





Article

Parliamentary Open Data in Scandinavia

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Abstract: This article presents a case study on the use of open data in the Scandinavian parliaments (Norway, Sweden, and Denmark). While the three countries have all opened the gates and provided access to data—for example, on the voting in parliament, debates, and notes from meetings in committees—the uptake and use of data outside the parliaments is limited. While journalists and academia are users of the open data, hackathons and third-party portals are at an explorative level. Still, there are indicators that hackathons can enhance democracy, and parliamentary data can increase political transparency.

Keywords: open data; big data; parliament; case study

1. Introduction

Governments strive to advance mutual government-citizen understanding by innovating with emerging computing technologies, such as open data and big data [1], to make a significant impact on societies through promoting government transparency and accountability, empowering citizens, and improving participation and public services [2,3]. The emergence of open data and big data has received increasing interest from governments, which has been interpreted as a set of perceived potential benefits for governments and the whole society towards further democracy [4]. This includes, for example, the Brazilian *My National Congress* [5]. Also, there have been various citizen initiatives to advocate for more data openness in government [6].

However, governments also experience barriers to adopt open data widely. Consequently, various national and cross-national projects such as the US data.gov [7] and the EU supported project Open4Citizens [8] have been launched. Also, in European Union (EU), a new directive on open data [9] entered into force on 16 July 2019, replacing the older directive on public sector information [10] from 2003 and the amendment to this directive from 2013 [11].

In this paper, we focus on open data in Scandinavian parliaments (Norway, Sweden, and Denmark). The three countries rank in the top end of international rankings of transparency and trust in government [12] and have implemented open data in their parliaments. Also, the three countries enjoy high levels of digital literacy and IT penetration, with strong administrative and legal traditions. In the e-government open data research field, the focus has been on administrative data [13–15], and less attention has been paid on the open data from parliaments. The research presented here aims to close this gap by providing an overview of the availability and use of open data from the three parliaments. By analyzing the national strategies on open data and cases of use of the open data, we also address why the data have been provided and how the open data is used. Our investigation of the which, when, why, and how questions has been done with qualitative research methods and theoretically anchored by the work on coordination theory.

The rest of the article is organized as follows: Section 2 provides background, followed by Section 3, which presents a discussion about theoretical perspectives on open government data. Section 4 discusses the methodology, and Section 5 presents our findings. The findings are discussed in Section 6, and finally, Section 7 provides a conclusion with a discussion of limitations and proposals for future work.

2. Background

Open Knowledge International [16] defines open data as “data that can be freely used, modified, and shared by anyone for any purpose.” To be more specific, open data is collected and shared on the Internet by an organization for free to be unrestrictedly used by anyone [17–20]. Open data published by governments are also called open government data (OGD). Open data makes it possible for third parties to generate value by analyzing and visualizing the data, and even combining data from various sources. While the literature defines open government data as “government-related data that is made open to the public” [17], there is a gap in the literature with regard to the definition of open parliamentary data, and even more so with regard to the dynamics of open data from parliaments. For example, in a study of open data on UK government spending data, there were identified gains on accountability, but less conclusive findings on participation and information transmission [21].

Explanations from the literature are that motivations to develop open data policies are diverse across the government organizations; some are willing to create an open data policy, while others are skeptical and concerned about the risks associated with open data [22]. This requires promoting a culture of openness based on recognizing the fundamental principle of institutionalizing public ownership of open data [22]. The institutionalization of the openness culture can be mandated by legal pressures and social and political pressures, as well as by having entrepreneurs within the government organizations [22].

Janssen, Charalabidis, and Zuiderwijk [23] discuss the advantages of open government data. The authors use three main categories: Political and social, economic, and operational and technical benefits. The political and social advantages include more transparency, democratic accountability, more participation, empowerment of the citizens, improved trust in government, public engagement, scrutinization of data, equal access to data, new and improved services for citizens, better policy-making processes, more visibility for the data provider, stimulation of knowledge development, creation of new insights, and new (innovative) social services.

The economic advantages are economic growth and stimulation of competitiveness, stimulation of innovation and improving new processes, products, and services, the creation of new products and services, using “wisdom of the crowds,” creation of new business opportunities, and availability of information for companies and investors.

The operational and technical advantages include the reuse of existing data, instead of recollecting the same data, and thereby avoiding duplication and related costs. Open data can also help the optimization of administrative processes, improvement of policy-making processes, provide access to external problem-solving capacity, and enable fair decision-making by benchmarking. Open data provides easier access to data and discovery of data, and the creation of new data based on combining data. It also enables external quality checks of data (validation), the sustainability of data (no data loss), and finally the ability to merge, integrate, and mesh public and private data.

The authors also address barriers for governments to start publishing open data and present six categories of barriers: Institutional, task complexity, use and participation, legislation, information quality, and technical [23].

Institutional barriers include the emphasis of barriers and neglect of opportunities, conflicting values (transparency vs. privacy), risk-averse culture, no uniform policy for publishing data, the provision of data adding no value for users, lack of resources to publish data, a revenue system based on creating income from the data, putting the organizations’ interests at the expense of citizen interests, lack of process for dealing with user input, and questionable quality of user input.

