

A Survey on Perceptions of Data Sharing in the Norwegian Public Sector

Leif Z. Knutsen¹[0000-0002-7830-3517], Bertha Ngereja¹[0000-0002-6842-1827], Ingebjørg Flaata Bjaaland¹[0009-0007-0590-1165], Jo E. Hannay¹[0000-0002-8657-7593], and Sinan S. Tanilkan²[0000-0003-4216-5172]

¹ Simula Metropolitan Center for Digital Engineering, Pb. 4 St. Olavs plass, 0130 Oslo, Norway

² Norwegian Computing Center, Pb. 114 Blindern, 0314 Oslo, Norway

{leif,bertha,ingebjorg,johannay}@simula.no, sinan@nr.no

Abstract. Sharing data among public institutions is essential for reaping the benefits of data-driven capabilities. Literature to date has identified several types of benefits that are likely to accrue to a wide range of sectors, as well as challenges and obstacles to implementing data-sharing solutions. We sought to identify perceptions of possible benefits, likely challenges, and the likelihood of overcoming them in the Norwegian public sector. Our survey of IT practitioners interested in the subject suggests that optimism about data sharing is high, concerns about a wide range of challenges are also high, and confidence in public institutions is tenuous. Responses also suggest that divisional management may be critical in implementing data sharing solutions. The pattern of responses suggests uncertainty consistent with low maturity in the field. We posit that data sharing among public institutions is part of a broader set of capabilities needed for public service innovation across institutions.

Keywords: Data Sharing · Public Sector · Survey · Digitalization

1 Introduction

Digital innovation in the public sector depends on the effective and responsible use of data that public institutions collect, use, generate, and share. There is considerable optimism about the potential benefits of data-oriented capabilities. For example, *open data* – making specific data publicly accessible, reliable, and understandable [25] – is associated with better use of data and better services [28]. *Big data* has several connotations [17] but refers broadly to the ability to perform analyses and generate insights from large, often exhaustive datasets. It has been identified as a driver of public-sector innovation [26,43]. Being *data driven* is seen as a strategic capability [32] and as an element for restructuring the public sector [24].

As capabilities in the public sector [35], open and big data highlight the need for governments to gather and collate data from disparate sources. Thus, the ability to *share data* is a prerequisite for both big and open data and other data-oriented capabilities in the public sector. But also as a fundamental capability in itself, *data sharing* – the ability to share data among public and private institutions to improve the value and

quality of services and to increase the scope of data available to decision-makers – creates opportunities for improving government services [11,13,32,36].

Public institutions have the legal authority to collect a wide range of data sets, but they also have the legal responsibility to safeguard them against abuse, disclosure, or damage. In addition to comprehensive legislation that restricts the use of data, such as the General Data Protection Regulation (GDPR) in the European Union (EU), several policy issues have been raised [9,10,47]. The practice of data sharing, i.e., that public institutions exchange data with each other, with private sector parties, and even across national boundaries, attracts concern. For example, GDPR allows organizations only to use data for disclosed purposes. Notwithstanding these constraints, institutions such as the EU see data sharing as an important part of improving government services [49], leading to a tension between realizing the full range of benefits from data sharing on the one hand and protecting citizens' rights on the other [21]. Governments also face obstacles in realizing the benefits of data sharing, such as restrictive legislation and policies, bureaucratic boundaries, diverse procedures in institutions, lack of trust, lack of resources, technical issues, and more. [29,50].

Norway's public sector is based on a unitary form of government with responsibility for services devolved to local governments and regional organizations. Public institutions maintain registers for individuals, companies, property, and more. Some data is shared among both public and private institutions for specific purposes, for example generating tax documents. There are calls for further data sharing, for example, health data among general practitioners and hospitals.

Moreover, a group of IT executives in the Norwegian public sector (Skate – Management and coordination of services in e-government) has taken several initiatives to capitalize better on authoritative data registers by sharing data among public institutions, both “vertically” between national and local authorities, and “horizontally” between public institutions at the same level.³ The prospect of ensuring better health outcomes has motivated significant efforts to ensure sharing of health data [15].⁴ Articles in the public press express frustration about the lack of progress in this area [16].

