Open data: an international comparison of strategies

Ever more governments around the world are defining and implementing "open data" strategies in order to increase transparency, participation and/or government efficiency. The commonly accepted premise underlying these strategies is that the publishing of government data in a reusable format can strengthen citizen engagement and yield new innovative businesses. However, as these open data strategies are relatively new, evidence of this expected impact is still limited. Important questions currently debated are: What is an appropriate open data strategy for governments? Why are some governments succeeding in opening up their databases and others struggling? How can open data policies contribute to increase citizens' trust and participation in government and provide an economic spur? In an inquiry for the Dutch Ministry of the Interior and Kingdom Relations, TNO (the Netherlands Organisation for Applied Scientific Research)[1] examined the open data strategies in five countries and gathered anecdotal evidence of its key features, barriers and drivers for progress and effects.[2] In this article we will give a brief overview of the research results and define key challenges for effective open data policy. Two of the main conclusions are that sound evidence of the precise effects is lacking (e.g. economic, social and democratic effects) and that the acquisition of more knowledge could strengthen a well-informed debate, remove governments' reluctance to invest in open data strategies and help them to develop an effective policy.

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"This article examines the open data strategies in five countries and provides evidence of its key features, barriers and drivers for progress and effects. It defines key challenges for effective national and European open data policy."

1 www.tno.nl

2 Initially TNO studied six countries — also Estonia — but the open data strategy of the Estonian government was too limited to provide any sound research results.

1. Introduction

On his first full day in office as United States president in January 2009, Barack Obama announced that his administration would start a transparency strategy which would imply an unprecedented level of openness in government. In a memorandum for the Heads of Executive Departments and Agencies he stated that (The White House, 2009) *"[…] We will work together to ensure the public trust and establish a system of transparency, public participation, and collaboration. Openness will strengthen our democracy and promote efficiency and effectiveness in Government."*

The debate is resurging about the actual priority of the Open Government strategy of the United States, as the federal government spends about four times more on securing its data than opening it up[3]. In 2009, the journalist Maura Reynolds had already criticised Obama's openness strategy, stating that (Reynolds, 2009) *"[…] In practice, the new president's record on government secrecy and transparency has turned out to be decidedly mixed, with his administration seeming to take as many steps toward shielding government information as it has toward exposing it to the sunshine."* This ironic asymmetry, however, is likely to occur in most countries that have Open Government strategies.

Notwithstanding the criticism, various countries have been inspired by Obama's openness claims and have followed the United States in publishing similar openness memoranda or declarations. In December 2009, the United Kingdom government published the report "Putting the Frontline First: Smarter Government" in which it is argued that government has to radically open up and promote transparency (Chief Secretary to the Treasury, 2009). In May 2010, the Australian government published a Declaration of Open Government (AGIMO, 2010), in which it supported informing and engaging citizens through increased government transparency. In other Western countries "open data" has increasingly been placed on the agenda by politicians and policy makers. The Danish government launched an Open Data Innovation Strategy ('Offentlige Data I Spil') in July 2010 (Danish Ministry of Science, Technology and Innovation, 2010) and several regions in Spain have actively developed open data policies (e.g. the Basque Country, Catalonia and Aragon)[4]. Moreover, the European Council stated in the Visby Declaration (Presidency of the European Council, 2009) that European Union (EU) member states should seek to make data freely accessible in open machine-readable formats and stimulate the reuse of public sector information. Accordingly, the European Commission and the EU member states committed themselves in the European eGovernment Action Plan 2011-2015 to *"maximising the value of re-use of public sector information (PSI), e.g. by making raw data and documents available for re-use in a wide variety of formats (including machine-readable ones) and languages and by setting up PSI portals"* (European Commission, 2010).

The attention of governments to open data is not only stimulated by the strategies of the front runners, but also by the development of technologies which enable the creation of new services based on the open data. It may be clear that openness or transparency of government is a traditional 'good governance' principle and that the right to the freedom of information has been constitutionalised in many Western countries – in Sweden as early as 1766 (Staples, 2007). However, the rise of the social web and the explosive growth of mobile Internet enable and stimulate the creation of new services and social engagement based on the government data. Today, over 71 million Europeans surf the mobile internet for more than six hours each day, and the number of user-created online applications is increasing rapidly (EIAA, 2010). In other words, the fact that users can access the internet always and everywhere, and software increasingly supports user-created content and applications, provides

3 The federal budget for IT security was US$4.2 billion in 2011, while the budget for information sharing, which includes Open Data efforts, was US$0.9 billion. These data have been retrieved from the it.usaspending.gov on 21-2-2011.

