The Potential within the Government for Innovation and Efficiency from Open Data – Examples from the Norwegian public Sector

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Abstract

Many of Norway's State organisations are seeing the potential and reaping the benefits from opening up their data and adopting a data sharing culture. In this paper we present some examples of innovation and efficiency-gains in the Norwegian public sector that are results of opening up data.

The paper explores some early examples of direct benefits for the public sector itself from opening up data. These are:
- Benefit 1: Design for sharing improves efficiencies – from integration-mess slowdown to sharing-induced agility
- Benefit 2: Improved Data quality and Service Delivery
- Benefit 3: Data sharing within the public sector provides for great savings

Background

In 2006 the Norwegian Parliament enacted a new Freedom of Information Act which superseded the previous law of 1970. Amongst the changes was the implementation of the "PSI-directive"[1]. The new legislation came into effect in 2009, the same year the open data portals data.gov and data.gov.uk were launched in the USA and the UK.

In November 2010 the Ministry for Government Administration and Reform issued a circular letter stating that every Ministry should demand that their subordinate State bodies opened up their data. This was followed up by the launch of the Norwegian Open Data Portal data.norge.no in September 2011 together with the datahotell which hosts data on behalf of many organisations. These are further supported by other tools such as the Open Data Guidelines which all public organisations should follow, the Norwegian open data licence (NLOD), the handbook for sharing of public sector data and the support and advisory role which is delivered by Difi (The Norwegian Agency for Public Management and eGovernment).

The initial years of the Government's open data actions were primarily motivated by creating new business opportunities and jobs in the private sector and improving openness. Potential efficiencies in the public sector were in many ways a secondary goal. However there has been a shift in recent years towards recognizing the huge potential which the opening up and sharing of public sector information can have on innovation and efficiency within the public sector itself.

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[1] Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information

Difi Traffic Light System

As a way of increasing the understanding of the value of open data within the public sector Difi has developed the traffic light system to make agencies aware that even if data can not be made publicly available (green data), often they can be shared either within the public sector (yellow data), or at least with the person or organisation the data concerns (red data). Therefore, the focus should be on *sharing* as a rule, not as an exception.

The need for such a sharing-culture is also documented by the Office of the Auditor General of Norway. In a survey from 2011 they find that 72 % of governmental agencies are aware of information that is held by other agencies, which would have been useful for themselves. And 55 % knows about information they hold themselves that should have been available to others.[2] Both numbers have significantly increased since a similar survey in 2007 (36 % and 30 % respectively).

Benefit 1: Design for sharing improves efficiencies – from integration-mess slowdown to sharing-induced agility

Many public sector agencies in Norway have a long tradition for using ICT to support their mission, such as The Norwegian Tax Administration and The Norwegian Labour and Welfare Service (NAV). Nearly sixty years of ICT development to support different tasks has led to a myriad of systems. The illustration below is from the Norwegian Tax Administration, which uses it to illustrate the resulting complexity. This is a *simplified* model of a *subset* of their systems, made in the first phase of an on-going modernisation project.
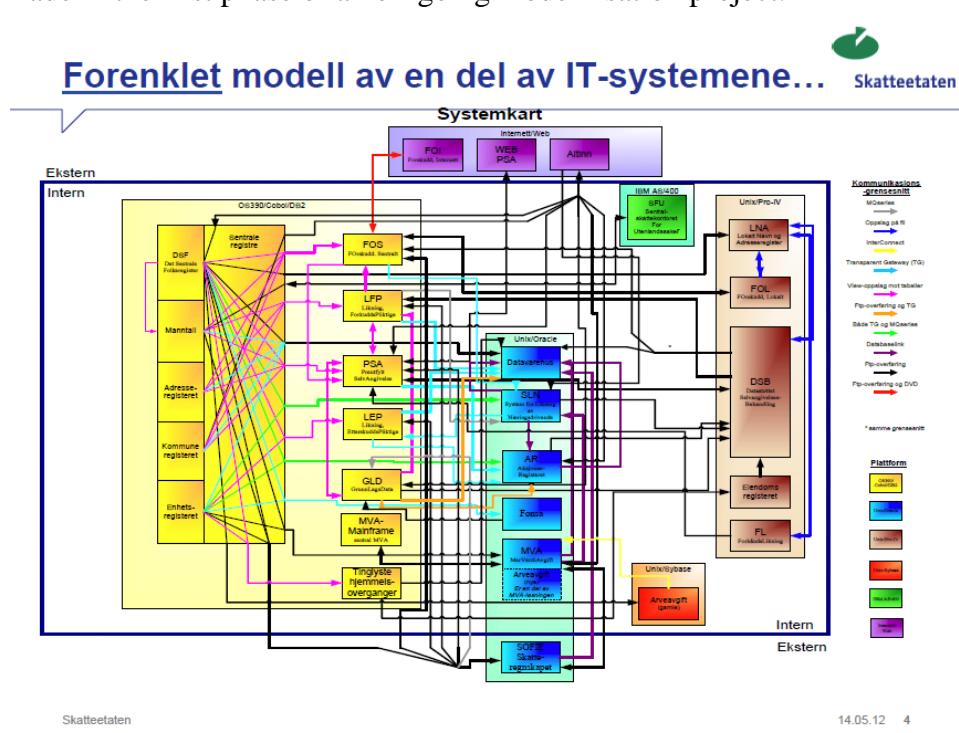
Figur 1 - Simplified model of a subset of the systems in the Tax Directorate

