THE SOVEREIGN DIGITAL PLATFORM - A STRATEGIC OPTION FOR SOCIETAL DEVELOPMENT

Short paper

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Abstract

Digitalisation of the public sector has emerged as a separate field, focusing on effective government and the provision of universal services. In this paper, building on the platform literature, we extend this perspective, suggesting that a particular class of platforms, which we call Sovereign Digital Platforms, can serve the needs of the public sector, but also contribute to efficiency and growth in the private sector.

Our empirical evidence is Altinn, a Norwegian public-sector platform, which was established in 2003. Altinn is more than a technical platform; it is also the core of a government-business ecosystem of innovation and participation, enabled by trust emerging from key public registers and their institutional custodians. We use the unique experience of Altinn to develop some key concepts of the Sovereign Digital Platform, and to discuss the implications for digitalisation policies.

Keywords: Public sector platform, digitalisation

1   Introduction

O'Reilly's book "Government as a Platform" (2011) has inspired many practitioners and researchers. O'Reilly was not aiming for e-government as a "vending machine", i.e. a mechanism for citizens paying taxes and receiving a set of pre-defined services. In contrast, his vision was the use of collaborative technologies to solve collective problems at a city, state, country and international levels:

> The hope is that Internet technologies will allow us to rebuild the kind of participatory government envisioned by our nation's founders, in which, as Thomas Jefferson wrote in a letter to Joseph Cabell, "every man...feels that he is a participator in the government of affairs, not merely at an election one day in the year, but every day" (p.14).

To achieve this O'Reilly envisioned government platforms, characterised by (i) openness and generativity, (ii) starting with simple solutions which evolve, (iii) designing for participation, (iv) learning from your hackers (i.e. from outsiders), (v) use data mining for participation, (vi) encourage experimentation and (vii) lead by example.

It is clear that "Government as a Platform" is something different than "platform for government". While many government initiatives the past five years have focused on platforms (Brown et al, 2017), the perspective is on user needs and technology solutions, not on participation and innovation.

In this paper we explore these ideas in the current digital government research, and in particular building on the experiences of Altinn, a Norwegian public-sector platform. Our perspective is somewhat less idealistic and more practical than O'Reilly's, but still conformant with his basic ideas. We introduce the notion of a Sovereign Digital Platform, which we define as a *"configuration of interdependent technology platforms and authoritative registers that collectively address the objectives of a sovereign state including citizens' informed participation and stimulation of innovation in businesses"*. As a

configuration, a sovereign digital platform orchestrates individual technology platforms so that they fulfil requirements for federated responsibility (national, regional, municipal) and capability (citizen engagement, governance, innovation and provision of universal services).

Our research question is, *how can Sovereign Digital Platform contribute to improving the delivery of universal services and stimulate more participative innovation?*

2   Public-sector Platforms

Digital infrastructures have made an impact in various contexts of society (Hanseth and Lyytinen, 2010); on a global scale this is witnessed in many sectors and networks, such as financial systems, supply chain, e-Health, mobile platform app-stores and social media. There is a considerable body of e-Government research, mainly focusing on public services, but also on democratic participation and governance. Some key findings include:

- While public sector agencies have deployed national and regional solutions, these largely address specific needs that are sector-based or within a specific jurisdiction. The IT silo problem is particularly apparent in the public sector (Bannister, 2001)
- The pace of change is slower than expected, and many programs have ended in partial or complete failures (Sauer and Willcocks, 2007).
- The field is theoretically weak, tending to be overoptimistic, and failing to accumulate knowledge (Heeks and Bailur, 2007).
- The tendency towards assuming organisational and service change in Government can be led by technology, rather than only enabled by it (Brown et al, 2017)

In the meantime, the strong current interest in platforms (Tiwana, 2013; Parker et al, 2016; de Reuver et al., 2017) has also triggered optimism in the public sector, and several government initiatives now focuses on the potential of platforms. However, public-sector platforms are different from the simple structure of two-sided markets championed in the platform literature (Bygstad and D'Silva, 2015); they serve a variety of purposes, they are more open (for the whole population), and they are often technically more complex (ecosystems or platform for platforms configurations).

In a seminal article Brown et al (2017) reviews the platform research and policies for the public sector, and proposes a framework in three dimensions, to understand and manage public sector platforms. The key argument is all three dimensions are critical, to approach the ideals of "Government as a Platform"; it should emerge as a clear organisational form, it should support market dynamics and it should support (technically) a platform ecosystem.

Dimension	Description	Some key references
Organisational form	Platform-ecosystem as collectively visualised organisational form	Anderson at el., 2014 Guo et al., 2014
Market dynamic	Platform-ecosystem as complex dynamic of commoditisation and shifting incentives for participation	Ghazawneh and Henfridsson, 2013 Markus and Bui, 2012
Architectural structure	Platform-ecosystem of modular interlinking processes, enabled by shared infrastructure	Tiwana, 2013 Jin and Robey, 2008

Table 1. Platform framework

We build on this framework as a sensitizing lens and will use it to discuss Altinn as a Sovereign Digital Platform.