Task complexity barriers include the lack of ability to discover the appropriate data, inaccessible original data (only processed data), lack of explanations of the meaning of the data, no information

about the quality of the information, applications hiding the underlying complexity of the data, duplication of data, data available in different forms (mainly when the data have been processed), and making unclear the original source of the data. The authors also mention difficulties in searching and browsing due to lack of indexes or other means to find correct data, that users may not be aware of potential use, to complex data formats and datasets, and the lack of helpdesk or support. Finally, focus on making single datasets, where real value may come from combining datasets, contradicting outcomes from the use of the same data, and invalid conclusions.

The use and participation barriers include the lack of incentives for users, that the publisher does not react to user input, frustration of too many data initiatives, lack of time to get into details, fees for accessing the data, registration before accessing the data, unexpected escalated costs, lack of time to make use of the open data, lack of knowledge and capabilities to be able to use the information, lack of statistical knowledge and the potential and limitations of statistics, and finally, possible lawsuits or other violations.

The legislation barriers include privacy violations, security, lack of license to use the data, conditions limiting the use of the data, disputes and litigations, the requirement of written permission to use data, and reuse of contracts and agreements.

The information quality barriers include lack of information and lack of its accuracy, incomplete information, obsolete and non-valid data, and unclear value. The authors also mention the issue of too much information to process and the uncertainty of what to look for, and that (essential) information may be missing. Finally, similar data stored in different systems may yield different results.

The technical barriers include not having data in a well-defined format that are easily accessible, lack of standardization, no central portal or architecture, no support for making data available, no meta standards, no standard software for processing the open data, fragmentation of software and applications, and finally, legacy systems that make the publishing of data more complicated.

Another potential barrier to use open government data is that heterogenous infrastructure in the government makes it difficult to implement a large-scale open data infrastructure [24].

The openness provided by open government data platforms makes it possible for citizens to keep track of activities and decisions made by the government. However, it there always be a conflict between openness and privacy. Connecting data from various sources, combined with advanced analysis techniques of big data, may put the government into a problematic situation regarding citizen privacy [23].

Most barriers are related to open data. The concept is not well defined and leads to problems related to complexity and privacy.

According to the European Open Data Portal (EODP) [25], open data is data that everyone (governments, businesses, and citizens) can access, use, and share to create social, economic, and environmental advantages.

The openness of open data is dependent on the data format and the license. Open data should be available in a standard, machine-readable format, and users should have unrestricted access to use the data for different application areas (transforming, combining, and sharing with others, or using the data for commercial purposes). The European Open Data Portal (EODP) related the openness of open data to the costs, where open data should be free to use, but not necessarily free to access. Entities that implement public open data platforms using government data incur costs to create, maintain, and publish open datasets, as well as to deliver big data in real-time.

The World Wide Web Foundation (W3F) argued that open government data initiatives build on involvement by the government, civil society, and the private sector [26]. The potential impact of open government data depends on the implementation of open government data policy [27].

In the US, the policies for creating, managing, disseminating, and preserving digital government information were too complex and existed before the emergence of open data and big data technologies; thus, these policies failed to address the use of government open and big data. As a result, the policy was not able to address the use of public and big data from the government [28]. As a result, it was recommended to develop a "big and open data governance model" to solve specific problems related to big and open data, such as privacy, data quality and reuse, archiving and storing, resources for data curation (accumulation, change, integration, and manipulation), and developing data standards and sustainable

data platforms [22]. In Australia, the government had an ambition and a plan to establish an open data policy, but the Australian government faced technical, legal, and cultural barriers [3]. The government had no clear policy on data formats and no watertight plan for necessary off-identification of data about individuals complying with the Australian privacy legislation [3]. The cultural barrier for open and big government data in Australia was manifested by the public service culture that favors the non-disclosure of data as the preferred option [9]. In the United Kingdom, the implementation of open government data raised essential questions related to standardization of open data and platforms, policy for sharing data, lack of consciousness of open government data, and the government responsibility to get the necessary resources for the implementation of open government data [22].

3. Theoretical Foundations

The theoretical foundation of this study of open data in the three Scandinavian countries is based on (1) a policy component, (2) a conceptual component, and (3) a coordination theory component.

Zuiderwijk and Janssen [29] developed the policy component of our framework. The authors aim to aid the implementation of open government data policies and to improve existing open government data policies through a focus on internal and external factors, the impact, stimulating the use of open data, and creating a culture of open data.

The authors argue that the policy environment and context (i.e., levels of government organizations, motivations and objectives, legislation, and political and cultural contexts) influence the policy content (i.e., amount of open data, type and quality of open data, and requirements for accessing open data). Consequently, the policy content influences the extent to which performance indicators of open government data are fulfilled (i.e., usages, risks, and benefits).

The second component of our framework (the conceptual component) builds on top of the study by Veljković, Bogdanović, and Stoimenov [30], who argue that the challenge in comparing (or benchmarking) open government initiatives is the lack of open government conceptual clarity. Based on this argument, the authors of the paper developed a conceptual model of open government based on a set of indicators related to five pillars of open government: Collaboration, open data, data transparency, government transparency, and participation. The indicators related to each pillar are demonstrated in Table 1.

Table 1. Components of open government conceptual model (adapted from [30]).

