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Open Government Data Licensing Framework: An Informal Ontology for Supporting Mashup

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Ontology for Supporting Mashup

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List of Abbreviations

BY –	Attribution condition applied in the context of a Creative Commons license and/or other type of attribution type of license.
CC –	Creative Commons Corporation (“Creative Commons”)
CC0 –	Creative Commons Public Domain waiver, which dedicates a work to the public domain
CC-BY -	Creative Commons Attribution license
CC-BY-NC –	Creative Commons NonCommercial license
CC-BY-NC-ND –	Creative Commons Attribution NonCommercial NoDerivatives license
CC-BY-NC-SA -	Creative Commons NonCommercial ShareAlike license
CC-BY-ND -	Creative Commons Attribution NoDerivatives license
CC-BY-SA -	Creative Commons Share Alike license
EU –	European Union
EU Database Directive, Database Directive –	Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases
IGO –	International Governmental Organization (e.g. the World Bank).
iOGDL4M –	An Informal Ontology of Open Government Data Licenses for Mash-up (Ontology)
IP –	Intellectual property
IPR –	Intellectual property rights
L4LOD -	(Licenses for Linked Open Data) is a lightweight vocabulary for expressing the licensing terms in the Web of Data
LOD –	Linked open data
NC –	Non-commercial
NGO –	Non-governmental organization
ND –	No derivatives
OWL -	The W3C Web Ontology Language
OD –	Open data
OECD –	Organization for Economic Co-operation and Development
OGD –	Open Government Data
PD –	Public domain
PI –	Public institution
PSI –	Public Sector Information
PSI Directive –	The Directive on the re-use of public sector information (Directive 2003/98/EC)
Revised PSI Directive –	Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the re-use of public sector information
SA –	Share alike
WIPO –	World Intellectual Property Organization

Abstract

Objectives of the thesis are –1) to identify the legal problems coming from mashups of Open Government Data (OGD) and 2) to propose an informal ontology to help technical reusers of Public Sector Information to utilize datasets according to their intended purpose and in compliance with the legal obligations that govern the rights to reuse the data.

A survey of national OGD portals found that the majority of OGD are released under inappropriate licenses, not fully complying with the legal rules that apply to the reuse of the data. Open Government Data can be released and covered by multiple licensing regimes, up to 33 in a single country.

We have analysed the European Union (EU) legal framework of reuse of Public Sector Information (PSI), the EU Database Directive and copyright framework and other legal sources (e.g., licenses, legal notices, and terms of use) that can apply to open government Datasets. From this deep analysis we have modelled several major concepts in an Informal Ontology of Open Government Data Licenses Framework for a Mash-up Model (iOGDL4M).

The iOGDL4M will be used for qualifying datasets in order to improve the accuracy of their legal annotation. The iOGDL4M also aims to connect each applicable legal rule to official legal texts in order to direct legal experts and reusers to primary sources.

This research aims to present 1) a legal analysis of OGD regulation in the European Union and its member states; 2) the Survey of National Open Government Data Portals and analysis of the most commonly applied licenses and legal notices and their compatibility; and 3) the Informal Ontology of Open Government Data Licenses Framework for a Mash-up Model.

This thesis is comprised of 4 publications. It consists of presentation of the research, the publications, and annexes that support the research.

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I. Open Government Data Licensing Framework: Legal Analysis, Survey and Informal Ontology

Chapter 1 - Introduction

Governments, municipalities, and other public bodies are releasing Public Sector Information (PSI) under different legal and technical conditions, which are unstable and create an artificial barrier[1] to realising the benefits from the reuse of public information.

According to a report [2], the growth of the EU economy can be increased by a staggering 1.9 per cent by 2020 as a result of reusing big and open data. The most significant benefits from Open Government Data (OGD) can be realised if the data can be productively merged, connected, combined, mixed, or otherwise enriched and analysed. However, there are legal problems that do not allow OGD to do so smoothly and to achieve the expected economic benefits.

There is a need to simplify the difficult process of legal analysis of legal rules applied to OGD coming from different jurisdictions and different PSI releasers. This research seeks to suggest an informal ontology that can be used to create automatic or semi-automatic tools which are able to express legal rules applied to OGD and to suggest which datasets can be merged and the conditions under which they can be reused.

1.1. The Problem

In the Open Data Research Network[3] more than 34,000 of the papers have been published and over 2,200 explicitly focused on Open Government Data, but there have been no studies on the regulation of Open Government Data in the EU and EU member states. There have also been no studies performed on Open Government Data portals: what kind of licenses or other legal tools are used to express legal rules that apply to datasets. There is no developed ontology to represent legal rules applied to Open Government Data or designed to provide information needed to mash up different open government datasets.

These problems have negatively impacted the reuse of open government data because 1) every stakeholder, before starting to connect different datasets in a mashup scenario, must make a deep analysis of different open government data licenses and legal norms applicable to those datasets; 2) is unclear whether mashed-up work can be protected, because copyright laws are not designed to protect fluent development of the intellectual work on data mashups[4]; 3) the legal protection of the datasets that have been connected and enriched by AI tools or crowdsourcing is also a “grey area”[4] of the legal framework.

One of the biggest problems in mash-up scenario is legal notes, which are not unified, doesn't have a common structure. Sometimes is a document (e.g. EU legal notice), sometimes is only one sentence (Spain, US datasets) or just a note, that legal note is applied without a reference to that note. Those legal notes usually are placed separately from metadata of the dataset; it means that automatic process of connecting legal notes with dataset is very complicated; lifecycle of legal notes in mash-up scenario of datasets is hardly realizable.

In this research work we present an informal ontology which can be used to develop a tool that can automatically or semi-automatically: 1) represent legal rules that apply to different open government datasets, 2) resolve rules and conditions that arise when different datasets are merged, and 3) assist the development of new licenses on derivative works.

1.2 Research Questions

Critical questions are formulated as follows:

- 1) How is Open Government Data regulated in the EU and EU member states?
 - a. What is Open Data?
 - b. What is Open Government Data? What are the conditions to reuse Open Government Data?
- 2) What tools do Public Sector Institutions use to represent legal rules that apply to Open Government Data?
 - a. Are the most frequently used licenses or other tools compatible? What are the conditions??
- 3) Is it possible to design an informal ontology that can represent legal rules applied to Open Government Data?
 - a. What are the legal rules that apply to open government datasets?
 - b. What are the possible license conditions that apply to adapters of OGD in derivative works, such as mashups?
 - c. Are the legal rules of different open government datasets compatible?
 - d. Does the license of an open government dataset fairly represent all the rules that apply to that dataset?

1.3 Objectives

The objectives of this research are to analyse:

- 1) The legal framework of Open Government Data in the EU and its member states;
- 2) The most frequent licenses and other tools adopted in an open government data global scenario.

The objective of this research is to design an informal ontology which:

- 1) will be able to facilitate development of an automatic or semi-automatic computational model that can check the compatibility among different licenses;
- 2) will be able express obligations, permissions, and prohibitions applied by legal norms;
- 3) identify mistakes (e.g. wrong license) provided by the releaser of open government data.

The results of this work will be useful for other researchers in the fields of open data and copyright law and for the representatives of public administration, to promote a deeper understanding of the problem of the multilayered and imbricated licenses of open data.

1.4 Methodology

This empirical research consists of separate parts, which represent the findings of different research questions. In each part, the methodology used is explained in detail. Because this research is interdisciplinary by nature, we apply different methodologies to investigate different objects. Legal norms are analysed, compared and presented in tables. A variety of licenses of Open Government Data are analysed in the Survey. The compatibility of licenses is analysed by reviewing the text of the licenses, analysing terms and conditions, and defining their degree of compatibility. The informal ontology is produced by using MELON methodology.

Descriptions of concrete methodologies are provided in these chapters:

1) The methodology of legal analysis to assess how Government Data is regulated in the EU and EU member countries is presented in the chapter *Methodology of legal analysis* (p 16).

2) The methodology of The Survey of the Licensing of Open Government Data is presented in the chapter *Methodology* (p.54).

3) The methodology for development of the Informal Ontology of Open Government Data Licenses Framework for a Mash-up Model (iOGDL4M) is presented in the chapter *Methodology and method of ontology design, language and tools for ontology modelling* (p.75).

1.5 Organization of the Work

This thesis is a collection of publications. It consists of (1) a description part, in which the whole research is explained; (2) a part in which the publications are presented. Before each of publication an introductory page is provided that explains the author's contribution to the publication and provides metadata for publication; (3) an annexes part that consists of research-supportive materials and materials produced during research, mostly representing the Ontology and the Survey. Additional material is also provided in Github.[5]

In the description part, the order of investigation is as follows:

Chapter 2 is dedicated to answering the research questions relating to legal analysis of legal norms. In the chapter *What is public sector information?*, findings and evidence are provided on how Public Sector Information is defined and understood in the EU and its member states. The findings include definitions of the main principles of use and related legal domains, which influence the reuse of PSI. The Chapter *Open data definition and principles* does not present legal analysis *per se*, but explains open data concepts, principles, and expectations as expressed by supporters of the domain. The Chapter *Open government data* represents findings coming from legal analysis and explains what kind of PSI that Open Government Data is, its main principles and directions for future development.

Chapter 3 addresses the second set of research questions: 1) What tools do Public Sector Institutions use to represent legal rules that apply to Open Government Data? It is based on a Survey of the Licensing of Open Government Data licensing framework. It consists of case studies of Open Government Data licenses used by open data portals in the U.S., Latin America, Europe, and Australia. It presents what legal instruments are used to express legal rules applied to Open Government Data and analyses how widely they are used. It also presents additional findings concerning flawed practices when publishing OGD; 2) Are the most commonly used licenses compatible? What are their conditions? Lastly, it explores options for compatibility among different licenses: which of the most popular licenses used in the OGD domain are compatible, how compatible and which are not?

In Chapter 4, the Informal Ontology of Open Government Data Licenses Framework for a Mash-up Model (iOGDL4M) is presented.

Chapter 2 – Legal Analysis of Open Government Data

“Making public all generally available documents held by the public sector — concerning not only the political process but also the legal and administrative process — is a fundamental instrument for extending the right to knowledge, which is a **basic principle of democracy**.”

Recital 16 of the 2003 PSI Directive

In this chapter of the thesis, a legal analysis of legislation is presented. The expectation of this part is to find answers to the following research questions: How is Open Government Data regulated in the EU and EU member states? What is Open Data? What is Open Government Data? What are the conditions that apply to the reuse of Open Government Data?

This chapter consists of two sub-chapters: 1) methodology of legal analysis; 2) Open Data and Open Government Data: definitions and principles. In the second sub-chapter, there are sections of analysis regarding what requirements apply to PSI releasers and re-users.

2.1 Methodology of the Legal Analysis

In this chapter we used a comparative, cross-national study of legislation applied to Public Sector Information. An investigation object – national PSI reuse legislation of EU member states – was compiled and most has already been translated and published by the European Commission. Because PSI Directive Article 12 requires Member States inform the Commission of implementation, we have limited our investigation of PSI law of Member States to the sources collected and published by the Commission. Other legislation that was studied was already well known to the researcher and all references used in this research are listed in the bibliography and Annex 4. The scope of the research was delimited in time, and we investigated legislation adopted by the deadline of the Directive 2013/37/EU implementation date: 18 July 2015. We also analysed all relevant legislation published on the European Commission website [6] up to 1 December 2015. The complete list of analysed legislation is provided in Annex 4. All significant subsequent legislation known to the researchers by 2 April 2017, while not analysed, are related to these countries and information is provided in footnotes: Belgium¹, Bulgaria², Croatia³, Czechia⁴, Estonia⁵, France⁶, Ireland⁷, Latvia⁸, Lithuania⁹, Luxembourg¹⁰, Poland¹¹, Portugal¹², Roma-

¹ Only Belgian federal legislation was analysed. For a deeper investigation, regional legislation should be analysed for the Walloon region, Flanders, the French Community, the German-speaking Community and the Brussels-Capital Region.

² This legislation was not analysed: Закон за достъп до обществената информация (Act amending the Access to Public Information Act) of 07/07/2000 as last amended on 11/12/2015, Official Gazette N°97 of 11/12/2015[235].

³ This legislation was not analysed: Act of 15 July 2015 amending and supplementing the Act on the right of access to information (Zakon o izmjenama i dopunama zakona o pravu na pristup informacijama)[236].

⁴ This legislation was not analysed: Act of 12 August 2015 amending Act no 106/1999 on free access to information[237].

⁵ This legislation was not analysed: Act of 15 December 2015 amending the Public Information Act and other related acts, RT I, 06.01.2016[238].

nia¹³, Slovakia¹⁴, Slovenia¹⁵. The results of analysis are presented in the tables of this chapter. In this chapter we also analyse technical literature, reports, reviews, and other information provided by IGOs and NGOs to support open data definitions and principles.

2.2 Open Data and Open Government Data: Definition and Principles

2.2.1 Understanding Open Data

What is open data? What is Open Government Data? What is Linked Open Data? In practice, these terms are sometimes used interchangeably because historically the Open Data movement has focused on pressing governments to release their data for open access. The object of our investigation here is explicitly limited to datasets released by Public Sector Institutions. That is why we are not distinguishing between these terms in this research. We understand Open Government Data to be a subset of open data.

⁶ This legislation was not analysed: Code on the Relations between the Public and the Administration (Code des relations entre le public et l'administration), consolidated version January 2017[239].

⁷ A new amendment was released but not analysed: European Communities (Re-use of Public Sector Information) (Amendment) Regulations 2015 of 24 November 2015[240].

⁸ This legislation was not analysed: Kārtība, kādā tiek piešķirtas ekskluzīvas tiesības informācijas atkalizmantošanai un publiskota informācija par šādu tiesību piešķiršanu (Ministerial Order setting the procedure for awarding exclusive rights for re-use of information and for publication of information on the award of such rights), 22/05/2007, Latvijas Vēstnesis N° 89 of 05/06/2007[241].

⁹ This legislation was not analysed: Law No VIII-1524 on the Right to Obtain Information from State and Municipal Institutions and Bodies (recast by Law No. XII-2666 of 11 October 2016)[242].

¹⁰ A new amendment was released but is not analysed here: Loi du 23 mai 2016 modifiant la loi du 4 décembre 2007 sur la réutilisation des informations du secteur public (Law modifying the law on the re-use of public sector information), Mémorial Luxembourgeois A N° 93 of 26 May 2016, p. 1726[243].

¹¹ A subsequent amendment was released, but which was not analysed: Ustawa z dnia 25 lutego 2016 r. o ponownym wykorzystywaniu informacji sektora publicznego (Act of 25 February 2016 on the re-use of public sector information), Dziennik Ustaw of 15 March 2016 [244].

¹² A later amendment was released, but which was not analysed: Lei n.º 26/2016 Aprova o regime de acesso à informação administrativa e ambiental e de reutilização dos documentos administrativos, transpondo a Diretiva 2003/4/CE [...] de 28 de janeiro, e a Diretiva 2003/98/CE [...] de 17 de novembro. (Law No 26/2016 Approves the rules on access to administrative and environmental information and re-use of administrative documents, transposing Directive 2003/4/EC [...] of 28 January, and Directive 2003/98/EC [...] of 17 November.) of 22/08/2016, Diaro da Republica, D.R 1a seria, n.º 160 of 22/08/2016, p. 2777[245].

¹³ A new amendment was released, but not analysed: Lege pentru modificarea si completarea Legii nr. 109/2007 privind reutilizarea informațiilor din instituțiile publice (Law No 299/2015 amending Law No 109/2007 on the re-use of information from public institutions), Journal Oficial de Roumanie no 898 of 07/12/2015[246].

¹⁴ This legislation was not analysed: Act No. 211/2000 on the Access to Information, amending certain laws (Freedom of Information Act) of 17/05/2000 (as amended - consolidated version of 1 January 2016), Zbierka zákonov SR n° 92 of 13/07/2000[247].

¹⁵ The following new amendments were released, but were not analysed: Act of 15 December 2015 amending the Public Information Access Act[248]; Decree on communication and re-use of public sector information (2016)[249].

Open data also encompasses data released by the private business sector¹⁶, NGOs¹⁷, private citizen initiatives¹⁸, journalists¹⁹, special interest groups, and hack activists²⁰. By “Linked Open Data”, we mean Open Data that meets specific technical requirements.

Open data definitions come from different sources. For example, Wikipedia uses this definition: “Open data is the idea that certain data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control”[7]. This definition is very ambitious and expresses the ideal of freedom of data; in real life, it is more complicated. The Open Knowledge Foundation proposes a more realistic description: “Open data is data that can be freely used, reused and redistributed by anyone - subject only, at most, to the requirement to attribute and share-alike”[8]. This definition represents legal conditions, e.g. attribution or share-alike, which come from the legal domain of open data, and are implemented through licenses. The definition of open data contains these principles:

- 1) Availability and Access – the data in a convenient and modifiable form should be available and downloadable over the internet all the time;
- 2) Re-use and Redistribution - the data must be provided under the terms that permit reuse and redistribution including the intermixing with other datasets free of charge (no levy, no closed paid format of the data);
- 3) Universal Participation – the conditions of use, re-use and redistribution of data should be not restricted and should be allowed for everyone for all the purposes (e.g. commercial re-use);
- 4) Interoperability – the data should be open to interoperate – or intermix – different datasets in terms of technical and legal conditions [8].

Most researchers trace advocacy for Open Data to Tim Berners-Lee, the inventor of the World Wide Web, who asked for “raw data now” in a 2009 TED talk, “The next web”[9]. Prior to the TED talk, there were instances of reuse of public sector information²¹, but calls for open data became a movement after 2009.

The Open Data Research network notes that according to Google Scholar data (2015-01-19), since 2009 the open data domain had captured the attention of researchers: more than 34,000 papers had been

¹⁶ A very interesting example is the JC Decaux company, which released City Bikes usage data for open access under a license developed by the French government, Etalab (Open License): JC Decaux, Open data, <https://developer.jcdecaux.com/#/opendata/vls?page=static>, last accessed 15.12.2014 (2013)

¹⁷ Several NGOs are intended to combat political corruption, promote open society, and are producing their own open data. E.g., “Transparency International” Lithuanian branch, Open data of mass media owners, <http://stirma.info/pages/apie>, last accessed 15.12.2014 (2014)

¹⁸ E.g. Zimnickas, Zemlys, Kilikevičius, Open dataset of Lithuanian Parliament 2012 election results, https://www.google.com/fusiontables/data?docid=1vOawBGzp_0c-8jiKTyY5sJ8MjiWM8sB1bYoAo6s#rows:id=1 last accessed 15.12.2014 (2012).

¹⁹ E.g. Bellingcat, <https://www.bellingcat.com/about/>, and Data Journalism | Global Investigative Journalism Network, gijn.org/resources/data-journalism/ 05.4.2017 (2017).

²⁰ E.g. Wikileaks, [https://search.wikileaks.org/advanced?publication_type\[\]=1&sort=3#results](https://search.wikileaks.org/advanced?publication_type[]=1&sort=3#results) 05.4.2017 (2017).

