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► **To cite this version:**

Melanie Dulong de Rosnay, Katleen Janssen. Legal and Institutional Challenges for Opening Data across Public Sectors: Towards Common Policy Solutions. *Journal of Theoretical and Applied Electronic Commerce Research (JTAER)*, Universidad de Talca - Chile, 2014, Special Issue “Transparency and Open Data Policies”, 9 (3), p. 1-14. 10.4067/S0718-18762014000300002 . halshs-01078542

HAL Id: halshs-01078542

<https://halshs.archives-ouvertes.fr/halshs-01078542>

Submitted on 29 Oct 2014

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Legal and Institutional Challenges for Opening Data across Public Sectors: Towards Common Policy Solutions

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Received 30 July 2013; received in revised form 28 February 2014; accepted 16 March 2014

Abstract

This paper addresses the current trends and issues with regards to opening up data held by public entities in various sectors, including public sector information, geographic data, cultural heritage, scientific publications and data. In the paper, opening up public data is defined as making it available for any purpose of use. While several initiatives have been taken within Europe to make public data available, many issues still remain unsolved. Based on the state of play in various sectors, this paper gives an overview of common issues that need to be addressed in order to move to more and better accessibility and reusability of public data. It will argue that even if sectors are currently regulated by different laws and policies governing data of a different nature, a common techno-legal framework can be defined to address legal, cultural and institutional challenges in a cross-sectorial manner.

Keywords: Public policy, Public sector information, Licensing, Control, Open data.

1 Introduction

The benefits of opening up public data are hard to deny. The availability of data held by public bodies increases the transparency and accountability of the public sector and enables public participation [2], [4], [32]-[33]. It enables citizens to know their rights and obligations, and to enjoy the benefits of a better service delivery by the public sector and a return on investment from their tax contributions [5], [33], [43]. Public data can be used by citizens to start communicating with each other and build a collective consciousness [37]. Next to these social benefits, opening up public data also encourages economic growth and innovation [34], [50], for instance with regard to public welfare, environmental issues, public health, scientific research and cultural heritage. Such data is an essential resource for many information products and services. Finally, the public sector itself can also profit from increased access to public data produced by other services [2], [32], [36]. The combination of datasets can increase serendipity for decision-making, and attention for making data available will lead to better internal data management and information preservation policies and practices.

However, the potential remains underdeveloped. First, public data often stay locked within one public body and are not made available to other parties. Next, even if they would be available, the data are often difficult to find and even more difficult to use, due to the restrictive use conditions and/or charges that may be attached to them. This is caused by insufficient and unclear legislation, lack of knowledge of existing contractual and technical tools and barriers within the public sector.

The objective of the paper is to identify if common issues and challenges to the accessibility and reusability of public sector information can be identified across different sectors, and if common solutions can be designed. This paper addresses some of the legal, cultural and institutional challenges limiting the availability of public data for any type of use. Availability for any type of use requires both unrestricted accessibility and reusability. Accessibility is defined as the possibility to read without legal (law and licence), economic (fee or subscription) or technical (registration or closed format) barriers [9] other than having a computer with internet access and standard software. The possibility to reuse goes further than mere access, as it implies the data can legally, economically and technically not only be read but also mined, incorporated or otherwise transformed to produce new data. The paper is based on literature research and desk research on existing initiatives of opening up public data, and on the analysis of regulations, policy documents, reports and news items. The analysis is based on legal analysis, legal argumentation and policy recommendations with a technical perspective aiming at maximizing availability. The review of regulation proposes an accurate panorama of the various types of issues. In selecting the cases and initiatives illustrating a classification of the barriers to the availability of public data, we focused on the European Union and its Member States as this research took place within the LAPSI 2.0 European Thematic Network on Legal Aspects of Public Sector Information (Site 27). We analyse various sectors in order to identify commonalities and differences, and to make policy recommendations that could have a cross-fertilizing effect on the availability of public data. While there are many definitions of both *data* and *public* (and related terms such as public sector, public service, government, administration, public sector bodies, public authorities, etc), we chose to take a broad perspective on both terms, avoiding debates on particular public bodies or datasets, which would make it difficult to produce general recommendations. We consider public data to be any type of content held by any organization financed and/or governed by the State, in formats such as raw data, compilations, information, photographs, reports, books, and any other copyrightable or non copyrightable works, including bibliographical notices, metadata, databases and their underlying structures and ontologies.

In order to detect barriers to opening up public data, we start in section 2 with a state of play of the main existing initiatives within different sectors. Next to Public Sector Information (PSI) and Open Government Data (OGD) in general, we discuss geographic data, cultural heritage, and scientific research. These sectors were chosen because the variety of nature of the content, the absence of obvious legal barriers to disclosure of the data such as trade secret or confidentiality, and the existence of large initiatives for making public data available. While there are other sectors such as crime data, legal data or business data, the types of data that have been included already give us a broad spectrum of issues that can be transposed to many other sectors. After that, we address in section 3 the legal, cultural and institutional barriers, and group them into general categories. Based on these limitations, we make recommendations in section 4 in order to move towards an information society in which public data can be considered truly open. The contribution of this paper to existing research on open data is to develop a classification of the barriers identified in sectors where open data initiatives are already developed and to propose structural policy recommendations based on common limitations across sectors. While the recommendations of this paper do not intend to fully reach all criteria and formal requirements for open data as defined in various existing definitions, such as the Open Definition (Site 1), it concentrates on common factors and policies that will stimulate the evolution towards such technically and legally open data.

