal and domain knowledge experts. This echoes Veale, Van Kleek and Binns's (2018) observation that a lack of knowledge amongst those vertically accountable for service delivery hampers progress. Many expressed the view that ownership of and responsibility for the identification of opportunities should lie with the business side; however, the lack of competence on the potential of the technology is a hindrance. "No one really sees a need for this" was mentioned by several participants. A considerable amount of time is therefore spent in some of the more advanced organisations to increase the

technical expertise of domain knowledge professionals, and this is viewed as a critical success factor.

Figure 2. Competence profiles in AI/data science production and implementation



A key concern in much of the current research is fear of the influence that the private sector will have on public services, due in part to a lack of competence in the sector, a perceived inability to attract in-house competence in a pressed employment market and the political prioritisation to outsource (boyd and Crawford 2012; Brauneis and Goodman 2018; Redden 2018). The situation on the ground, however, is not as clear cut as current research suggests. Survey responses show that only 30% of the entities mainly use private sector consultants (see Figure 2). All the interviewees pointed to the importance of in-house expertise in the development, ordering and implementation of data-driven practices. Despite political prioritisation to outsource, experienced practitioners are reluctant to use private consultants for the entire process. The justification here was threefold. Firstly, they see a lack of understanding of the public sector and the type of data and responsibility involved. Secondly, data science is a long-term issue requiring regular development and maintenance. Thirdly the public sector needs to understand and control what is being done and cannot simply outsource this. A hybrid solution, if possible, seems to be preferred. The general assumption that the public sector finds it difficult to attract data science expertise is also nuanced. Whilst there is some truth in this, it was not experienced across the board. For many technologists, the public sector is an attractive "workplace with meaning", and many of our informants (and particularly those from the larger and more advanced organisations) are inundated with applicants to positions. Smaller organisations, by contrast, are struggling to recruit. This suggests that they may be forced to utilise the private sector for the entire data-driven process and risk that the private sector may shape public sector actions.

In addition, as Andrews (2019) points out, data-driven practices are often framed around leadership attitudes. Our discussions identified three distinct groupings of leader perspectives: some experience prioritisation difficulties, as leaders fail to see value; others encounter unrealistically high expectations; in the third grouping, leaders see recent data-driven capabilities as simply a new form of digital technology to be incorporated into the organisation rather than as a fundamental change in direction needing specific leadership prioritisation—an evolution rather than a revolution. This latter category was particularly apparent in the organisations that have considered themselves data driven for many years. Another observation is a lack of clear distribution of roles, responsibilities and authority. Many see a need to restructure their organisation, with the responsible unit often randomly placed. It can, for example, be found in the IT, statistics or analysis department.

All expressed the importance of the public sector AI forum, which was established by practitioners and which specifically does not permit membership from the private sector. This is an area for exchange of competence and is seen as a safe and open environment in which to learn from both success and failure.

Discussion: The unseen

The analysis identified many challenges encountered in the implementation of data-driven public administration. The policy level places significant emphasis on data and infrastructures, whereas practitioners are more concerned with organisational and competence issues. Both levels regard legal frameworks as a major hindrance. Discussing unseen issues in government discourse is important in order to broaden the perspective (Redden 2018). We observed that several of the potential negative implications and risks identified by scholarship were rarely considered at either level. These challenges are often more value laden and less practical, and procedural, making them more difficult to grasp for public sector actors. Nevertheless, highlighting the unseen and connecting it to the practical issues highlighted above adds to a procedural and critical understanding.

The potential for changing power dynamics between citizen and state as well as the insecurity over citizens' growing concern regarding the use of data-driven practices—as risks that could weaken trust (Redden 2018) - were rarely addressed. There is consensus at all levels that work be conducted in such a way that the high levels of trust that the sector enjoys should not be diluted. However, trust was often equated to privacy and legal issues. The perception seems to be that, when privacy is protected and current regulations adhered to, there is little concern. The practitioners were well intentioned, with many stating that they were "using technology for the good of society", but this is a normative assessment without concrete content and guidelines, and effectiveness was clearly a dominant variable. A data-driven meeting with the public sector requires large data flows between public entities in which the citizen becomes more visible, even if data is managed and shared responsibly (Hintz et al. 2018). One interviewee was particularly concerned with how far the public sector should go here, stating, "Society needs to agree with itself about what it wants here", to which a colleague responded, "Yes, but this is above our heads". There

is little evidence that policy addresses any issues of changing power dynamics. We cannot ascertain from the material whether the silence on the policy level is a conscious decision or these potential consequences have simply not been considered.