²¹ The EU PSI Directive was adopted in 2003, which was close to the idea of the open data phenomena. If we look for earlier cases, the most significant are from the late 1970s and early '80s when the weather forecast industry began to develop as television started to use satellite technology[250]. Satellite data was expensive and generally unavailable to TV companies, so the information had to be shared for free by Public Institutions. The European Commission reported that “the volume of meteorological data procured from the public sector between 2002 and 2007 had increased for 74% of the companies”[251]. According to Weiss (2003), the U.S. Market for Private Weather Services was \$430 mln. in 1999, \$9.6 billion in contract value in the five years ending March 2002 [252].

published mentioning “open data”, and over 2,200 of them explicitly focused on “Open Government Data”[3]. It indicates that the open data domain remains very popular among researchers. It is important to mention that not only researchers, but NGOs, IGOs and private companies provided reports and investigations of the open data domain. For example, a very valuable early investigation of Open Data was made by Becky Hogge (2010) [10], executive director of the Open Rights Group. Andrew Stott, Senior Open Data Consultant of World Bank, presented a valuable report at 2014, in which the economic value of Open Data was highlighted and provided recommendations to governments[11]. In 2012, the private company Deloitte LLP, provided a white paper[12] that provided an Open Data definition and promoted the use of Open Data. Nevertheless, these reports, white papers, and many research papers did not distinguish between Open Data and Open Government Data, and applied the term Open Data to Open Government Data.

“Linked Open Data” was defined by Auer et al. (2007)[13]. Also, we find that the legislators of the Revised PSI Directive adopted technical standards for Public Sector Information, thus making the term “Open Government Data” more conceptually “linked” than it was before.

2.2.2 Open Government Data Definition

A definition for Open Government Data derives from the concept of public sector information, which is related to the re-use definition in the EU. Article 3 of Directive 2003/98/EC set forth the general principle that “Member States shall ensure that, where the re-use of documents held by public sector bodies is allowed, these documents shall be re-usable for commercial or non-commercial purposes”. The Directive defined re-use of public sector information (PSI): “**re-use** means the use by persons or legal entities of documents held by public sector bodies, for commercial or non-commercial purposes other than the initial purpose within the public task for which the documents were produced”. The Directive initiated the process of sharing PSI with private bodies, but the concept also began to evolve independently from the main principle when implemented by Member States, e.g. imposing taxes for using data of Real Property Register and Cadastre in Lithuania or even forbidding the re-use or re-selling of data to third parties (“National Audit Office of Lithuania, Report on Activities of the State Enterprise Centre of Registers in Providing Public Services” 2004). These cases prompted the European Commission to review Directive 2003/98/EC, and the European Parliament updated it by adopting a new Directive 2013/37/EU in 2013. In the revised Directive, the definition of PSI re-use comes closer to the open data definition (although there are still special exceptions that permit charges for PSI re-use): (1) Minimal restriction to re-use (3p.); (2) Interoperability (20p.); (3) Machine-readable format: (21p.); and (4) Open licenses (26p.).

To sum up, in the EU, Open Government Data can be defined as public sector information, offered paid or non-paid for non-commercial and commercial re-use, available in a machine-readable format, interoperable, and likely covered by open licenses or minimal restrictions to re-use it.

On the other hand, a condition that requires that the paid information be released in a proprietary standard and covered by a special license runs counter to the open data definition. From that point of view, not all PSI could be defined as Open Government Data, but only that which corresponds to the Open Data definition.

Moreover, this definition is still more abstract, and in practice government data “as open data” is not widely available. This is because many de facto Member States are still not using the updated version of the Directive. The Revised Directive should be implemented by 18 July 2015 and revised before 18 July

2018, but as our research has found, it has not always been implemented on schedule (please check the Annex).

It is useful here to compare two other definitions from outside the EU. The Open Knowledge Foundation suggests the following definition of open government data: “Data produced or commissioned by government or government controlled entities and it can be freely used, reused and redistributed by anyone”. The following benefits of open government data are expected: transparency, released social and commercial value, and development of Participatory Governance[15].

In the United States, Open Government Data has been defined as information from the federal government, executive departments, and agencies, that is publicly available data that is structured in a way that enables the data to be fully discoverable and usable by end users. The U.S. and EU open government data definitions are not co-extensive. The U.S. definition is closer to the definition of open data than the EU definition. Open Government Data follows these principles in the U.S.:

- (1) **public**: all data should be available, except that which is not allowed to be published by law;
- (2) **accessible**: machine-readable, indexed, and open, not proprietary formats;
- (3) **described**: all expected data for the re-user should be provided, e.g. how to process, limitations, and security requirements;
- (4) **reusable**: no restrictions on re-use are to be guaranteed by an open license;
- (5) **timely**: data should be released as quickly as possible;
- (6) **managed post-release**: there should be an interactive service available to respond to complaints [16].

In conclusion, there is no single definition of Open Government Data: it is understood differently in different government institutions, different regions, and in The Open Knowledge Foundation. This situation creates different expectations from the stakeholders (developers of open data apps and public bodies), creates potential conflicts in the legal framework of open government data, and does not solve the legal problems that arise from the mash-up of open government data.

2.2.3 What is Open Government Data in the EU and its Member States?

Because Open Government Data is not legally defined in EU, it is important to investigate how Public Sector Information is understood in EU member states. Are they following the PSI Directive and have they implemented it fully, or there are some specific exceptions? In this chapter, the complexity of the Public Sector Information definition in EU member states is discussed. The Public Sector Information definition will be analysed through the lens of the Open Data concept.

There is no official definition of Public Sector Information in EU. The EU PSI Directive describes only the principle of what Public Sector Information is. Why is this? It could be answered by legal analysis of regulatory norms for PSI in the EU and EU member states.

2.2.3.1 “Tower of Babel” Problem

It is necessary to investigate legal norms of EU member countries and the EU, and compare the definition to those which originate from non-EU sources if we want to find the definition of the term “Public Sector Information” (PSI).

Analysis of the legal domain of the EU and its member states indicates some problems regarding the definition. The main problem is that term “Public sector information” is understood differently in EU

member countries, but EU legislation is trying to gather different concepts to one united concept of PSI. The chronological development of the PSI concept can be grouped into three periods:

- 1) Before the PSI Directive;
- 2) Implementation of the PSI Directive (~2003/2005-2013/2015);
- 3) Revision of the PSI Directive in 2013 and its implementation.

Before the PSI directive, the concept of PSI was developing in a de-centralized way in EU member states. Each country had its own independent concept, and it created a “Tower of Babel” effect. In 2003 the PSI Directive was published and should have been implemented by 2005. The PSI Directive set out minimum harmonization of national rules and practices of the PSI concept and its re-use. Implementation of PSI directive was not entirely successful in the EU, and a revision of the PSI Directive was made after 10 years. The revised PSI Directive gave tools to the European Commission to control implementation of the PSI directive. Hopefully in the next years, a unified concept of PSI will be achieved in the EU, as long as the Commission is able to use those tools effectively.

2.2.3.2 Concept of PSI

The concept of PSI can be described as de-centralized or united, but can also be characterized as direct or expanded. The direct concept of PSI derives strictly from the term “public sector information” and includes different forms of information managed by the public sector. An expanded concept of PSI can include extra rules, exceptions, and tasks relative to the direct concept.

There is a good example of a direct PSI definition published by the OECD: “‘Public sector information’ is **information**, including information products and services, generated, created, collected, processed, preserved, maintained, disseminated, or funded by or for the Government or public institution” [17]. The OECD PSI definition is straightforward and describes PSI as essentially all information held by the public institution.

The EU PSI Directive represents an expanded form of the PSI concept and presents a slightly different concept of PSI (comparing to the OECD’s) because the PSI concept developed from “the right to get access to public information”, and can be summarized as information held by a public institution that is accessible to the public and can be re-used by public. This concept has changed a bit over 10 years from “**can** be re-usable” (in the 2003 PSI Directive) to “**must** be re-usable” (in the Revised PSI Directive, 2013).

2.2.3.3 Analysis of the PSI Term Used in Legal Domain of the EU and its Member States

The term ‘information’ can have an expansive meaning nowadays and is often used synonymously with data, records, documents, etc. Erik Borglund and Tove Engvall investigated how Open Data discourse is communicated in legal texts, and they found that there was no single term, but the principal words were: record, information, document and data [18].

It is unsurprising that problems in terminology arise in the legislation of the European Union, especially among its Member states. In EU legislation, the definition of **Public Sector Information (PSI)** is understood in different ways.

In Directive 2003/98/EC[19] (PSI Directive), PSI is understood as a “**document**”, and during revision of the directive, the definition was left unchanged, but the concept was expanded in Directive 2013/37/EC (the Revised PSI Directive) [20]. Implementation of the PSI Directive and the Revised PSI

Directive in the EU Member States is still on-going, so the PSI definition is not yet fully harmonized by the national law of EU member states.

Firstly, to understand the roots of the PSI definition, a deeper investigation of the PSI Directive is needed. The Preamble of the PSI Directive, recital 11 introduces the definition of “document”: “This Directive lays down a generic definition of the term ‘document’, in line with developments in the information society. It covers any representation of acts, facts or information — and any compilation of such acts, facts or information — whatever its medium (written on paper, or stored in electronic form or as a sound, visual or audiovisual recording), held by public sector bodies. A document held by a public sector body is a document where the public sector body has the right to authorise re-use.”[19] A formal definition of “document” is provided in Article 2, para. 3: “‘document’ means: (a) any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording); (b) any part of such content”.[19] So as a start, Public Sector Information can be understood as a document or part of the document, no matter what form or content.

However, the word “document” is often used broadly and sometimes equivalent to the term “information” (any content), so use of the term “document” can be misleading. In bureaucracies and other large organizations, a “document” is often understood to be information in a certain form that has been catalogued or registered (e.g. in a document management system). Such a use of the term “document” is more related to “not live” information. On other hand, the very title of the “Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector **information**” states that the regulation is about information and not the narrow description of a document as understood in bureaucratic terms. Also the PSI Directive in recital 12 explains the need for live data (“the documents available in a timeframe”[20]). So the term “document” is used as synonym for *information* and also includes *data*.

In some legal contexts, the term “document” is more connected to the legal responsibility of the institution or the information holder, compared to other terms such as “information” or “data”. Also, the concept of “access to documents” comes from the “right to get information from the public sector”, and it was understood as the right to obtain certain specific documents.

Secondly, after 10 years the PSI directive was revised with the intention to further harmonize the definition of PSI in member states. The legislators of Directive 2013/37/EU (the revised PSI directive) observed that “Since the first set of rules on re-use of public sector information was adopted in 2003, the amount of data in the world, including public data, has increased exponentially and new types of data are being generated and collected.”(recital 5, emphasis added)[20] “At the same time, Member States have now established re-use policies under Directive 2003/98/EC and some of them have been adopting ambitious **open data** approaches to make re-use of accessible public data easier for citizens and companies beyond the minimum level set by that Directive. To prevent different rules in different Member States acting as a barrier to the cross- border offer of products and services, and to enable comparable public data sets to be re-usable for pan-European applications based on them, a minimum harmonisation is required to determine what public data are available for re-use in the **internal** information market, consistent with the relevant access regime.” (recital 6, emphasis added)[20].

On other hand, while legislators expressed their intention to harmonize “public data” in the Preamble of the Revised PSI Directive, substantive changes to definition were not made to the text of PSI Directive Article 2; only the concept of PSI was updated.

Thirdly, the PSI directive 2003/98/EC was implemented in all EU member countries and EEA countries (Iceland, Liechtenstein, and Norway). The problem is that the EU member states implemented the PSI Directive in *different* ways. Thirteen member states adopted specific measures for PSI re-use: Bel-

gium, Cyprus, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Romania, Spain, Sweden, and the United Kingdom. Three member states adopted new measures specifically addressing re-use to supplement existing legislation predating the Directive: Austria, Denmark, and Slovenia. Nine member states adapted their legislative framework for access to documents to include re-use of PSI: Bulgaria, Croatia, Czechia, Estonia, Finland, France, Latvia, Lithuania, Netherlands, Poland, Portugal, and Slovakia.[6]

Tables 1 to 3 provide definitions of PSI as defined in national laws.

Table 1. Definitions of PSI by the Member States which have adapted their legislative framework for access to documents to include re-use of PSI.

Country	Definition
Bulgaria	“Public sector information is any information objectified on paper, electronic or other media, including when stored as a sound recording or video recording, and collected or created by a public sector body.”[21]
Croatia	“‘Information’ shall mean any data owned by a public authority in the form of a document, record, file, register or any other form, regardless of the manner in which it is presented (written, drawn, printed, recorded, magnetic, optical, electronic or any other recording);”[22]
Czechia	“ Publicly disclosed information shall mean information which may be retrieved and obtained at any time, in particular printed information or information released on another data carrier facilitating the recording and storage of information displayed on an official notice-board, with the possibility of remote access, or placed in a public library. Accompanying information shall mean information which is closely connected with the requested information (for example, information concerning its existence, origin, quantity, the reason for denial of access, the period over which the reason for denial of access will last and when it will be re-examined, and other important features).”[23]
Estonia	“Public information is information which is recorded and documented in any manner and on any medium and which is obtained or created upon performance of public duties provided by law or legislation issued on the basis thereof.”[24]
Finland	“A document is defined as a written or visual presentation, and also as a message relating to a given topic or subject-matter and consisting of signs which, by virtue of the use to which they are put, are meant to be taken as a whole, but are decipherable only by means of a computer, an audio or video recorder or some other technical device. An official document is defined as a document in the possession of an authority and prepared by an authority or a person in the service of an authority, or a document delivered to an authority for the consideration of a matter or otherwise in connection with a matter within the competence or duties of the authority. In addition, a document is deemed to be prepared by an authority if it has been commissioned by the authority; and a document is deemed to have been delivered to an authority if it has been given to a person commissioned by the authority or otherwise acting on its behalf for the performance of the commission.”[25]
France	“Are considered administrative documents, regardless of time, place of storage, form and support documents created or received as part of their public service mission, by the State, local authorities and by other persons of public law or persons under private law entrusted with such a mission. Constitute such documents including records, reports, studies, reports, records, statistics, directives, instructions, circulars, notes and ministerial replies, correspondence, opinion, forecasts and

	decisions.”[26]
Latvia	<p>“1) information – an item of information or a collection of items of information recorded, stored or transmitted in any technical form;</p> <p>2) circulation of information - the initiation, generation, compilation, collection, processing, utilisation or destruction of information;</p> <p>3) documented information – information whose entry into circulation can be identified.”[27]</p>
Lithuania	<p>“Document shall mean any information to be provided, or any part thereof, compiled or received by a State or local authority institution or body, in written, including electronic, or graphical form, or in audio or video form.</p> <p>Information shall mean knowledge available to a State or local authority institution or body.”[28]</p>
The Netherlands	<p>(2005-2015) The PSI is “public information by virtue of this Act or another Act and that has been laid down in documents held by a public sector body if such re-use is intended for purposes other than the initial purpose for which the information has been produced” [29]</p> <p>(2015 onwards) ‘document’: a written record or other material containing data held by a body entrusted with a public task; [30]</p>
Poland	<p>Constitution Article 61: “1. A citizen shall have the right to obtain information on the activities of organs of public authority as well as persons discharging public functions. Such right shall also include receipt of information on the activities of self-governing economic or professional organs and other persons or organizational units relating to the field in which they perform the duties of public authorities and manage communal assets or property of the State Treasury.</p> <p>2. The right to obtain information shall ensure access to documents and entry to sittings of collective organs of public authority formed by universal elections, with the opportunity to make sound and visual recordings.</p> <p>3. Limitations upon the rights referred to in paras. 1 and 2 above, may be imposed by statute solely to protect freedoms and rights of other persons and economic subjects, public order, security or important economic interests of the State.</p> <p>4. The procedure for the provision of information, referred to in paras. 1 and 2 above shall be specified by statute, and regarding the Sejm and the Senate by their rules of procedure.”[31]</p> <p>“All information about public matters constitutes public information within the meaning of the Act and is made available and re-used on the basis of principles and procedure specified in this Act.”[32]</p>
Portugal	<p>“Access to, and the re-use of, administrative documents is guaranteed in accordance with the principles of publicity, transparency, equality, justice and impartiality.</p> <p>“Administrative document” – any information support medium, be it in written, visual, sound, electronic or any other material form, held by the bodies and entities referred to in the next Article, or held on their behalf;”[33]</p>
Slovak Republic	<p>Act (211) of 17 May 2000: “(1) Everyone shall have the right to access the information available to the obliged entities [defined in section 2].</p> <p>(2) An obliged entity under Section 2(3) shall only make available information on the management of public finance, on the disposal of the property of the state, the higher territorial unit or the municipality; and the content, performance and activities conducted on the basis of an agreement.</p> <p>(3) Information shall be made available without establishing any legal or other reason or interest for which the information is requested.”[34]</p>

Regulation of 2012: "Information means any content or partial content in any form, such as a register, electronic record or audio or audiovisual recording or work, stored on any kind of data carrier; information shall not include computer software." [35]

Table 2. Definitions of PSI by Member States which have used a combination of new measures specifically addressing re-use and legislation predating the Directive

Austria	<p>Federal regulation: "Document" means: a) any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording); b) any part of such content. "A document held by public sector bodies" means any document which the public sector body may make available for re-use." [36]</p> <p>Vienna federal state: "Document" means any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording) as well as any part of such content, with the exception of computer programs. "Re-use" means the use by persons or legal entities of documents held by public sector bodies, for commercial or non-commercial purposes other than the initial purpose within the public task for which the documents were produced. Exchange of documents between public sector bodies (Article 2(1) of Directive 2003/98/EC) purely in pursuit of their public tasks does not constitute re-use. A document is held by a public sector body when this body has the right to authorise reuse." [37]</p> <p>Carinthia federal state: "Information means factual statements on matters which at the time of the request for information are known to the body that is subject to the obligation to provide information by virtue of its official activities and which need not first be obtained or compiled in order to comply with the obligation to provide information." [38]</p> <p>Vorarlberg federal state (till 2015): "Document" means any representation of content, irrespective of the medium used (written on paper or stored in electronic form or as a sound, visual or audiovisual recording), or any part thereof. "Document held by a public-sector body" means any document for which that public-sector body may decide whether to allow reuse. [39]</p> <p>(2015 onward): 'document' means any representation of content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording) or a part thereof;</p> <p>b) 'document held by a public sector body' means a document which a public sector body is able to reuse". [40]</p> <p>Lower Austria federal state 'Document' means: a) any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording); b) any part of such content. 'Document held by a public-sector body' means: a document which the public-sector body is authorised to make available for re-use. 'Re-use' means: the use by persons or legal entities of documents held by public-sector bodies, for commercial and non-commercial purposes other than the initial purpose under the public task for which the documents were produced. The exchange of documents between public-sector bodies within the meaning of Article 2(1) of Directive 2003/98/EC purely in pursuit of their public tasks shall not constitute re-use. [41]</p> <p>Tyrol federal state: Documents "are held by public sector bodies and which the latter have created as part of their public tasks, insofar as such bodies make the</p>
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	<p>documents available for re-use. Documents are any contents, whatever their medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording), or parts of such contents (extracts) except for computer programs.” [42]</p> <p>Burgenland federal state: “Information means factual statements on matters of which the body obliged to provide information is aware at the time that the request for information is lodged. “Document”: any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording) as well as any part of such content, with the exception of computer programs. “Document held by a public sector body”: a document” regarding which the public sector body is entitled to allow re-use.” [43]</p> <p>Styria federal state: ““Document”: any representation of a content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording) or a part thereof. “Document held by a public sector body”: Document which the public sector body is authorised to make available.” [44]</p> <p>Salzburg federal state: “Document: any content, or parts thereof, whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording) produced by a public sector body in order to carry out its public task. Document held by a public sector body: a document whose re-use may be authorised by the public sector body.”[45]</p> <p>Upper Austria federal state: ““Document” means: a) any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording); b) any part of such content. “Re-use” means: the use by persons or legal entities of documents held by public sector bodies, for commercial and non-commercial purposes other than the initial purpose within the public task for which the documents were produced. Exchange of documents between public sector bodies within the meaning of Article 2(1) of Directive 2003/98/EC purely in pursuit of their public tasks does not constitute re-use.”[46]</p>
Denmark	<p>Year 1985: “Right of access to files shall include internal working documents in their final form if 1) the documents contain only the substance of the authority’s final decision on the outcome of a case; 2) the documents contain only information that the authority had a duty to record; 3) the documents are self-contained instruments drawn up by an authority to provide proof or clarity concerning the actual facts of a case, or 4) the documents contain general guidelines for the consideration of certain types of cases.” [47]</p> <p>Year 2005: “1. The Act covers the re-use of documents and data collections held by public sector bodies; however, see paragraph 2.</p> <p>2. The Act does not apply to documents and data collections: (1) which have been produced or enhanced in the course of a public sector body’s commercial activities, or (2) for which third parties hold a non-material right.</p> <p>“Document” means all information regardless of the medium and any part of such information. “Data collection” means registers or other systematic lists for which use is made of electronic data processing.” [48]</p>
Slovenia	<p>“Public information shall be deemed to be information originating from the field of work of the body and occurring in the form of a document, a case, a dossier, a register, a record or other documentary material (hereinafter referred to as “the document”) drawn up by the [state or public] body, by the body in cooperation with other body, or acquired from other persons.</p> <p>Archive material held by the competent Archive, within the frame of public archive service in accordance with the Act governing archives, is not public information according to this Act.</p>