2 State of Play: Existing Initiatives in Specific Sectors

In this section, we provide an overview of the most important and representative initiatives of opening data in the considered sectors in order to identify the strengths and weaknesses of the various approaches. Some of the

experiences are regulated by specific legislation, while others are governed by less binding policies or may even only be institution-specific or based on grassroots movements without official policy support.

2.1 Public Sector Information

The European Commission has a long history of efforts in opening up data to the public. Most of these efforts have concentrated on the availability of public sector data as a resource for the information industry. Since 1989, the Commission had been paving the road towards the adoption of the 2003 Directive on the re-use of public sector information (PSI directive) [2], [27]. This directive established a minimum set of rules that governs the re-use and the practical means of facilitating the re-use of documents held by public bodies of the Member States of the European Union (Article 1 of the PSI directive). Its objective is twofold: on the one hand, it proposes measures to facilitate the obtaining of PSI (e.g. regarding formats, time limits for responding to applications, transparency measures); on the other hand it wants to ensure a level playing field between the PSI users and holders.

While the PSI directive encouraged the availability of PSI for re-use, it did not oblige the Member States and the public sector bodies to make their data available, so it did not establish an actual right to re-use public sector documents. It also allowed the imposing of conditions and charges (within certain limits) on the re-use of data, so the data are not open under the terms defined in this paper, i.e. requiring accessibility and reusability. In many of the Member States the PSI directive did not have a large impact, but some Member States actively tried to promote the re-use of PSI and dedicated time and resources to developing a policy, platform and culture that actively encouraged re-use, for example the United Kingdom (Site 2), the Netherlands (Site 3), and France (Site 4). Yet, the full potential of PSI still remains untapped. Therefore, the European Commission proposed an amendment of the PSI directive in 2011, as part of its Digital Agenda for Europe [12], [14]. Under the new directive [30], which was adopted in June 2013, a right to re-use public sector documents is established and the default charging policy is marginal cost pricing.

2.2 Open Government Data

While the regulations and policy documents on PSI show a top-down approach to the opening up of public sector data, at the same time a more collaborative approach has emerged, focusing on *open government data* (OGD). It is not based on the economic potential of data held by the public sector, but rather on government accountability, transparency and public participation. It is supported by civil society advocates for freedom of information and fundamental rights. The proponents of open government data demand for data that can be used for any purpose without any restriction (other than Share Alike copyleft-like licensing conditions) and under a maximum charge of the cost of dissemination. OGD has been taken up as a policy objective by a number of European countries. The most important example is the United Kingdom, where then Prime Minister Gordon Brown, advised by Sir Tim Berners-Lee, decided to start a process for opening up public sector data to the public for any use. In January 2010, the web portal data.gov.uk was launched (Site 5) and in 2012, a right to data was included in the Freedom of Information Act to emphasise that data sets requested under the Act should be provided in a machine-readable format enabling re-use [47]. Also in 2012, the Open Data Institute was founded, an independent non-profit institute promoting research and good practice in open data (Site 28).

Other EU countries are also embracing OGD. Since March 2010, the Dutch central government has adopted a policy to make its data available via the central portal (Site 6) under a Creative Commons Zero (CC0) public domain dedication, signalling that data can be used for any purpose without restrictions (Site 4). In France, the Prime Minister launched in December 2011 the data portal (Site 7), which was expected to enable the dissemination of as much data as possible, under easy and open conditions and free of charge [31]. Other countries that are moving towards OGD include Denmark, Germany, (albeit slowly), Spain, Finland, Ireland, and Norway. While these national policies are only slowly starting to emerge, many sub-national and local initiatives are paving the way, with frontrunners in the cities of Paris, Marseilles, Rennes, Stockholm, Enschede, Rotterdam, Berlin, Ghent, and the regions of Lower Saxony, Piemonte, Rome, Aragon, and Tuscany (Site 8).

2.3 Geographic and Environmental Data

Geographic and environmental data are a particularly valuable category of PSI. On the level of the European Union, several policy initiatives can be mentioned. First, the 2003 directive on access to environmental information holds a right for citizens to request environmental information from public authorities and obligations for public bodies to actively disseminate information and create electronic databases holding environmental information [26]. This directive is based on the 1998 Convention on access to information, public participation to decision-making and access to justice in environmental matters, generally referred to as the Aarhus Convention [48].

Next, the 2007 Directive establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) [28] aims to enable the exchange of geographic data between public authorities for performing their public tasks relating to the environment and to give the public access to view and download services for geographic data. While its focus lies with improving data sharing between public bodies and not with opening up data for any use, INSPIRE may still have a great value due to its far-reaching obligations with regard to metadata and the technical interoperability of geographic data and services (Site 9). Next to INSPIRE, the Copernicus (previously Global

Monitoring for Environment and Security (GMES)) programme of the EU also intends to increase the availability of earth observation data for services related to the environment and security (Site 10), and to promote full and open access to GMES data and services [29].