The Norwegian public sector operates on the basis that innovation happens at the sectoral and organisational level (Difi 2018). In the data-driven context, this translates to central initiatives around the facilitation of data sharing, but data usage remains the responsibility of the local level. Our findings show that, with the exception of the AI forum, activities are indeed happening locally, with no central coordination. There is currently no way of knowing what data-driven projects are being planned or, indeed, in production, which, as Brauneis and Goodman (2018) write, is a major transparency concern. That data-driven practices may have unintended societal consequences was recognised but not problematised by most practitioners. This is due largely to the fact that their individual projects may indeed be innocuous and have minimal societal impact; when combined, however, "small" and fragmented initiatives may actually have a real impact on the state-citizen relationship. The majority of current projects are based on control. Each of these can be justified from an organisational perspective, but, when taken on a national level, the question needs to be asked of whether this is moving in the direction of better services to citizens, as envisioned, or could signify a shift towards more state control.

A data-driven public administration brings to the fore many of the classic questions of public administration that are tied to equity, accountability, political legitimacy and what it means to be a professional public administrator, challenging them in fundamental ways (Barth and Arnold 1999; Bullock 2019; Veale, Van Kleek and Binns 2018). There is no evidence in the data material that they are being seriously considered by any stakeholders. For example, questions of human agency in decision-making (Lipsky 1980) were rarely mentioned, although most projects are expected to replace (parts) of discretional decision-making. Again, data-driven public administration is seen mainly as a technical or organisational issue hindered by existing legal frameworks. Many decisions around the implementation of data-driven public administration are delegated to data scientists, information management specialists and architects, who do not have the expertise to understand the potential implications for governance of the administrative state (Barth and Arnold 2019). Coupled with this, the neutral language of technology in which data-driven public administration is framed often facilitates designers' neglecting the processes of democracy and accountability (Veale, Van Kleek and Binns 2018).

The discursive context of data-driven public administration is significantly shaped by corporate technology companies (Andrews 2019). Although most public sector entities in Norway encourage the in-housing of competence, the growing reliance on private sector infrastructure, such as Microsoft Azure and Amazon web services, is an unproblematised issue in the discourse. Data-driven public administration might further intertwine the public and business spheres and give the private sector increasing control over public sector infrastructure and data (Redden 2018). This is further compounded by our observation that citizens are barely included in processes at either the policy or the practitioner level. The discourse is reserved for politicians, private and public sector

'experts' and officials, despite research finding the immense importance of popular support in administrative reform (Caiden 1999). There is a widespread impression that the Norwegian population has high levels of digital literacy and is therefore able to grasp, use and assess data-driven tools. Digital competence measures, however, do not measure data literacy, as only the use, knowledge and command of digital services is measured (Kompetanse Norge 2018). The general competence related to data-driven technology in the population is low, which makes it difficult to initiate public discussion, allowing greater room for influence by corporate interests.

Few practitioners regarded ethics as a major challenge to act upon. This result was somewhat surprising given the popularity of ethics in this domain. As with other aspects of this analysis, a nuanced picture emerged. When challenged, many had just started working and had not yet encountered any ethical dilemmas, which often surface further down the road of development and implementation (Veale, Van Kleek and Binns 2018). While public sector entities with sensitive data (such as health data) view ethics as a major challenge, those with more technical or non-sensitive data see this as little or no challenge. Again, practitioners seem to believe that, once privacy and legislation are respected, the solution is automatically ethical. The current framing of the problem around personal data and privacy leaves little room for consideration of the potential impact of nonpersonal, synthesised and anonymised data. This type of data operates outside the scope of data protection law (Andrew and Baker 2019) and is largely considered benign. However, there is a growing body of research pointing to the concern that this data can still have a major societal impact. Anonymised and aggregated data can still be sensitive and political (Kitchin 2014), and, even when anonymised, behavioural data can have immense power to influence and discriminate (Zuboff 2019). The fact that many governments participate in the sharing and utilisation of this type of data (Andrew and Baker 2019), to which Norway is no exception, suggests the need to incorporate this perspective into the discourse.