Pillars of Open Government	Indicators
Collaboration	Government-to-Government Government-to-Citizen Government-to-Business
Open data	Complete Primary Timely Accessible Machine processable Non-discriminatory Non-proprietary License-free
Data transparency	Authenticity Understandability Reusability
Government transparency	Procedures Tasks Operations Regulations
Participation	Open dialog

The third component in our framework is the coordination theory component, developed by Zuiderwijk and Janssen [31] to identify coordination needs and challenges for open data. They use a set of coordination mechanisms to address those challenges and needs towards improving policymaking and decision-making. The principal argument of Zuiderwijk and Janssen is that the activities of the open data community are, to a large extent, uncoordinated. This stems from several factors. These factors are:

- Various stakeholders are involved in the open data process (i.e., open data publishers, open data facilitators, users of open data, and open data legislators);
- Open data publishers often lack a clear sight over what is done with the data, which value they can create, and how they can be used for improving their policies and decisions; and
- The fact that open data publishers and users are often not aware of each other's needs and activities (i.e., the format of data preferred by users and how to stimulate the use of open data).

Thus, coordination is argued to be necessary, as it leads to a better understanding of the open data process and results in integrated actions, improved performance, and improved policies. Zuiderwijk and Janssen [31] identified six specific coordination challenges:

- Inappropriate regulatory environment;
- Fragmentation of open data;
- Unclear boundaries of responsibilities;
- Lack of feedback on open data use;
- Lack of interconnected processes; and
- Lack of standardized and planned processes.

They argue that the coordination challenges may be solved, although not guaranteed, by a mix of three coordination mechanisms:

- Coordination by standardization;
- Coordination by the plan; and
- Coordination through feedback.

4. Methodology

Our study is exploratory; an exploratory case study is a suitable method to address the "how" research questions [32] and understand the phenomenon in its natural context [33]. For an overview of our research, see Figure 1. Our study started with a review of theoretical perspectives on open data, followed by empirical data collection on parliament open data initiatives. Our study is also interpretive, as the data collection was not guided by pre-assumptions from literature or theory [34].

All three countries are among the small countries with regard to population, Norway has a population of 5.2 million, Denmark has a population of 5.7 million, and Sweden has a population of 9.8 million. The Scandinavian countries have been continuously highly ranked in international comparisons on e-government and e-participation initiatives, and are known for strong welfare services and long democratic traditions. The parliament of each country has a long history.

- The Norwegian Parliament ("Stortinget") was established in 1814.
- The Danish Parliament ("Folketinget") was established in 1849.
- The Swedish Parliament ("Riksdagen") was established in 1866.

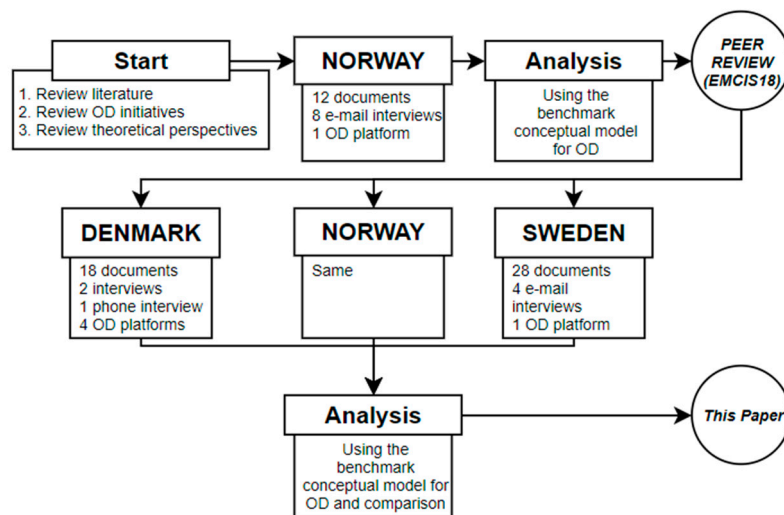


Figure 1. Overview of our research process.

Citizens have a high level of trust in democratic institutions (governments and parliaments). All three countries have Freedom of Information acts, securing access for citizens to government and parliament documents and proceedings.

The empirical foundation of our analysis includes:

- Documents published on the websites of the parliaments and the governments;
- Examination of the open data published by the parliaments;
- Review of websites using open data from the parliaments; and
- Interviews with civil servants in the three parliaments and users of open data from the parliaments.

The purpose of analyzing the documents was to get an overview of available data, and the interviews provided evidence about the motivation and intended results of using open and big government data. The format of the interviews includes interviews at their offices, phone-based interviews, and interviews through e-mail. The use of an e-mail interview method is appropriate in occasions when the informants are too busy to be interviewed synchronously and allows the informants to have enough time to think and answer the interviewer's questions at their convenience [35–37]. The findings from the case study were analyzed using the benchmark conceptual model for open government [30]. The data gathering in Sweden and Denmark was done after the completion of the Norwegian study, and preliminary findings from Norway were discussed at the EMCIS conference in 2018 [38].

5. Analysis/Findings

5.1. The Norwegian Parliament

The Norwegian Parliament has been actively using information and communication technology to increase transparency [39]. The website of the parliament provides access to documents used for decision making, minutes of meetings, and even webcasts of the meetings. The expansion to also provide access to the underlying data through application program interfaces and standard data formats shows the continuing commitment of the Norwegian Parliament to contribute to a transparent society.

The Norwegian Parliament's open data platform is run as a companion website to the main *stortinget.no* site. The datasets can be downloaded or accessed through an application program interface (API) [40]. The open data platform was developed as part of a major overhaul of the website, where data on voting in parliament was made accessible. The first version of the platform had voting

data and data on the cases that were being voted on, as well as questions from members of parliament. Since the launch, there has been continuous development.