While INSPIRE and Global Earth Observation System of Systems (GEOSS) are mainly directed at the exchange of information between public bodies, the directive on access to environmental information mostly addresses access by citizens, and GMES truly aims to make its data available for any use. EU policies are supported by national, regional and local initiatives that intend to make geographic data easily available for any use. Frontrunner Italian Piemonte Region started with opening up geographic data and created a portal for other types of data as well (site 11). In the United Kingdom, the national mapping agency Ordnance Survey has also released some of its small and mid-scale data free of charge under an open licence released by the UK government (Site 12). In the Netherlands, the Ministry of Infrastructure and Environment, the Ministry of Economic Affairs, the National Mapping Agency, Geonovum (the INSPIRE coordination body) and the Agency for infrastructure facilities (Rijkswaterstaat) have joined forces to create a geographic data portal offering mostly open data (Site 13). Geographic data can also be downloaded free of charge in Denmark since January 2013 (Site 14).

2.4 Cultural Data

Cultural data encounters public domain works and the metadata describing these works. Public domain works are being made available online to the public in the form of digital reproductions databases curated in databases at transnational level (such as the Europeana project (Site 15), national level or on websites of cultural heritage institutions themselves. Mere digitalization does not create copyright, but the absence of a binding framework for cultural data leaves Member States and cultural heritage institutions alone to implement platforms policies or working contracts. There is no mandate to distribute public domain cultural data as open data. The EC issued in 2006 a recommendation on digitisation and online accessibility of cultural material [11] asking national legislation to identify barriers to the use of works which are in the public domain, for example administrative acts required for each reproduction. The 2010 second report on the implementation of that recommendation [13] went further and invited Member States to take steps to remove them. A 2009 report on digital libraries [20] had stated that “public domain content in the analogue world should remain in the public domain in the digital environment”, which the Comité des Sages [19] confirmed in 2011 by asking cultural institutions to “make public domain material digitised with public funding as widely available as possible for access and re-use”, but at the same time by accepting restrictions to non-commercial use. The October 2011 Commission recommendation on the digitisation and online accessibility of cultural material and digital preservation [15] also asked for the widest possible access and reuse for non commercial and even commercial purposes.

The June 2013 PSI Directive extends its scope to libraries (including university libraries), museums and archives [30]. Member States are expected to ensure that documents shall be reusable for commercial and non-commercial purposes. But the text also adds that libraries and museums may charge for re-use over and above the marginal costs incurred for reproduction and dissemination. Moreover, public-private partnerships for digitisation allow the re-opening of a period of exclusive rights for 10 years, with a possibility to renew the exclusivity every 7 years after review. Therefore, there is no provision that would guarantee open access and reuse of public domain works, even for non commercial purposes.

As for institutional initiatives, libraries and museums gathered within the Europeana portal are offering access to millions of mostly out-of-copyright works. Europeana previously restricted commercial use on the portal (Site 16), while letting institutions continue to govern the use of works reproductions they host. However, in September 2011, Europeana dropped the non-commercial clause for the re-use of metadata provided by content providers (Site 17), which are now made available under CC0 (Site 18) public domain conditions.

2.5 Scientific Data

Scientific data gather publications and underlying data (text, images, software, metadata, audiovisual recordings, databases, data, which may include copyrighted and personal information). The online availability of publications started by the grassroots movement of Open Access to scientific publications led by academics and librarians supported by non-profits and public research institutions [44] (site 19), either by uploading articles in institutional repositories (green road) or by publishing in an Open Access journal (golden road).

In 2006, an EC Study recommended “Research funding agencies (...) should [e]stablish a European policy mandating published articles arising from EC-funded research to be available after a given time period in open access archives...”[7]. Since then, the EC led numerous consultations and studies on the topic (Site 20), and since 2008 runs a pilot under the Seventh Research Framework Programme grant program, mandating publications to be deposited in an open archive with an embargo of maximum six months [42]. The European Commission will “establish open access to scientific publications as a general principle for all EU funded projects in Horizon 2020” [16], but still without more than policy recommendations towards Member States. Mandates requiring to archive publications in open repositories have been adopted by many universities and funding institutions (Site 21), including the European Research Council. The Commission Recommendation of 17 July 2012 on access to and preservation

of scientific information [18] targets scientific publications and research data that receive public funds and asks for clear open access policy not later than 6 months after publication, or 12 months for social sciences and humanities.

The movement of Open Access to scientific publications is extending to scientific data and databases. The EU has been producing recommendations [21], [38] towards open data for science, however without mandating the deposit. Under Horizon 2020, open access to publications has become the norm and a pilot has been set up for opening up research data, however without a mandate or clear guidelines to develop the expected Data Management Plan [17].

3 Obstacles to Opening Data

Even though the momentum for opening up government data has been growing considerably and continuously in the last few years, many barriers still remain and a large part of the potential of public sector data still remains unfulfilled. In this section, we discuss the main common issues and barriers that need to be tackled to develop a true open data ecosystem in the European Union. These issues and barriers do not only relate to legal conflicts, but also to the political and institutional landscape and other cultural factors. They have been identified by literature research, discussions with PSI officers and participation to the LAPSI network. Obstacles discussed include overlapping regulations (3.1), the relationship between open data and privacy (3.2), the applicability of copyright and database rights, licensing incompatibilities (3.3), competition aspects (3.4) and liability concerns (3.5) and practical barriers, such as lack of awareness and resources, or technical restrictions (cf. infra 4.2).