4 See for instance http://opendata.euskadi.net/w79-home/es

new opportunities to increase government transparency.

2. Open data programmes

In our study for the Ministry of the Interior and Kingdom Relations, TNO examined five countries: Australia, Denmark, Spain, the United Kingdom and the United States. When comparing the strategies of these five countries, it appears that the focus of the strategic plans differs. For instance, whereas the emphasis of the United States government is on transparency to increase public engagement, Denmark underscores the opportunities that open data offers for the development of new products and services. The United Kingdom explicitly mentions the use of open data to strengthen law enforcement. In its report "Putting the Frontline First" the British Chief Secretary to the Treasury (2009) states that "The new online crime maps which went live in October 2009 mean that for the first time everyone in the country can search by postcode for facts about crime in their area and what is being done by the policy to deal with it."[5] Table 1 below gives an overview of key programmes, stakeholders involved and motivations for open data policy of the countries studied.

Table 1: Overview of programmes, objectives and focus open data strategies.

Country	Programme	Launch	Responsible authority	Key motivations
Australia	Government response to the Gov 2.0 report, Open Gov declaration	May 2010 and July 2010	AGIMO, 2010	*"Once public sector information is liberated as a key national asset, possibilities — foreseeable and otherwise — are unlocked through the invention, creativity and hard work of citizens, business and community organisations. Open PSI is thus an invitation to the public to engage, innovate and create new public value."*
Denmark	"Open data Innovation Strategy ('Offentlige Data I Spil')"	July 2010	Danish Ministry of Science, Technology and Innovation, 2010	*"Access to government data provides the basis for new services and different analyses, new information and better insights that are useful to citizens and businesses alike. ICT companies will be able to create new business in developing digital services and advanced content based on public data, and citizens can convert ideas and creativity into practical solutions to everyday problems."*
Spain	"Avanza2"	July 2010	Ministerio de Industria, Turismo y Comercio, 2010	*"Data are crucial for the knowledge economy. By publishing Public Sector Data, more (economic) value can be generated. The data are a source for the development of new products and services. In addition, data are important to exercise one's democratic rights. Citizens are better informed about and engaged in government."*

5 For example http://maps.met.police.uk

Country	Programme	Launch	Responsible authority	Key motivations
United Kingdom	"Putting the Frontline First: Smarter Government"	December 2009	Chief Secretary to the Treasury, 2009	*Action 1: strengthen the role of citizens and civic society, 1.3 Radically opening up data and promoting transparency: "Ultimately a more informed citizen is a more empowered citizen. In a modern democracy citizens rightly expect government to show where money has been spent and what results have been. […] Data can also be used in innovative ways that bring economic benefits to citizens and businesses by releasing untapped enterprise and entrepreneurship. "*
United States	Open Government Memorandum and Plan	January 2009 and April 2010	The White House, 2009) and US Department of State, 2010	*"My Administration is committed to creating an unprecedented level of openness in Government. […] Openness will strengthen our democracy and promote efficiency and effectiveness in Government. […] Transparency promotes accountability and provides information for citizens about what their Government is doing."*

Overall, this comparison of strategies demonstrates that a distinction can be made between three primary motivations to publish government data (see also Figure 1 below):

1. **Increase democratic control and political participation.** Most of the countries studied argue that the publishing of government data can empower citizens to exercise their democratic rights. The United Kingdom government for instance states that (Chief Secretary to the Treasury, 2009, p.25): *"Ultimately, a more informed citizen is a more empowered citizen. In a modern democracy citizens rightly expect government to show where the money has been spent and what the results have been"*[6]. The United States government published several datasets online in order to make politics and policy making more transparent and provide citizens with the tools to monitor government performance. For instance, it launched the website www.recovery.gov in 2009 on which state reports on expenditures are published.