3   Method

To investigate this issue, we chose to conduct a structured case study (George and Bennett, 2005) of Altinn that was established in 2003. We did a systematic documentation of history of Altinn, based on written documentation and interviews with central stakeholders. This was supplemented with observa-

tions made by the second author, who participated actively in the development and evolution process as an employee of a system integrator. The chronology of Altinn is documented in section 4.

We first documented the key events and identified the main services of Altinn. We then analysed the social and technical structures of Altinn. Then we assessed the features and socio-technical networks of Altinn with O'Reilly's criteria. Finally, we propose a framework for Sovereign Digital Platforms.

4   Findings

Altinn (portmanteau for "Alternativ Innrapportering") was introduced as a government portal for the mandatory reporting of company financial statements. It was gradually expanded, and in 2009 redesigned to serve as a platform. We first provide a chronology of the development of Altinn (Table 1).

Altinn I (2003-2008)	Altinn II (2009-2018)
Portal for form-based submissions	New architecture for co-operation
Company reporting Automated tax return	Six types of services including a service development toolset
Software vendors offered Altinn plug-ins	APIs available; web services and REST
Partly financed by the system integrator. Service owners pay per transaction.	Fixed price for development and operation. Service owners pay based on potential annual savings
Mainly technical development	Innovation@altinn used as a means to stimulate platform adoption, new use-cases and enrich the platform

Table 1. Development of Altinn 2003-2018

2003: Altinn I introduced. A key component was forms management technology used in the portal. Two central registers served as authoritative directories for the solution, the National Register (of inhabitants) and the National Register of Businesses. The solution covered 80 forms for business-to-government usage and was well received by the business community. Two services were introduced:

(i) Submission: A service owner creates a service to allow a user to submit data as per a defined schema. Submitted data will be sent to the inquiring agency (service owner) and can also be stored in the user's storage area in Altinn. The service allows the service owner to split the data to different agencies. The service pattern offers different mechanisms for preparation, signing and submitting data. Other mechanisms allow for notifications and allocation of tasks with deadlines.

(ii) Message: Service owners can send messages to registered users of Altinn. The messages appear in the user's Altinn mailbox. Messages support HTML messages and attachments. The user can be notified by SMTP-based e-mail or SMS that information is available for review or processing.

2005: Automated tax return. This solution, developed by the Tax Authority, generated a tax statement based on the information obtained via Altinn (incomes, property) and banks and insurance companies (accounts, pensions). Altinn's portal capability provided taxpayers with the ability to approve pre-filled statement of returns. This automated functionality served most of the tax returns and most inhabitants regarded this as a great time saver. It also greatly simplified the work for the tax authorities, since data extraction and algorithms did most of the job.

2005: More actors. The success of Altinn attracted other public organizations: the Central Bank of Norway, other ministries and several public agencies started engaging with businesses using Altinn.

2006: Security Portal. Altinn adopted *ID-porten*, the public authentication gateway established by the Agency for Public Management and eGovernment (DIFI). This provided a flexible solution i.e. it al-

lowed for different commercial solutions for electronic IDs to be used. The same year Altinn received the prestigious "Rosing Award" from the Norwegian Computer Society.

Altinn II - In 2007 the Tax Authority issued a request for proposal to extend the functional scope of Altinn. The contract was awarded in a dialogue-based negotiation.

2008: Altinn II introduced. Altinn II was a significant increase in scope of functionality and technology capability. While Altinn I was developed as a portal, Altinn II was commissioned to be a platform for collaboration. These services allowed 3rd party entities to implement an Altinn plug-in in their software products, i.e. accounting, financial, CRM systems and others. A key enabler for service development included a toolset; the Service Development Toolset aimed at service developers.

2011-12: Media storm. Altinn had now become a service most Norwegians knew well, and two unfortunate incidents occurred. In 2011 the system crashed the day of tax return, because of user overload. In 2012 a flaw in a commercial software component for caching IP-addresses allowed all users to see the name, address and communication headers of one specific taxpayer; the last user who logged in before the component failed. The following media storms exaggerated the damage done, but triggered improvement of the security and privacy mechanism and increased awareness among policy-makers about the role of national components.

2013: API for developers. Recognizing the status as a national platform Altinn provided a REST API for external developers. This feature augmented the existing self-service capability represented in TUL – the service development toolset. In 2014 an Altinn app was released, supporting a larger innovation arena for 3rd party developers. The following types of services were made available:

- Access: Service owners use this service to provide access to information from their systems.
- Links: Allows users to access schemas and services on other websites. Access is secured through Altinn's authentication and authorization components.
- Transmission: Service owners use this to transfer large volumes of data between parties.