In 2014, the platform was expanded to include information about the individual members of parliament and XML versions of documents and meeting referendums dating back to 2008. In early 2015, another extension was implemented, this time with data on parliament meetings, meeting agendas, and data on public hearing processes, as well as meeting minutes dating back to 1998. The biography section for members of parliament was also expanded. The latest update came in 2017 when the platform received an overhaul, including user registration, and all documents and publications from the Norwegian Parliament was published. In total, more than 20,000 documents were made available.

The current platform contains the following data: Parliament sessions and years, counties (members of parliament are elected from their county), topics, political parties represented in parliament (present and past), committees (present and past), members of the parliament (present and past), member biographies and pictures, members of the government, questions raised, cases, voting records (also for individual representatives) and voting results, meetings, agendas, hearings, list of speakers, publications, and speeches made by members of the parliament. Data can be combined using API calls so that users can, e.g., list all speakers from a party on a specific topic or case, data on how representatives vote on specific issues, etc. There are plans for further expansion, and the respondent reports that the next step is to make more data available as downloads, as well as through the API. This is because journalists and other non-technical users find the API challenging to use and have asked for downloadable formats and a more straightforward user interface, so they can access the data without having to hire programmers to do the work. The need for technical competence is reported as a significant obstacle to increased use. There are also plans for including even more datasets.

5.1.1. Parliament's Motivation and Drivers for Open Data

According to the interview respondent from the parliament, the motivation for the open data platform was both external and internal. There was much pressure for opening up data on voting in parliament, especially from the people behind the service "Holder de ord?" ("Do they keep their words?") (see the subsection on use cases for details), as well as from journalists making freedom of information requests and wanting more straightforward access to data. Internally, motivation was driven by the need to become more efficient. Before the launch of data.stortinget.no, a lot of data had to be manually filed, hard-copied, and sent to the institutions using it.

Both internal and external motivation should be seen in the context of the open data movement that emerged a decade ago. Several key people from the industry, IT, news, and academia pushed for more openness and freely accessible data from the government, government institutions, agencies, and research institutions. The main argument was that data are valuable, can lead to innovative services, as well as increased transparency, and that taxpayers had already paid for the data to be made, so they should not have to pay again to access it. As a result, the Norwegian Mapping and Cadastre Authority made all their geographical data available in 2013, the National Meteorological Institute publishes open weather data, and research institutions are pushing towards open access publishing of both data and research publications.

5.1.2. Use Cases of Data from Parliament

Several organizations make frequent use of data from the Norwegian Parliament:

Holder de ord? (*Are they keeping their promises?*) is an independent organization based on voluntary work and funded by freedom of speech organizations and the open-source community. Their volunteers combine voting data from the Norwegian Parliament with the party programs to find out if they vote in accordance with their programs, and other related questions. The data published on their website is used both by citizens and mass media to find out how loyal the representatives are to their party programs. The organization has close connections to the open-source community, and

all code is available through GitHub [41]. The service was established in 2012 to monitor voting on climate-related issues, but was later enhanced to cover all political issues handled by the parliament.

The respondent said they have around 40,000 visits every year. Many are from mass media, research institutions, and organizations, but most visits are from ordinary citizens with interest in politics. During the last years, statistics from the website have been on the front page of large national newspapers and have also appeared in radio newscasts from the Norwegian Broadcasting Corporation (NRK).

Samstemmer.net is another example. The application won the hackathon apps4Norway by creating a database of members of the parliament and their voting records. The idea was to see what members agree most based on their voting records. The project is no longer active, but the code is available on GitHub [42].

Briatte.org [43], developed by Francois Briatte, visualizes the ties between representatives based on what bills they are sponsoring. In most cases, the visualization shows that allies support the same bills, but a closer study shows some intriguing ties between parties that seldom agree on issues in the mass media.

Talk of Norway is a research project at the University of Oslo, Norway. The project experiments with different machine learning techniques used on data from the parliament. The aim is to find more about how parliamentary sessions work. The project is a collaboration between researchers in linguistic technology and political science.

Hackathons: Several hackathons initiated by the Agency for Public Management and eGovernment (Difi) have used data from parliament. A hackathon is a time-constrained event where the goal of the participants is to create a working application by the end of the event. Hackathons match well with open data sources. More recently, the hackathon Hack4.no, a collaboration between the Norwegian Mapping and Cadastre Authority and the University of South-Eastern Norway, has used parliamentary data several times. The 2017 second runner-up used data from the parliament to create a smartphone app in collaboration with the Office of the Auditor General of Norway.

Media use: While some media outlets, such as the data journalism team of the UK newspaper the Guardian, have become proficient users of open data, Norwegian media are falling somewhat behind. A couple of the major newspapers and the national Norwegian Broadcasting Corporation (NRK) use open data in some stories, but the potential is far more significant. One example where data from parliament contributed is the website *krisepakke.no*, where the newspaper *Klassekampen* worked with several local newspapers to track where funding allocated to companies suffering from the 2015 fall in oil prices finally ended up. While this is an excellent example of data journalism, most of the collection processes were based on manual freedom of information queries, indicating that the potential for open data is far higher than what is currently realized when it comes to the media's role as watchdog.