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[2] «Riksrevisjonens oppfølging av forvaltningsrevisjoner som er behandlet av Stortinget Dokument 3:1 (2011–2012)», http://www.riksrevisjonen.no/Presserom/Pressemeldinger/Sider/Oppfolging2011.aspx

The model above illustrates the challenges which many public sector organisations face by these legacy systems which do not allow for sharing between the systems. As a result, costs for operations and necessary changes are surging due to the complexity caused by years of point-to-point integration between stovepipe-systems.

The Norwegian Tax Administration saw their ICT-related costs double in the period from 2000-2008. The increasing cost is also a strong indicator of reduced ability to change. Every new change requires an increased effort of "what-if"-analysis to make sure the change will not break anything. However, the risk of unforeseen consequences of each new change increases with each existing integration.

Automatisation of case handling and ICT decision support systems has had an enormous effect. The possibility for automatisation of decision making is often taken into account when parliament considers new or changes existing welfare services. But the automatisation has come with a price in form of less flexibility, which we now struggle to explain to leaders and politicians. If parliament enacts a reform that is incompatible with existing ICT-systems in the large agencies, they no longer face a two-five years reform-period. 10-20 could become the new norm.

One of the best known examples of this inflexibility is the new General Civil Penal Code which was enacted by parliament in 2005. Amongst other things it raises the maximum sentences from 21 to 30 years for terror attacks. Despite this the terrorist from the July 2011-attack in Oslo and Utøya could not be sentenced according to the law in 2012, seven years after the law was enacted, as it had yet to take effect, due to unforeseen consequences to the case handling system of the judicial system. The latest estimate is that the law might come into effect in 2021, if Parliament commits approximately 300 million euros.[3]

Another related example in Norway was the program for modernisation of ICT in the The Norwegian Labour and Welfare Service (NAV). In 2006 NAV was established as a merger of the earlier Welfare Directorate and Labour Directorate. With few exceptions, their ICT-portfolios have existed side-by-side within the Welfare Directorate since, with little information exchange and synergies between the two "environments". In 2012 Nav chose tenders for development partners and the modernisation work began. In the autumn of 2013 the program was terminated, due to concerns that a vital milestone related to implementing a reform of the disability pension on the modernized platform would not be reached in time. Nav has instead chosen to re-use the latest of their existing systems for implementing the reform, thus potentially increasing existing complexity, and re-plan the modernisation. The Directorate faces critical questions on what the results are of the approximately 90 million euros which has been spent from the start of the implementation of the program.

Is there a way out of the increasing complexity and lack of flexibility in the increasing interconnected governmental ICT-systems? According to a case study from USA, Department of Homeland Security, there is a potential of 6:1 in value for each dollar invested in "data management" and "data architecture" activities for a system.[4] Such investment in the development and implementation of the system pays off during the systems lifespan. The case study describes a model starting with a typical system with "data in a black box" and lack of

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[3] From the newspaper «VG», http://www.vg.no/nyheter/innenriks/ny-straffelov-forsinket-i-16-aar/a/10114788/
[4] DHS cost model shows benefit of data architecting, see: http://www.fiercegovernmentit.com/story/dhs-cost-model-shows-benefit-data-architecting/2012-12-09

documentation. The value of data-related activities pays off through "fewer failed modernisations", "better data quality", "reduced number of interfaces" etc.

Our impression is that "data architecture" and "data management"-activities which the model refers to can be formulated as "designing for sharing" and "making open and machine-readable the new default"[5]. The Norwegian Public Roads Administration recently modernized one of their core systems according to these principles and their analysis of the effects supports our impression.

The Norwegian Public Roads Administration maintains "the national road database" (NVDB), which contains information about all roads and all "objects" along the road (bridges, crossings, road signs etc.). All information is geo-located in cooperation with the mapping Authority. With data from the NVDB a GPS-navigation system will for instance be able to tell what speed limit applies to the current position.