3.1 Overlapping Regulations Promoting the Availability of Public Data

While many open data initiatives do not have an explicit legal basis, they are all embedded in an existing legal framework relating to freedom of information, re-use of public sector information and the exchange of data between government bodies. While all these regulations stimulate the availability of public sector data, the lack of clarity with regard to their interaction causes uncertainty on the conditions and limits on the possible use of the data. The legislation on the re-use of PSI and freedom of information (FOI) legislation have a different scope: while PSI allows the further reuse of accessible information, FOI is essentially about access and it is still under debate in how far the information a citizen can obtain under this legislation can be used for other purposes than learning its content [2], [34], [36].

Both often entail different formal requirements for requests; different policies on charging and licensing, etc, making it important for the user to know which regime his or her use of data will fall under. Currently, it is unclear what a user is allowed to do with data he or she obtains under freedom of information regimes, and when he or she will rather be subject to re-use regulations. This will not only cause concern to the users, but may also cause reluctance in public sector bodies to fully open up their data without any guarantees on the legal basis for doing so. They may be tempted to impose stricter re-use conditions covers any possible use or make less information proactively available out of worry what can be done with the data that is disseminated [34] (cf. infra 4.2).

Ideally, the policies on FOI, OGD, re-use of PSI and data sharing between governments should be harmonized, streamlined and integrated [34]. However, such an overarching approach does not allow for much differentiation in charges and use conditions, so it only works if open data is adopted as the starting point. Of particular interest for future research would be how such an overarching policy might be based on arguments for the existence of a right to access public sector information under the right to freedom of expression and freedom of information recognised in article 10 of the European Convention for Human Rights [2], [34], [49].

3.2 Privacy and Data Protection

Public data are also subject to several regulations intended to restrict their availability. These restrictions protect legitimate interests, which also have to be balanced with the regulations promoting open data [33]. One is the protection of the individual's privacy, particularly with regard to the processing of his personal data. In EU legislation, personal data are defined as *any information relating to an identified or identifiable natural person*, and in turn an identifiable person is "one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity" [23]. Obviously, a very large part of public sector data will also fall under the definition of personal data and have the potential to harm a person's privacy, e.g. data from company registers or census data, but also geographic data (can be linked to a person's location) or environmental data (can be linked to a person's health). Hence, a conflict may appear between the interest of the public in public sector data for accountability and transparency, and the interest of the persons whose data is involved. For example, the public has a right to know about the spending of its Parliament members, but at the same time these members of Parliament are also entitled to their privacy, albeit maybe less so because they are public figures representing the interests of the nation. Another example where a conflict can easily be seen is public procurement data, as shown by the European Court of Justice's Farm Subsidy judgment [22].

In summary, the conflict between OGD and data protection represents two rights that are fundamental to a democratic society. On the one hand, the values of transparency, accountability and economic growth call for

increased openness, while on the other hand, the respect for privacy requires restraint in making data available. More research is needed to determine how the two fundamental interests can be reconciled and how guidelines and tools such as privacy-by-design can be offered to the data producers and users on how to avoid or deal with possible conflicts that may arise. This includes embedding attention for privacy and data protection in the entire data life-cycle process, allowing the public bodies to already take into account possible privacy-protecting and anonymisation measures with a view to publishing the data from the moment they start to compile the material [40].

A lack of guidelines in this domain requires public bodies to make uninformed decisions, often giving preference to privacy concerns over the public interest in the availability of the data, for instance in initiatives relating to opening up information on available real estate, or with regard to information on owners and board members of companies. This approach is aided by the attention that is generally given by civil society and the media to potential privacy violations by the government (which is currently greater than the interest in open government data), and by the strict views on privacy of national privacy watchdogs. Such strict views can be explained by the fact that it is the task of such watchdogs to protect privacy, and not necessarily to balance it with other interests. Therefore, they will always start from the viewpoint that any risk to privacy should be avoided, rather than question whether the risk to privacy might be justified by the protection of other interests, such as transparency.

Of course, one could question in how far the hesitance of public bodies to make their data available on the basis of privacy arguments is legitimate or stems from lack of knowledge, and in how far the privacy-argument is used to restrict public access to the data for other reasons which are described in subsequent sections (e.g. a proprietary attitude towards the data, concerns for liability, monetary arguments, etc.). In other words, is the protection of privacy sometimes used as an excuse to limit the availability of public sector data?

3.3 Copyright and Licensing

Many of these obstacles seem to be based on a sense of ownership by the public bodies over their data. Similarly to privacy, governments can choose as an excuse to make full use of the prerogatives offered by copyright and database rights, allowing them to control any usage and modification of their work.

The copyrighted status of PSI work constitutes a barrier to the clearing of rights, therefore to access and reuse. The copyright legal framework grants to the creator of works the exclusive right to control the reproduction and the modification of works. In addition to copyright law, the access and reuse of data can be governed by database law granting producers the exclusive right to control extraction and re-utilization of the whole or a substantial part of the data [24], which encompasses the state and public institutions gathering information they produce, collect and/or curate on a website portal. The conditions of use of the data can be determined either by the database terms of use or by copyright law, but also by the provisions governing the contracts of the civil servants, private employees or external contractors working for the public, government, geographic, environment, cultural or research institutions and drafting the metadata, which creates complexity and doubt at the institutions level in the absence of unified guidelines. It is not clear whether the state as an administrative entity is the right holder and has the rights to decide of the dissemination policy and apply an open license to its data in order to not exercise fully copyright prerogatives. Copyright as embedded in labour law and public market regulation lacks clarity, preventing the state to decide on its distribution policy when it does not own the content he ordered and funded.