Most administrative reforms fail, as reformers are often too optimistic and unrealistic, falling into the many traps of implementation (Caiden 1999). Our findings at the practitioner level echo those of Hagendorff and Wezel (2019), who point out that, although data-driven technologies draw on a mythical character, they still require a significant amount of hands-on work and produce a variety of hidden costs. The challenges of implementation presented in this paper are interwoven and mutually dependent. Acting upon one challenge will not solve all the others; in fact, it might elicit other, unforeseen consequences. However, the public sector and policy discourse are often concerned with challenges in isolation rather than with interdependent issues to consider. These findings therefore challenge the often-deterministic check box approach as embraced by policymakers, industry and practitioners. Data-driven practices are nonlinear and ambiguous, administrative reform a dynamic process. As the installed base of public administration is fragmented and varies highly within the sector, this indicates that there is no one-size-fits-all solution to the challenges that public entities face. The sector's work itself is both enabled and limited by the bottom line of creating public value and public mandates. One might argue that these challenges are unseen because their implications are not immediately

visible, particularly when social scientists, public administration scholars and citizens are not involved.

Conclusion

This paper asks the overall research question of what challenges are encountered and problematised in a nascent phase of data-driven public administration implementation. Studying the practical experience of implementing administrative reform and grasping the challenges of contemporary government provide practitioners, researchers and policymakers with "real-world" experience of the grand idea of data-driven public administration and help to root discussions about the "what", "how" and "where to" within the setting of public administration. There is a distinct lack of research in this area. It is crucial to increase this in order to maintain integrity in what is a paradigm shift for public administration and to expand research beyond the UK and US contexts. By laying bare the complexity involved in data-driven public administration implementation, we endeavour to whet the appetite of public administration scholars to engage more deeply and to provide insights for policymakers and public servants alike, which heretofore may not have been visible.

Keeping track of the ongoing data-driven transformation of society, determining its potential social implications and finding appropriate social and legal responses prove to be challenging (Kitchin 2014). This paper adopts a practice approach to the phenomenon, focusing on both the institutions and practitioners currently working on its realisation in the Norwegian context. Highlighting the challenges requiring action as identified by practitioners, we contextualise the experience of public sector actors within policy and research in the field. We discuss unseen issues that are simply either not on the radar or considered inconsequential. Setting this ambiguity tied to data-driven practices within the broader policy and research context draws a complex picture of technical, organisational, regulatory and cultural issues, which bears much resemblance to earlier research on administrative reform. What we can observe is that, when embarking on their journey to deploy these technologies to access and utilise the "goldmine" of data, deterministic views and hype tied to data-driven practices at the policy level often fall apart when applied to political, noisy, stressful, complex and contested deployment settings, such as public administration (Veale, Van Kleek and Binns 2018).

Understanding the interplay of both seen and unseen challenges and the practical experiences of public sector practitioners can contribute to a broader understanding of the phenomenon. A holistic approach at a political, administrative and societal level will help to frame the discussion and broaden the perspective beyond the current focus. The empirical account given here does, though, also have theoretical implications for the field of public administration reform. The limitations of this study include its small sample size (due to few organisations having embarked on the data-driven journey), and it does not follow the cross-implementation process over time. Implementation is highly context dependent, as shown in this analysis; the findings therefore cannot be generalised for all public sector reforms; however, they provide an interesting starting point for further research. The unseen issues as discussed in this paper

and the contested concept of the data-driven public sector are particularly ripe for further research. It is beyond the scope of this paper to evaluate success or failure; what is clear, however, is that implementation approaches currently struggle to understand and appreciate the complexity of the challenge. Implementation is a long, arduous and uncertain process (DeLeon 1999); however, given that this is still in the nascent phase, there is time to adjust the course.

Acknowledgements

The authors would like to thank Alice Elizabeth Dalsjø for her research assistance transcribing interviews and sorting literature. In addition, we would like to thank Petter Almklov, Endre Grøtnes, Arild Jansen, Malcom Langford, Emil Røyrvik, Dag Wiese Schartum and Martin Standley for reading and commenting on earlier drafts of the article. We would also like to thank the Norwegian AI forum for their assistance distributing the survey.

Conflict of Interest

No conflict of interest has been declared by the authors.

Funding

The research presented in this paper was partly funded by the Norwegian University of Science and Technology´s (NTNU) digital transformation initiative project "Digital infrastructures and citizen empowerment" (DICE) and the Norwegian Research council's public administration PhD program.