2. **Foster service and product innovation.** Several governments emphasise the new opportunities for innovation generated by open government data. The Danish government for instance states in its strategy (Danish Ministry of Science, Technology and Innovation, 2010) states that "ICT companies will be able to create new business in developing digital services and advanced content based on public data, and citizens can convert ideas and creativity into practical solutions to everyday problems." Elaborating on the stimulation of user-driven innovation, the United Kingdom (Chief Secretary to the Treasury, 2009, p.26) argues that: "Data can also be used in innovative ways that bring economic benefits to citizens and businesses by releasing untapped enterprise and entrepreneurship. […] A study by the University of Cambridge found that the growth to the UK economy from freely releasing just a subset of the public sector data that are currently sold could be £160 million in the first year alone (Newbery et al, 2008)."

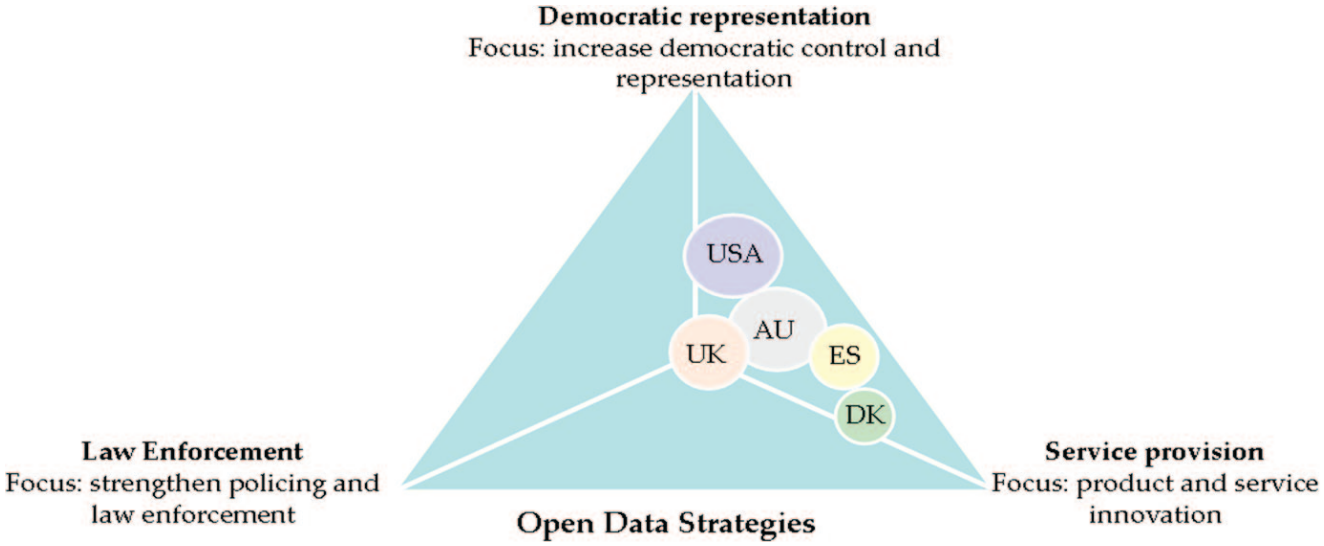
3. **Strengthen law enforcement.** The last motivation to open up government data is to involve citizens in and strengthen policing and law enforcement. In particular the United Kingdom and United States mention this motivation in their strategies. In these countries all kind of applications have been developed (by government and businesses) based on security data which aim to inform citizens and involve them in – for instance – criminal investigation tasks.[7]

6 The US Government is doing this via www.recovery.gov

7 Examples are the "FBI most wanted" iPhone application http://apps.usa.gov/fbis-most-wanted/ and the Metropolitan Police Crime Mapping http://maps.met.police.uk/

When mapping the motivations onto a triangle that illustrates the three basic tasks of government; representation, service provision and enforcement, the following picture emerges:

Figure 1: Overview of the focus of the open data strategies of the countries studied.



3. Open data instruments

The instruments applied by the five countries to implement open data policy can be roughly divided into four types: (a) education and training, (b) voluntary approaches, (c) economic instruments and (d) legislation and control.

Table 2: Overview of types of instruments applied by countries to implement their open data strategy.