Exceptions and limitations to copyright and related rights could provide a breathing space for access to PSI and reuse. But these exceptions are not operationally broad in the digital environment. Many Member States did not implement in their national transposition of the European Union Copyright Directive (EUCD) [25] workable exceptions for education, science, libraries and museums. Such exceptions were optional and an absence thereof lead to the impossibility for schools to display PSI material in educational material or national libraries to archive copyrighted works. Besides, these exceptions target categories of users, while open data means accessibility and reusability for all.

Copyright and database law are completed by private regulation and contract law to define websites terms of use and reuse. States and public institutions are using a variety of licenses on their platforms, from restrictive terms of use to open licenses. Restrictive terms of use will for instance reserve commercial rights, or allow only personal use. Open licenses have been designed to facilitate the use and reuse of public data by removing legal restrictions and allowing the broadest usage. However, even open licenses present interoperability issues. Licensing incompatibility happens when data from two different sources are licensed under different conditions and cannot be combined together or remixed.

Many open licensing framework exist to distribute open data: Creative Commons (CC) licenses, CC0 protocol, Open Knowledge Foundation (OKFN) licenses (Site 22) and finally open licenses written by governments, for instance in the UK [45] in Italy (Site 23) and in France (Site 24). They all aim at making data as broadly available as possible, but nevertheless may contain hidden or visible legal restrictions to reuse, be incompatible among each other or contain legal internal incompatibilities [8], [39], [41].

Attempts are being led to reach compatibility by inserting compatibility clauses within the text of the licenses, accepting that derivative works and datasets may be re-licensed not only under the same license, but also under

licenses that will have been recognized compatible. The development of ad hoc licenses by governments and institutions stems from the fear of public institution that standard licenses are not answering their special needs. These *vanity licences* are not only potentially incompatible licenses, they also raise the information and transaction costs of the users who will have to read and process legal terms of use.

3.4 Competition

Besides legal obstacles to opening data, cultural and institutional reasons observed in the course of the LAPSI European Network are slowing down the process. On the one hand, open data can be seen as an unfair competitor for private providers and on the other hand, the public sector may consider commercial reuse of open data an unfair appropriation of the common good.

Interestingly enough, OGD may be felt as an attack to private sector business model and a possible distortion of competition. Large companies have started to build up their own databases, either because they could not get access to comparable public sector data or because these data were not suitable for their purposes. Examples of this are road databases created by companies such as Teleatlas (now TomTom) and Navteq (now Nokia). These companies have made very large investments in their databases, and would understandably be unhappy if comparable government road databases would be made openly available for any use, including use by possible new competitors and business clients. This discussion was held in the Netherlands when the Ministry of Infrastructure and the Environment (Rijkswaterstaat) intended to make its road database freely available for re-use, including for commercial purposes. This was highly contested by some private sector mapping companies, who considered this unfair competition by the government [33]. Comparable discussions could also arise with regard to e.g. company registers, address data, and other large databases for which private sector alternatives have been developed over the years. For such databases, conflicts may arise between the interests of potential new users of openly available government data and existing private sector market players. In these cases, the question will arise if the market players will be able to call on the rules of competition law to prevent damage to their business models, or whether the interests of society will prevail on their commercial interests. These questions require more insight in the role of the state on the information market and the scope of their task to provide information to the public [33].

Problems also arise when public bodies fear the competition of the private sector. This fear may take the form of reluctance of public institutions to authorize commercial reuse or in other words, concern that others may freeride and commercialize their data, which they have spent considerable time and public resources on. Hence, they do not want these data, which belong to the public, to be used for commercial gain.

On the other side of the spectrum, there is a set of public bodies who are very willing to make their data available for use, but preferably not under open conditions, or under a marginal or no cost regime. These public bodies' core business is often to create and disseminate data, and their business model often requires them to charge for providing data to the users or recover costs. For instance, this is the case for the United Kingdom's Trading Funds, which have the obligation of making a profit on their activities [46]; and for many public bodies in the cultural sector.

3.5 Liability

Closely related to the fear of public bodies to lose control over their data, is their concern for the possible liability they might incur if their data is altered, erroneous, not updated, not suitable to be used for particular purposes or misused, causing damage or loss to other people (Site 26). Public bodies do not realize their data are useful for other purpose than what they were created or collected for, or believe that their data is of insufficient quality to let any third parties use them (unless additional investments are made, which are not willing to do or let others do it in their place). Their response to this concern is either to refuse to make the data available, or to impose strict licensing conditions and liability waivers, in order to maintain control over what happens with the data once they are *out of their hands*.

In order to mitigate the concerns of the public bodies, the UK Open Government Licence for instance requires that the re-user does not *mislead others or misrepresent the Information or its source* [45] and the French government license states that *The re-use shall not mislead third parties or misrepresent the content of the Information, its source and its time of last update* (Site 24). French standard licences of the Agency for the State's Intellectual Property (APIE) forbid any *modification or alteration*, leaving it unclear whether they mean actual legitimate use such as abridgement, translation, visualization or the mash-up of datasets, or whether they are only referring to a restriction on tampering with the raw data [3].