5.2. The Danish Parliament

The Danish case of open data is illustrative of the complexity of ranking and assessing openness. In the UN ranking of e-participation the openness of data (but not open data per se), Denmark was top-ranked in the 2018 ranking. While Denmark was also in the top three ten years earlier in 2008, the Danish UN ranking was only number 54 in 2014 and 22 in 2016. Looking at the general openness of data by government, the Office of the Auditor General's report from 2019 on Open Data concluded that a massive range of open data from the government has been provided in Denmark. At present, there are 921 open datasets available from 88 different places in government. However, by international benchmarking, the open data progress is among the lowest in OECD and the EU. This is contrasted by the overall international top-ranking of digitalization in Denmark. In particular, strategies and policies are ranked low. Thus, Denmark is ranked number 26 out of 32 nations by the European Data Portal and number 30 of 32 ranked by OECD. When benchmarking the actual data available, the ranking is better (11 of 94 countries in the Global Open Data Index and 13 of 115 at Open Data Barometer) [44].

The open data project from the Danish Parliament was launched in September 2014. The Danish Parliament's (Folketinget) open data platform is a subdomain (oda.ft.dk) of their primary domain folketinget.dk. The parliament has had a public database since 1994, but the open APIs for the full dataset were not available until 2016.

The current platform contains 50 different identifiers: The main metadata are votes, voting records, legal documents, members of the parliament, documents not directly related to legislation/law proposal such as questions asked from the committee to the Minister or reports and notes received by the committees (these documents are referred to as general documents), points on the agenda, debates, EU cases, files, decision proposals, and minutes from meetings. The remaining datasets are used to specify the type of an element or link elements to each other. One example is the possibility to link an actor with type "member of parliament" to the voting records to find out how a particular representative has voted. Data are available as XML and JSON. The Danish Parliament provides a full MS SQL backup each night. This decision has been taken to push the users to maintain and update their databases, rather than using the parliament's. Thus, the Danish Parliament does not provide datasets at the open data platform, but metadata only. Still, at other sites from the parliament (folketinget.dk) and through folketingstidende.dk, users can access plenary proceedings.

5.2.1. Parliament's Motivation and Drivers for Open Data

The motivation of providing open data was driven by three main motives: (1) Provide metadata only to avoid any biased interpretation of data, (2) modernize and streamline the internal system, and (3) respond to a general wave of open data policies that swept through the public administration.

The decision to provide metadata only was primarily motivated to avoid any possible bias or conflict in the interpretation of data. Secondly, the parliament's back-office systems needed improvement of data integration, and more streamlining of data flows. By providing open data, the parliament could, over time, build a new architecture for internal data use. Consequently, the parliament approach users of their open data with what can be labeled as an "open arms" policy, rather than a "us-versus-them" approach. For example, the parliament is supportive of external users that have technical challenges analyzing the metadata.

Thirdly, the initiative on open data was fueled by a range of open data policy initiatives at the administrative level [45–47] and a push for more public online access to data from the parliament to decrease digital divide and as enabler of improving democracy [48,49] and openness with regard to petition documents relating to new proposals and legislation (petition-part) through hoeringsportalen.dk.

The point of making the parliament data openly accessible was, therefore, not a move from closed and protected data to fully open data. The transition was more about providing external access to raw data stored in an electronic record system that was already available to the members of parliament, and already available in a summative format to the general public through Folketinget.dk.

"We actually reported it as an IT project back in 2010, but that was not a priority. Since then, we have concluded that we would rather make data available so that others can use it, rather than having to spend resources on producing apps, for example. Therefore, it has now been approved by the Executive Board of the Parliament in the 2013 action plan." [50].

The decision to open the data was, in part, driven by a general open data wave in the government and specific incidents. In the open data action plan from the government, it was stated: "The Danish Parliament's work results in several documents—or data—that provide insight into the actions and priorities of the national government. Even today, much of this material can be found on the Danish Parliament's websites ft.dk and folketingstidende.dk, where you can read the various documents. However, the material is generally published as single documents in a form that makes it difficult, for example, to utilize the material directly as content in new innovative digital solutions." [51].

5.2.2. Use Cases of Data from the Danish Parliament

Kend dit Folketing (*Know your parliament*). ogtal.dk has, together with altinget.dk, developed <https://kendditfolketing.dk/>. Google Digital News Innovation Fund funded the project. The company ogtal.dk has as its key vision to help improve democracy. Thus, the company is a non-profit company. The main challenge of the supply of open from “Folketinget” is the lack of documentation of the data and limited data span. There is no documentation of the historical data provided. Thus, the company ogtal.dk need to classify all data themselves and define key concepts.

Also, there is a problem with the documents regarding the public hearing of law proposals. During the parliamentary cycle, there is a legal demand that all documents regarding the law proposal are made available to the public. This is not done through Folketinget.dk, where only the results from decisions and committee material are available. Instead, the petition material is made public through <https://hoeringsportalen.dk/>. Each ministry decides the format for the material and how the material is available. Without the data from [hoeringsportalen](http://hoeringsportalen.dk/), the data from Folketinget has very limited interest, since they only show the formal decisions that are taken, not the political decision-making process.

The second major problem is the data range. Data are available from 2009 and certain data only from 2016. This makes it very difficult to make any analyses useful for citizens and other users of the company’s products.

Hvem stemmer hvad (*Who votes what*). The company Buhl & Rasmussen has developed a website based on open data from the parliament, where citizens can see polls and distribution of votes by party, age, gender, and voting districts.

Ulobby (*ulobby.eu*) is a Danish start-up that aims at un-boxing the political processes and enables lobbyists and citizens to influence the political agenda in various countries. The approach from Ulobby is scalable and targeted at a roll-out in various countries and targeted public affairs professionals. Thus, this example differs from the other examples from Denmark by not being available to the general public.