Broad category	Instruments	Examples	Countries applying instrument
Education and training	Knowledge exchange platforms	The Danish government created a platform for government practitioners to exchange experiences/ideas on open data projects.[1]	AU, DK
	Guidelines	The Spanish government developed a guide for government practitioners to stimulate public sector information reuse.[2]	DK, ES
	Conferences, sessions, workshops	One aspect of the Aporta project in Spain is to inform and educate government practitioners during workshops on how to publish government data online.	AU, DK, ES, UK, US

(Footnotes)

1 http://digitaliser.dk/group/520340
2 http://www.aporta.es/web/guest/form_descarga_aporta

Broad category	Instruments	Examples	Countries applying instrument
Voluntary approaches	Overall strategies and programmes	Probably most well-known is the memorandum of President Obama (2009): *"My Administration is committed to creating an unprecedented level of openness in Government. We will work together to ensure the public trust and establish a system of transparency, public participation and collaboration. […]"*	AU, DK, ES, UK, US
	General recommendations	In its "Engage" report (Government 2.0 taskforce, 2009:xvii) the Australian government defines 13 recommendations, among which there is the recommendation that a lead agency should be established for advancing the Government 2.0 agenda (including open data).	AU, DK, ES, UK, US
	Public voluntary schemes	The UK describes in its report "Putting the Frontline First" (Chief Secretary to the Treasury, 2009:26): *"Our public data principles state that public data will be: (a) published in reusable, machine-readable form, (b) available and easy to find through a single easy to use online access point, (c) published using open standards and following the recommendations of the World Wide Web Consortium, (d), […]"*	AU, UK,US
Economic instruments	Competitions, app contests and camps	The government of the state of Victoria in Australia organised "App My State", a competition for citizens/businesses to develop apps while using public data[3]	AU, DK, ES, UK, US
	Financing of open data portals	Data.gov.uk, a website of the UK government, offers all kinds of national and local data for free to stimulate reuse[4].	AU, DK, ES, UK, US
Legislation and control	Public sector information law	In 2005 the Danish government enacted law no. 596 on the reuse of public sector data which involves an implementation of the EU PSI directive (European Commission, 2003).	ES, DK, UK
	Freedom of Information act	The Freedom of Information (FoI) Reform Act (2010) in Australia made the initial FoI act more pro-active in the disclosure of government information (Prime minister and cabinet, 2010).	AU, US
	Technical standards	One of the key pillars of the open data strategy of the Danish government is to create (open) technical standards which stimulate interoperability (Danish Ministry of Science, Technology and Innovation, 2010).	AU, DK, UK
	Monitoring	In Australia, the Information Commissioner has the task to monitor the progress being made with open data projects.	AU, UK, US

(Footnotes)

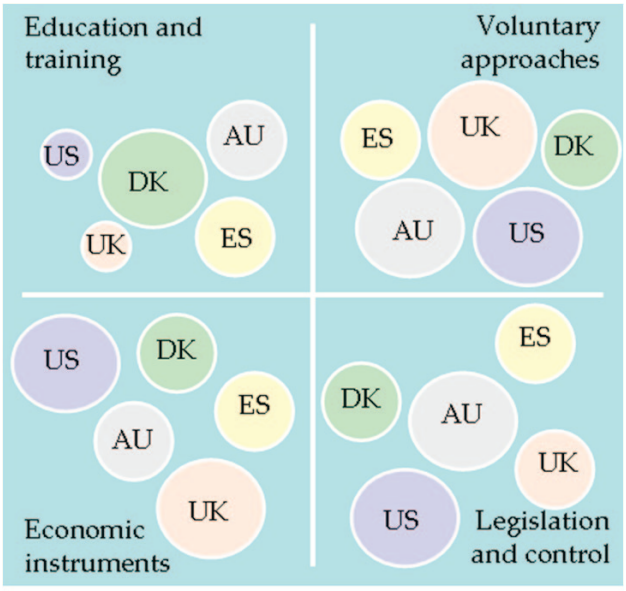
3 http://www.premier.vic.gov.au/app-my-state/about-app-my-state.html
4 http://data.gov.uk/

When comparing the five countries, it appears that they all applied various voluntary instruments to stimulate open data policy. However, the comparison also reveals important differences in the specific features of the instruments. Although all governments have open data strategies, the level of detail differs substantially. Whereas the Spanish Avanza2 programme only defines general starting points for open data policy, the Australian and United Kingdom governments describe concrete open data principles to be applied. As regards legislation and control, differences between countries can be found in the proactive approach with which government data have to be disclosed. In particular Australia and the United States have strong proactive legislation which requires free (or low cost) and easy (e.g. user friendly) access to government information.