It falls to IT practitioners to realize the benefits of data sharing and overcome barriers. The motivation for the present study is to understand better IT practitioners' level of interest in this topic and their perceptions of both the promises and the difficulties of data sharing.

2 Background

In the literature, characteristics of data sharing for public services have been described in terms of areas in which data sharing applies, including anticipatory government, service design and delivery, and performance management [32]; in terms of at what level data is shared: technical, organizational and political [13,36], and in terms of the types of benefit data sharing might yield, such as innovation, transparency, and efficiency [11].

³ <https://www.digdir.no/skate/rad-til-regjeringens-digitaliseringsarbeid/3034>

⁴ <https://www.digdir.no/digitaliseringsradet/direktoratet-e-helse-helsedataprogrammet-2018/1998>

Authors have applied different paradigms for categorizing obstacles and challenges to data sharing including impediments related to control, management, lacking agreement on goals, long goals, and lack of funding [36]; challenges related to obtaining useful data, data sharing, interoperability, discoverability, human and technical capacities, and legitimacy and public trust [32], public manager uncertainty about big data [22], digital champions' perceptions of barriers [48]; issues that may be cultural and political, technical, related to privacy and security, and efficient data management [11].

We have, however, yet to find research on the perceptions that IT practitioners might have about issues concerning data sharing. Consequently, we seek to build an understanding of IT practitioners' level of interest in the topic, their perceptions of benefits, their perception of challenges and hindrances, their perception of the benefits of data sharing certain segments of the public sector, their perception on funding data sharing and finally, their confidence in the public sector's ability to realize opportunities/benefits and overcome challenges/obstacles. We briefly recount relevant literature on each of these themes.

2.1 Benefits of sharing data

Articulating, measuring, and managing benefits in the public sector involves challenges [40]. One issue is that benefits may accrue to more than one actor and in some cases do not benefit the sponsoring institution at all. Several schemata have been proposed for disaggregating potential benefits of data sharing. To capture perceptions, we chose and adapted classifications that, in our experience, were relevant to the public sector. As a starting point, Christodoulou et al [11] provided three areas for which data sharing can provide benefits (innovation, transparency, and efficiency), and we added elements from other research; i.e., case processing, decision-making, [6], data collection [2], error correction [42], and productivity [13]. These benefits areas are summarized in the upper-left portion of Table 1.

2.2 Challenges and hindrances to sharing data

If sharper clarity on the benefits of sharing data drives more and better-targeted data sharing solutions, a clearer understanding of challenges should prepare practitioners and reduce the likelihood of delays and other problems. The literature has surfaced different challenges and hindrances related to internal capabilities, lack of shared standards that enable sharing, and other external limitations, especially regulatory and legal. From the literature, we derived the following specific types of challenges and hindrances: leadership support and legal/regulatory issues [4,38], shared technical infrastructure [19,27], strategic approaches [3,14], technical standards [13], common semantics [46], short-term versus long-term goals [29], and technical competence [6]. These are summarized in the upper-right portion of Table 1.

2.3 Data sharing in different public sector segments

The Organisation for Economic Co-operation and Development (OECD) uses the Classification of the Functions of Government (COFOG) [31,8], which we found to be generally applicable but too broad at its highest (divisional) level and too granular at lower

Table 1. Concepts of data sharing

<i>Benefits areas</i>	<i>Challenges and Hindrances</i>
Innovation [11]	Leadership support [38,4]
Transparency [11]	Legal and regulatory issues [38,4]
Efficiency [11]	Shared technical infrastructure [19,27]
Case processing [6]	Strategic approaches [3,14]
Decision making [6]	Technical standards [13]
Data collection [2]	Common semantics [46]
Reducing errors [42]	Short-term vs long-term goals [29]
Productivity [13]	Technical competence [6]
<i>Public-sector segments</i> [31]	<i>Funding</i>
Healthcare	Earmarked funding [45]
Welfare	In competition with cross-segment funding [45]
Defence and National security	Internal budgeting in each organization [45]
Services for Businesses	Philanthropic donations [34,45]
Agriculture	Contributions from collaborating organizations [20,33]
Police, Customs, etc.	
School and Education	
Higher Education	
Research	
Public Finance	
Children and adolescents	
Transportation and Infrastructure	
Environment and Sustainability	
Art and Culture	
Cross-sectorial	