In 2011 a project was initiated to modernise the NVDB system, whereby improving access to the database, both for the organization itself and its partners. Being aware of – and supportive towards the governments newly issued circular letter on open data, they ended up with a concept where the data from the database is indexed on a web-server and made available through an API built with REST-ful web-services, open for all.[6] On top of this API they developed the web-app they were in need of, which lets the user navigate the data through a map. The first version of their API is a read-only API, but they plan to extend it to a read-write API, including an authentication-layer in order to give access to some information in the NVDB that cannot be made generally available to the public due to privacy (record of accidents), i.e. "yellow" and "red" data according to the traffic light system.
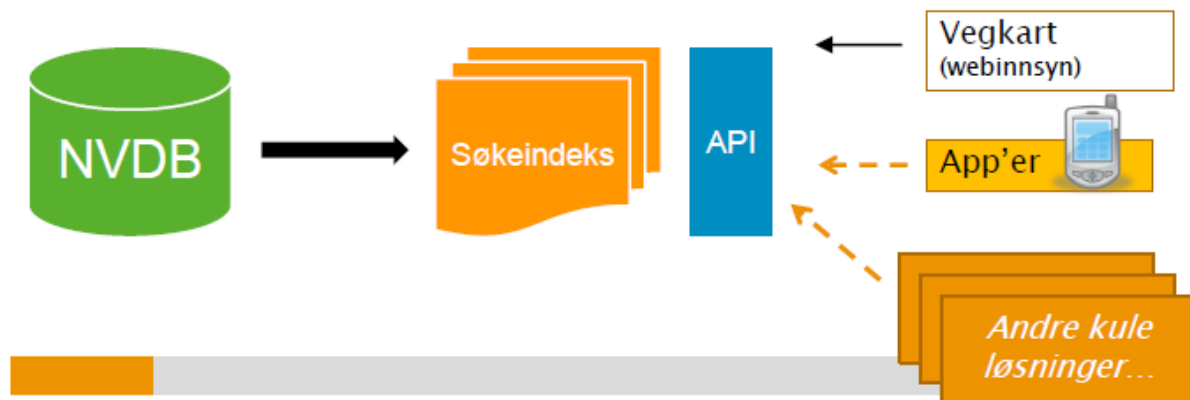
Figur 2 - Illustration of the modernised solution for accessing NVDB

In a presentation held by The Norwegian Public Roads Administration late 2013 the agency states that the solution that was initially meant for modernising access to one of their datasets, is now seen as a pattern for modernising the entire infrastructure. According to the agency the effect of the modernised solution is threefold;
- Improved information security; i.e. improved confidentiality, integrity and accessibility

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[5] The Open Data Policy in the USA; "Making Open and Machine Readable the New Default for Government Information", see: http://www.whitehouse.gov/the-press-office/2013/05/09/executive-order-making-open-and-machine-readable-new-default-government-

[6] See: https://www.vegvesen.no/nvdb/api/

- Improved agility (flexibility and ability to make changes) through radical simplification of the ICT infrastructure
- Opening data for re-use (both within and outside the public sector)

As we've shown, the lack of flexibility in the ICT-systems is an increasing concern in public sector, and therefore the experience from The Norwegian Public Roads Administration is especially relevant. But it would have been very easy to categorise it as irrelevant for the other agencies facing similar challenges, for instance the above mentioned Norwegian Labour and Welfare Service and the Norwegian Tax Administration, had it not been for the fact that the modernised solution also has resulted in improved information security.

There is reason to believe that The Norwegian Public Roads Administration has experienced a shift away from what seems to be the traditional view on information security; the *confidentiality* aspect has been viewed as the most important, followed by *integrity* and then *accessibility*. Through focusing on accessibility first, and then adding solutions for confidentiality and integrity, all data that *can* be shared is shared. According to the Roads Administration this increases the awareness of the value of the data, and the need for quality assurance. Building their own products on the same API that is being used by others, is also the best guarantee that the data will be *accessible*.[7]

Open data is clearly not a panacea to resolving all the complexity issues in the Norwegian Public Sector. However, the Roads Administration case study is of relevance when identifying opportunities to curb the cost-explosion related to operations of, and necessary changes to, the ICT-systems in public sector of Norway. Moving from "data in a black-box" to systems designed for sharing and availability of data, not only greatly increases agility, but also the act of opening up data is a valuable contribution to building a culture of openness in the public sector and will drive transparency of the systems in general – all of which can lead to increased innovation and effectiveness in the Norwegian Government.[8]

Benefit 2: Improved Data quality and Service Delivery
The Public Roads Administration are not the only organisations which have seen improved data quality and service delivery through opening up data. The Norwegian Meteorological Institute and has witnessed major improvements in data quality and hence delivers better services due to the opening up of their data and the ensuing feedback which they have received from their users.