The countries studied apply similar economic instruments. In all the five countries there are many initiatives where government bodies finance projects in which government data is published online. In addition, all governments have a central open data portal and organise events to award innovative service creation based on public data. However, the number of datasets online and the sophistication of the open data portals differ. In particular, the United States and United Kingdom have published many datasets (respectively 305 151 datasets in the US, of which 2001 are of high value, and

5 632 datasets in the UK)[8] and launched advanced websites. Education and training instruments are applied to a lesser extent. Of all the countries, Denmark is most active in the provision of education and training – this to stimulate coherence and standardisation of open data strategies of the separate government institutions. In Figure 2 below, the application of the four types of instruments by the five countries is depicted (the larger the circle the more instruments are applied):

Figure 2: Overview of the application of the four types of instruments by each country.



4. Barriers and drivers of open data policy implementation

To collect information about barriers and drivers for open data policy, TNO conducted a survey among policy-makers and experts in the five countries studied. The following table provides a "top 10 overview"[9] of the drivers and barriers mentioned by the stakeholders in each country:

Table 3: Overview of drivers and barriers of open data policy mentioned by stakeholders of each country.

#	Countries	Top 10 drivers	Countries	Top 10 barriers
1	AU, DK, ES, UK, US	**Strategies and experiences in front runner countries**. An important driver for open data policies are inspiring examples from other countries. The British "Show us a better way" (Arthur, 2008) was for instance one of the reasons for the Australian government to start "MashUp Australia"[1].	AU, DK, ES, UK, US	**Closed government culture.** Stakeholders of all the countries studied mentioned the closed government culture as an important barrier to open data policy. As one of the respondents stated: "government practitioners are rewarded for secrecy, not openness".
(Footnote) 1 http://mashupaustralia.org/				

8 Data.gov and Data.gov.uk were accessed on 28 December 2010

9 The more frequent drivers and barriers are mentioned among all countries, the higher they rank in the top 10 of table 3. When drivers and barriers are equally mentioned among all countries, the ranking is based on how extensive these topics were covered in interviews and documentation. However, more quantitative research is needed to substantiate the ranking.

#	Countries	Top 10 drivers	Countries	Top 10 barriers
2	ES, UK, US	**Political leadership**. President Obama may be the most well-known example of political leadership in the area of open data. Former UK Prime Minister Gordon Brown has been an important support of open data policy. In Spain, regional politicians championed open data policy.	AU, DK, ES, UK, US	**Privacy legislation**. The countries studied have strong privacy legislation and cannot publish information which leads to the identification of persons. All countries recognise the tension between open data policy and the privacy of their citizens.
3	AU, ES, US	**Regional initiatives**. In several countries, initiatives of regional and local government (e.g. apps4democracy of Washington D.C.[2]) provided an incentive for national open data policy.	AU, ES, UK, US	**Limited quality of data**. Several countries suggested that the quality of some government data is too limited to permit its publication.
4	DK, UK, US	**Citizen initiatives**. Best practices of user-driven innovations (e.g. app created to find public toilets in Denmark[3]) based on government data pushed several governments to (further) develop their open data policy.	AU, ES, UK, US	**Limited user-friendliness/info overload**. Technical experts of several countries stated that the existing databases should be converted into more user-friendly datasets to be of use for citizens and businesses.
5	AU, UK, US	**Market initiatives**. NGOs, entrepreneurs and journalists have put pressure on governments to open up. In the UK the newspaper, The Guardian, for instance launched the "Free our data" campaign in which citizens were asked to claim access to government data (Arthur & Cross, 2006).	AU, DK, ES, US	**Lack of standardisation of open data policy**. A lack of open data standards between (levels of) government organisations has been identified as a barrier to open data usage by citizens and businesses and subsequently new open data policy.
6	AU, UK, US	**Emerging technologies**. Respondents of several countries suggested that technological trends (e.g. mobile Internet and social software) enable engagement and innovation based on government data, which provides a window of opportunity for open data policy.	AU, UK, US	**Security threats**. In particular UK and US policy makers and experts stated that - because of security reasons - some government data cannot be published.
7	DK, ES, UK	**European legislation**. European countries mentioned the EU PSI Directive as an incentive for open data policy.	ES, DK, UK	**Existing charging models**. In particular the European countries identified existing charging models as a barrier. Currently, the income of several government organisations is based on the selling of data, which makes them reluctant to publish the data.
8	UK, US	**Thought leaders**. In some countries experts and communities played an important role in putting open data on the political agenda. Examples are Tim Berners-Lee and Tom Steinberg in the UK and Tim O'Reilly and Carl Malamud in the US.	ES, DK, UK	**Uncertain economic impact**. Uncertainty about the economic impact makes some countries reluctant to invest in open data policy.
9	UK, US	**Possibility of monitoring government**. In particular in the UK and US, the urge to keep a check on government provided a boost for open data policy (in particular political data).	ES, US	**Digital divide**. Respondents in Spain and the US have stated that their governments should solve the problem of the digital divide so as to ensure equal access to the open data.
10	UK	**Budgets cuts**. In the UK government savings were an incentive to publish data on public expenditures and involve citizens in choices to be made on where to make cuts.	US	**Network overload**. Experts in the US identified a limited capacity of existing networks as a barrier to open data policy.