levels. Based on a survey and analysis of IT activity and expenditures by government agencies we conducted in 2021 (currently unpublished), we elaborated the COFOG logic and created a classification intended to be more intuitive for IT professionals, summarized in the lower-left portion of Table 1.

2.4 Funding data sharing initiatives in the public sector

Funding is an important factor for data sharing in the public sector [5,23,51]. Developing and implementing data sharing initiatives are costly in both tangible (people, money, equipment) and intangible aspects (data, information), while the benefits are often hidden and unclear, leading the government to opt spending their budget on other investments [7]. Nonetheless, the governmental ability and readiness to invest in the necessary digital innovations and its related costs are essential [5].

Public-sector policy frameworks for funding initiatives may well result in implications such as the lack of reliable and dedicated funding for the cross-boundary collaboration and cooperation that is necessary for sharing data [33,51]. Since data sharing initiatives in the public sector are initiated on an ad-hoc basis, they may only sometimes be prioritized against other initiatives considered as more critical [51]. Consequently, data sharing initiatives in the public sector, in general, are hindered by financial constraints [5,23,51]. In the following, we elicit relevant funding alternatives that we summarize in the lower-right portion of Table 1.

The traditional alternative is to allocate government budget through fixed-term stable funding [45], but this approach may not work well for digital innovations because it

does not take into account the long-term funding requirements and the need for collaboration across organizations [5] and may require maintenance and further development. Funding plans should include the maintenance process and resources [45]. Alternatives to traditional fixed-term funding should be considered [45]. One flexible approach suggested is stable fixed-term funding with the flexibility to be provided annually as the initiative is developed [45].

In addition to constraints imposed by government budgeting and funding practices, data sharing initiatives in the public sector face funding challenges with approaches that are unstable over the time horizons of data-sharing solutions. Examples of these unstable approaches include (i) grants and funding programs [45], (ii) institutional funding [45], (iii) philanthropic donations from foundations [34,45], or (iv) external funding from strategic partnerships with other organizations [20,33]. The challenge with external funding is that data sharing may stop when the funding ends [20].

3 Research Questions

The manifold issues above on realizing benefits and overcoming obstacles, and our interest in better understanding IT practitioner perspectives leads us to formulate the following research questions:

RQ1: To what extent are IT practitioners interested in data sharing as a topic?

RQ2: To what extent do practitioners perceive that data sharing can contribute to the benefits areas of Table 1?

RQ3: To what extent do practitioners perceive that data sharing can create value in the public-sector segments of Table 1?

RQ4: To what extent do practitioners perceive that the challenges and hindrances of Table 1 impact good data sharing solutions?

RQ5: How appropriate do practitioners think that the funding alternatives of Table 1 are for data sharing?

RQ6: How much confidence do practitioners have in the public sector's ability to realize the potential value and overcome hindrances? If applicable, how confident are they about their own organization's abilities?

4 Methodology

We operationalized the concepts in the research questions in a manner intended to have relevance for the particular study setting of a seminar for Norwegian IT professionals.