Re-use of public information means the use by natural or legal entities, for commercial or non-commercial purposes other than the initial purpose within the public task for which the documents were produced. The use of information within the body or exchange of information between the bodies purely in pursuit of their public tasks does not constitute re-use of information.” [49]

Table 3. Definitions of PSI by Member States which adopted specific PSI re-use measures

Cyprus	“Document” means: (a) any content whatever its medium (printed on paper or stored in electronic form or as a sound, visual or audiovisual recording); (b) any part of the content referred to in paragraph (a).[50]
Germany	“Information shall be defined as any record stored in any way” [51]
Greece	<p>Regulation of 2006: “Document for re-use” means any document which is issued or held by public sector bodies, especially surveys, minutes, statistical data, circulars, replies by administrative authorities, opinions, decisions, reports, whatever the medium (i.e. written on paper, stored in electronic form or as a sound, visual or audiovisual recording), as well as any part of such document. For the implementation of the provisions of this law, “documents” also means private documents which are held in public sector bodies’ records and were used or taken into consideration so as to define their administrative purpose.[52]</p> <p>Regulation of 2014: “The documents, information and data are made available online as a dataset or via programming interfaces in open machine-readable format which complies with open standards according to the provisions of Article 6 hereof, from a fixed point of deposit. (...) ‘Document’, means any document, part of a document, information or data published or made available to public sector bodies for handling within the scope of their responsibilities, and in particular, studies, records, statistical data, circulars, directives, replies from administrative authorities, recommendations, decisions or reports, regardless of the recording medium used (e.g. printed on paper, stored in electronic format, or audio, visual or audiovisual recordings). For the implementation of the provisions of this law, ‘documents’ also refers to personal documents held in the archives (files) of public sector bodies, used or taken into account to determine administrative courses of action.” [53]</p>
Hungary	<p>(2012-2015) “‘Public sector information’ means data of public interest and data made public on grounds of public interest as defined in the Act on Informational Self-Determination and Freedom of Information” [54]</p> <p>(2015 onward) “public sector information” means information of public interest and information disclosed due to public interest as defined in the Act on Informational Self-Determination and Freedom of Information. [55]</p>
Ireland	“‘Document’ means all or part of any form of document, record or data, whether in physical, electronic or other form and includes: (a) any memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, (b) any photograph, and (c) any sound, visual or audio-visual recording;”[56]
Italy	“Document: the presentation of acts, facts and information in whatever form, held by a public sector body or body governed by public law. This definition does not include computer programs; public data: data that is accessible by anyone;”[57]
Luxembourg	“‘Document’: a) any content whatever its medium (written on paper or stored electronically, sound, visual or audiovisual recording); b) any part of such content;”[58]

Malta	<p>(2007-2015) “‘Document’ covers any representation of acts, facts or information - and any compilation of such acts, facts or information - whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording), held by public sector bodies, but is not intended to cover computer programmes;” [59]</p> <p>(2015 onward) "document" covers any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording), including any part of such content. [60]</p>
Romania	<p>“Document - any content or part of such content, whatever its medium, be it on paper, stored in electronic format, or as sound, video or audiovisual recording;”[61]</p>
Spain	<p>(2007-2015) “This Law applies to documents prepared or held in safekeeping by public sector Administrations and organizations that authorize their re-use. Document means any information, whatever its physical or electronic support and whatever its form of graphic or audio expression or image used. Documents do not include computer programmes protected by specific legislation applicable to them.”[62]</p> <p>(2015 onward) Document: All information or part thereof, whatever the medium or form of expression, whether textual, graphic, audio visual or audiovisual, including associated metadata and data content with the highest levels of accuracy and disaggregation. For these purposes, computer programmes protected by the specific legislation applicable to them shall not be considered documents.[63]</p>
Sweden	<p>“In this Act, the word ‘document’ shall have the meaning set out in Chapter 2 Section 3, first paragraph, of the Freedom of the Press Act. A computer program shall not, however, be regarded as a document.”[64] “Document is understood to mean any written or pictorial matter or recording which may be read, listened to, or otherwise comprehended only using technical aids. A document is official if it is held by a public authority, and if it can be deemed under Article 6 or 7 to have been received or drawn up by such an authority. A recording under paragraph one is deemed to be held by a public authority if it is available to the authority using technical aids which the authority itself employs for communication in such form that it may be read, listened to, or otherwise comprehended. A compilation of information taken from material recorded for automatic data processing is however regarded as being held by the authority only if the authority can make it available using routine means. A compilation of information taken from material recorded for automatic data processing is not however regarded as being held by the authority if the compilation contains personal information and the authority is not authorized in law, or under an ordinance, to make the compilation available. Personal information is understood to mean any information which can be referred back directly or indirectly to an individual.”[65]</p>
United Kingdom	<p>(2005-2015) “document means any content, including any part of such content, whether in writing or stored in electronic form or as a sound, visual or audiovisual recording, other than a computer program; content means information recorded in any form”[66]</p> <p>(2015 onward) “document” means any information recorded in any form, including any part of such information, whether in writing or stored in electronic form or as a sound, visual or audiovisual recording, other than a computer program.[67]</p>

Deeper investigation of the national law in EU member states shows the existing differences in the definition of PSI. Some countries use a PSI definition as a “document”, “information”, “data” or other.

These differences can be classified according to ones using: 1) the **same definition** of PSI as provided in the PSI Directive (Austria, including the Austrian federal states of Vienna, Vorarlberg, Lower Austria, Tyrol, Styria, Salzburg, and Upper Austria), Cyprus, the Slovak Republic (from 2012), Greece (from 2006 to 2014), Luxembourg, and Spain) and 2) those which have **adopted a specific definition** (all others).

The differences in the definition of PSI can also be classified into 4 groups: **document group** (definition of PSI is strongly related to a document), **information group** (PSI is understood as some kind of information), **data group** (PSI is understood as a data, record, file, etc.) and **other group** (PSI is understood as a representation of content, knowledge, matters, or other). Such classification is used to group definitions because PSI meaning is related to document, information, data or other. Subgroups explain differences of grouped definitions and represent the key meaning of the definition. The classification is presented in Table 4.

Table 4. Differences in the definition of PSI

Group	Subgroup	Example
Document	Document	Austria (including the federal states of Vienna, Vorarlberg, Lower Austria, Tyrol, Styria, Salzburg, and Upper Austria), Cyprus, the Slovak Republic (from 2012), Greece (from 2006 till 2014), Luxembourg, and Spain all used the same definition as provided in PSI Directive;
	Documented information	Estonia defines it as information that is recorded <u>and documented</u> . It means that information that is not documented is not under the scope of PSI; Latvia defines it as “documented information – information whose entry into <u>circulation can be identified</u> ”[27];
	Administrative documents	France and Portugal defines it as “administrative documents”;
	Documents, information and data	Greece (from 2014) implements the Revised PSI Directive and provides an updated conception of PSI: it is the documents, information, and data that are made available online as a dataset or via programming interfaces in an open machine-readable format that complies with open standards ;
	Documents, record and data	Ireland defines it as a document and means all or part of any form of document, record or data ;
	Document and any content	Romania defines it as a document and it means any content or part of such content.
Information	Information and meta-data	The Czech Republic it defines as “publicly disclosed information”. Also it includes metadata, which is named as “accompanying information”;
	Any information	Bulgaria defines it as any information collected or created by a public sector body;
	Public information	It is defined as public information in the Netherlands and Poland (all information <u>about public matters</u> constitutes public information);

		The Slovak Republic (until 2012) used very narrow definition of PSI limited to information only about public finance, state/municipality property, and agreement-based activities;
	Information in the form of a document, case, register, record, or other documentary material	Slovenia defines it as information originating from the field of work of a state or public body and occurring in the form of a document, a case, a dossier, a register, a record or other documentary material drawn up by the body, by the body in cooperation with other body, or acquired from other persons.
	Information means content	The United Kingdom defines it as information and it means any content or part of such content.
Data	Data	Croatia defines it as any data owned by a public authority. It means that ownership of rights to data is important; Hungary defines it as data of public interest and data made public on the grounds of public interest;
	Data collections	Denmark (from 2005 onward) granted access not only to documents but also to data collections . Exception was made for information produced for commercial activities of a public sector body, or for which third parties hold a non-material right. "Data collection" means registers or other systematic lists involving electronic data processing ;
	Files	Denmark (until 1985) granted access to files only if 1) they were the substance of the authority's final decision on the outcome of a case; 2) the documents contain only information that the authority had a duty to record ; 3) the documents were self-contained instruments drawn up by an authority to provide proof or clarity concerning the actual facts of a case , or 4) the documents contained general guidelines for the consideration of certain types of cases.
	Any record	Germany defines it as any record stored in any way.
Other	Presentation and message	Finland defines it as "written or visual presentation , and also as a message ";
	Presentation of acts, facts and information	Italy defines it as a document and it means the presentation of acts, facts, and information
	Any representation of content	The Austrian state of Vorarlberg defines it as any representation of content , or part of it, upon which a public-sector body may decide whether to allow reuse ;
	Representation of acts, facts or information - and any compilation	Malta defines it as a document, and it means any representation of acts, facts or information - and any compilation of such acts, facts or information;
	Knowledge	Lithuania uses the definition: "document shall mean any information; information shall mean knowledge available to a State or local authority institution or body";
	Known factual statements on matters	The Austrian states of Carinthia and Burgenland define it as factual statements on matters which at the time of the request for information are known to the body;

	Matter or recording and compilation of information	Sweden defines it as a document and it means any written or pictorial matter or recording that may be read, listened to, or otherwise comprehended only using technical aids. It also includes a compilation of information taken from material recorded for automatic data processing .
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2.2.3.4 Summary of the Analysis of the PSI Definition

A close analysis of adopted definitions shows that most EU member states use differing terms to describe Public Sector Information. From an Open Data perspective, it is less important which term is used — “document” or “data” — and more important to identify when a particular definition extends beyond the scope of the PSI directive definition.

Firstly, it is risky to restrict the definition of PSI only to administrative documents or documented information, because there is much other information held by public bodies that is not strictly considered administrative documents or “documents”— that is, “documented information” in bureaucratic terminology. Such a narrow definition runs against the stated objectives of the Directives.

Secondly, definition in terms of ownership of the information should also be avoided, because some works are already in the public domain and, according to the Revised PSI Directive, it should be provided (e.g. from archives, museums) as public domain works. Also, there are discussions [68] within the open data community: Does PSI belong to the public sector or does it belong to the public domain (because it was produced by public money)?

Thirdly, it is common case that PSI be defined in terms of information provided for re-use. For example, “Document held by a public sector body: a “document” regarding which the public sector body is entitled to allow re-use.” In such case, PSI is limited only to information that is provided for re-use by an institution and there is a risk, that it limits the right to get access to information and requires taking the initiative to ask for new information that has not been provided by the institution. On the other hand, such a limitation regarding re-use is a right of each EU member state according to PSI Directive recital 9: “This Directive does not contain an obligation to allow re-use of documents. The decision whether or not to authorise re-use will remain with the Member States or the public sector body concerned. This Directive should apply to documents that are made accessible for re-use when public sector bodies license, sell, disseminate, exchange or give out information.”[19]

Implementation of the Revised PSI Directive makes changes to PSI terminology, because the PSI concept was updated to include metadata, open and machine-readable formats, and embodies a forward-thinking understanding of what is open data. For example, the Spanish PSI regulation from 2015 defines: “Document: **All information** or part thereof, whatever the medium or form of expression, whether textual, graphic, audio visual or audiovisual, **including associated metadata and data content with the highest levels of accuracy and disaggregation**.” [63]

The Revised PSI Directive was to have been implemented in national laws of member states by 18 July 2015, but the Directive was implemented by the deadline only in Austria (and its federal states), Germany, Greece, Italy, Malta, the Netherlands, Spain, and the United Kingdom. Some countries did not implement the entire Revised PSI Directive, particularly Denmark, Latvia, Hungary, and Sweden. For detailed information, please see Annex 1.

It is hoped that the Revised PSI Directive will be fully implemented in all member states, including its definitions of PSI, and will be interpreted to support the Open Data concept, e.g. as it did Greece.

2.2.4 What is not Open Government Data in the EU and its Member States?

2.2.4.1 Exceptions

Of course, not all information held by the public sector should be disclosed to the public and be made available for re-use. Limitations should be reasonable, because it limits the right to access information held by the public bodies. Usually these limits are set according to the interests of state security, the secrecy of criminal investigations, personal privacy, etc.

Limitations also can be set because of the economic interest of public sector institutions. This practice is widely applied in EU member states. This limitation is controversial and should be evaluated case by case. It is worth assessing whether a country is getting more benefit by protecting information in order to earn a profit for the public institution by selling information, weighed against the benefits coming from free access to information. The weather forecast industry, which could not have been developed without free access to expensive meteorological data captured by satellites, is an example that counts in favour of supporting free access to PSI information.

On other hand, giving away access to valuable information for free means cutting off a source of income to public bodies, which usually use those profits to cross-subsidize important public tasks. The government should take a risk and ask for extra funding to make a reorganization of public institutions, if it wants to reach the goal of free access. Because the PSI re-use industry still is early in development, governments have found enough reasons to protect the economic interests of public bodies and to restrict access to commercially valuable PSI. In the EU, the decision was made that every country can decide individually which information can be locked. This decision can be found in the PSI Directive. Table 4 presents reasons given for not making public information accessible for re-use coming from PSI Directive.

Table 5. Reasons not to make public sector information accessible for re-use

Reasons	Legal basis	Explanation
Activities falling outside the scope of the public task of a public sector body	PSI Directive Article 1, para. 2: “This Directive shall not apply to: (a) documents the supply of which is an activity falling outside the scope of the public task of the public sector bodies concerned as defined by law or by other binding rules in the Member State, or in the absence of such rules as defined in line with common administrative practice in the Member State in question;”[19]	PSI Directive Recital 9: “Activities falling outside the public task will typically include supply of documents that are produced and charged for exclusively on a commercial basis and in competition with others in the market. ”[19]
IP rights	PSI Directive Article 1, para. 2(b): “documents for which third parties hold intellectual property rights;” Article 1, para. 5: “The obligations imposed by this Directive	IP rights owned by a party other than the public body is a reason to exclude documents from PSI availability for re-use.

	shall apply only insofar as they are compatible with the provisions of international agreements on the protection of intellectual property rights, in particular the Berne Convention and the TRIPS Agreement.”[19]	
Excluded from Access	PSI Directive Article 1, para. 2(c): “documents which are excluded from access by virtue of the access regimes in the Member States, including on the grounds of: —the protection of national security (i.e. State security), defence, or public security, —statistical or commercial confidentiality;”[19]	Classified information, statistical and commercial confidentiality are excluded from PSI available for re-use.
Special access regime	PSI Directive Article 1, para. 3 “This Directive builds on and is without prejudice to the existing access regimes in the Member States. This Directive shall not apply in cases in which citizens or companies have to prove a particular interest under the access regime to obtain access to the documents.” [19]	PSI Directive Recital 9: “The Directive builds on the existing access regimes in the Member States and does not change the national rules for access to documents. It does not apply in cases in which citizens or companies can, under the relevant access regime, only obtain a document if they can prove a particular interest. ” [19] Limited-access documents are excluded from PSI accessible for re-use.
Public service broadcasting	PSI Directive Article 1, para. 2 (d): “documents held by public service broadcasters and their subsidiaries, and by other bodies or their subsidiaries for the fulfilment of a public service broadcasting remit;” [19]	All information concerning public service broadcasting is excluded from PSI accessible for re-use. It is related to the commercial interests and non-disclosure of “secret sauce” or independent mass media principles.
Educational and research	PSI Directive Article 1, para. 2(e): “documents held by educational and research establishments, such as schools, universities, archives, libraries and research facilities including, where relevant, organisations established for the transfer of research results;” [19]	Documents held by educational and research establishments are excluded from PSI accessible for re-use mainly because of the commercial interest of the institutions (competition and etc).
Cultural	PSI Directive Article 1, para. 2(f): “documents held by cultural	Documents held by cultural establishments are excluded from

	establishments, such as museums, libraries, archives, orchestras, operas, ballets and theatres.” [19]	PSI accessible for re-use mainly because of the commercial interest of the institutions.
Software	PSI Directive Recital 9: “The definition of ‘document’ is not intended to cover computer programmes.” [19]	Software is excluded, mainly because of third party IP rights.
Disproportionate effort to extract document	PSI Directive Recital 13: “Public sector bodies should view requests for extracts from existing documents favourably when to grant such a request would involve only a simple operation . Public sector bodies should not, however, be obliged to provide an extract from a document where this involves disproportionate effort .” [19]	If the requested PSI is too difficult to provide and takes a burdensome amount of time, then PSI need not be provided. In some cases, such information could be provided by charging extra fees for such retrievals.
Personal data	PSI Directive Recital 21: “This Directive should be implemented and applied in full compliance with the principles relating to the protection of personal data in accordance with Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and of the free movement of such data” [19]	Personal data is not part of PSI accessible for re-use.

The Revised PSI Directive made changes to the reasons why public information should be not provided for re-use, and the amendments are presented in Table 5.