2013: Digital bankruptcy process. The debt restructuring process of a company involves many actors, such as banks, creditors, lawyers and accountants, tax and legal authorities, and often takes months and years. Using Altinn and supporting authoritative registers from the responsible agency, a faster process was implemented with digitally-enabled and secure interaction between the actors. This utilizes Altinn's workflow capability to coordinate activities across organizational boundaries.

2015: "The A-message" (Work report). Employers had to report information on employees and wages to the Tax Authorities, the Welfare Agency and Bureau of Statistics using different forms, at different times of the year. The A-message ensured that employers only report using one electronic form using Altinn. This allows agencies to capture information in their respective systems.

2009-2017: Innovation@Altinn. This started as a "think tank" programme including the Altinn managers and developers, members of academia, representatives from the agencies, IT vendors and system integrators. The programme was run on an annual basis including 4-5 network meetings where participants discussed ideas and created prototypes for new services and capabilities in Altinn. Brønnøysund Register Centre and its system integrator were co-hosts of the program.

2016-2017: Digital Public-Private Collaboration (DSOP) In 2014, ideas from the Innovation@altinn programme triggered the creation of user-managed-consent as a platform feature in Altinn. Spearheaded by Finance Norway, the association of financial institutions, Norway Tax and Brønnøysund Registers Centre, a pilot solution allows any loan applicant to give banks restricted consent to data captured as an A-message. This has reduced processing times and provides greater market competition. DSOP is now established as a collaborative to drive cross-sectorial initiatives from public and private actors.

2017: National Data Catalogue. The data catalogue is a design-time component for the discovery of terms, data sets and APIs managed by public enterprises. This is aimed at augmenting the Service Development Toolset and accelerating the service development process with the potential to automate it. The catalogue uses the EU standard DCAT-AP and will support agencies' data governance activities including GDPR requirements. Descriptions from other standards-based catalogues can be automatically collected, thereby enhancing collaboration that can attract more developers to the platform.

The overall results from Altinn are impressive: In 2014, Altinn handled a peak of 1 million daily requests, supported the collaboration between more than 40 government agencies and was used by 70% of the population. As a part of a benefit realization analysis, the net present value of Altinn was estimated to 2.6 billion USD (Flak and Solli-Sæther, 2013). The solution builds on long-term and careful standardization: shared metadata (semantic interoperability), open technical standards, cooperation between public agencies and private vendors (organizational interoperability) and adapting laws and regulations in developing digital services and supporting the once-only principle.

The highest value of Altinn in our opinion, however, is not the services, but the platform: Altinn was built to build. The tender documentation for Altinn II stated "The platform must be robust, flexible and prepared for the future, to become an enabler to help the different actors in the public sector to realize their needs to modernize into full e-government organizations. The platform must be sustainable and support changes to applications and components and include new ones." (Skattedirektoratet 2001, p.9).

5   Discussion: A Framework for Sovereign Digital Platform

Assessing the experience from Altinn with O'Reilly's (2011) criteria for Government as a Platform, we suggest that although it does not fulfil all of them, it shows a clear way forward. It is relatively open and generative, it started simple and has evolved based on needs, and it is designed for collaboration. Starting with tax reporting, it was not designed for experimentation, but the platform services and API policies produced substantial innovation far beyond the domain of tax and regulatory reporting.

We use the platform framework of Brown et al (2017) to discuss the status of Altinn and the prospects of a Sovereign Digital Platform. Brown et al. argued that a government platform should conform to all three dimensions of their framework (Table 2)

Dimension	Description	Assessment
Organisational form	Platform-ecosystem as collectively visualised organisational form	Altinn generates an ecosystem with high visibility in Norwegian businesses and technology providers
Market dynamic	Platform-ecosystem as complex dynamic of commoditisation and shifting incentives for participation	Altinn has a clear government-business perspective, allowing for innovations in businesses, particularly for providers of technology and software solutions
Architectural structure	Platform-ecosystem of modular interlinking processes, enabled by shared infrastructure	Altinn has a clear platform structure; building on national registers (civil registry, legal entities and cadastre), enabling an ecosystem of government and business actors through various boundary resources.

Table 2. Assessing Altinn with the Platform Assessment Framework

Our assessment is that Altinn generates an ecosystem with high visibility in the Norwegian society, supporting the interaction of enterprise from the public, private and third sector and for innovation in the private sector. Its platform core builds on national registers that is the basis for institutional trust in the applications and services in the Altinn ecology.

We suggest this can be theorised to a more general concept of Sovereign Digital Platform, illustrated in figures 1 and 2.

The Sovereign Digital Platform orchestrates three categories of actors and their interactions.