4.1 Survey Design

We designed an online questionnaire starting with demographic questions about the respondents' organizational level of responsibility, functional area, and whether they

⁵ Asked only to those reporting to work in an organization where data sharing is relevant

Table 2. Survey questions

<i>Survey questions</i>	<i>Answer options</i>
SQ1 How large is your interest in data-sharing (on three interest variables)?	11-point ordinal (no – large interest)
SQ2 How familiar are you with the possibilities and challenges associated with sharing data in the public sector (on three familiarity variables)?	11-point ordinal (low – very confident)
SQ3 How much do you think data sharing can contribute to improvement (in eight benefits areas)?	11-point ordinal (little – much)
SQ4 How useful do you think data sharing is for the following (15 segments) of the public sector?	11-point ordinal (not useful – useful)
SQ5 How much do you think the following (nine challenges) hinders good data sharing solutions?	11-point ordinal (little – much)
SQ6 How much confidence do you have in the public sector meeting the following (six requirements) for data sharing?	11-point ordinal (little – much)
SQ7 How suitable do you think the following (four mechanisms) are for funding data sharing among organizations over a five-year period?	11-point ordinal (poorly – well suited)
SQ8 How well do you think your organization succeeds in (two action variables)? ⁵	11-point ordinal (poorly – well)

worked in the public or private sectors; their personal interest in data sharing; and perceived knowledge about the topic at hand. Following this, the main part of the questionnaire contained sections based on the concepts summarized in Table 1. The survey questions directly relevant to answering the research questions are in Table 2. The full questionnaire design (in Norwegian and the English translation), the survey results and full analysis can be found at <https://osf.io/a53nx/>.

4.2 Survey Execution

We ran the survey in late August 2023 at a seminar titled “Sharing of Data among Actors – opportunities, limitations, and solutions”.

Forty-seven people attended the seminar in person, and 28 attended online, yielding $n_{\text{total}} = 66$ responses. Five provided demographic data only, leaving $n_{\text{included}} = 61$ responses answering SQ1–SQ8, which is the set of responses included in the analysis. Two respondents replied only to SQ1 and SQ2, and one replied to all questions until SQ7 (but not SQ8), leaving $n_{\text{complete}} = 58$ respondents who completed the entire survey. (Respondents were allowed to leave questions unanswered.) Among the n_{included} respondents, 4.0% worked in top management, 11.5% in divisional management, 50.8% as project or team leaders, 27.9% as specialists or experts and 4.9% in other work areas. Respondents’ area of daily work was: 36.1% technology, 34.4% development, 14.8% staff functions, 4.9% in the line organization, and 9.8% reported other.

Further, 32.8% were employed in the private sector (54.9% of these were allocated to an assignment for the public sector), and 67.2% were employed in the public sector, bringing the total of respondents whose daily work is in the public sector to 86%.

4.3 Survey Data Analysis

We present quartile boxplots for visual inspection of the results. We conducted ordinal comparisons between the variables in Table 1 with *Friedman's two-way analysis by ranks*, reporting omnibus tests across all variables and pairwise comparisons between pairs of variables. For each variable, we further conducted categorical comparisons between the organizational levels and also between the work domains with the *independent samples Kruskal-Wallis* test for three or more categories of data, reporting omnibus tests across all categories and pairwise tests between categories. These non-parametric tests are suitable because we cannot make assumptions about the distributions in the variables [30].

We accept a significance level of $\alpha = 0.05$; i.e., that a difference in our sample between variables or categories has a 5% (or lower) probability of falsely indicating a difference in the population. Here, we only report significant results due to space restrictions. All tests and descriptive statistics are generated using *IBM SPSS* (v.27).

We report effect size for the Kruskal-Wallis test using Cohen's d ,⁶ with the following rules of thumb: <0.1 (very small), $0.1 - <0.3$ (small), $0.3 - <0.5$ (medium) and $0.5 - <1.2$ (large) [12,39]. For Friedman's tests, effect size estimates are calculated in terms of Kendall's W [44]. As Kendall's W has a different range from Cohen's d , different rules of thumb are needed to evaluate effect sizes for Kendall's W : $0.1 - <0.3$ (small), $0.3 - <0.5$ (medium) and ≥ 0.5 (large) [39]. These effect size measures only apply at the omnibus level [41]. Where applicable, we report the corresponding omnibus effect size as a proxy for effect sizes for pairwise comparisons.

5 Results

RQ1: IT practitioners' interest in data sharing. Figure 1 shows boxplots for responses to the three interest variables of SQ1, revealing a high interest in data sharing for all three variables.