Table 6. Amendments to the PSI Directive: comparative analysis

PSI Directive	Revised PSI Directive
“documents the supply of which is an activity falling outside the scope of the public task of the public sector bodies concerned as defined by law or by other binding rules in the Member State, or in the absence of such rules as defined in line with common administrative practice in the Member State in question;” [19]	“documents the supply of which is an activity falling outside the scope of the public task of the public sector bodies concerned as defined by law or by other binding rules in the Member State, or in the absence of such rules, as defined in line with common administrative practice in the Member State in question, provided that the scope of the public tasks is transparent and subject to review ”[20]
“documents which are excluded from access by virtue of the access regimes in the Member States,	“documents which are excluded from access by virtue of the access regimes in the Member States,

including on the grounds of: — the protection of national security (i.e. State security), defence, or public security, — statistical or commercial confidentiality;” [19]	including on the grounds of: — the protection of national security (i.e. State security), defence, or public security, — statistical confidentiality, — commercial confidentiality (e.g. business, professional or company secrets)” [20]
“documents held by educational and research establishments, such as schools, universities, archives , libraries and research facilities including, where relevant, organisations established for the transfer of research results” [19]	“documents held by educational and research establishments, including organisations established for the transfer of research results, schools and universities, except university libraries and’;” [20]
“documents held by cultural establishments, such as museums, libraries, archives, orchestras, operas, ballets and theatres. ” [19]	“documents held by cultural establishments other than libraries, museums and archives. ’;” [20]
“This Directive builds on and is without prejudice to the existing access regimes in the Member States. This Directive shall not apply in cases in which citizens or companies have to prove a particular interest under the access regime to obtain access to the documents. ” [19]	“This Directive builds on and is without prejudice to access regimes in the Member States.’;” “ documents access to which is restricted by virtue of the access regimes in the Member States, including cases whereby citizens or companies have to prove a particular interest to obtain access to documents; ”[20] “parts of documents containing only logos, crests and insignia; documents access to which is excluded or restricted by virtue of the access regimes on the grounds of protection of personal data, and parts of documents accessible by virtue of those regimes which contain personal data the re-use of which has been defined by law as being incompatible with the law concerning the protection of individuals with regard to the processing of personal data;” [20]

These are the main changes to the exceptions that were implemented in the Revised PSI Directive:

- Activities falling outside the scope of the public task of a public sector body (which typically includes supplying documents that are produced and charged for exclusively on a commercial basis and in competition with others in the market) remain excepted, **provided that the scope of the public tasks is transparent and subject to review;**
- **Libraries, museums, university archives and archives** are no longer under the exception not to provide documents for re-use;
- A new exception goes to **parts of documents containing only logos, crests and insignia.**

These changes show that legislators were not satisfied with those limitations to provide public data accessible for re-use when the reason was **activities falling outside the public task**. The legislators asked for transparency and to be those decisions subject to review.

The analysis of PSI regulatory norms implemented in member states also found that there are also unique exceptions, provided in Table 6, not regulated by the PSI Directive or Revised PSI Directive.

Table 7. Unique exceptions of PSI by the Member States.

Country	Unique exceptions
Austria	(2005-2015) §3(1)5 which are covered by commercial protection rights [69], [70]
Bulgaria	§5 The right of access to public information and public sector information may not be exercised against others' rights and reputation , or against the national security, public order, national health, and moral standards [21]
Croatia	<p>§15(2)2 where information constitutes a trade or professional secret, under the law;</p> <p>§15(2)3 where information is a tax secret, under the law;</p> <p>§15(2)5 where information is being created within a public authority, and its publication prior to completing the creation of comprehensive and final information might seriously damage the process of adopting a decision;</p> <p>§15(2)7 in other cases stipulated by the law.</p> <p>§15(3) Public authorities may restrict access to information if there are grounds to suspect that its publication might:</p> <p>1) prevent efficient, independent and unbiased conduct of judicial, administrative or other legally regulated proceedings, or the execution of a court decision or sentence;</p> <p>2) prevent the work of any bodies conducting administrative supervision, inspection supervision or the supervision of legality[71]</p>
Denmark	<p>(1985) §7 The right of access to files shall not apply to an authority's internal working documents. Internal working documents shall include:</p> <p>1) any document prepared by an authority for its own use;</p> <p>2) correspondence between units within the same authority, and</p> <p>3) correspondence between a local council and its committees, departments and other bodies, or between those bodies. [72]</p> <p>§13(1)4. The right of access to documents may be limited to the extent necessary to protect considerations for carrying out public supervisory, regulatory and planning activities and measures planned under tax law [72]</p> <p>(2005) §2(4) The Act is not applicable to the [Danish] Parliament and bodies connected with it [73]</p>
Estonia	<p>§35(1) A holder of information is required to classify the following as information intended for internal use:</p> <p>5) information the disclosure of which would endanger objects protected under heritage conservation;</p> <p>6) information the disclosure of which would endanger the preservation of protected areas or protected species or varieties and their habitats [74]</p>
Greece	§3(1)(c) iv) protection of the cultural heritage from theft, looting, vandalism, illegal excavation, illicit trade in antiquities, and in general to avoid putting at risk movable and immovable monuments and areas protected under Law 3028/2002 [75]
Italy	<p>§1(2) The public sector bodies and bodies governed by public law are not obliged to grant the re-use of documents (...) The decision as to whether or not to grant such re-use rests with the body or body concerned, except where specific laws or regulations apply [76]</p> <p>(2006-2010) §3(1)(f) The following documents shall be excluded from the application of this Decree: those relating to data on the online national employment exchange, on the employee register and that used for the certification of employ-</p>

	<p>ment contracts, covered by Legislative Decree No 276 of 10 September 2003 and its implementing provisions [76],[77]</p> <p>(2006-2010) §4(1)(d) This Decree is without prejudice to provisions on: the commercial re-use of documents, data, and cadastral and mortgage information, (cf. Article 1(367) to (373) of Law No 311 of 30 December 2004) [76],[77]</p>
Poland	<p>§1(4) The right to public information is subject to restriction on the grounds of protection of an important economic interest of the state to the extent and at a time at which making the information available:</p> <p>1) would weaken the negotiation capacity of the State Treasury in the process of administration of its property, or the negotiation capacity of the Republic of Poland in the process of concluding an international agreement or decision-making by the European Council or the Council of the European Union,</p> <p>2) would make it significantly more difficult to protect the financial interests of the Republic of Poland or the State Treasury in proceedings before a court, tribunal or another adjudicating body [78]</p>
Romania	<p>(2007-2008) §5(2) The commercial re-use of the documents (...) shall be done with the agreement of the public institution holding the documents, on the basis of an application submitted to that institution.[79][80]</p> <p>(2007-2008) §8(1) Public institutions may establish charges for services relating to the commercial re-use of documents.[79][80]</p>
Slovakia	<p>(2000) §11(1)(e) The Obligee shall limit disclosure of information or not provide information, if it concerns the place of habitat of endangered species of plants and animals, minerals and fossils and there is a threat of inappropriate destruction, damage or disturbance. [81]</p> <p>(2012)§21c (1)(h) The specific provisions on the re-use of information shall not apply to information which concerns emergency plans, evacuation plans and/or documents for ensuring the physical and material safety of the obliged entity or which, if disclosed, might endanger the security of the obliged entity's information system, such as access passwords, vulnerability analyses and risks to the information system for their duration, penetration test results, information-system security settings, security policy and information-security documents designated by it, and security projects.[82]</p>
Slovenia	<p>§22(1) The body shall set a price for the re-use of public information for commercial purposes (...) [83]</p>
Sweden	<p>§2(2)5 The right of access to official documents may be restricted only if restriction is necessary with regard to: the economic interests of the public institutions [84]</p>

2.2.4.2 Different Legal Regimes for Protection of Public Sector Information

There are different legal regimes for protection of information held by public bodies: personal data, classified information, information concerning trade secrets, data stored in state registers and state information systems, creative works protected by copyright, and other intellectual property.

2.2.4.2.1 Personal data

Personal data protection regulation has significantly changed in the EU[85]: “‘Personal data’ means any information relating to an identified or identifiable natural person (‘data subject’) an identifiable

natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person;” Art. 4 (1)[86].

Protection of personal data is a deeply held principle in today’s Europe, which saw the lessons of World War II, when information about a person’s religion, sexuality, origins, health etc. were used to commit war crimes. Even Open Government Data that has been undergone a de-identification process has the potential to be misused to infringe protections on personal data, by de-anonymization or re-identification of the data, or by merging different datasets with commercial data, which could be collected by legal or non-legal means. This argument is widely used by critics of Open Government Data. In a case in Lithuania in 2015, the personal data of persons called for mandatory military conscription were published, and journalists easily identified most of celebrities on the list[87][88]. Also, personal information protection is not managed enough to protect against massive leaks of personal data.

On other hand, the accessibility of personal data, such as health-related data, widely available for researchers could influence big discoveries and change our lives[89].

The PSI Directives clearly state that protection of personal data is paramount: “This Directive should be implemented and applied in full compliance with the principles relating to the protection of personal data in accordance with Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.” (2003 recital 21; 2013 recital 11)[20]. The Revised Directive adds the principle that if personal data is processed, it must not be processed or mixed with other OGD in a way that is incompatible with the purposes for collecting the personal data. (recital 11)[20]

2.2.4.2.2 Classified Information, Information Concerning Trade Secrets

A governmental secret that is classified information or information concerning trade secrets are not part of Open Government Data and is protected by national laws. Nevertheless, hack-activists are making these kinds of data publicly available, e.g. via Wikileaks[90], the Panama Papers[91], etc., and this kind of information is increasingly becoming a part of the publicly accessible data cloud.

On other hand, “sensitive” data that would otherwise be classified information or trade secrets can sometimes be discovered by collecting, combining, mixing, and reverse-engineering legitimate OGD information (e.g. tracking truck movements from traffic cameras to identify clients and the amounts of goods).

2.2.4.2.3 Data of State Registers and Information Systems

In Europe there are different models for the funding of state registers (cadastres) and state information systems, e.g. there is a special legal regime in Lithuania for information stored in state registers and state information systems implemented by the Law on State Registers (2004). Some models use information sharing as a significant source of funding for their systems. Because of these cases, there are some complaints from member states that EU requirements to release PSI without charge or without discrimination is undermining their current funding models. The PSI Directive set a deadline for terminating such exclusive arrangements as the contracts expire and not later than 18 July 2043[19].

2.2.4.2.4 Copyright, IP Rights and Other Rights of Databases and Information

Copyright, *sui generis* database rights, intellectual property rights, related rights, other rights protecting creative works, databases, software, and information are not part of OGD, unless the right holder permits such use.

The problem is that the copyright regime in the EU applies copyright protection automatically, and if a right holder wants to waive the rights, the waiver should be disclosed, e.g. in a license.

There are debates whether copyrights should be secured for Public Sector Information and protected as something of “value” and property of the “state”, or whether copyrights should be waived and released to the Public Domain. For example, Finland released most of its PSI to the public domain (“Official documents shall be in the public domain, unless specifically otherwise provided in this Act or another Act.”[25])

The Revised PSI Directive takes this position on documents covered by Intellectual Property Rights: “Taking into account Union law and the international obligations of Member States and of the Union, particularly under the Berne Convention for the Protection of Literary and Artistic Works and the Agreement on Trade-Related Aspects of Intellectual Property Rights, documents for which third parties hold intellectual property rights should be **excluded** from the scope of Directive 2003/98/EC. If a third party was the initial owner of the intellectual property rights for a document held by libraries, including university libraries, museums and archives and the term of protection of those rights has not expired, that document should, for the purpose of this Directive, be considered as a document for which third parties hold intellectual property rights. (Recital 9)”[20]

2.2.4.3 Summary of the Analysis of Public Sector Information Excluded from Open Government Data

Not all Public Sector Information can be made accessible as Open Government Data. There is special legislation that protects different kinds of data, information, creative works, etc. The PSI Directive and Revised PSI Directive provide most of the applicable exceptions; other exceptions are regulated by personal data protection, intellectual property rights protection, state classified information protection, commercial secrets protection, and as state property based on information resources protection legislation.

Thus, it is important not to release information categorically as Open Government Data because it may be protected by other laws. Still, it remains a challenge with existing de-anonymization techniques to ensure data privacy on one hand, and to grant open access to data held by public bodies on the other. The challenges of balancing privacy interests and open government has been discussed by T. Scassa[92].

2.2.5 What are the Requirements That Apply to Re-use of Open Government Data in the EU?

The 2003 PSI Directive was the core legislation on re-use of public sector information and many OGD concepts have developed from this legislation. It established the principle and mechanism of re-use of PSI. The purpose of PSI Directive 2003/98/EC was the establishment and functioning of the internal market of re-use of Public Sector Information to meet the objectives of the Treaty of Rome establishing the European Economic Community [93], particularly Article 95.

The Directive was revised after 10 years, and amendments were made by the Revised PSI Directive. The PSI Directive with its amendments establish requirements that apply to the re-use of Public Sector

Information, and establish concrete roles for the European Commission, member states, and national authorities.

2.2.5.1 Requirements that Apply to the Re-use of Public Sector Information

The PSI Directive and its amendment establish these important principal requirements concerning re-use of public sector information:

- a) Re-use must be provided for **commercial** or **non-commercial** purposes of re-use (PSI Directive Article 2, para. 4; Article 3, Revised Directive Article 1(3));
- b) Specific **requirements for formats** to provide PSI for re-use are applied (Revised Directive Article 1(5));
- c) Special requirements apply to **charges** for providing PSI for re-use (Revised Directive Article 1(6));
- d) Special requirements apply to **transparency** of any applicable conditions and standard charges for the re-use (Revised Directive Article 1(7));
- e) Special requirements applies to **licenses** of Public Sector Information (PSI Directive Article 8.2; Revised Directive Article 1(8));
- f) Special requirements applies to **practical arrangements**, how and where PSI should released (Revised Directive Article 1(9));
- g) A principle of **non-discrimination** applies to comparable categories of re-use (PSI Directive Article 10);
- h) Prohibition of **exclusive arrangements** (PSI Directive Article 11, Revised Directive Article 1(10)).

2.2.5.2 Commercial or Non-commercial Purposes of Re-use

The PSI Directive clearly express that PSI re-use must be available not only for non-commercial purposes, but also for commercial purposes; this is a general principle of the PSI Directive (Article 3). The only possible limitation is there may be different charges applied for commercial uses (see more in sub-chapter Non-discrimination). The majority of EU member states have implemented this principle; only in Latvia is re-use allowed only for private individuals (since 2016).

2.2.5.3 Requirements for Formats

What makes Open Government Data **linked**? The answer is any technology that makes data more understandable and connectable by machines. However, it is nearly impossible to readily connect different OGD datasets without specific tools to help identify the structure and content of individual datasets. Those tools include machine-readable formats and metadata, and also specialized languages and pre-existing formats. As S. Braman explains, “Meta-technologies vastly expand the degrees of freedom with which humans can act in the social and material worlds.” [94]

The legislators of the EU decided to implement these tools as a part of the PSI concept in the Revised Directive (see Table 7).

Table 8. Development of available formats conception

Directive 2003/98/EC	Directive 2013/37/EC
“Public sector bodies shall make their documents available in any pre-existing format or language, through electronic means where possible and appropriate.”[19]	“Public sector bodies shall make their documents available in any pre-existing format or language , and, where possible and appropriate, <u>in open and machine-readable format together with their metadata</u> . Both the format and the metadata should, in so far as possible, comply with formal open standards .” Art. 5[20]
“On the basis of this Directive, public sector bodies cannot be required to continue the production of a certain type of documents with a view to the re-use of such documents by a private or public sector organisation.”[19]	“On the basis of this Directive, public sector bodies cannot be required to continue the production and storage of a certain type of documents with a view to the re-use of such documents by a private or public sector organisation.”[20]

The Revised Directive explains: “Public sector bodies shall make their documents available in any pre-existing format or language, and, where possible and appropriate, in open and machine-readable format together with their metadata. Both the format and the metadata should, in so far as possible, comply with formal **open standards**.”

Directive 2013/37/EC Article 1, para. 2 introduces these definitions:

a) **machine-readable format**: “means a file format structured so that software applications can easily identify, recognize and extract specific data, including individual statements of fact, and their internal structure;”[20]

b) **open format**: “means a file format that is platform-independent and made available to the public without any restriction that impedes the re-use of documents;”[20]

c) **formal open standard**: “means a standard which has been laid down in written form, detailing specifications for the requirements on how to ensure software interoperability.”[20]

Discussion of these tools was promoted to the preamble of the Revised PSI Directive:

“To facilitate re-use, public sector bodies should, where possible and appropriate, make documents available through open and machine-readable formats and together with their metadata, at the best level of precision and granularity, in a format that ensures interoperability, e.g. by processing them in a way consistent with the principles governing the compatibility and usability requirements for spatial information under Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) (recital 20)”[20]

“A document should be considered to be in a machine-readable format if it is in a file format that is structured in such a way that software applications can easily identify, recognise and extract specific data from it. Data encoded in files that are structured in a machine-readable format are machine-readable data. Machine-readable formats can be open or proprietary; they can be formal standards or not. Documents encoded in a file format that limits automatic processing, because the data cannot, or cannot easily, be extracted from them, should not be considered to be in a machine-readable format. Member States should where appropriate encourage the use of open, machine-readable formats. (recital 21)”[20]

Still, it is important to realise that other useful tools can be developed along different paths. There are “five levels of maturity for metadata management:

- Metadata Ignorance;
- Scattered or Closed Metadata;

- Open Metadata for Humans;
- Open Reusable Metadata;
- Linked Open Metadata”[95].

These problems have been pointed out and discussed by authors: “The analysis indicates that there are no data aggregators and OGD catalogues in the **Greek** landscape (...) Furthermore, there are several public agencies which follow the newest ‘linked-open-data’ paradigm of publishing data and maintain their data in two different sites with different functional, semantic and technological capabilities. Semantic web characteristics on Cl@rity Program, Greek Fire Brigade and Police under the Ministry of Citizens’ Protection, as well as Ministry of Interior, Decentralisation and e-Government (for “Kalikratis” a new managing structure of Greek prefectures and municipalities) have been inherited from their attempt to conform to the linked-data principals and link their datasets the LOD Cloud constituting the Greek one along with DBpedia which is not considered as a governmental attempt.” [96].

It is also interesting that in the PSI national law in Hungary, “machine-readable format” is interpreted as a “format automatically editable as an IT tool”. Latvian national PSI law uses its own open format and metadata definitions, instead of terms adopted from the Revised PSI Directive, and requirements to formats are to be applied only “if useful”.

To conclude, it was a significant conceptual advance that the Revised PSI Directive specifically asked to provide PSI in any pre-existing format or language and in open and machine-readable format together with their metadata.

2.2.5.4 Charges for Accessing PSI

Open access does not always mean that data is available free of charge. Of course, the Open Data community would like all data to be accessible free of charge, but at this moment it is not possible. Why is this not possible? Because EU member states use different methods to fund existing state information systems, registers, etc. One of funding models is to charge for giving access to PSI. The European Commission has as an objective to make these access charges as low as possible, and this is implemented by the PSI Directive and its amendment with specific rules concerning charges for PSI re-use. The problems still exist, however, and not all EU member states are in compliance with the rules concerning charges for PSI re-use²²²³.

In 2013, legislators made a significant update concerning charges for PSI (see Table 8).

Table 9. Development of principles governing charges for PSI

Directive 2003/98/EC	Directive 2013/37/EC
“Where charges are made, the total income from supplying and allowing re-use of documents shall not	“1. Where charges are made for the re-use of documents, those charges shall be limited to the marginal costs incurred for their reproduction, provision and dissemination.