Whether or not such provisions are legally required in a government licence is debatable. It is a general legal obligation of all citizens to refrain from such illegitimate use, whether or not this is made explicit in a licence. Yet, their inclusion seems to make public bodies more comfortable with opening up their data to the public. However, a recent study in the Netherlands has shown that the fear of public bodies for possible liability claims is unrealistically high and that the liability risks are fairly small and can be limited to a great extent by clear guidelines and implementation measures [6].

4 Solutions and Perspectives

This paper has provided an overview of the availability of public data across various sectors (section 2). The overview of initiatives and barriers to open up access to data given here shows many issues still need to be tackled before the open data ecosystem can be a true success (section 3). Some of these issues are specifically related to a particular sector, but most are common and could be addressed by a unified European framework aiming at waiving most obvious difficulties. This section proposes a synthesis of common problems (section 4.1) and a sketch of possible common solutions deriving thereof (section 4.2) as summarized in Table 1:

Table 1: Commons obstacles and possible solutions to open data

Sector of data or of law	Specificity	Common issue or asset	Possible solution
PSI	Focus on access	Right to reuse	Establish a right to reuse focusing on availability
OGD	Some datasets in machine-readable formats Some portals under CC0	Enabling reuse	Generalize technical and licensing accessibility and reusability
Geographic and environmental information	Obligations in terms of metadata and technical interoperability	Focus on reuse	Generalize technical and licensing availability requirements
Culture	Non Commercial licenses Exclusivity to private partners Possibility to charge above marginal cost	Barriers to the Public Domain Fragmentation and conflict of rules	Fully include culture in the scope of the PSI Directive
Science	Only recommendations	No general mandate to archive	Generalize technical and licensing accessibility
PSI/OGD law	Overlapping regulations Difference of scope Different policies	Conflict of rules Uncertainty	Harmonization of formal requirements
Personal data law	Prevents to disclose data	Conflict of rules Uncertainty	Privacy by design Anonymisation from collection
Copyright law and database law	Prevents to disclose data Special statutes within labour law and public market regulation Database rights Incompatible licenses	Uncertainty Lack of unified guidelines Lack of exceptions to copyright Transaction costs	Harmonization of rules Common licensing framework
Competition law	Commercial reuse by private users & Competition with established private users seen as unfair	Fear of losing control Conflict of interest Uncertainty	Harmonization of rules
Tort and liability	Alteration forbidden	Fear of being held liable Uncertainty	Develop a framework <i>do not misrepresent</i>

4.1 Common Barriers to Access and Reuse

We identified in section 2 how the selected sectors with open data platforms and policies managed access and reuse and what were the remaining barriers. In section 3, we focused on the legal obstacles identified by desk research and the participation to a European Network. We will now try to summarize the findings in order to cluster the barriers detected across sectors.

Public Sector Information is supported by a European legal framework recommending openness, but no effective right of re-use has been established yet. Open Government Data can be hosted by numerous platforms to host datasets in the Member States, but there is no mandate for governments to deposit their datasets. Geographic and environmental data benefit from a sectorial legal framework putting an emphasis on technical interoperability and the obligation to disseminate in a manner enabling reuse. Cultural data is led out of the scope of public data, both access and reuse are limited. While the 2013 PSI directive is a step in the right direction, its flexibility on charging and exclusive agreements for digitisation still endanger the availability of Public Domain works. Next, in the scientific sector, the open dissemination of scientific data is also only subjected to recommendations but no mandate.

Then, we observed that the lack of clarity in the legal framework and internal conflicts were the two reasons posing practical limitations to the actions of Public Sector Bodies. Overlapping regulations have been identified between PSI and OGD legislations, which have different scope and requirements. Privacy and data protection is sometimes also assumed to clash with the objective of open data. Copyright law lacks unified guidelines removing barriers to dissemination. Private copyright agreements are also either restrictive or incompatible. Competition law may have conflicting objectives with open data. All these reasons can be used by governments to not release data (Site 26).

However, while many recommendations can be made for each sector, addressing the specific problems presented in the second column (specificity), we should recognise that many of the issues that are limiting the right of access and reuse are common to most – if not all – of the sectors. As shown in the third column of the table proposing a high-level of abstraction of the specific problems, they can be caused on the one hand by a lack of clarity and confidence and on the other hand by an absence of rights, a barrier to rights, a fragmentation of rights or a conflict between legal provisions. Since these problems can reach this common higher-level of abstraction, we claim that they should be tackled on an overarching level for more effectiveness. The fourth column of the table identifies possible generic solutions to these two classes of common problems, which will be presented in the next sections.

It has been induced from the higher level expression of the common problems and solutions that they can be clustered into two classes of propositions. First, practical tools and guidelines can contribute to the generalization of best practices for accessibility and reusability (section 4.2) to reduce uncertainty and fear. Second, a common legal framework (section 4.3) is necessary to solve legal conflicts, harmonize rules within Europe and constitute the foundation of an effective and transparent right to reuse.

4.2 Implementation Guidelines

While many of the barriers that were described above have some roots in the lack of legal framework, a large part of them will already be eliminated or considerably reduced by increasing the awareness of public bodies, policy makers and users of the potential of open data and educating them on the actual risks of open data rather than the perceived ones. The lack of willingness can often also be caused by a lack of resources. Many public bodies, particularly those for whom the creation of data is not their core business but only a side-product of their other activities, simply do not have the human, technical or financial resources to dedicate the necessary attention to opening up their data and adding metadata.