The Norwegian Meteorological Institute and Yr.no
During the first years of this millennium The Norwegian Meteorological Institute radically changed their view on how to deal with their meteorological data. They went from a position where they sold their weather forecast at a higher price than many other national meteorological institutes, to sharing their data freely and openly for all. The opening up of the data resolved the moral dilemma which they found themselves in; where they received millions of euro from public coffers to collect weather data and develop meteorological

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[7] Often referred to as "eat your own dogfood"

[8] For example the "rules in a black-box" situation, which actually challenges one of the foundations of a modern welfare state, the "rule of law"-principle. By providing a similar overview and openness to rules as to data – what rules are implemented, in which system, and through which means – could be a major contributory factor in combating the complexity issue.

models, whilst the taxpayers were checking lower-quality -- but free -- weather forecasts, before they set sails or went hiking in the mountains.

In 2007, in cooperation with the Norwegian National Broadcasting Service (NRK), they launched the weather service yr.no, which simultaneously exposed all the forecasts and historical observation data as open data through an API, becoming one of the first in the world to open up meteorological data.

Today Yr.no has forecasts for 9 million locations around the world, and the users originate from 200 different countries.

The decision to make weather data available as Open Data has obviously led to far better access to high quality forecasts for citizens in Norway (and many outside Norway too). But a less well known fact is that the open weather data has led to an improved quality in the models used to make the forecasts. Already before the official launch of the service, yr.no received so much feedback on the forecasts that they could

- fix errors in the models that had been there for years, but no-one had cared to fix, because the resulting errors had not been shown to ordinary users earlier.
- amendments to the models after periods of special weather types that has revealed systematic errors in the forecasts.[9]
- apply new models in order to give more precise forecasts for wind.[10]

The main mission of the Norwegian Meteorlogical Institute is to protect life, property and environment. By opening up their data the Institute has improved its ability to fulfill that mission and is delivering a better service.

Benefit 3: Data sharing within the public sector provides for great savings

Difi has created the National Electronic Contact Register for citizens in Norway. This can be shared with all public sector organisations and means that they no longer need to maintain their own contact register. It also hugely improves data quality as the user only needs to relate to one central dataset. Whilst this is not strictly open data it is shared data ("yellow") and a result of the emerging 'sharing culture' within the public sector.

The *Brønnøysund Register Centre* has opened up major parts of the company register. In January 2014 there were 1.2 million look ups in the register, as compared to just over 360,000 in the same period last year. Many of these are from the public sector.

In 2003 the Norwegian Parliament decided to start a modernisation program for the *Norwegian State Educational Loan Fund*. Re-using existing information was one of the principles laid out in the white paper.[11] 40 % of the costs was to be taken from the existing budgets, forcing them to realise the value of the efficiencies along with the modernisation investments. The results so far: 70 % of the applications can be handled entirely by machines, they have reduced the average time used to handle an application by 50 %, the number of

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[9] See: http://om.yr.no/info/fakta/historie/

[10] See: http://om.yr.no/2014/04/11/bedre-vindvarsler-i-paskefjellet/

[11] St. meld. nr. 12 (2003-2004), «Om modernisering av Statens lånekasse for utdanning», see: http://www.regjeringen.no/nb/dep/kd/dok/regpubl/stmeld/20032004/Stmeld-nr-12-2003-2004-.html?id=197547

phone calls has dropped from 1.5 million to 0.5 million, reduced number of employees and operation costs. While at the same time the number of applicants has increased by several hundred thousand. Their annual budget is cut with nearly 10 million euros. Their vision is that the applicant only shall have one question "how much do you want?", and the rest of the information relevant for handling the case should be gathered from other sources (green, yellow and possibly red data – with the applicants consent). In public, the State Loan Fund has advocated the need to "quit using the citizen as a carrier pigeon".[12]

In order to reduce the administrative burden of filling out forms, the *Statistics Norway (SSB)* has for many years sought to get access to existing data gathered by other public sector bodies. Cross-checking and analytics of different sources of information has for instance led to the curious fact that their copy of the National People Registry has more detailed and up to date information than the authoritative register, held by the National Tax Directorate.

In 2011, SSB completed a census in Norway for the first time using only existing data, with no forms to fill. Although the 2001-census also to a large extent was based on existing data, the price in 2011 for each counted person was only 1/10 of that in 2001. In comparison, the 2011-census in the USA was almost 80 times more expensive for each person counted as the 2011-census in Norway.[13]

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[12] Difi-report 2013:10 on Information Management in the Norwegian Public Sector (in Norwegian): http://www.difi.no/artikkel/2013/10/informasjonsforvaltning-i-offentleg-sektor-difi-rapport-2013-10
[13] Difi-report 2013:10 on Information Management in the Norwegian Public Sector (in Norwegian): http://www.difi.no/artikkel/2013/10/informasjonsforvaltning-i-offentleg-sektor-difi-rapport-2013-10