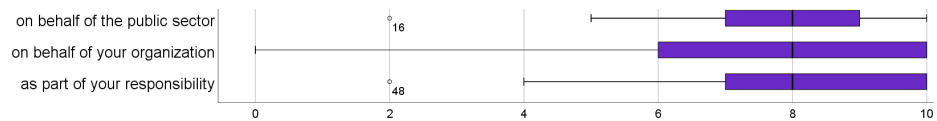


Fig. 1. IT practitioners' interest in data sharing ($n = 61$)

Pairwise tests for organizational levels indicate that divisional management is significantly more interested in data sharing *as part of their own responsibility* than are project/team leaders ($p = .035$, omnibus $d = .368$) and also significantly more interested in data sharing *on behalf of the public sector* than are specialists and experts ($p = .032$, omnibus $d = .511$).

⁶ calculated using https://www.psychometrica.de/effect_size.html

Figure 2 shows boxplots for the three familiarity variables of SQ2, showing that familiarity with the possibilities and challenges of data sharing is closer to medium. Pairwise comparisons indicate that respondents feel they can contribute significantly less to *decisions regarding data sharing* than *explain data sharing in their own organization* ($p = .016$, omnibus $W = .100$).

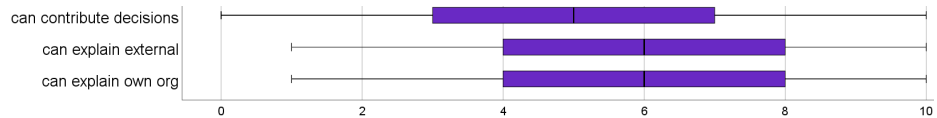


Fig. 2. IT practitioners' familiarity with possibilities and challenges with data sharing ($n = 60$)

The data exhibits significant and large differences across organizational levels for each of the three familiarity variables in Figure 2 ($.006 \leq p \leq .023$, $.803 \leq d \leq .978$). Pairwise tests show that divisional managers tend to rate themselves as significantly better at explaining and making decisions about data sharing than do project and team leaders, specialists/experts, and to some extent, top managers ($.001 \leq p \leq .037$).

RQ2: The contribution of data sharing to selected benefit areas. Figure 3 gives boxplots for the eight benefits area variables of SQ3, showing that respondents perceive the potential benefits from data sharing to be high or close to high for all benefits areas. The omnibus test across all eight variables reveals significant differences ($p = .000$) but with a small effect size ($W = .164$). Pairwise tests show that data sharing is perceived to benefit *making public institutions responsible* and *reduced work effort public sector* significantly less than all other benefits areas ($.000 \leq p \leq .011$). Similarly, data sharing is perceived to benefit *reduced work effort in the public sector* and *making public institutions responsible* significantly less than all other benefits areas ($.000 \leq p \leq .014$). Finally, data sharing is perceived to benefit *higher quality public sector services* significantly less than *improved analysis in the public sector* ($p = .020$).

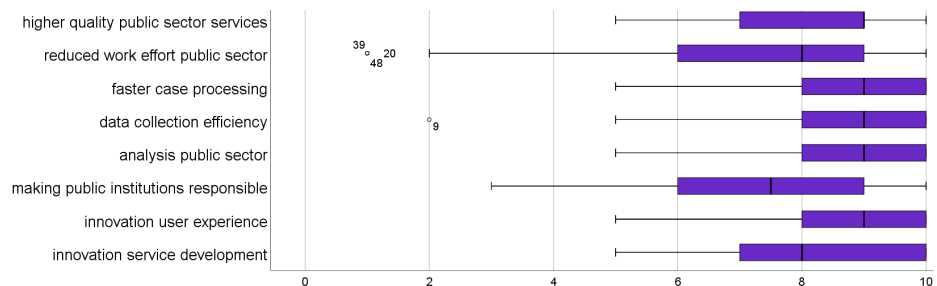


Fig. 3. Contribution of data sharing on benefits areas ($n = 58$)

Across respondents' organizational level, pairwise tests show that top management has a significantly higher ($p = .038$, omnibus $d = .385$) belief in a *reduction in work effort in the public sector* resulting from data sharing than do project or team leaders.