Folkets Ting (*Peoples Parliament*) is a frontrunner of opening data to the public. Folkets Ting started, in 2009, a homepage that, through web-scraping, was collecting data (law proposals, questions from parliament members to ministers (paragraph 20 questions) and other documents) from Folketinget.dk and made these available through open APIs to others (developers) and through a more user-friendly interface and extensive use of visualization. According to interviews with the founder, the motivation was not a commercial motive: “There is no commercial purpose to it at all. It would be to dilute the concept if I tried to coin it . . . it was a huge opportunity to do something with impact. The combination of political data and making them accessible to public debate in a bold way is worth making because it is so potentially explosive.” [52].

Hackathons: The Open Knowledge Denmark arranged, in May 2014, a workshop on voting data regarding the European Patent Court on 25 May. The day after the voting (26 May), the workshop participants analyzed the data by focusing on outliers and a possible explanation of the outliers [53]. By combining data on income etc. with the voting data, they found it puzzling that there was a massive *No* to Denmark joining the European Patent Court: “To their surprise, they found that at Taarbæk School, they had switched to yes and no answers when the final report was sent. The bug was fixed, but it might not have been discovered if the workshop had not taken place.” [54]

Media use: Several Danish media use open data. Here, we highlight Altinget only. Altinget is a political niche medium, backed by one of the largest editorial teams, and one of the most profiled users of open data and data from the Danish Parliament. For example, they have launched a decision-chain (visualization of a political decision-making process) at altinget.dk/decisionchain/. Although the same information can be found at the ft.dk site, the Altinget bundles the data with journalistic articles and debate forums—the parliament does not offer these at their website. Also, Altinget has launched a voter–politician matching service to see which candidate best represent the voter’s opinion. By tracing the speeches and votes in parliament on key areas, the voter can match the candidate with their own view. The data provided for this test come from the parliament data (altinget.dk/kandidater/). Also, Altinget is part of the site Kend Dit Folketing (see above).

5.3. The Swedish Parliament

The Swedish Parliament's open data platform is a subdomain website of their primary domain (Riksdagen.se). Data can be accessed through an API and downloaded in several formats (CSV, HTML, JSON, SQL, TEXT, and XML). The API allows for search queries. Users can also create reports to quickly filter, compare, and overview the data in the web browser (only for parliamentary members and votes). The parliament has had public databases since 1993, and in 2010, an API was added which made open data a natural step forward. One developer opened the databases that were used for the main domain. The data are originally from Rixlex. Today, the data are used by the primary domain and internal applications. Available data range from the parliamentary diary, committee reports and the parliamentary members' motions, to statements of opinion to the parliament's calendar. In total, 27 datasets have been published. They are planning to continue the development of the platform and to improve the documentation.

The documentation for the open data is currently in Swedish, but covers changelogs, data sources, content models, about datasets, about reports, explain document ID, database models, codes and terms, and deviations in data. At the same time, examples of how the data can be used are also provided. The platform has an English page, but it only explains that they have open data and what it is.

5.3.1. Parliament's Motivation and Drivers for Open Data

Publishing open data was part of the modernization. From the start, open data was only published for the needs of the parliament, but soon they noted that external users were interested.

5.3.2. Use Cases of Data from Parliament

Riksdagsappen [55] (*The parliamentary application*) is an android smartphone application provided by PP Consult that allows the user to find and follow decided issues. The purpose of the app is to increase the transparency of the parliament for the citizen. Today the app has about 100 users.

PeoplePolitics [56] is a social media website that seeks to make politics accessible, fact-based, and transparent for everyone. The website is currently under development; as such, it has few users and low impact.

Voteringsstavlan [57] (*The vote result board*) is a website where anyone can view how politicians vote on different issues, developed by two people. The development of the website was motivated by curiosity about how politicians vote; whether they vote with or against the party and whether they abstain were two of the questions. They hope to help citizens to be more politically involved between elections. For four months, they received 602 unique visitors. They also have a twitter account where they publish the outcome of different issues. In 85 days, their tweets were shown about 11,700 times.

Riksdagskollen [58] (*The parliament lookup*) is an android smartphone application developed by two master students from Linköping University. The application allows the user to follow, for example, what is happening in the Swedish parliament, the work of parliamentary members, and vote results. The application was a project for them to test and learn how to develop smartphone applications. Over time, the master students received positive user feedback that encouraged further development. Today, the application is installed on around 2000 phones with 50 to 100 active users per day.

Hackathons: Parliamentary data has been used in the hackathon Hack for Sweden [59]. However, while the parliament is supporting the hackathon, they do not openly state that their data are used in different hackathons. The same is seen on the hackathon's website, where public agencies are more in the spotlight, and only the reference to the parliament's open data is through journalistic articles.

Media use: Some journalists use open data, but open data is a rare occurrence in media. One example is the international journalistic team J++ [60]. The team provides a website about the promises of politicians from 2014's election. However, this application has not been connected to the voting records of the politicians that are provided by parliament. Another example is SvT Play that made some reportages based on open data, and DN (Today's News) developed the web service Riksdagskollen that

allows users to find the politicians that are working with the issues they are interested in. However, the web service has been terminated. Active open data use in Swedish media seems to be cold.

Based on the analysis and findings from each parliament, Table 2 presents an overview of open data in the three Scandinavian parliaments. The table makes it easier to compare the three parliaments.

Table 2. Overview of open data from Scandinavian parliaments: Initiation year, documentation, site URL, datasets, timespan, and access format.