(Footnotes)

2 http://www.appsfordemocracy.org/
3 http://www.findtoilet.dk/

Interestingly, policy makers and experts in all the countries studied, mentioned inspiring strategies and experiences in other countries as an important driver for open data policy. Some policy makers even stated that the fact that their country has a track record of being an advanced information society, and that they wanted to maintain that image, was an important incentive for their policy on public sector information reuse. Notable is also the "political leadership" factor which was identified as a driver for open data policy by Spain, the United Kingdom and the United States. Policy makers in Australia and Denmark stated that the lack of political leadership formed a barrier to further progress on open data policy. As regards the barriers, closed government culture and privacy legislation

have been mentioned by policy makers and experts in all countries. Many respondents stated that norms such as confidentiality, risk avoidance and fear of political escalation prevent government practitioners from publishing datasets. This barrier may be related to the "political leadership" driver in the sense that a high-level role model may help to break through any existing and ingrained routines. Privacy concerns have also been identified as an important barrier for open data policy. On the one hand, governments perceive opportunities emerging from open data (e.g. increased social engagement and innovation) and, on the other hand, they discern an increased threat to peoples' privacy.

A comparison between the drivers and barriers leads to another interesting observation: whereas the drivers lie predominantly outside government, the barriers are within government organisations. Important drivers for open data policy are for instance citizen pressure, market initiatives, emerging technologies and the ideas of thought leaders. There are several examples in which groups of citizens or businesses successfully put pressure on the government to open up. One example is the "Free our data" campaign of the Guardian newspaper in the UK (Arthur & Cross, 2006). The newspaper called on readers to claim access to government data, which then gave a boost to the UK open data policy (Arthur & Cross, 2006). The table shows that the barriers predominantly lie within government, such as the closed culture, limited quality of data, lack of standardisation and existing charging models. This difference between external and internal factors which drive or hamper open data policy may provide clues about the choice of an optimal policy mix for open data. External pressure may for instance be used to solve certain internal impediments such as the unwillingness of organisations to change their financing model.

Another difference which is demonstrated by Table 3 is between drivers and barriers for open data in Anglo-American countries and other countries. In particular, in the UK and the US, there is pressure from citizens, NGOs and businesses on governments to open up data. This may be caused by the fact that these countries generally have a longer and more extensive tradition of watching and monitoring the performance of government. In addition, it seems that in particular in the European countries the charging models of government data are seen as an important barrier to open data policies. These countries also pose questions about the economic value of open data and are reluctant to define policy when evidence of economic impact is lacking. Yet, in these countries the European Public Sector Information directive on the reuse of government data (European Commission, 2003) has been identified as an important driver for open data policy.

5. Effects of open data policy

In none of the countries studied did the research team find sound evidence of the impact of the open data policy. The UK and the US are the only countries which have evaluated their open data policies. In the publication "Open Government – some next steps for the UK" the Centre for Technology Policy Research (2010) describes the open data policy of the UK government and defines recommendations for future policy. Although the study provides insight into the instruments applied by the UK government to implement its Open Government strategy (which includes an open data strategy), it does not assess the precise economic and social impacts of these instruments. In the US, the Office for Budget and Management called on all federal governments to evaluate their Open Government plans before 27 April 2010.[10] This self-evaluation contained 30 criteria: their formulation was based on President Obama's declaration.[11] Although this self-evaluation assesses the process of the development, the completeness and the concreteness of the Open Government plan, it does not address its impact.