The omnibus test across all work domains shows a significantly large difference ($p = .038$, $d = .704$) in perceptions about *data collection efficiency*. Pairwise tests for work domains show that those working in technology have significantly higher expectations of *data collection efficiency* than do those working in development ($p = .013$) and those working in the line organization ($p = .041$).

RQ3: Value creation in public-sector segments. Figure 4 shows boxplots for the 15 public sector-segment variables of SQ4, where perceived potentials for value creation from data sharing are high to medium-high for all the segments. The omnibus test across all 15 variables shows a significant, small difference ($p = .000$, $W = .299$).

Pairwise comparisons show that *arts and culture* as well as *agriculture* are perceived to hold a significantly lower potential for value creation from data sharing than all the other variables ($.000 \leq p \leq .034$). Also, *research* is perceived to hold a significantly higher potential for value creation than all the other variables except for *across sectors*, *police and customs*, and *health* ($.000 \leq p \leq .038$), while *health* holds a higher potential than all except *welfare*, *police and customs*, and *across sectors* ($.000 \leq p \leq .040$). Other variables are also found to differ significantly, but against fewer variables.

RQ4: Impact of challenges to data sharing: Figure 5 shows boxplots for the nine challenges variables of SQ5 which are perceived to have between medium and high impact. The omnibus test across all nine variables shows significant, small differences ($p = .000$, $W = .093$). Pairwise comparisons show that *a lack of top management support*, and to some degree *lacking goals/strategies*, and *technical competence* are considered less impactful than the other variables ($.000 \leq p \leq .027$). *Unfit technical infrastructure* is reported to have significantly less impact than *lacking common understanding and standards for data* ($p = .009$) and *lacking collaboration between organizations*

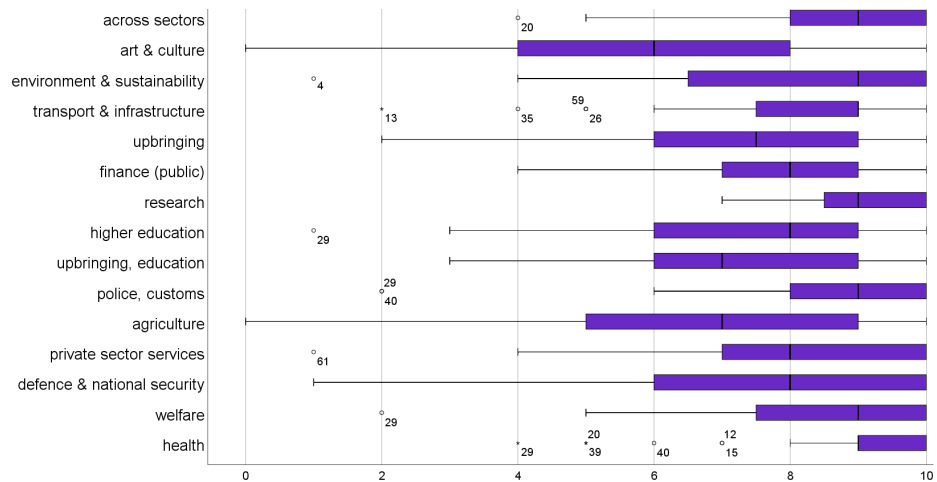


Fig. 4. Potential for value creation within public-sector segments ($n = 56$)

($p = .026$). *Lacking technical standards for collaboration* is reported to have significantly less impact than *lacking collaboration between organizations* ($p = .049$).