²² E.g., the National Audit Office of the Republic of Lithuania made a report on “Whether disclosure of the public sector data is ensured” in December 2016: “The currently applied regulation and pricing practices allow for exceptions and do not encourage the data disclosure. The absence of breakthrough in the field of data disclosure is also due to the fact that the data provision prices remained unadjusted for 6 to 11 years, and data managers not only recover their costs, but also include unrelated costs in the data provision price”[253].

²³ National PSI law in Latvia and Hungary allows for charges for data processing. E.g. Hungarians PSI law states that “a reasonable return on investment” is counted as “a profit margin of no more than 5%”.

exceed the cost of **collection, production**, reproduction and dissemination, together with a reasonable return on investment. Charges should be cost-oriented over the appropriate accounting period and calculated in line with the accounting principles applicable to the public sector bodies involved.”[19]

2. Paragraph 1 shall not apply to the following:

(a) public sector bodies that are **required to generate revenue** to cover a substantial part of their costs relating to the performance of their public tasks;

(b) by way of exception, documents for which the public sector body **concerned is required to generate sufficient revenue** to cover a substantial part of the costs relating to their collection, production, reproduction and dissemination.

Those requirements shall be defined by law or by other binding rules in the Member State. In the absence of such rules, the requirements shall be defined in accordance with common administrative practice in the Member State;

(c) libraries, including university libraries, museums and archives.

3. In the cases referred to in points (a) and (b) of paragraph 2, the public sector bodies concerned shall calculate the total charges according to **objective, transparent and verifiable criteria** to be laid down by the Member States. The total income of those bodies from supplying and allowing re-use of documents over the appropriate accounting period shall not exceed the cost of collection, production, reproduction and dissemination, together with a reasonable return on investment. Charges shall be calculated in line with the accounting principles applicable to the public sector bodies involved.

4. Where charges are made by the public sector bodies referred to in point (c) of paragraph 2, the total income from supplying and allowing re-use of documents over the appropriate accounting period shall not exceed the cost of **collection**, production, reproduction, dissemination, **preservation** and **rights clearance**, together with a reasonable return on investment. Charges shall be calculated in line with the accounting principles applicable to the public sector bodies involved.”[20]

The principle to “not exceed the cost of collection, production, reproduction and dissemination, together with a reasonable return on investment” is established: “Where charges are made by public sector bodies for the re-use of documents, those charges should in principle be **limited to the marginal costs**. However the necessity of not hindering the normal running of public sector bodies that are required to generate revenue to cover a substantial part of their costs relating to the performance of their public tasks or of the costs relating to the collection, production, reproduction and dissemination of certain documents made available for re-use should be taken into consideration. In such cases, public sector bodies should be able to charge above marginal costs. Those charges should be set according to objective, transparent and verifiable criteria and the total income from supplying and allowing re-use of documents should not exceed the cost of collection, production, reproduction and dissemination, together with a reasonable return on investment. The requirement to generate revenue to cover a substantial part of the public sector bodies’ costs relating to the performance of their public tasks or of the costs relating to the collection, production, reproduction and dissemination of certain documents, does not have to be a legal

requirement and may stem, for example, from administrative practices in Member States. Such a requirement should be regularly reviewed by the Member States. (recital 22)”[20]

Some countries such as Finland elect not to apply charges, so the Revised PSI Directive accommodates this option: “The upper limits for charges set in this Directive are without prejudice to the right of Member States to apply lower charges or no charges at all. (recital 24)”[20].

The Revised Directive also leaves an option to EU member states to set some criteria for charging above marginal costs: “Member States should lay down the **criteria** for charging above marginal costs. In this respect, Member States, for example, may lay down such criteria in national rules or may designate the appropriate body or appropriate bodies, other than the public sector body itself, competent to lay down such criteria. That body should be organised in accordance with the constitutional and legal systems of the Member States. It could be an existing body with budgetary executive powers and under political responsibility (recital 25)”[20].

2.2.5.4.1 Charges to Libraries, Museums and Archives

The Revised PSI Directive contains a special provision for libraries, museums and archives. They can ask for charges for IPR clearance and for preservation costs: “Libraries, museums and archives should also be able to charge above marginal costs in order not to hinder their normal running. In the case of such public sector bodies the total income from supplying and allowing re-use of documents over the appropriate accounting period should not exceed the cost of collection, production, reproduction, dissemination, **preservation** and **rights clearance**, together with a reasonable return on investment. For the purpose of libraries, museums and archives and bearing in mind their particularities, the prices charged by the private sector for the re-use of identical or similar documents could be considered when calculating a reasonable return on investment.” (recital 23)[20].

2.2.5.5 Transparency

The Revised Directive updates the principle of transparency when charging to make sure that charges are calculated openly and correctly (see Table 9). The Revised PSI Directive establishes the new requirement to publish charges for PSI re-use, but to also include the calculation basis for such charges. This is an important tool to empower re-users of PSI to have more information about the charges and to have a basis for asking for correction if the charge is incorrect.

Table 10. Development of concept of transparency in the case of charging

Directive 2003/98/EC	Directive 2013/37/EC
“Any applicable conditions and standard charges for the re-use of documents held by public sector bodies shall be pre-established and published , through electronic means where possible and appropriate.	“1. In the case of standard charges for the re-use of documents held by public sector bodies, any applicable conditions and the actual amount of those charges, including the calculation basis for such charges, shall be pre-established and published , through electronic means where possible and appropriate.
On request, the public sector body shall indicate the calculation basis for the published charge. The public	2. In the case of charges for the re-use other than those referred to in paragraph 1, the public sector body in question shall indicate at the outset which factors are taken into account in the calculation of those charges. Upon request,

sector body in question shall also indicate which factors will be taken into account in the calculation of charges for atypical cases. Public sector bodies shall ensure that applicants for reuse of documents are informed of available means of redress relating to decisions or practices affecting them.”[19]	the public sector body in question shall also indicate the way in which such charges have been calculated in relation to the specific re-use request. 3. The requirements referred to in point (b) of Article 6(2) shall be pre-established. They shall be published by electronic means, where possible and appropriate. 4. Public sector bodies shall ensure that applicants for re-use of documents are informed of available means of redress relating to decisions or practices affecting them.”[20]
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These transparency requirements are not implemented by Denmark and Latvia in their national PSI law; other EU Member Countries have implemented these requirements.

2.2.5.6 Licensing

The PSI Directive establishes a tool – a license – by which public institutions may impose conditions on PSI re-use. It is odd, however, that the European Commission, which should be leading the way on open government data, is not publishing its own information using the license tool, but by using a different tool: a legal notice[97]. Moreover, the Commission decision of 12 December 2011 on the re-use of Commission documents states that “documents shall be made available for re-use without application unless otherwise specified and without restrictions or, where appropriate, **an open licence or disclaimer** setting out conditions explaining the rights of re-users”[98]. In practice during this survey, there were no licenses identified as applied by the European Commission, only the legal notice. While the legal notice contains a disclaimer from responsibility or liability and links to legislative documents, it is not a disclaimer of rights in the context of availability for re-use. Since the EC legal notice is not an open license or disclaimer for re-use, is impossible not to note the European Commission is not following its own regulations.

The PSI Directive regulates license technical requirements: it should be “available in digital format and can be **processed electronically**”[19] It is not specified how it should be available to be processed electronically, but we can look to the example of the Creative Commons Rights Expression Language (CCREL)[99].

The only requirement applied to conditions imposed to licenses are that “these conditions shall not **unnecessarily restrict possibilities for re-use** and shall not be used to **restrict competition**”[19].

Table 10 shows the progress of legislation (by the PSI Directives) concerning licensing.

Table 11. Development of the concept of licensing

Directive 2003/98/EC	Directive 2013/37/EC
“1. Public sector bodies may allow for re-use of documents without conditions or may impose conditions, where appropriate through a licence, dealing with relevant issues . These conditions shall not unnecessarily restrict possibilities for re-use and shall not be used to restrict competition.	“1. Public sector bodies may allow re-use without conditions or may impose conditions, where appropriate through a licence. These conditions shall not unnecessarily restrict possibilities for re-use and shall not be used to restrict competition.”[20]
2. In Member States where licences	

are used, Member States shall ensure that standard licences for the re-use of public sector documents, which can be adapted to meet particular licence applications, are available in digital format and can be processed electronically. Member States shall encourage all public sector bodies to use the standard licences.”[19]

Most of the EU members states have implemented licensing requirements to their national PSI law, except Hungary. Latvia has not implemented the requirement of “not unnecessarily restrict possibilities for re-use”.

2.2.5.6.1 To license Open Government Data or Not?

The PSI Directives do not clearly require that a license must be used in all cases regarding publishing of PSI for re-use. Of course, PSI re-use may be not always occur in a particular digital medium, so it is understandable why the PSI Directives do not “draw red lines”. But when it comes to Open Government Data, licenses serve a very important role. Why?

There are generally two possibilities when Open Government Data is published without applying any tool, such as licenses, legal notices or terms of use, to provide information about the legal rules that apply to a dataset:

- a) The dataset belongs to the public domain by national law (e.g. Finnish PSI), or it is deliberately released without any tool in order not to set extra barriers for OGD re-users. It would be preferable that some kind of statement of dedication to the public domain be apparent to the re-user.
- b) The dataset was released by mistake without a license or other tool expressing legal rules.

What problems arise if it is unclear whether any tools apply to the dataset? First, there are problems in some jurisdictions, e.g. EU copyright could be applied automatically, because 1) the dataset itself is very similar/equivalent to a protectable database from the perspective of the EU Database Directive; or 2) some PSI could be within the scope of other copyright or intellectual property protection. Second, absent any tool, it is unclear who is responsible for the information. In the Revised PSI Directive, there is a suggestion to have light licenses with few restrictions: “In relation to any re-use that is made of the document, public sector bodies may impose conditions, where appropriate through **a license**, such as acknowledgment of source and acknowledgment of whether the document has been modified by the re-user in any way. Any licenses for the re-use of public sector information should in any event place as **few restrictions on re-use as possible**, for example limiting them to an indication of source. **Open licenses** available online, which grant wider re-use rights without technological, financial or geographical limitations and relying on open data formats, should play an important role in this respect. Therefore, Member States should encourage the use of open licenses that should eventually become common practice across the Union. (recital 26)”[20]

So, it is clear that Open Government Data in the EU ought to be released by attaching a license, most preferably an open license, otherwise there can be no assurance that the dataset is not covered by some copyright, *sui generis* database right, other intellectual property right or even by some specific rules from national administrative law.

2.2.5.7 Practical Arrangements

The concept of “practical arrangements” was established as a standard practice for how Open Government Data should be made available, and in any portal sites that provide links to decentralised assets lists, if they exist. In other words, a central open (government) data portal should be established by each EU member (e.g. Germany - Das Datenportal für Deutschland www.govdata.de; Spain - Iniciativa de datos abiertos del Gobierno de España <http://datos.gob.es/>).

The Revised PSI Directive amended the PSI directive by adding specifics regarding metadata, machine-readable format, and cross-linguistic search (see Table 11). The linguistic search enables more stakeholders to find and utilize OGD.

Table 12. Development of practical arrangements concept

Directive 2003/98/EC	Directive 2013/37/EC
“Member States shall ensure that practical arrangements are in place that facilitate the search for documents available for reuse, such as <u>assets lists</u> , accessible preferably online, of main documents, and <u>portal sites</u> that are linked to decentralised assets lists.”[19]	“Member States shall make practical arrangements facilitating the search for documents available for re-use, such as asset lists of main documents with relevant metadata , accessible where possible and appropriate online and in machine-readable format , and portal sites that are linked to the asset lists. Where possible Member States shall facilitate the cross-linguistic search for documents .”[20]

2.2.5.8 Non-discrimination

Non-discrimination is a very important principle, which ensures that PSI should be available for all re-users under the same conditions. PSI Directive Article 10.1 states broadly: “Any applicable conditions for the re-use of documents shall be non-discriminatory for comparable categories of re-use.”[19]

However, the second sentence of PSI Directive Article 2.4 indicates that the term “re-use” does not apply to exchanges between public sector bodies “purely in pursuit of their public tasks”. To avoid discriminatory conditions compared to all other re-users of PSI, when public sector bodies (e.g. state enterprises) provide PSI re-use for commercial activities, the principle of non-discrimination is also applied in these commercial cases: “If documents are re-used by a public sector body as input for its commercial activities which fall outside the scope of its to the supply of the documents for those activities as apply to other users” Art. 10, par. 2[19].

2.2.5.9 Exclusive Agreements

Exclusive agreements are those agreements which provide PSI for re-use on different or exclusive terms compared to other re-users. Exclusive agreements exist because

- 1) Some member states have a funding model for Public Institutions based on the recovery of costs and other revenue from re-users of PSI;

- 2) Some Public Institutions provide some important public tasks, for which it uses information in discriminatory ways compared to other market players.

Those exclusive agreements are impermissible according to the PSI Directive. The Commission also views such agreements negatively from a competition law perspective and expects the practice of such exclusive agreements to be stopped by 2043:

“Competition rules should be respected when establishing the principles for re-use of documents avoiding as far as possible exclusive agreements between public sector bodies and private partners. However, in order to provide a service in the public interest, an exclusive right to re-use specific public sector documents may sometimes be necessary. This may be, inter alia, the case if no commercial publisher would publish the information without such an exclusive right. In order to take this concern into account Directive 2003/98/EC authorises, subject to a regular review, exclusive arrangements where an exclusive right is necessary for the provision of a service in the public interest.” (recital 29)[20].

“In order to take due account of contracts and other arrangements which grant exclusive rights and which were concluded before the entry into force of this Directive, appropriate transitional measures should be established to protect the interests of the parties concerned where their exclusive rights do not qualify for the exceptions authorised under this Directive. Those transitional measures should allow for the parties’ exclusive rights to continue existing until the end of the contract or, for open-ended contracts or contracts of a very long duration, to continue to exist for a sufficiently long period to allow the parties to take appropriate measures. Those transitional measures should not apply to contracts or other arrangements concluded after the entry into force of this Directive but before the application of national measures transposing this Directive, in order to avoid situations whereby contracts or other long-term arrangements which do not comply with this Directive are concluded so as to circumvent future national transposition measures to be adopted. Contracts and other arrangements concluded after the entry into force of this Directive but before the date of application of national transposition measures should therefore comply with this Directive as from the date of application of national measures transposing this Directive.” (recital 32)[20]

The Directive 2013/37/EC amends the provisions of Article 11 significantly:

“2. This paragraph shall not apply to digitisation of cultural resources;

2a. Notwithstanding paragraph 1, where an exclusive right relates to digitisation of cultural resources, the period of exclusivity shall in general not exceed 10 years. In case where that period exceeds 10 years, its duration shall be subject to review during the 11th year and, if applicable, every seven years thereafter.

The arrangements granting exclusive rights referred to in the first subparagraph shall be transparent and made public.

In the case of an exclusive right referred to in the first subparagraph, the public sector body concerned shall be provided free of charge with a copy of the digitised cultural resources as part of those arrangements. That copy shall be available for re-use at the end of the period of exclusivity.

3. Exclusive arrangements existing on 1 July 2005 that do not qualify for the exceptions under paragraph 2 shall be terminated at the end of the contract or in any event not later than 31 December 2008;

4. Without prejudice to paragraph 3, exclusive arrangements existing on 17 July 2013 that do not qualify for the exceptions under paragraphs 2 and 2a shall be terminated at the end of the contract or in any event not later than **18 July 2043**”[20].

It is interesting that Hungary responded to these changes by developing its own terms, e.g. exclusive arrangements existing on **17 July 2013** were modified to **1 January 2016**. Latvia and Sweden had ended already all exclusive agreements by national PSI law.

2.2.5.9.1 Exclusive Agreements Related to Digitisation of Cultural Resources

The Revised PSI Directive has special regulations on exclusive agreements related to the digitisation of cultural resources: “Where an exclusive right relates to digitisation of cultural resources, a certain period of exclusivity might be necessary in order to give the private partner the possibility to **recoup its investment**. That period should, however, be limited in time and as short as possible, in order to respect the principle that **public domain material should stay in the public domain once it is digitised**. The period of an exclusive right to digitise cultural resources should in general not exceed **10 years**. Any period of exclusivity longer than 10 years should be subject to review, taking into account technological, financial and administrative changes in the environment since the arrangement was entered into. In addition, any public private partnership for the digitisation of cultural resources should grant the partner cultural institution full rights with respect to the post-termination use of digitised cultural resources.” (recital 31)[20].

2.2.5.10 Institutional Control

What are the institutions that are tasked to ensure that Public Sector Information is released for re-use? These institutions are set by PSI Directive and its amendment: the European Commission, EU member states and national authorities.

2.2.5.10.1 European Commission Role

The European Commission is assigned a leading role in controlling re-use of PSI results in each member state, but in practice the role is not used very proactively, e.g. only a few reports are released.

The Revised Directive states that “The Commission has supported the development of an online **Public Sector Information scoreboard** with relevant performance indicators for the re-use of public sector information in all the Member States. A regular update of this scoreboard will contribute to the exchange of information between the Member States and the availability of information on policies and practices across the Union.” (recital 27)[20] “The Commission should assist the Member States in implementing this Directive in a consistent way by issuing guidelines, particularly on recommended standard licenses, datasets and charging for the re-use of documents, after consulting interested parties.” (recital 36)[20]

The Revised PSI Directive in Article 13 establishes a duty for the European Commission: ‘The Commission shall carry out a review of the application of this Directive before 18 July 2018 and shall communicate the results of that review, together with any proposals for amendments to this Directive, to the European Parliament and the Council.’ This duty can be executed, however, only with the cooperation of the member states: “Member States shall submit a report every 3 years to the Commission on the availability of public sector information for re-use and the conditions under which it is made available and the redress practices. On the basis of that report, which shall be made public, Member States shall carry out a review of the implementation of Article 6, in particular as regards charging above marginal cost.”

The European Commission’s review shall address “the scope and impact of this Directive, including the extent of the increase in re-use of public sector documents, the effects of the principles applied to charging and the re-use of official texts of a legislative and administrative nature, the interaction between data protection rules and re-use possibilities, as well as further possibilities of improving the proper functioning of the internal market and the development of the European content industry”[20].

Unfortunately, the survey of the Revised PSI Directive (Annex 1) shows that Member Countries have not been so eager to implement the provisions of the Revised PSI Directive. The Commission is not obliged to compel member states for better cooperation, unification of PSI, meta-data, licenses, etc.

2.2.5.10.2 The Role of Member States

The role of member states is important because without government support, little OGD is released²⁴. Governments have reasons not to release PSI for re-use, because some funding models for Public Institutions rely on revenue from selling data (“Member States should lay down the criteria for charging above marginal costs.” (recital 25)[20]). Other reasons are that OGD fosters too much transparency, so not all political parties, especially in Eastern Europe and some regions of South Europe, are ready for such open transparency.