	Norway	Denmark	Sweden
Established	2012	2014	Public databases from 1993. API and open data from 2010.
Documentation available	Yes. In Norwegian only.	Yes. In Danish only.	Yes. In Swedish only.
Site URL	http://data.stortinget.no	http://oda.ft.dk	http://data.riksdagen.se/
Datasets	Parliament sessions and years, counties (members of parliament are elected from their county), topics, political parties represented in parliament (present and past), committees (present and past), members of the parliament (present and past), member biographies and pictures, members of the government, questions raised, cases, voting records (also for individual representatives) and voting results, meetings, agendas, hearings, list of speakers, publications, and speeches made by members of the parliament. Datasets can be combined using the API.	Votes, voting records, legal documents, members of the parliament, general documents, points on the agenda, debates, EU cases, law proposals, and meetings. The remaining datasets are used to specify the type of an element or link elements to each other. All data are stored in a relational database.	Information about members of the parliament with what they have said and done (aggregated database). Motions made by members. Voting records. Documents: The parliamentary diary, committee reports, ministry publications series, documents from the committee on EU affairs, order papers, agenda, explanatory memorandums, submissions and reports, interpellations, the chamber's activities, EU commission's proposals and reports, government bills, records and minutes, written communication from the parliamentary, meetings, written questions, Swedish government official reports, list of speakers, commission inquiries, committee documents, statements of opinion, and others. Vote data, speeches, the parliamentary calendar.
Datasets	Members of parliament from 1945 (including pictures). Other data from 1988.	Complete metadata from 2013. Session minutes from 2009 in XML files possible to relate to database.	Most datasets go back to 1971. Vote data are available from 1993/1994. Ministry Publications Series, Swedish Government Official Reports, documents related to the Committee on European Affairs, EU commission's proposals and reports, and information about members of the parliament from 1990. Order papers/agenda, explanatory memorandums, written communication from the parliament, and list of speakers from 2000. Chamber's activities and meetings from 2010. Parliamentary diary from 2014.
Access format	API. Direct download of representatives and policy documents as XML. Support tools (data builder) to create search queries for the API.	API. Data are available as XML and JSON. Full MS SQL database backup every night. Some of the datasets link to documents in PDF format (e.g., biographies, minutes from meetings, and case documents	API. Direct download as HTML, text, CSV, XML, JSON, or SQL. Support tools to create search queries for the API. Have premade reports to quickly filter, compare, and overview the data in the web browser (only for parliamentary members and votes).

6. Discussion

The study of the three Scandinavian parliaments reveals that the path to open data in parliament is more an explorative and new strategic path than a clear metrics-driven strategy. Still, the findings show that the three parliaments have embraced open data and put effort into making data available to the public. So far, the number of applications using the data is limited. At the same time, open data has been used in hackathons in all three countries. This may indicate an emerging interest in making new applications to analyze and visualize the work of the parliaments. The open data is used by the media and may save time for the employees of the parliaments, and at the same time, provide effective access for the media.

To use open data requires an understanding of computer programming, so the data itself is not very useful for ordinary citizens. However, the provision of open data allows building useful applications that can inform citizens in new and innovative ways.

The provision of open data is a step to fulfill the intentions of the “Freedom of Information Acts” in all three countries. All three Scandinavian countries have transparency high on its agendas and see digitalization as a measure to provide better access to public sector information.

The parliaments have made an effort to make its data open, despite a few limitations. Our study indicates that the open data from the parliament meets the open government indicators, except being discriminatory (i.e., difficult to access by non-technical users). Furthermore, there are no interactive means of interactive communication (e.g., social media, blogging, photo and video sharing, etc.), where people can share their ideas, give their feedback on various matters of concern, and be involved in the policy-making process. Table 3 shows the open government pillars, indicators and findings.

Table 3. Open government indicators revisited.

Open Government Pillars	Open Government Indicators	Findings
Collaboration	Government-to-Government	Allowing collaboration with other countries, solving cross-border problems such as transport, crime prevention, and health. Collaboration between ministries and between ministries and public agencies.
	Government-to-Consumer	Supporting developers, journalists, researchers, and other interested stakeholders.
	Government-to-Business	Support for work and business statistics, and providing open data hosting platforms for businesses.
Open data	Open data characteristics complete	Yes, within boundaries of the open data initiative.
	Primary data	The open data platform is connected to archival systems, so data are original.
	Timely publication of data	Data are published as soon as they become available.
	Accessible	Accessible through API.
	Machine processable	Several machine-readable formats.
	Non-discriminatory	Non-technical users cannot download and make use of the data. Planned updates will make data more accessible.
	Non-proprietary	Published under open data license. Some material is under copyright (e.g., pictures).
Data transparency	License-free	Published under open data license. Free to use and share as long as the source is cited.
	Authenticity	Parliament is verified publisher and in control of the repository.
	Understandability	Partially: Data require some technical competence for use, making it challenging to, for example, journalists with no technical background.
	Reusability	Handled by open data license.
Government transparency	Procedures Tasks Operations Regulations	The framework for transparency is in place through open data license and guidelines for open data found in the digital agenda. Focus on data-driven innovation.
	Open dialogue	No explicit feedback mechanism, except contact information to people responsible for the repository. Frequent users have an on-going dialogue with data owners, and suggestions are implemented at regular intervals.