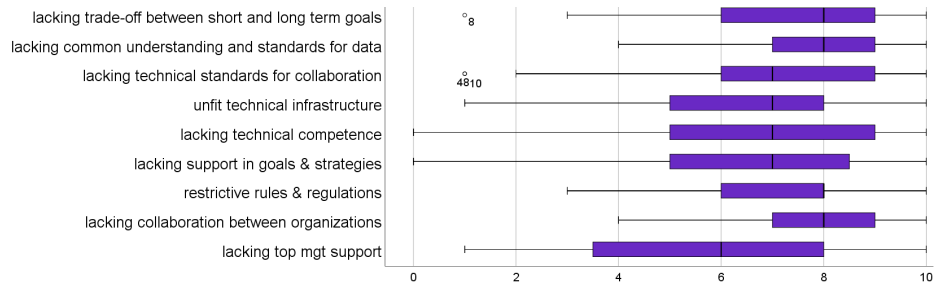


Fig. 5. Impact of challenges to data sharing ($n = 55$)

Pairwise comparisons on organizational level show that divisional management has significantly lower concern about *restrictive rules and regulations* than do project and team leaders ($p = .039$, omnibus $d = .355$). Divisional managers also have a significantly lower concern about *lacking trade-offs between short and long-term goals* than do specialists/experts ($p = .045$, omnibus $d = .504$).

Omnibus tests across work domains show significantly large differences in concerns about *lacking technical competence* ($p = .032$, $d = .734$) and unfit technical infrastructure ($p = .007$, $d = .949$). Pairwise comparisons indicate that there are different perceptions about the *impact of restrictive rules and regulations* (considered significantly lower by staff functions than development ($p = .025$), lacking technical competence (considered significantly lower by staff functions than technology ($p = .004$), and unfit technical infrastructure (considered significantly lower by staff functions than technology ($p = .025$) and development ($p = .001$)).

RQ5: Likely funding mechanisms for data sharing. Figure 6 shows boxplots for the three financing option variables of SQ7. Visual inspection shows that most funding mechanisms are considered medium or above likely, with earmarked allocation being most likely, but with statistically insignificant differences.

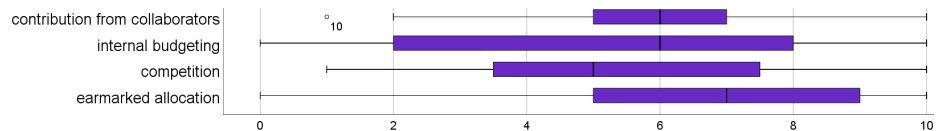


Fig. 6. Mechanisms for funding data-sharing solutions ($n = 56$)

RQ6: Confidence in the public sector to realize benefits and overcome obstacles. Figure 7 shows boxplots for the six requirements variables of SQ6. Visual inspection shows that practitioners' faith in the public sector meeting requirements for data

sharing is mostly around medium. The omnibus comparison across all the variables shows significant, small differences ($p = .012$, $W = .053$). Pairwise comparisons indicate that IT practitioners have lower faith in *learning from others' experiences abroad* than *domestically* ($p = .027$), *understanding of impediments* ($p = .009$) and *understanding of benefits* ($p = .007$).

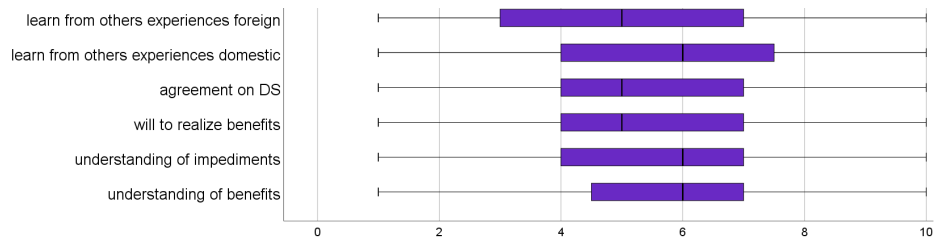


Fig. 7. Faith in the public sector meeting requirements for data sharing ($n = 55$)

Pairwise comparisons across respondents' organizational level show that specialists/experts rate the public sector's *understanding of impediments* as significantly lower than what divisional managers do ($p = .025$, omnibus $d = .473$). Top managers rate the public sector's *will to realize benefits* as significantly lower than do specialists and experts ($p = .022$, omnibus $d = .519$).