The Revised PSI Directive establishes some control tools for member states: Directive 2013/37/EC Article 1, para. 11 amends Article 13, para. 2 to require that: “Member States shall **submit a report every 3 years** to the Commission on the availability of public sector information for re-use and the conditions under which it is made available and the redress practices. On the basis of that report, which shall be made public, Member States shall carry out a review of the implementation of Article 6, in particular as regards charging above marginal cost.”[20]

Nevertheless, as the Survey of Revised PSI Directive (Annex 1) shows, not all member states have been quick to embrace OGD development. Directive 2013/37/EC Article 2, para 1 sets deadlines for adopting the new regulation: “By 18 July 2015, Member States shall adopt and publish the laws, regulations and administrative provisions necessary to comply with this Directive. They shall immediately inform the Commission thereof. They shall apply those measures from 18 July 2015.”[20]

2.2.5.10.3 National Authorities

National authorities are the institutions which are responsible for PSI publication, management, control of the costs of publication, and dispute resolution.

Directive 2013/37/EC Article 1, para. 4 refers to requirements for national authorities: “Any decision on re-use shall contain a reference to the means of redress in case the applicant wishes to appeal the decision. The means of redress shall include the possibility of review by an impartial review body with the appropriate expertise, such as the national competition authority, the national access to documents authority or a national judicial authority, whose decisions are binding upon the public sector body concerned.”[20]

“The means of redress should include the possibility of review by an impartial review body. That body could be an **already existing national authority**, such as the national competition authority, the national access to documents authority or a national judicial authority. That body should be organised in accordance with the constitutional and legal systems of Member States and should not prejudge any means of redress otherwise available to applicants for re-use. It should however be distinct from the Member State mechanism laying down the criteria for charging above marginal costs. The means of redress should include the possibility of review of negative decisions but also of decisions which, although permitting re-use, could still affect applicants on other grounds, notably by the charging rules

²⁴ The city of Vilnius’s open data initiatives [254], which are a quite unique case in Lithuania, suggest that development of OGD is highly dependent on the strength of support of the government/municipality/institution.

applied. The review process should be swift, in accordance with the needs of a rapidly changing market. (recital 28)”[20]

2.2.5.11 Summary of the Requirements

Requirements for the re-use of Public Sector Information were set in motion by the EU PSI Directive in 2003, although to date not all member states have fully implemented the Directive. A significant update was made by the PSI Revised Directive, which was in 2013, adding meta data, open formats, machine-readable formats, all of which make PSI released for re-use closer and closer to the goal of (Linked) Open Government Data. As more countries implement the Revised Directive into national PSI law, more PSI becomes available for commercial and non-commercial use, making possible open machine-readable formats, connections with metadata, the establishment of national Open Data Portals, reduction of discriminatory terms, sunseting of exclusive agreements, and lower overall costs for accessing PSI.

2.2.6 What Requirements Apply to Re-users of Open Government Data in the EU?

As already presented in the sub-chapter discussing licensing, there are only a few requirements that apply to re-users from the PSI Directive and its amendment. Additional requirements may be set by national PSI law, or special PSI laws in federal states, municipalities, or by public institutions.

Most EU countries have their own, unique requirements and rules for PSI re-use. National PSI law can vary widely, e.g. in Croatia there are fines for public officers who do not provide information for re-use; in Spain there are fines up to 100,000 Euros for violations of PSI re-use made by re-users.

What features are shared in common? Most national requirements applied to PSI re-users ask for acknowledgement of the source, to provide some license information, and provides a disclaimer (no warranty and no-endorsement by the EC) for using the PSI. The minimum set of requirements (if Finland is not counted) is set by the European Commission. The EC implements the following requirements:

- (a) the obligation for the re-user to **acknowledge the source** of the documents;
- (b) the obligation **not to distort the original meaning or message** of the documents;
- (c) the **non-liability** of the Commission for any consequence stemming from the re-use [98].

Other countries can take a very different approach to those requirements for re-users, so it is important to find a way to express these requirements in a machine-readable format. We have tried to express national PSI rules applied to PSI in the iOGDL4M to be discussed below (see the third Paper *OGDLAM Ontology: Analysis of EU Member States National PSI Law* Sub-Chapter *OGDLAM model for the country profile*).

2.3 Summary

In this chapter we analysed European legislation to answer several questions: How is Open Government Data regulated in the EU and EU member states? What is Open Data? What is Open Government Data? What are the conditions for re-use of Open Government Data?

In the EU OGD is regulated by the 2003 PSI Directive and the Revised PSI Directive of 2013. PSI reuse can also be regulated by other Directives, regulations and international treaties. In EU member states, the PSI Directives are implemented by national PSI law, which can vary from country to country in different and unique ways. Those differences motivate us to develop tools that can help make these requirements comprehensible in a machine-readable format.

This analysis inevitably has its limitations because legislation on Open Government Data is very dynamic. Even during the period when the analysis was performed (the end of 2015 to April 2017) there already entered into force no fewer than 17 new bills or amendments in EU member states. New legislation that was not analysed has been indicated in the footnotes. This dynamic legal situation has been driven in large part by the 2013 revision of the PSI Directive, and we can predict that as the implementation process nears completion, the legislation of OGD will be more stable for a while, until the next amendment of the PSI Directive.

We need to take this dynamic effect into account for future work concerning the development of legal ontologies in the domain of Open Government Data.

Chapter 3 – Survey of the Licensing of Open Government Data

In this chapter, a Survey is presented on the licensing of Open Government Data (OGD) from national portals. The Survey covers the most developed OGD national portals during two periods: (i) from October to November 2013 in the U.S., Canada, Australia, India, Russia, and selected countries in Latin America, Europe, and Africa; and (ii) from October 2014 to January 2015 in the U.S., Canada, Australia, and selected countries in Latin America, Europe.

As a preliminary matter, licenses can come from entities of widely varying geographical scope. The Creative Commons Corporation has made a range of standardised licences available that are used around the world, such as CC BY, CC BY-SA, CC BY-ND, CC BY-NC, CC BY-NC-SA, CC BY-NC-ND or CC0 [100]. There are regional licences, such as the ISA Open Metadata Licence v1.1 [101] provided by the European Commission. Licenses can vary at the national level by country or locally, as with the UK Open Government Licence [102], Italian IODL 2.0 [103], French Licence Ouverte [104], German Open Licence [105], the Canadian Region of Waterloo - Open Data Licence v.1.0 [106], and Finnish National Land Survey open data licence - version 1.0 [107]. Licences have also been issued by private initiative e.g. ODbL [108], and sometimes national authorities use CC0 licences, e.g. the Swedish National Bibliography and authority data released with an open license [109]. The number of different licenses is what drove the Survey of the current situation of OGD licensing.

The Survey of the Licensing of Open Government Data is intended to represent the range of tools currently used to express the legal regulations applied to datasets that are published by public bodies around the world. It is necessary to have a general view how different countries are developing OGD and what problems arise because of the Open Data movement. Differing regulation of Public Sector Information (PSI), copyrights, and *sui generis* database rights suggest there could be serious problems when mashing-up different datasets from different jurisdictions, because of the potentially incompatible licenses and legal norms. The Survey presents the situation of licensing and other tools used to express legal regulations applied to OGD.

This Part is to answer the following research questions: What tools do Public Sector Institutions use to represent legal rules that apply to Open Government Data? Are the most frequently used licenses or other tools compatible? What are the conditions?

3.1 Related Work

Surveys of OGD portals as a global phenomenon have not been performed before. Since the Survey was started in October 2013, it has proved to be a quickly evolving subject of investigation²⁵. The issues raised by differing licenses have been discussed previously by some scholars.

F.Morando [110] presented “A Bird’s-eye View on Open Data Licenses” and made an analysis of different types of licences. Morando promoted the idea of a uniform common creative licence for the public sector, based on the problem of multiplicity of open data licences. On other hand, the analysis was incomplete, and it was focused on the compatibility of only one license with respect to others.

S.Villata and F.Gandon[111] presented the L4LOD Vocabulary Specification V2[112], which presented “the distribution of the different licenses over the data sets of the LOD cloud”.

A “Linking Open Data” cloud diagram by Richard Cyganiak and Anja Jentzsch was presented in <http://lod-cloud.net/>. In the cloud diagram, an analysis of licensing was provided[113]: “43 (17.84 %)

²⁵The UK, U.S., and New Zealand launched the first OGD portals in 2009.

out of the 295 data sources provide licensing information.; 198 (82.16 %) out of the 295 data sources do not provide licensing information.”

Problems from the comparison of licenses were also discussed by Gandon F., Governatori G., Lam H., Rotolo A.[114–116].

The EU has funded the project ENGAGE, where one of the main goals is “the development and use of a data infrastructure, incorporating distributed and diverse public sector information (PSI) resources, capable of supporting scientific collaboration and research, particularly for the Social Science and Humanities (SSH) scientific communities, while also empowering the deployment of open governmental data towards citizens” [117]. This project also deals with the legal and technical problems that can arise from combining datasets.

3.2 Methodology

The goal of the survey was to test the preliminary hypothesis that different kinds of licenses are applied to OGD as the global phenomena. Another research question was posed: What kinds of licenses or other tools are used in different OGD portals?

The observational approach[118] was adopted to collect data for the Survey. The sole researcher (the author of this thesis) collected data through observation of Open Government Data portals. The motivation for choosing the observational method was 1) flexibility, and 2) the observations did not necessarily need to be structured around a predetermined hypothesis.

First, the development of many OGD portals was on-going: some of them were labeled as “beta” versions, and some were not accessible, so there was a need for flexibility. Second, the hypothesis related only to licenses as the tools to represent legal regulation of OGD, and there was a need to identify other possible tools in the research area. The observer did not know what to expect in this swiftly evolving environment, so it would have been risky to be constrained by a preconceived hypothesis.

Two time periods were allocated for data collection and analysis: a) October and November 2013; and b) October and November 2014, and January of 2015.

In October and November 2013, the first observation and collection of data was performed. After a year, a second period of observation was started, but because of significant development of the OGD portals, the second observation was not fully complete by November 2014, and more time was allocated for the Survey, which was concluded in January 2015. During the last three months of the Survey, the results continued to change, so all the results were updated in January 2015.

The first period of data collection began with an identification of national OGD portals. A list of OGD portals on Wikipedia[119] was used as a starting point, and the list was verified. Some of OGD portals listed were not functioning or were not accessible, so the list was corrected. Wikipedia included a few municipal OGD portals, and for comparison those portals were also investigated.

Secondly, the OGD portals were observed and the kinds of licenses used were identified. Each portal was explored by checking what kinds of licenses are used. The most investigated portals provided statistics of the licenses used, or at least some classification of the license of datasets.

During the observation, a large variety of licenses were identified. In some portals, information about the licenses was provided in structured form, or there were statistics or other useful information about the licenses that was provided, but in other cases a representative sample of 30-50 different datasheets was selected randomly from the portal.

The results were assembled into a comprehensive table. The following partial table illustrates the variety of licenses used in the portals (see Table 12).

Table 13. An example of the table produced during the OGD portal Survey in 2013

Open data initiative portal	CC0	CC-BY	CC-BY-SA	CC-BY-NC	Local	ODBL	PDDL	Notes
Argentina government						X		
Bahía Blanca (Argentina) municipal		CC BY 2.5 AR					X	Depends on provider
Brazilian government			CC BY-SA 3.0		Not openly licensed	X		Depends on provider

After the first period of collecting data, the Creative Commons family of licenses were identified as widely used and the compatibility of the newest version 4.0 licenses was analysed. The results were presented in the tables: Table 13 shows the main features of the licenses, Table 14 compares the CC-BY license with other v. 4.0 licenses by an informal logical analysis of norms, and it analyses general and specific terms of the licenses in the form of rules. Table 15 represents the final results of comparing CC-BY v. 4.0 licenses for a mash-up model.

Table 14. Example of Table of Comparison of CC-BY v. 4.0 licenses of the main terms

Licence	Commercial purpose	Reproduce and Share the Licensed Material, in whole or in part	Share Adapted Material (Modification)	Same terms or conditions should be provided on modification	Conclusion
CC-BY 4.0	YES	YES	YES	NO	No extra restrictions, general terms
CC-BY-SA 4.0	YES	YES	YES	YES	Restriction to change conditions of licence provided to modification of the content

Table 15. Example of the Table of Comparison of CC-BY v. 4.0 licenses by informal logical analysis of norms

Rules/Licences	CC-BY 4.0	CC-BY-SA 4.0	CC-BY-ND 4.0	CC-BY-NC 4.0	CC-BY-NC-SA 4.0	CC-BY-NC-ND 4.0

General CC-BY rules:						
1) IF You Share the Licensed Material OR Modification, AND If is NOT requested by the Licensor, to remove any of the information THEN You must provide identification of the creator(s) AND a copyright notice AND a notice that refers to Primary License AND a notice that refers to the disclaimer of warranties AND a URI or hyperlink to the Licensed Material to the extent reasonably practicable. 2) IF You Share the Modification THEN You must indicate AND retain an indication of any previous modifications.(...)	X	X	X	X	X	X
Specific CC-BY rules						
Reproduce and Share the Licensed Material, in whole or in part for any purpose	X	X	X			
Reproduce and Share the Licensed Material, in whole or in part for non-commercial purpose	X	X	X	X	X	X

Table 16. Example of Table of Comparison of CC-BY v. 4.0 licenses for a mashup model

Licence	CC-BY 4.0	CC-BY-SA 4.0	CC-BY-ND 4.0	CC-BY-NC 4.0	CC-BY-NC-SA 4.0	CC-BY-NC-ND 4.0	Conclusions
CC-BY 4.0	YES	YES, BY-SA terms	NO	YES, Non-commercial	YES, Non-commercial, BY-SA terms	NO	CC-BY 4.0 can be used for mash-up with other licences, except with those which do not allow modification
CC-BY-SA 4.0	YES, BY-SA terms	YES	NO	NO	NO	NO	CC-BY-SA 4.0 licence requires the same BY-SA terms for modifications, which does not allow the setting of extra terms, such as non-commercial or no modifications.

The second period of data collection resumed with an evaluation of the working list of OGD portals. No active portals were removed from the list, and new active portals were added; only national OGD portals were left at this stage.

Because of significant changes that occurred in OGD portals in the intervening year, additional information was observed and collected. In the absence of specific licenses, all legal notices (including terms of use, obligations, limitations, liability, privacy rules, etc.) that were published on the portals of OGD were then identified in order to understand whether these fragmented legal regulations could fully replace license instruments. Also, the focus was on how the licenses are used and how metadata was provided (mistakes, etc.).

The results are provided in Table 16, which includes additional columns: e.g. concrete number of datasets to which specific regulatory regime (by attaching specific licenses, terms, notes) was applied; the date that the information was checked; whether a link to the license text was provided or only a label of a license; and a notes section.

During observation of the U.S. OGD portal (data.gov), certain unusual problems were overcome. The U.S. portal contained no statistics nor did it provide any classification by license. Because of the large

number of datasets, the earlier practice of checking every dataset was rejected. Instead, the portal was tested by queries to specific URLs, and it was discovered that the portal responded to some calls²⁶, which helped to count the datasets with different legal regulations. Queries were formulated by browsing and looking for metadata of different kinds of datasets, especially those provided by different public bodies.

Table 17. An example of the table produced during the OGD portals Survey 2014/2015

Country	Address of portal	Uniform names of the license	License used in the portal	Number of data resources(*)	Date of check	License link	Notes *Note: data resources means that one resource can have more than one dataset, usually divided over different time periods
Argentina	http://datospublicos.gob.ar	ODbL	Open Data Commons Open Database License (ODbL)	23	2014.10.30	http://opendefinition.org/licenses/odc-odbl/	
Australia	http://data.gov.au/dataset	CC-BY	CC-BY 3.0 Australia	4837	2015.01.09		
Australia	http://data.gov.au/dataset	License not provided	not specified	193	2015.01.09		

During the Survey 2014/2015, datasets were found that had misleading metadata regarding the license of the dataset. For example, some U.S. OGD portal datasets were covered by 3 different types of licenses, and it was unclear which license applied to the dataset. The licenses in these cases were marked as “not identified by Survey”. There were also cases where the applicable regulation of datasets in the

²⁶Eg. <http://catalog.data.gov/dataset?license=Open+Database+License>,
<http://catalog.data.gov/dataset?license=License+Not+Specified>, <http://catalog.data.gov/dataset?license=CC0>,
<http://catalog.data.gov/dataset?license=Creative+Commons+CCZero>,
http://catalog.data.gov/dataset?q=%22Although+these+data+have+been+processed+successfully+on+a+computer+system+at+the+Idaho+Geospatial+Data+Clearinghouse%2C+no+warranty%2C+expressed+or+implied%2C+is+made+regarding+the+utility+of+the+data+on+any+other+system%2C+nor+shall+the+act+of+distribution+constitute+any+such+warranty.%22&sort=score+desc%2C+name+asc&ext_location=&ext_bbox=&ext_prev_extent=-139.21874999999997%2C8.754794702435618%2C-61.87499999999999%2C61.77312286453146.

U.S. OGD portal could not be identified by any of the observation tools used, so those cases were also counted as “not identified by Survey”.

Analysis of compatibility of licenses was performed in this order: 1) the six most frequently used licenses or other tools were selected for the analysis; 2) the text of the license or legal notice was analysed in depth and potential compatibility issues were assessed. The results are presented in Table 17.

Table 18. Comparison of top licenses for mash-up model

License	Open Government Licence – Canada 2.0.	DATA.G OV Data Policy Statements	Licence Ouverte	Open Government Licence v3.0 (UK)	Legal notice (EU)	CC-BY 4.0.
Open Government Licence – Canada 2.0.	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
DATA.G OV Data Policy Statements	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution

3.3 The Survey

3.3.1 Part I: Survey of National OGD Portals of October-November 2013

In October and November 2013, the following national Open Government Data portals were surveyed:

1. Argentine government open-data website. <http://datospublicos.gob.ar>.
2. Bahía Blanca municipal open-data website. <http://bahiaablanca.opendata.juniar.com>.
3. Brazilian government open-data website. <http://dados.gov.br>.
4. Portuguese government open-data website. <http://dados.gov.pt>.
5. Belgian government open-data website. <http://data.belgium.be>.
6. Canadian government open-data website. <http://data.gc.ca>.
7. French government open-data website. <http://data.gouv.fr>.
8. U.S. government open-data website. <http://data.gov>.
9. Australian government open-data website. <http://data.gov.au>.
10. Indian government open-data website. <http://data.gov.in>.
11. Italian government open-data website. <http://data.gov.it>.
12. Moroccan government open-data website. <http://data.gov.ma>.
13. UK government open-data website. <http://data.gov.uk>.
14. New Zealand Government open data initiative. <http://data.govt.nz>.
15. Austrian federal government open-data website. <http://data.gv.at>.
16. Norwegian government open-data website. <http://data.norge.no>.
17. Dutch government open-data website. <http://data.overheid.nl>.
18. Moldavian government open-data website. <http://date.gov.md>.
19. German federal government open-data website. <http://daten-deutschland.de>.

20. Chilean government open-data website. <http://datos.gob.cl>.
21. Spanish government open-data website. <http://datos.gob.es>.
22. Uruguayan government open-data website. <http://datos.gub.uy>.
23. Costa Rican government open-data website. <http://datosabiertos.gob.go.cr>.
24. Greece's open government geospatial data. <http://geodata.gov.gr>
25. Ghana Open Data Initiative - Ghana government open-data website, GODI. Launched in February 2012.
26. Metropolitan Municipality of Lima, Peru open-data website. <http://lima.datosabiertos.pe>.
27. Estonian government open-data website. <http://opendata.ee>.
28. European Commission Data Portal. <http://open-data.europa.eu>.
29. Kenyan government open-data website. <http://opendata.go.ke>.
30. OpenGovData Russia Catalog, private initiative. <http://opengovdata.ru>.
31. City of Palo Alto, California, USA, municipal open-data website. <http://paloalto.opendata.junior.com>.
32. Rotterdam municipal open-data website. <http://rotterdamopendata.nl>.