While the three parliaments are performing well along with the open government indicators, there are several coordination challenges evident if we look at open data at the national level (see Table 4). These challenges have been identified by [31] and are said to be addressed, although not guaranteed, by three coordination mechanisms: Standardization, plan, and feedback, as discussed earlier in this paper. However, these mechanisms require in-depth coordination-related knowledge [31].

Table 4. Key coordination challenges.

Coordination Challenge	Examples from Scandinavian Parliaments
Inappropriate regulatory environment	The regulatory environment is in place (Freedom of Information Acts). However, current laws favor making documents openly available, not open data. No formal push to make the parliaments publish open datasets.
Fragmentation of open data	Government open data is generally scattered across a wide range of repositories. National open data portals have been established, but there is no published central register of open data. All three parliaments are using companion websites for open data or metadata.
Unclear boundaries of responsibilities Lack of feedback on, and discussion of, data use Lack of interconnected processes Lack of standardized and planned processes	Fragmented central responsibility for open data. The parliaments are autonomous and make their own decisions about open data provision. Still, all three parliaments have made efforts to make large amounts of information available to possible users of open data sources.

On the national government level, the identified challenges are mostly related to a lack of central organization. While there has been a push towards publishing open data, as shown in the examination of policy documents, there is still no central organization with the mandate to force agencies to publish their data, despite that infrastructure, regulation and resources/support are in place. The three parliaments are autonomous and can decide what data to publish themselves. Still, the three parliaments have published many datasets and metadata. The infrastructure has been put in place, and the workforce has been allocated to support open data.

One of the Norwegian respondents said that many requests for data come from journalists and others with limited or no technical knowledge. To promote the use of open data, the publishers (in this case, the parliaments) could develop new ways to access data and make applications that allow end-users to extract and combine data without programming skills. The concept of data builders, where users can use a graphical user interface to create new data by extracting and combining existing data, is one measure that can increase the value of the open data for its users.

By publishing the data as open data, the three parliaments contribute to a more open and transparent public sphere. However, their motives for providing open data are also linked to the improvement of the internal data architecture and development of new, innovative applications for citizen insight. The variance in approach to providing open data in Sweden, Norway, and Denmark is illustrative of the technical dilemmas of providing open data. For example, while Denmark provides metadata only, Norway provides datasets. Also, the Danish Parliament provides a full MS SQL backup set every night for its mainly professional users. Also, it is important to note that in all three countries, there are provisions of datasets about parliament affairs through other online channels.

The three parliaments' open data show a high degree of variance of how long the data go back in time. While the data from Norway date back to 1945 and Sweden date back to 1971, the data from Denmark date back to 2013. This remarkable difference is partly due to variance in how data are provided (metadata versus dataset). Despite the examples of use from the three countries, the culture of openness and possible business models for companies using the data are still at an explorative stage. While this could indicate that there inflated expectations on who can and who has an interest and time to "play" with the open data, we did identify examples of use targeted to the general public and examples of companies using the data to provide services to a professional community.

The provision of open data from parliament is supplemented by a very widely provision of data and "open-washing" through other channels from the parliament and ministries. Although the provision of data through the other channel does not fulfill the formal requirement to open data, the accessibility of data might be part of the reason why there has not been a quicker and more widespread use of the open data provided by parliament.

7. Conclusion and Future Work

The Scandinavian parliaments are, overall, on a par with regard to open data from parliament. All countries have documented datasets available and follow an emergent strategy. The metrics of success are blurry, and there are relatively few users of the data. Still, we hesitate to make drastic conclusions with regard to the potential and future use of open data.

One possible strategy is to create outside pressure on the government to create open data policies for all government entities. Establishing a national open government data repository is an important measure to make big and open data available to businesses, organizations, and citizens. The national repository should link to all local open data repositories managed by government entities. The demand for big and open linked data (BOLD) is growing, and a national repository will also make it easier to handle privacy-related issues [61].

7.1. Limitations

The research presented here is based on empirical data from the Scandinavian parliaments, their effort to make their data open, and the use of parliamentary data by others. The study has not examined other parliaments and their efforts, but the results presented here might be relevant for other settings and parliaments and researchers interested in parliaments and their attitudes towards open data.

7.2. Future Work

The research presented here can be extended to include parliaments from other countries. Also, it would be fruitful to follow the development of open data, open data policies, and provision of tools and APIs in the three Scandinavian parliaments over a longer period. In particular, we encourage research on which measures can be applied to possible release the potential of open data in the parliaments. At the theoretical and conceptual dimension, we encourage more work on what we see as a continuum of open data provision. While both metadata and datasets are open data, we also found various other channels and formats from other parliament and government channels that could be perceived as openness. Thus, we encourage conceptual and classification work on open data from a formal technical approach and a perception point of view. While more research needs to be done on these two themes, there is also a need to further explore motives and business models for using the data, innovative visualization techniques to make the results open data analysis more accessible to non-experts, and promotion of a culture for openness.

Transparency is an essential foundation for democracy. By publishing the data as open data, the three parliaments do what is expected from them. They contribute to a more open and transparent public sphere. However, their motives may also be to reduce internal workload caused by requests for information. By letting the media and citizens serve themselves, it is not necessary to allocate employees to do the job manually. The three parliaments also facilitate the development of new, innovative applications for citizen insight. Based on their efforts, the three parliaments are good role models for open data initiatives.

Thus, we propose that the next step for open data in the three countries should be creating and institutionalizing a culture of openness at a national level to push more agencies, municipalities, and counties to publish their data. Cases such as the Scandinavian parliaments could be used to demonstrate the potential outcomes of open datasets.

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