It is crucial that public sector bodies in charge of developing datasets are not left alone with the mission of opening them. Many public bodies for which the production and delivery of data is not a prime activity are not equipped to deal with the conflicts mentioned above and are dependent on guidance and support from the higher administrative level in order to determine their policy for disseminating public sector data. Besides, some Member States were satisfied with just transposing the directive into law without complementing it with an implementation policy or practical measures to aid the public bodies in adjusting - or even designing - their data policies. This has limited the actual impact of the PSI directive to a considerable extent [35]. Technical implementation guidelines should target at least two levels: the format allowing reuse, and the ability for datasets to be located by search engines in a distributed manner with ad hoc metadata and/or through the development and the provision of national repertoires to host the data of institutions which cannot develop their own platform.

First, institutions may release their data, but in a format that does not allow to its fullest extent access and reuse. Open data should be reusable and therefore made available in an open format which can be processed by any application and software, in order to deliver adaptable data, not inert data [50]. In February 2013, 25% and 84% of data were delivered in a proprietary, closed format on the UK data.gov.uk and French data.gouv.fr portals (Site 25). The June 2013 PSI directive requests data to be made available in open and machine readable format. Data should be modifiable, not only to make derivatives, but also to be transferred to other media, formats, visualisation tools or platforms. Technology can create barriers in the same way that royalty fees and rights clearance are restricting the availability of data to be effectively searched and processed by any data mining or aggregating programme. Technical barriers include protection measures that prevent to copy the file or download the dataset in its entirety, compulsory registration or design features that make search and automatic processing more difficult [8]. The absence of indexing or the lack of metadata describing the data will also make the data cognitively difficult to interpret and reuse.

But as many public bodies will not be ready for this, it should currently be a priority for central government to encourage the availability of public sector data in *whatever format there is*, and focus on getting the data out there, rather than imposing technical demands that would delay the availability of the data (such as is arguably the case in INSPIRE), but be compliant with open data principles in terms of open format. The lack of resources to develop technical solutions to distribute data in open format with semantic and legal metadata can be overcome by raising awareness on existing solutions. Free software tools are available for public services to use and build upon, without requiring to build everything from scratch. Such tools should be listed and made available by upper level authorities. Next, the possible users are often also unfamiliar of the possibilities of public sector data. Searchability should therefore be combined with discoverability as this lack of awareness occurs on different levels. First, the user may not know if the data he or she would like to use even exists or is available for use, because the public bodies do not have asset lists or provide information on what data they hold. Therefore, the development of national or thematic

portals providing a gateway to the data held by multiple public bodies is an important tool in opening up public sector data. Such portals should contain links to as many different types of data as possible, based on the demands of the user (rather than on the assumption of the public sector itself that particular data might be interesting for re-use). While national portals are developing in many countries, most of them leave the user find out what public sector data he can use. A complementary solution not based on centralized repositories is the use of legal metadata, allowing search engines to locate resources based on their accessibility and reusability status [1]. It is imperative that the user has easy access to the conditions of use of these data. At first instance, the user should be able to consult legal metadata that provide information on the fitness of the data for his or her purpose, and that may already give an indication on how he or she can use the data. In case the data are available under a standard open licence without any additional conditions, this may also be reflected in the metadata. Creating metadata is a costly and time-consuming process that will not be at the top of the public body's priority list. An incentive or a mandate from central government will often be needed for the public bodies to invest resources in their metadata. For instance, a strong incentive was given by the INSPIRE directive, which imposes obligations on the Member States and public bodies to create metadata for all the geographic data under the directive [28].

Simplicity of expression of the use conditions is vital. While in an ideal world with a common framework as suggested below, the conditions of use for datasets from different public sector data providers across countries would be harmonised, this may currently still be unfeasible, due to the differences in business models and national legal frameworks governing these data providers. Therefore, the focus should be on meeting the user's need for simplicity. Only when such simplicity is fully achieved for all public sector data providers, a truly useful harmonisation process can be started.

4.3 A Common European Techno-Legal Framework for Open Data

Public Sector Bodies need clear guidelines on how to deal with the relationship between open data, copyright, privacy and personal data, competition, tort and liability law. The development of an inclusive and harmonized framework at the European level is necessary to reach the full potential of open data. Otherwise, contradictions between the various fields of law will prevent data to be fully accessible and reusable. Therefore, in addition to guidelines on open formats and metadata and the provision of repositories, we recommend to the European Union to develop a single licensing scheme. It will avoid governments to have to develop their own license. Because it will be drafted according to European law, it will avoid potential conflicts between open licenses [8]. The purpose is to include in a single document conditions related to the waiving of copyright and database right allowing the broadest extend of accessibility and reusability such as a CC0. It should also address the branches of law which have been left out of the scope of the PSI Directive and most existing open licenses, therefore opening up to potential conflicts of laws, fear for the data provider to be held accountable and uncertainty for the data reuser.

With regard to competition issues, clear guidelines should be made for public bodies to determine which are their core tasks and a decision tool to determine whether they should undertake a particular commercial activity or not and under which circumstances they may have an effect on the market.

Liability and tort law are the elephant in the room of open licenses as most of them organize a full disclaimer of liability for the data provider [10]. In the same time, many governments include a provision to limit the alteration of data, which is contradictory with processing it. A debate must be opened to make sure the burden of responsibility is neither preventing to provide the data nor to modify it.