Results of the Survey are presented in the Table 18.

Table 19. Results of the OGD portal survey, 2013

Open data initiative portal/used licenses	CC0	CC-BY	CC-BY-SA	CC-BY-NC	local	ODBL	PDDL	Notes
Argentine government						X		
Bahía Blanca (Argentina) municipal		CC BY 2.5 AR					X	Depends on provider
Brazilian government			CC BY-SA 3.0		Not openly licensed	X		Depends on provider
Portuguese government			CC BY 3.0 PT					
Belgian government					X			Depends on provider
Canadian federal government					X			Open Government Licence - Canada
French government					X			Open Licence
U.S. government					X			Depends on provider, sometimes licence is not provided

Australian government		CC BY 3.0 AU						
Indian government					X			
Italian government	X	X		CC- BY- NC- SA	X			Depends on provider, IODL v1.0 , IODL v2.0
Moroccan government						X		
U.K. government					X			OGL
New Zealand government		CC BY 3.0 NZ						
Austrian federal government		CC BY 3.0 AT						
Norwegian government					X			NLOD
Dutch government	X							
Moldavian government					X			
German federal government		X		CC BY- NC 2.0	X			Depends on provider
Chilean government			CC BY 3.0 CL			X		Depends on provider
Spanish government					X			
Uruguayan government	X				X			Depends on provider, Uruguay Open Data Licence, Without licence
Costa Rican government							X	
Greek gov-			CC					

ernment			BY-SA 3.0 GR					
Ghanaian government					X			Only general conditions, no licence equal CC0
Metropolitan Municipality of Lima, Peru							X	
Estonian government								N/A
European Commission					X			Europe Legal Notice
Kenyan government		CC BY 3.0						
Russian open data private initiative		CC BY 3.0						
City of Palo Alto, California							X	
Rotterdam municipality in the Netherlands					X			Open licence
Egyptian government					X			Not open

The findings of the Survey are:

- 1) CC0 licenses were used by public administration institutions in Italy, the Netherlands, and Uruguay;
- 2) CC-BY licenses were used by public administration institutions in Australia (CC BY 3.0 AU), Austria (CC BY 3.0 AT), Chile (CC BY 3.0 CL), Germany, Italy, Portugal (CC BY 3.0 PT), New Zealand (CC BY 3.0 NZ) and also by the Argentine municipality of Bahía Blanca (CC-BY 2.5 AR);
- 3) CC-BY-SA licenses are used by public administration institutions in Brazil (CC BY-SA 3.0) and Greece (CC BY-SA 3.0 GR);
- 4) CC-BY-NC licenses are used by public administration institutions in Italy and Germany (CC BY-NC 2.0);
- 5) ODBL licenses are used by public administration institutions in Argentina, Brazil, and Chile;
- 6) PDDL licenses are used by the Bahía Blanca (Argentina) municipality, Costa Rican public administration institutions and the Metropolitan Municipality of Lima, Peru;

- 7) Local licenses were used by public administration institutions in Brazil (not openly licensed), Belgium, Canada (Open Government License), France (Licence Ouverte), Italy (IODL v1.0, IODL v2.0), Germany, Norway (NLOD), Moldova, Spain, UK (OGL), Uruguay (Uruguay Open Data License), the U.S and also by the European Commission and the municipality of Rotterdam in the Netherlands (Open license).
- 8) There were some datasets in the U.S. and Uruguay that were not protected by licenses;
- 9) Licensing depends on the providers of data sources in Brazil, Belgium, Chile, Italy, Germany, U.S., Uruguay and also in the municipality of Bahía Blanca (Argentina);
- 10) Only a single kind of license was found in Australia, Austria, Canada, Costa Rica, France, Greece, Moldova, New Zealand, Norway, Portugal, UK, Spain, the municipality of Lima, the municipality of Rotterdam and the European Commission (the EC legal notice).
- 11) The central government uses different kinds of licenses than municipalities in Argentina (e.g. the Argentine government uses ODBL, while the municipality of Bahía Blanca uses CC-BY 2.5 AR and PDDL) and the Netherlands (the central government uses CC0 and the Rotterdam municipality uses a local license).

In conclusion, the results of this Survey required investigation of the comparison of licenses and their effect on datasets from different jurisdictions and different permissions to use the data. Viewed as a whole, these results show that the principles of Open Data are not usually respected, e.g. by limiting the use of datasets to “non-commercial use only” attribute. The licenses encountered most often during the Survey were the range of standardized licenses from Creative Commons.

3.3.2 Analysis of the Creative Commons v.4.0 Licenses for the Datasets Mash-up Scenario

At the end of 2013, the Creative Commons Corporation released version 4.0 of its licenses[100]. These licenses accommodate *sui generis* database rights (in general) and are more adapted for the use of licenses internationally. This Survey presents a comparison of CC v. 4.0 licenses by their main terms. The CC-BY 4.0 license respects the principles of Open Data principles the most, and the CC-BY-NC-ND 4.0 license is the most restrictive. The Survey essentially confirms the findings by Morando[120] for previous versions of the Creative Commons licenses, except that datasets/databases covered by CC-BY-ND 4.0 and CC-BY-NC-ND 4.0 licenses cannot be used in a mash-up of datasets/databases models, because no modification is permitted, including arrangement with additional datasets. The results of the Survey are:

- 1) The licenses that restrict the use of licensed material for commercial purposes are CC-BY-NC 4.0, CC-BY-NC-SA 4.0, and CC-BY-NC-ND 4.0.
- 2) The licenses that allow reproduction and sharing of licensed material, as a whole or in part, are CC-BY 4.0, CC-BY-SA 4.0, CC-BY-ND 4.0, CC-BY-NC 4.0, CC-BY-NC-SA 4.0, and CC-BY-NC-ND 4.0.
- 3) The licenses that restrict sharing of adapted material (modification) are CC-BY-ND 4.0 and CC-BY-NC-ND 4.0.
- 4) The licenses that require the same terms or conditions be provided on the modification are CC-BY-SA 4.0 and CC-BY-NC-SA 4.0.
- 5) CC-BY 4.0 can be used for a mash-up with other licenses, except those which do not allow modification: CC-BY-NC-ND 4.0 and CC-BY-ND 4.0.
- 6) The CC-BY-SA 4.0 license requires the same BY-SA terms for modifications, which does not allow setting extra terms, such as non-commercial or no-modification. The CC-BY-SA 4.0 license can be combined only with the CC-BY 4.0 and CC-BY-SA 4.0 licenses.

- 7) The CC-BY-ND 4.0 and CC-BY-NC-ND 4.0 licenses cannot be used for a mash-up with the other licenses because they do not allow modifications.
- 8) The CC-BY-NC 4.0 license can be used for a mash-up with other licenses that allow the setting extra terms as non-commercial or that it has already: CC-BY 4.0, CC-BY-NC 4.0 and CC-BY-NC-SA 4.0.
- 9) The CC-BY-NC-SA 4.0 license can be used for a mash-up with the other licenses that allow setting extra terms as non-commercial and no-modification or that it has already: CC-BY 4.0, CC-BY-NC 4.0 and CC-BY-NC-SA 4.0.

From the perspective of mashing-up different datasets/databases, the survey shows that not all CC-BY v. 4.0 licenses are compatible (see Tables 19-21). For example, if content covered by the CC-BY 4.0 license is mixed with content covered by the CC-BY-NC-SA 4.0 license, the new content must then respect all the terms of the more restrictive CC-BY-NC-SA 4.0 license. On the other hand, we found that the less restrictive terms of the CC-BY 4.0 licenses require only the use of the same license conditions applied to the original content and to identify that content. In essence, a new license for mixed content provided in the example should be covered by the CC-BY-NC-SA 4.0 license, and datasets/databases that are covered by different licenses must be identified and information must be provided about the conditions of the primary license for specifically identified content.

Table 20. Comparison of CC-BY v. 4.0 licenses of the main terms

Licence	Commer- cial purpose	Reproduce and Share the Licensed Mate- rial, in whole or in part	Share Adapted Mate- rial (Modifica- tion)	Same terms or conditions should be provided on modification	Conclusion
CC-BY 4.0	YES	YES	YES	NO	No extra re- strictions, general terms
CC-BY-SA 4.0	YES	YES	YES	YES	Restriction to change conditions of licence provided to modification of data
CC-BY-ND 4.0	YES	YES	NO	NO	Restriction to share modification
CC-BY-NC 4.0	NO	YES	YES	NO	Restriction to use for commercial purpose
CC-BY-NC-SA 4.0	NO	YES	YES	YES	Restriction to use for commercial purpose and to change conditions of licence provided to modification of data

CC-BY-NC-ND 4.0	NO	YES	NO	NO	Restriction to use for commercial purpose and to share modification
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Table 21. Comparison of CC-BY v. 4.0 licenses by informal logical analysis of norms

Rules\Licences	C C- BY 4.0	C C- BY- SA 4.0	C C- BY- ND 4.0	C C- BY- NC 4.0	C C- BY- NC- SA 4.0	C C- BY- NC- ND 4.0
General CC-BY rules:						
3) IF You Share the Licensed Material OR Modification, AND If is NOT requested by the Licensor, to remove any of the information THEN You must provide identification of the creator(s) AND a copyright notice AND a notice that refers to Primary License AND a notice that refers to the disclaimer of warranties AND a URI or hyperlink to the Licensed Material to the extent reasonably practicable.	X	X	X	X	X	X
4) IF You Share the Modification THEN You must indicate AND retain an indication of any previous modifications.						
5) IF You Share the Licensed Material THEN You indicate the Licensed Material is licensed under Primary License, AND include the text of, or the URI or hyperlink to, Primary License.						
6) IF You Share the Licensed Material THEN Every recipient of the Licensed Material automatically receives an offer from the Licensor to exercise the Licensed Rights under the terms and conditions of the Primary License.						
7) IF You Share the Licensed Mate-						

<p>rial THEN You may NOT offer or impose any additional or different terms or conditions on, or apply any Effective Technological Measures to, the Licensed Material if doing so restricts exercise of the Licensed Rights by any recipient of the Licensed Material</p> <p>8) IF You fail to comply with the Primary License, THEN Your rights under the Primary License terminate automatically. This rule does not apply automatically; the violation is cured, provided it is cured within 30 days of your discovery of the violation; or upon express reinstatement by the Licensor.</p>						
Specific CC-BY rules						
Reproduce and Share the Licensed Material, in whole or in part for any purpose	X	X	X			
Reproduce and Share the Licensed Material, in whole or in part for non-commercial purpose	X	X	X	X	X	X
Produce, Reproduce, and Share Adapted Material.	X	X		X	X	
<p>IF You Share the Modification THEN</p> <ol style="list-style-type: none"> 1) The Adapter's License you apply must be a Creative Commons license with the same License Elements, this version or later, or a Primary License Compatible License, AND 2) You must include the text of, or the URI or hyperlink to, the Adapter's License that you apply. You may satisfy this condition in any reasonable manner based on the medium, means, and 		X			X	

<p>context in which you Share Adapted Material, AND</p> <p>3) You may not offer or impose any additional or different terms or conditions on, or apply any Effective Technological Measures to, Adapted Material that restrict exercise of the rights granted under the Adapter's License you apply.</p>						
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Table 22. Comparison of CC-BY v. 4.0 licenses for a mashup model

Licence	CC-BY 4.0	CC-BY-SA 4.0	CC-BY-ND 4.0	CC-BY-NC 4.0	CC-BY-NC-SA 4.0	CC-BY-NC-ND 4.0	Conclusions
CC-BY 4.0	YES	YES, BY-SA terms	NO	YES, Non-commercial	YES, Non-commercial, BY-SA terms	NO	CC-BY 4.0 can be used for mashup with other licences, except those which do not allow modification
CC-BY-SA 4.0	YES, BY-SA terms	YES	NO	NO	NO	NO	CC-BY-SA 4.0 licence requires the same BY-SA terms for modifications, which do not allow setting extra terms as non-commercial or no-modifications.
CC-BY-ND 4.0	NO	NO	NO	NO	NO	NO	CC-BY-ND 4.0 licence cannot be used for mashup with other licences because it does not allow modifications
CC-BY-NC 4.0	YES, Non-commercial	NO	NO	YES	YES	NO	CC-BY-NC 4.0 licence can be used for mashup with other licences that allow setting extra

							terms as non-commercial
CC-BY-NC-SA 4.0	YES, Non-commercial, BY-SA terms	NO	NO	YES, Non-commercial, BY-SA terms	YES	NO	CC-BY-NC-SA 4.0 licence can be used for mashup with other licences which allow setting extra terms as non-commercial or no modifications.
CC-BY-NC-ND 4.0	NO	NO	NO	NO	NO	NO	CC-BY-NC-ND 4.0 licence cannot be used for mashup with other licences because it does not allow modifications

3.3.3 Part II: Survey of the National OGD Portals of 2014 October-2015 January

From October 2014 to January 2015, the survey of the licensing of OGD was reinitiated. The goal of the survey was to collect state-of-art of licenses used in OGD portals to cover datasets. The main OGD portals of twenty-one countries were selected for further investigation: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Costa Rica, France, Germany, Greece, Italy, Moldova, New Zealand, Norway, Portugal, Spain, the Netherlands, UK, Uruguay, US, as well as the EU OGD portal. The task of the survey was not to inspect the condition of the dataset or the links to the dataset, because in many cases the links were not working or files were missing. Also, the task of the Survey was not to check if there was a dataset or container of datasets. In all cases, there were data containers identified as datasets. All information from the portals was taken as-is. Overall, information from 435,682 datasets was classified and investigated. The table of the results of the Survey is presented in Annex 2.

During the first part of the survey the OGD portals were checked: 1) Are there datasets covered by any license; 2) if the dataset was not covered by a license, were there any legal notices or conditions for re-use applied to the datasets; 3) were there datasets without a license, or where information about the license was not provided.

The results of the first part of the survey were: a) **56%** of all datasets from the investigated portals were covered by a **license**; b) **17%** of all datasets were not covered by a license, or information about the license in the OGD portal was not provided, or there were other conditions set for the re-use of the dataset or it was **license-free**; c) **27%** of all datasets were covered by a legal notice in the portal or in the metadata of the dataset or indicated as a **legal notice**. A legal notice was used in OGD portals of the EU (100%), Moldova (100%), Spain (11%), U.S. federal datasets (100%), other U.S. datasets (0.3%) and Germany (only 3 datasets). In Spain and the U.S., there were different legal notices.

The second part of the survey was dedicated to the multiplicity of licenses in global OGD phenomenon. The range of different licenses was investigated, and the most popular licenses were identified. Licenses provided by national authorities and applied only locally are termed "local licenses", and the term does not include Creative Commons localized licenses (see the Fig.1).

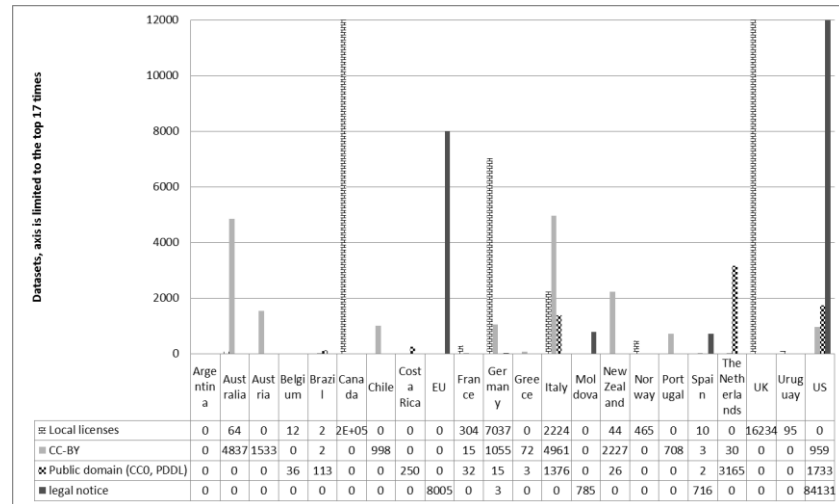


Fig. 1. The results of National OGD Portals: countries overview through license scope

The results are these: 1) by far the most popular licenses are **local licenses**, which cover 90% of licensed datasets (e.g. Open Government License – Canada, Licence Ouverte, Open Government License (UK), Non-Open Government License (UK), Data license Germany – attribution – version 1.0 and 2.0, Italian Open Data License 2.0 and 1.0, NLOD, Uruguay Open Data License); 2) the second most popular (6%) of the licenses are **CC-BY licenses**, including localizations (e.g. CC BY 3.0 AU, CC BY 3.0 NZ, CC BY 3.0 AT, CC BY 3.0 CL, CC BY 3.0 GR, etc.); 3) the third most popular (2%) are licenses waiving copyright to the **public domain** (CC0 and PDDL); 4) all other licenses account for only 2% of the datasets. Of that 2% portion, the other licenses can sub-divided: ODbL (45%), CC BY-NC including versions and localizations (38%), CC BY-SA including versions and localizations (10%), Open Data Commons Attribution (3%), GPL (2%), Against DRM (1%), CC BY-ND (1%), CC BY-NC-ND, CC BY-NC-SA, and GFDL (<1%).

In summary, the Survey of OGD portals found that in a global licensing scenario, the overwhelming majority of the licenses are local licenses. Only 17% of the datasets were not covered by a license or legal notice. Taking into account that OGD portals and the ODG domain are still in an early phase of development, these proportions are likely to shift in the near future. A second significant discovery was that the CC-BY license is becoming increasingly important, and it is understandable that CC-BY is becoming a prevalent standard in the global OGD scenario: among the Creative Commons licenses, CC-BY has the fewest restrictions on re-use of the dataset and is generally considered as an open license. The third major finding is that many countries, such as the Netherlands, the U.S., Italy, Costa Rica, Brazil, Belgium, New Zealand, France, Germany, Greece, and Spain, release datasets to the public domain. Last but not least, 27% of investigated datasets are “covered” by legal notices. The question that emerges is how to connect and annotate these legal requirements to datasets in the Linked Open Data (LOD) domain.

3.3.4 Analysis of the Top Six Licenses for Datasets in a Mash-up Scenario

In a datasets mash-up scenario where two different datasets are mixed, an analysis of the compatibility of the licenses (or legal regimes applied to datasets) should be performed. The need for this analysis can be avoided only when a dataset is not covered by any license or legal notice or is covered by a license dedicating it to the public domain, because such datasets are compatible for mash-up with another dataset that is covered by a license (that allows modifications).

The survey of the licensing of OGD examined the six most popular legal regimes of datasets. The compatibility of these licenses and legal notices are shown in a Table 22.