10 http://www.whitehouse.gov/open/around/eop/omb/self-evaluation
11 http://www.whitehouse.gov/open/documents/evaluation

In order to justify their open data strategy, the countries examined often refer to more general and macro-economic studies on open data. The Australian government for instance quoted a study on spatial data, "The Value of Spatial Information: The impact of modern spatial information technologies on the Australian economy" (Acil Tasman, 2008), which calculated that the industry for spatial data in 2006/2007 represented a turnover of 1.37 billion Australian dollars. In Denmark, authorities referred to a study by Gartner (2010), which estimated that – by publishing government data – the Danish government could stimulate the creation of new services to the value of 600 million Danish krone (Gartner, 2010). Governments of several countries (e.g. Spain and United States) quote the PIRA (2000) and MEPSIR (2006) studies of the European Commission, which calculated respectively that (a) the economic value of public sector information is 750 billion Euros in the US and 68 billion Euros in Europe and (b) the market for government information in the EU is estimated at around 27 billion Euros. Another influential study which is often referred to is "Models of Public Sector Information Provision via Trading Funds" of Cambridge University (Newbery et al, 2008) which estimated the economic value of government data in the UK at £6 billion.

Although most countries legitimise their open data study based on these studies, many policy makers also recognise that the precise economic impact of open data for their country, and specific sectors or organisations, remains largely unclear. Impact studies at both the meso and micro levels are lacking and, since the macro studies use different indicators to estimate the economic impact, the calculations differ substantially (Uhlir, 2009). Desk research by the research team revealed that even less evidence is available on the social and democratic effects of open data policy. In the literature on government transparency and trust research, results are contradictory (e.g. Rothstein, 2001, Bovens, 2003 and Curtin & Meyer, 2006). Some studies for instance found that government transparency increases trust in government (as people perceive that they have a stronger control over government) and other studies found that it decreases trust in government (as more government failures are identified). The causal relation between open data and democratic participation is far from clear. In a study on "Open data, democracy and public sector reform" by Davies (2010), a mere 36% of the respondents stated that open data improves the local or national democracy. However, the survey was not representative and it is not clear from the study why respondents find that open data does not contribute to a stronger democracy. The cause may for instance lie in information overload or the type of data published, two factors which could be easily overcome by taking appropriate measures. In addition, there seems to be a slight "pro open data" bias in publications on the subject. Bovens (2003) is one of the few scientists who identified the dark side of open data as he contends that radical openness may result in a culture of political scandals and obstruct government processes due to political cynicism and a lack of trust in government.

All in all, one has to conclude that evidence of economic, social and democratic impacts of open data policy is still immature or lacking. More research is needed in order to place a focus on open data policy, decide on the use of certain instruments and reach the desired impact.

6. Conclusions

This TNO study shows that, in an increasing number of Western countries, "open data" is being placed on the political and administrative agenda. The study also demonstrates that – although federal and regional governments have defined open data strategies – individual government agencies are often reluctant to implement these strategies. A crucial barrier for their implementation is the closed culture within government, which is caused by a general fear of the disclosure of government failures and any ensuing political escalation. Another important research result yielded by the study is the lack of understanding of the precise effects of open data strategies, which make government

agencies hesitant to open up data actively. More insight into the multiple impacts of open data (e.g. economic, social and democratic impacts) could be one of the keys to establish successful and effective open data policies. By assessing and addressing both positive and negative impacts, government agencies will be enabled to choose deliberately a certain strategy, focus and instruments. The research shows that the focus of strategies is currently on fostering innovation and strengthening democratic participation, whereas some evidence indicates that open data could also contribute to enhancing law enforcement. In addition, the character of the instruments is predominantly voluntary and legal, whereas education and training could also be effective – in particular in the case of a closed governmental culture. In conclusion, the acquisition of more knowledge on the positive and negative effects (e.g. economic, social and democratic effects) of the "open data" phenomenon could strengthen a well-informed debate, remove governments' reluctance and help them to develop an effective policy.

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