- **Citizen Engagement**: An SDP allows public-sector agencies to proactively engage with its constituents through data-driven services and by sharing information on policy and rights. An SDP encourages the development of media and social platforms that are built on user-managed consent and "once-only" as key principles for engagement. An SDP encourages service-providers and agencies to educate citizens and drive inclusion.

- **Cross-agency collaboration**: An SDP drives collaboration across levels of federated responsibilities (national, regional, municipal) and across sectors. An SDP uses principles for technical and semantic interoperability to drive automation and potentially algorithmic regulation. This translates to proactive interactions with citizens and service providers, improves productivity across agencies and transparency in government.

- **Co-production in Service Delivery**: An SDP supports service providers - public, private or third sector - comply with regulatory requirements. Channels for regulatory reporting open newer forms

Figure 1 Sovereign Digital Platform - Interactions and actors

of data-sharing that support co-production in service delivery, reinforces institutional trust and increases transparency. The catalogue-based data governance also provides mechanisms for securing for personal privacy and creates opportunities for service providers.
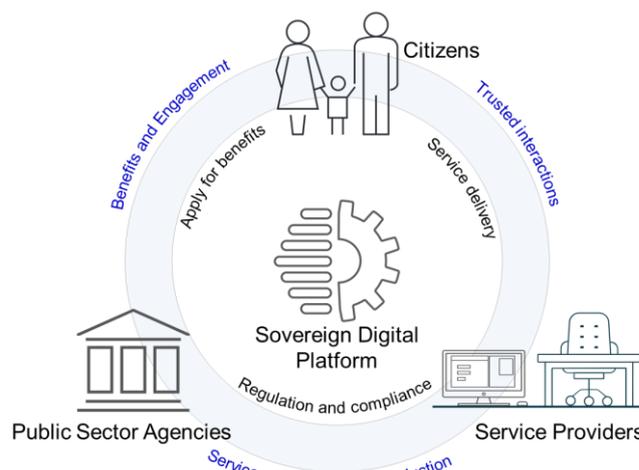
The interactions between these actors defines four categories of platforms that the Sovereign Digital Platform enables, each with complementary capabilities (Figure 2)

- **A) Governance Platforms** enforce regulation and oversight and drive collaboration between government agencies across different levels of federation in a sovereign state. In the context of the SDP, these intra-state platforms support national access points and simplify collaboration across transnational entities like the Nordic Council and the EU. Such inter-state collaboration builds on appropriate legislative and organizational interoperability that is negotiated by sovereign states.

- **B) Platforms for democratic arenas** encourage social interaction, communication and participation from citizens and their representatives. These platforms exhibit similar characteristics as seen in media platforms used in news, education and marketing enterprises.
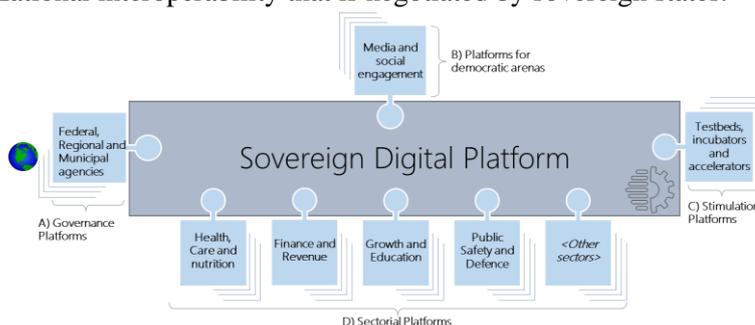

- **C) Stimulation Platforms**

Figure 2 Sovereign Digital Platform – A platform for platforms

serve in the experimentation, incubation and development of data-enabled businesses e.g new technology-enabled business models and cross-sectorial businesses. These platforms are particularly relevant in increasing generativity by exploring and developing additional platforms and digital services for a local and global market.

- **D) Sectorial Platforms** are anchored in specific domains e.g. Finance (banking, payments, insurance etc) or health (hospitals, general practitioners, pharmacies etc). These platforms collectively serve the objectives of all actors operating within a domain i.e. public agencies, service providers and actors from the third sector. A domain has several platforms serving its actors including col-

laboration among actors within the domain. Business associations in cooperation with government agencies are primary sponsors of domain-specific platforms.

6 Conclusion

This short paper used the Norwegian public platform Altinn to explore the concept of "Sovereign Digital Platform". We believe the Sovereign Digital Platform supports the key intra-state interactions between government, citizens and service providers and in doing so, establishes the basis for inter-state collaboration that is applicable in a transnational context.

Further research should investigate the implications of the Sovereign Digital Platform in blurring the traditional government-business boundary and the corresponding governance structures. We also need to assess the skills required of public servants in the future especially in the role of facilitators and enablers in shaping new markets that will use data as an individual and societal resource.

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