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Appendix A: Survey template

1. In which organisation are you employed? [Free text question]

2. What job code/title do you have? [Free text question]

3. In your opinion, how data-driven is your organisation in relation to other actors in the public sector? Please answer this on a scale of 1 to 10, with 10 being very data driven and 1 being minimally data driven. [Likert scale]

4. In your opinion, how highly prioritised is AI/data science in your organisation? Please answer this on a scale of 1 to 10, with 10 being highly prioritised and 1 being not prioritised. [Likert scale]

5. How is the work with AI/data science organised within your organisation? Here, examples of answers are (not exhaustive): the IT department; the statistics/analysis department; integrated across the organisation. [Free text question]

6. Who are the main AI model developers for your organisation? [Drop-down list]

- *a. Mainly in-house staff*
- *b. Approximately 50/50 consultants and staff*
- *c. Mainly hired consultants*
- *d. Other*

7. How far has your organisation progressed in the work with AI/data science? [Drop-down list]

- *a. Starting to think about using it*
- *b. Planning phase*
- *c. Start-up phase*
- *d. Testing*
- *e. Production*
- *f. Operation/management*

8. Follow up to 7: (a) What are you considering using AI/data science for? [Free text question]; (b) What are you planning to use AI/data science for? [Free text question]; (c) What is AI/data science used for in your organisation? [Free text question]

9. Below are a number of potential reasons for using AI/data science. Please rank them from most important (highest) to least important (bottom). [Ranking]

- *a. More efficient decision-making processes*
- *b. Better quality and timeliness in decisions*
- *c. More precise predictions*

d. Increased user orientation
e. Increased innovation and business development
f. Increased employee satisfaction
g. Reduced costs

10. Below are a number of potential challenges around the adoption of AI in the public sector. Please rate how large the challenge is for your organisation on a scale from 1 to 5, with 1 being no challenge and 5 being a very large challenge. [Likert scale]

a. Technical infrastructure
b. Ethics
c. Organisational culture
d. Access to data
e. Data quality
f. Privacy and security
g. Analytics competence
h. Legal and regulatory framework
i. Citizens' insecurity and willingness to accept AI/data use
j. Uncertainty around what AI could be used for in the organisation
k. Lack of funding
l. Pressure from management to deliver
m. Fear of downsizing in the organisation

11. Are there other challenges when using AI/data science in your organisation? [Free text question]

12. Do you have a project/activity in the AI/data science area that you would like to tell us about so that we can share it with others? Please give a short description of the project/activity. [Free text question]

13. Would you or anyone else in your organisation be willing to be interviewed by us? We are looking for insights into what the public sector needs in the AI/data science field. [Yes/No]

a. Contact information [Free text question]

14. Do you have anything else you would like to add or comments on this questionnaire? [Free text question]

Appendix B: Interview guide

The guide followed a general approach, with a number of common questions posed to each interviewee based on the survey questions, which are found below. An individual guide was, however, prepared for each organisation, adapted to the responses that were made in the survey. Here, we made comments on interesting issues to follow up with the interviewee(s). We presented the responses to the interviewees and encouraged them to elaborate and explain their justifications for the responses.

Questions

1. What is your name and job title, and what are you working with in your organisation?

2. In your opinion, how data-driven is your organisation in relation to other actors in the public sector?

a. Why did you position your organisation here?

b. What does it mean to your organisation to become data driven?

3. In your opinion, how highly prioritised is AI/data science in your organisation?

4. How is the work with AI/data science organised within your organisation?

a. Why is the work organised this way?

5. Who are the main AI model developers for your organisation?

a. Why did the organisation choose to place the responsibility here?

6. How far has your organisation progressed in the work with AI/data science?

a. What are you currently planning to use this technology for, or what is it already used for?

b. Do you have a project/activity in the AI/data science area that you would like to tell us about?

7. In the survey, you ranked potential reasons for using AI/data science in your organisation. Can you elaborate on this ranking?

a. Are there any other reasons that you would like to add?

8. Graph: Here we presented the interviewee(s) with the graph of their results measured against the average of the AI forum and encouraged them to discuss each of the challenges and justifications as to their ranking. They were asked to elaborate on each of the challenges.

a. Are there other challenges when using AI/data science in your organisation?

b. Would you like to discuss challenges in a specific project?

9. Is there anything else you want to discuss or bring up?

Notes

1. https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/2634733