Figure 8 shows boxplots for the two action variables of SQ8 and shows that the respondents' perception of their own organization's ability to realize the benefits of data sharing is medium, and the ability to handle impediments to data sharing is just above medium. No significant differences were found.

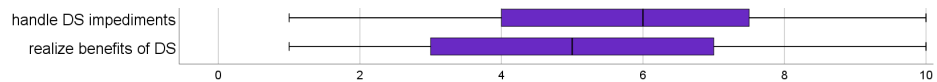


Fig. 8. Own organization's ability in realizing benefits of, and handling impediments to, data sharing ($n = 56$)

6 Discussion

Respondents generally perceived significant benefits from sharing data, which was consistent with the optimism in the literature. However, the middling responses about concerns suggest uncertainty or ambivalence. Combining these with the low levels of confidence in the public sector's ability to realize benefits and overcome obstacles indicates that data sharing solutions are still in early stages with a limited experience base. We do not yet have the basis to speculate why two types of benefits (public sector accountability and cost efficiency) and two segments (agriculture and arts/culture) were rated

less promising for data sharing than the others, but is somewhat understandable in the light of ongoing public debate that health and research are rated highly as segments in which data sharing will have a positive impact.

Our data suggests that divisional managers see their responsibility differently than others do: they are more interested than others in data sharing, more confident in their understanding, and less concerned about obstacles than respondents at other organizational levels. Divisional managers may view data sharing as part of their responsibility. We expect this landscape to evolve in the next few years, most likely as part of a broader drive to integrate digitalization across public institutions.

7 Conclusion

Our findings about perceptions of the benefits of data sharing are consistent with the view that sharing data is an essential part of data-driven value creation. The optimism is tempered by misgivings about realizing the benefits and the lack of ability among public institutions to realize data sharing solutions.

In a broader sense, data sharing is a necessary component of a “dynamic system of systems” that enables innovative digitalization across organizations [1] – building awareness and capabilities about data sharing may be associated with the design and implementation of solutions that integrate across organizations.

8 Limitations

We provide the relevant information to replicate the survey so that other researchers/professionals can conduct it in other contexts. In the following, we present potential limitations for this study’s validity [18,37] of the study’s results and findings.

Construct validity: For this exploratory survey, we developed concepts and categories by synthesizing themes from the literature to be used at the conceptual level in the research questions. The questionnaire items were then designed with the intent to reflect those concepts. As described in Section 4, we evaluated the categories to avoid conceptual gaps and overlaps, also by getting feedback from external reviewers. Clearly, however, one should work further toward grounding the conceptual models empirically.

Internal validity: By differentiating on grouping variables we believed to be relevant (i.e., respondents’ level in the organization, their sector of employment, and work area), as well as their interest in and awareness of data sharing, we mitigated the threat of unstudied factors somewhat. Further comparative studies are needed when more is understood about what salient grouping factors may explain variations.

External validity: An obvious threat is that the respondents are limited to the group of Norwegian IT practitioners present at the seminar. While their responses likely represent their roles in Norwegian public sector digitalization, we cannot be certain that their view applies to other roles and situations in other countries. We start with this small target audience to validate the suitability of the survey before conducting it in a broader context. We plan to conduct the survey at an international level to extend our dataset and substantiate our findings and comparisons further.

9 Implications for research and practice

Both our review of available literature and this survey suggest that data sharing is an emerging and important phenomenon that warrants further research. Hopes about benefits combined with concerns about obstacles, and particularly legal constraints, highlight both potential value and pitfalls for practitioners.

To this end, we hope that this paper provides the initial context and baseline for further research into data sharing, both in its own right and as part of the impetus for the public sector to become more data driven. Further, we suspect that the ability to build data-sharing solutions may reflect organizations' capability to digitalize across traditional divisions for the public good.

We also hope that this paper provides practitioners with better means to navigate issues related to data management, especially potential benefits and likely obstacles. Since the notion inherently calls for collaboration across public institutions, we believe that our findings may help facilitate productive discussions based on shared models and terminologies and that the work ahead to build solutions will enhance maturity in the field and accelerate learning.

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