Finally, rules related to labour law and the assignment of rights from private contractors and public markets, as well as personal data and privacy, should be placed in an annex to this European Open Data License to help public sector bodies to take decisions and provide template complementary licenses to clear the necessary authorizations from third parties. Adding guidelines and practical tools will contribute to developing a framework for public sector bodies to release their data in confidence, after having cleared and offered all the necessary rights to the reusers.

5 Conclusion

This paper demonstrated that across sectorial specificities, common solutions can be designed to remedy challenges to the accessibility and reusability of public sector information. Obstacles to the unrestricted access and reusability of public data are legal, institutional and technical, but also cognitive. In order to reach a culture of sharing, legal conflict between sectorial regulations with different policies scopes and requirements need to disappear. But some other political factors should also evolve. The question of the control on the reuse of data and the lack of awareness of licensing and technical barriers and solutions are also delaying the process of opening data. Beyond specific situations, general concerns are common among sectors. In addition to the need for a harmonised framework supporting open data at the legal and technical level and reducing uncertainty, the way forward would be to look at practical measures and educate to licensing and technical tools which can help the policy maker, the institution and the user. Making the user central and involve all stakeholders is crucial to avoid a possible flaw of transparency, the availability of raw data which cannot be interpreted.

Practical measures include creating data portals and metadata; and simplifying licensing and contractual issues. Education of users and providers is key here: both need to know what is technically and legally possible in order to develop their plans within these boundaries. Moreover, a tight link between the debates on technical and legal requirements is essential. If technical solutions are developed separately from legal solutions, the former may end up being problematic to implement in national jurisdictions and the latter may be unrealistic or unadjusted to technical developments and practice. From a technical perspective, the easiest solution is of course to enable as much openness as possible. The simplest way to avoid licensing requirements, incompatibility and legal insecurity is to place data in the public domain. Developing a single European open data license drafted in plain language, and based on the public domain, would avoid transaction costs and make it easier to conjugate potentially contradictory requirements.

Acknowledgments

This research has been supported by LAPSI 2.0, the European Thematic Network on Legal Aspects of Public Sector Information and by the Open Big Data project of the 2013 Interdisciplinary Programme on Communication Sciences of the French National Centre for Scientific Research.

Websites List

Site 1: Open Definition

<http://opendefinition.org/okd/>

Site 2: UK National Archive policy

<http://www.nationalarchives.gov.uk/information-management/policies/leading-psi-policy.htm>

Site 3: Dutch Government Policy

<http://www.rijksoverheid.nl/copyright>

Site 4: French State Intangible Heritage Agency policy

<http://www.economie.gouv.fr/apie/donnees-et-images-agence-patrimoine-immateriel-letat-apie>

Site 5: UK Government Open Data Platform

<http://data.gov.uk/data>

Site 6: Dutch Government Open Data Platform

www.rijksoverheid.nl

Site 7: French Government Open Data Platform

<http://www.data.gouv.fr/>

Site 8: ePSI Platform

<http://epsiplatform.eu/>

Site 9: Inspire Directive

<http://inspire.jrc.ec.europa.eu/>

Site 10: European Copernicus Programme, Previously Known as The Global Monitoring for Environment and Security (GMES)

<http://copernicus.eu/>

Site 11: Piemonte Region Open Data Platform

<http://www.dati.piemonte.it/>

Site 12: Ordnance Survey UK National Mapping Agency

<http://www.ordnancesurvey.co.uk/oswebsite/products/os-opendata.html>

Site 13: Dutch National Geodata Platform

<http://www.pdok.nl/nl>

Site 14: Danmark National Geodata Platform

<http://download.kortforsyningen.dk/>

Site 15: Europeana Cultural Heritage Data Platform

<http://europeana.eu/portal/>

Site 16: Europeana Terms of Use

<http://www.europeana.eu/portal/terms-of-service.html>

Site 17: Europeana Data Exchange Agreement

<http://pro.europeana.eu/web/europeana-project/newagreement>

Site 18: Creative Commons Public Domain Dedication

<http://creativecommons.org/publicdomain/zero/1.0/>

Site 19: Budapest Open Access Initiative

<http://www.budapestopenaccessinitiative.org/>

Site 20: Commission's Policies on Open Access to Scientific Information

<http://ec.europa.eu/research/science-society/index.cfm?fuseaction=public.topic&id=1301&lang=1>

Site 21: ROARMAP: Registry of Open Access Repositories Mandatory Archiving Policies

<http://roarmap.eprints.org/>

Site 22: Open Data Commons

<http://opendatacommons.org/>

Site 23: Italian Government Open Data licence

<http://www.dati.gov.it/i odl/2.0/>

Site 24: French Government Open License

http://www.etalab.gouv.fr/pages/Licence_ouverte_Open_licence-5899923.html

Site 25: Statistics by Regards Citoyens

<http://www.nosdonnees.fr/dataset/liste-des-fichiers-de-datagouvfr>; CVS file at <http://t.co/jqJ9Ktna>

Site 26: Sunlight Foundation

<http://sunlightfoundation.com/blog/tag/reasons-not-to-open-data/>

Site 27: LAPSI 2.0 Project

<http://www.lapsi-project.eu>

Site 28: Open Data Institute

<http://theodi.org/>

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