Table 23. Comparison of top licenses in a mash-up model

License	Open Government Licence – Canada 2.0.	DATA.G OV Data Policy Statements	Licence Ouverte	Open Government Licence v3.0 (UK)	Legal notice (EU)	CC-BY 4.0
Open Government Licence – Canada 2.0.	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
DATA.G OV Data Policy Statements	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
Licence Ouverte	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
Open Government Licence v3.0 (UK)	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
Legal notice (EU)	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition
CC-BY 4.0	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution

These results are promising for Open Data principles because it means that *most* datasets from the investigated OGD portals should be compatible due to the proper implementation of a license regime. The only remaining step is to ensure that attribution requirements are followed, which are essentially statements about the source of the data and links to the licenses. It should be remembered that even though

most of the datasets may ultimately be compatible, their value should not always be measured by the quantity of their numbers, but judged by the quality of their information.

The only problem comes from the EU legal notice, which has one important requirement: “the obligation not to distort the original meaning or message of the documents”. This requirement in a mash-up scenario may sometimes be understood as a “distortion of original meaning or message of the documents”[121], so there is some uncertainty when it can be interpreted as distortion.

Still, many datasets remain covered by other, restrictive licenses. Not all Creative Commons licenses are compatible, which means incompatible licenses become a barrier for the goal of Linked Open Data. Datasets covered by incompatible licenses become isolated from the “cloud of data” in the OGD domain and do not create any further value in mash-ups of the datasets.

Contract-type licenses also present a barrier to LOD. Only when the significance of contracts made by software agents become recognized in PSI re-use domain will the barrier disappear. As an alternative, closed platforms of pools of datasets could be used in specific projects for re-use of PSI (e.g. in medicine, where sensitive personal data is held, and contracts are needed to protect patient identification data), or platforms such as ENGAGE, [117] which could be upgraded to resolve contract problems by harmonising them.

One of the most difficult obstacles in the mash-up scenario is that when legal notices are not used uniformly, they lack a predictable common structure. Sometimes the notice is a document (e.g. the EU legal notice), sometimes only one sentence (Spain, U.S. datasets) or just a note that a legal notice is to be applied without a reference to that notice. These legal notices are often found separate from the metadata of the dataset; it means that an automated process for connecting legal notices with the dataset becomes very complicated; it will be difficult to implement a systematic treatment of legal notices in the mash-up scenario of datasets.²⁷

To sum up, the most-used licenses and standardized legal notices to protect OGD are compatible in global scenario. Some licenses (e.g. CC-BY-NC-ND) are not compatible in a mash-up scenario. Still there are a sizeable number of datasets, particularly in Spain, (with 33 licensing regimes), that are not covered by standardized legal notices, and such a legal regime for protecting datasets is ultimately incompatible with the global environment of dataset legal regulation (see Fig. 2).

²⁷ E.g. in the us.gov portal there are 350 datasets covered by a legal notice that provides conditions of re-use: “The Minnesota Department of Natural Resources makes no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. **By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer.** The Minnesota Department of Natural Resources assumes no responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.”

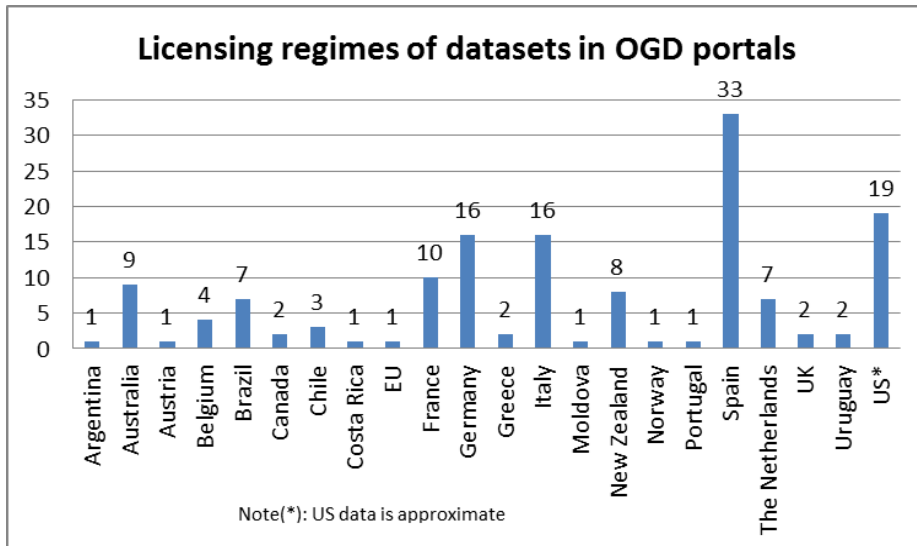


Fig. 2. The results of Survey of 2014-2015: country view through different licensing regimes of datasets

3.4 Summary of Chapter 3

This Survey has answered the following research questions:

1) What tools do Public Sector Institutions use to represent legal rules applied to Open Government Data?

The Survey found that the most popular tool is a license, the second most popular – legal notice/terms of use, and third – license-free. Legal notices are used in the OGD portals of the EU, Moldova, Spain, U.S. federal datasets, and in few cases are used in other U.S. datasets and Germany. The most popular form of the licenses are **local licenses**, which covers 90% of licensed datasets, e.g. Open Government License (Canada), Licence Ouverte (France), Open Government License (UK), Non-Open Government License (UK), Data license Germany – attribution – version 1.0 and 2.0, Italian Open Data License 2.0 and 1.0, NLOD, Uruguay Open Data License); 2) the second most popular form is **CC-BY licenses**, including localizations (e.g. CC BY 3.0 AU, CC BY 3.0 NZ, CC BY 3.0 AT, CC BY 3.0 CL, CC BY 3.0 GR, etc.); 3) the third most popular are licenses waiving copyright to the **public domain**: CC0 and PDDL; 4) all other licenses (ODbL, CC BY-NC including versions and localizations, CC BY-SA including versions and localizations, Open Data Commons Attribution, GPL, Against DRM, CC BY-ND, CC BY-NC-ND, CC BY-NC-SA, GFDL) cover only 2% of the datasets.

2) Are the most used licenses compatible? What are the conditions?

The analysis of the six most-used licenses and CC-BY and legal notices shows that these Open Government Data sets are ready to be mashed-up. There still exists some issues coming from EU legal notice concerning “the obligation not to distort the original meaning or message of the documents”.

The conditions of the most-used licenses are usually based on a requirement to acknowledge the source, provide a link to the original source and license, identify modification, etc. All these requirements respect Open Data principles and could be described as an “open license”.

Some problems remain: 1) in some countries (e.g. Spain, Italy) there are different extant licensing regimes, which call for a deeper inquiry into mash-up possibilities; 2) licenses, or other tools attached to OGD, do not guarantee that all legal rules are explained to the re-user of OGD, 3) mistakes can arise by attaching the incorrect right, or the wrong type of license to the OGD.

These problems once again suggest that legal rules that apply to OGD should be presented in a machine-readable format, because otherwise the OGD mash-up model cannot be readily implemented.

Chapter 4 – Informal Open Government Data Licenses Ontology

The Ontology of Open Government Data Licenses Framework for a Mash-up Model (OGDL4M) is an informal legal ontology that describes legal and common-sense concepts to explain how the ecosystem of Open Government Data mash-ups are affected by copyright, EU database *sui generis* rights and Public Sector Information (PSI) management rules. It connects existing copyright, legal rights, license ontologies, and expression language.

The OGDL4M introduces an informal ontology for the EU Database Directive[122] and the EU PSI reuse rules that apply to Open Government Data. It establishes links with Copyright Ontology[123], schema.org[124], DBpedia[13][125], the time interval pattern[126], the Data Catalog Vocabulary (DCAT)[127], and adapts some important parts of the L4LOD[112] and LKIF[128] ontologies.

The OGDL4M ontology serves as a foundation for creating a tool that can automatically or semi-automatically explain the deontic rules (from the EU PSI reuse domain, EU Database Directive, and copyright domain) that apply to OGD datasets, generate the requirements applied to an Adapter's License, express the prohibitions and obligations that apply to the licensed material, and provide guidance whether or not different OGD datasets may be mashed-up.

This Ontology can also be used for annotating OGD licenses, legal notices, and contracts, and to query the inferred legal information to support decision-making by developers for the purpose of creating mash-ups. Several technologies will be able to use this Ontology: RDF triples repository using SPARQL queries for filtering the fitted legal information; OWL reasoners for inferring more knowledge (e.g., permission, obligations, exceptions); and legal reasoning engines[116][129] using compliance-checking methods for combining different licenses.

4.1 Related Work

Several scholars have worked on this subject (J. Breuker, A. Boer, R. Hoekstra[130], K. Berg[128], M. Palmirani[131, 132], S. Peroni[133], P. Casanovas[133], V. Rodríguez-Doncel[134], A. Rotolo[135], S. Villata[112], J. Broersen, L. Torre[136], F. Gandon, A. Kasten, D. Paehler, R. Garcia, J. Delgado[137]) and the present research has been inspired by their earlier work. However, the previous results addressed the problems only partially and were not tailored to the Open Government Data domain. For this reason a concrete, empirical application of the earlier work to the most frequently used licenses for OGD[138] revealed some critical issues that this work intends to address.

The development of OGD4LM started with an analysis of L4LOD[112], which is “a lightweight vocabulary for expressing the licensing terms in the Web of Data”[112] and a simple ontology presenting a very general view of licensing open data. Other useful ontologies to develop OGD4LM include those which analyse licensing (RDFLicense[139]), intellectual property, especially copyrights (IPRonto[140], CopyrightOnto/co[123]), linked data rights (ODRL v.2.1[141]), legal norms, sources (LKIF[128]) and expression language ccREL[99].

L4LOD has limited usefulness, however, because some important basic elements are missing: copyrights, EU *sui generis* database rights, and special terms and conditions from the Open Government Data domain. There are some obvious visible differences between the L4LOD:Permission concept and the concept of permissions existing in a legal copyright and related rights domain, and some exclusive treatments from the PSI domain that are not incorporated in the L4LOD:Permission concept. Thus, the relationship between the *Prohibition* and *Permission* concepts has not been properly represented. When we

tried to apply L4LOD to the latest Creative Commons licenses, Open Government License Canada v.2.0, and UK OGL v.3.0, the results revealed that some important concepts were not handled by L4LOD: i) the *exceptions* concept exists in every investigated license (except CC0 1.0); and ii) the *prohibition* concept needs to incorporate more classes, such as *NoWarranty* or *NoEndorsment* for governmental types of licenses; iii) the *Attribution* class lacks some elements, such as *CopyrightNotice*, *NoticeOfLicense*, *Identification*, *IndentificationOfLicensesMaterial*, *IdentificationOfModification*, etc.

IPRonto[137] has some valuable terminology and structure from the copyright domain. IPRonto also has a useful approach to rights management. CopyrightOntology(co:)[123] is very similar to IPRonto, and it represents the general concepts of the copyright domain. The problem is these two ontologies are not longer being developed or supported; IPRonto is no longer even publicly available. Linked Data Rights[142] and the related ODRL v.2.1[141] (certain properties, concepts, named individuals are shared in common with OGD4M) could be linked to the OGD4M ontology. Some problems are 1) Linked Data Rights incorporates only a small subset of copyright and EU *sui generis* database rights; 2) ODRL v.2.1 models rights expressions, but lacks concepts of certain rights, especially copyrights, *sui generis* database rights, and rules from the PSI re-use framework.

The RDFLicense[139] could be used by looking up the name of the license associated with the work, linking to the license text via RDFLicense (although some texts are not available), and setting jurisdiction of the license. The main problem with the RDFLicense is the legal code is not structured, and it is not possible to link directly to a specific provision of the license text (e.g. to section 5 of CC-BY 4.0. Disclaimer of Warranties and Limitation of Liability). This problem could be solved by using XML to structure the license (e.g. Akoma Ntoso XML schema [143]).

ccREL[99] could be adapted by using suggested machine-readable expressions of copyright licensing terms and related information. ccREL has a very light vocabulary and was essentially designed for use with Creative Commons[100] licenses.

To sum up, there are previously developed ontologies for Creative Commons licenses that focus primarily on the general copyright domain (reflecting the Berne Convention), but excluding the very important copyrights for database and *sui generis* database rights implemented by the EU Database Directive. It also excludes regulation from administrative law that is designed to manage public sector information, e.g. protection of data privacy, trade secrets, state secrets, re-use of public sector information, etc. It is therefore important to develop an ontology that fills existing gaps and present directions for future development.

4.2 Motivation

Firstly, Open Government Data is generally released in the form of *datasets*. A dataset can be a database, a part of database or in rare cases, a set of databases. So, the concept of a dataset is closely related to databases and their related rights. It is therefore important for the Ontology to include all possible rights and actions relevant to databases that are granted by copyright and *sui generis* database rights.

Secondly, OGD is released by public sector institutions (or Public Institutions, PI), which are regulated by administrative law and have specific rules for the management and re-use of Public Sector Information (PSI). Also, OGD releasers should follow specific rules from the legal domains of personal data protection, trade secrets, and state secrets. It should respect intellectual property rights if the datasets contain protected intellectual property.

To date, there have been no ontologies neither incorporating database-related rights, nor incorporating PSI re-use law, so it is essential to develop such ontology as we seek to promote the development of OGD re-use.

4.3 Methodology and Method of Ontology Design, Language and Tools for Ontology Modelling

The Methodology named MeLOn (Methodology for building Legal Ontology) was used to develop the OGDLM ontology. MeLOn is a new empirical methodology for building legal ontologies developed by M. Palmirani in order to help legal experts model legal concepts using the principles of data modelisation. MeLOn has already been implemented by a few scholars [144], and it takes its inspiration from SAMOD [145].

MeLOn was developed after several years of empirical practice in CIRSIFID, and it aims to resolve typical issues working in the legal domain [146]: 1) Legal experts: they lack competencies in conceptual or data modelling, and they often adopt technical tools (e.g., Protégé [147]) without the necessary awareness of the technical consequences; 2) Legal domain sources: legal texts and other relevant sources (e.g., soft law, case law, interpretation, doctrines, social rules) are the main sources for developing a legal ontology, and it is essential to connect existing legal material (whether formalised or not) to the ontology; 3) Legal domain goals: ontologies are often designed teleological from the start by formalising the goals to be addressed, although in the legal domain this work is not limited to one particular application; rather, the aim is to model existing legal concepts “as is”; 4) Legal domain evaluation: evaluation is fundamental for testing the quality of an ontology, but it can be very difficult to evaluate legal concepts. There are problems of exceptions and interpretation, and special methodology should be defined for those use-cases.

State-of-art of methodologies of ontology design can be described as *top-down*, *bottom-up*, or *middle-out* modelling methodologies [148]. They can also be described in terms of the scope of granularity: a) Top ontology - Dolce+ [149], Core ontology - LKIF [128], Core Legal Ontology (CLO) [150], LRI-Core [151], etc.; b) Domain ontology - OPJK [152], IPROnto [137], CopyrightOntology [123], JudO [153]; c) Linguistic-oriented - JurWordNet [154], Legivoc [155], EuroVoc [156], etc.; d) Light ontology - L4LOD [112], ODRL [141]. There are also different design methodologies: OntoClean [157], WebODE [158], pattern-oriented - NeOn [159], SAMOD [145].

There are “six core legal ontologies” [160]: LLD [161]: Atomic formula, Rules and Modalities; NOR [162, 163]: Agents Behavioral invariants, Realizations; LFU [164, 165]: Normative Knowledge, World knowledge, Responsibility knowledge, Reactive knowledge and Creative knowledge; FBO [166]: Norms, Acts and Concepts Descriptions; IKF-IF-LEX Ontology for Norm Comparison [167]: Agents, Institutive Norms, Instrumental provisions; Regulative norms; Open-textured legal notions, Norm dynamics; LRI-Core Legal Ontology [168]: Objects, Processes, Physical entities, Mental entities, Agents, Communicative Acts. In addition to these six, there is also a seventh valuable ontology: LKIF-core [169].

MeLOn describes ten steps for creation of an ontology: i) description of the ontology goals and proposing in natural language the definition of some use-cases for the empirical test; ii) definition of evaluation indicators; iii) analysis of the state of the art for related ontologies; iv) formation of a list of all the relevant terminology and production of a glossary of the main legal concepts; v) modelling a knowledge base of the legal domain by creating the following tables (Concepts tables, Object properties, Data properties, Ontology restriction (Axioms)); vi) transforming the tables in UML and later in OWL in order to optimise the modelisation; vii) empirical testing of some scenarios and use-cases defined in step i); viii) refinement of the ontology based on the results of the empirical test, including the evaluation of legal experts; ix) evaluation on the basis of the indicators defined in step ii); and x) publishing and documentation (using LODE tool [170]).

1. **Description of the ontology** is a short description of the goal of the ontology in one page with the research questions that the ontology intends to address. Two or three use-cases are selected and described in details (storytelling). In our case the use-cases are Creative Commons licenses, Open Government License Canada v.2.0 and UK OGL v.3.0.
2. **Definition of evaluation indicators** defines some parameters/indicators for evaluating the ontology according to the intended end goal. In our case the indicators are the following: i) completeness of the legal concepts definition; ii) correctness of the explicit relationships between legal

concepts; iii) coherence of the legal concepts modelisation; iv) applicability to concrete use-case; v) effectiveness for the goals; vi) intuitiveness for the non-legal experts; vii) computational soundness of the logic and reasoning; viii) reusability of the ontology and mapping with other similar ontologies.

3. **State of the art** of related ontologies describes the state of the art of related ontologies and answers these questions: Does an ontology already exist that can help to develop the new ontology? If there is an ontology that can help to develop the new ontology, can the existing ontology be extended or linked to the new one? In this work, several existing ontologies were taken in consideration and reused (e.g., L4LOD, LKIF, CopyrightOntology, Time [21], DBO [22]).
4. **Formation of a list of all the relevant terminology** and production of glossary is the process used to develop a knowledge base of the specific legal terminology relevant for the domain and to generate the glossaries. Legislative documents, case law and other sets of legal norms should be consulted for determining the specific legal terminology. A glossary of terminology has the form of a table with these column headings: term, definition by legal source (citing legal source, license, document, case law or legal theory, or common custom of the legal domain), link to normative/legal source, normalised definition (definition of term, made by the author of the new ontology, simplified or extended from a normative/legal source to fulfil the expectations of possible methodology users). The normalised definition should be a natural language description of the legal text using subject, predicate, and object, with the aim to reuse the terms of the glossary as much as possible and avoid duplicative or ambiguous terminology. In this way, a legal expert is forced to create triples that can be aggregated later on into more abstract assertions (TBox or ABox). Table 23 presents a representative part of a glossary, representing classes and properties from a legal source.

Table 24. A part of the glossary

Term	Definition by legal source	Link to normative/ legal source	Normalised Definition
Display (permission)	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b). In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any communication, display or performance to the public; E.g. (US law): To display a work means "to show a copy of it, either directly or by means of a film, slide, television image, or any other device or process or, in the case of a motion picture or other audiovisual work, to show individual images non-sequentially	96/9/EC 5.1(e) 96/9/EC 5.1(d) 17 U.S.C. § 101	The act of displaying to the public (of database or part of it). Applies to Derivative Work/Database and Original Work/Database.
Distribution (permission)	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution , communication, display or performance to the public of the results of the acts referred to in (b). In respect of the expression of the database which is protectable by copyright, the author of a database shall	96/9/EC 5.1(e)	An act or process of transmission of database or copy of database (Also an act of making available database to the public). Applies to Derivative Work/Database and Original Work/Database.

	have the exclusive right to carry out or to authorize: any form of distribution to the public of the database or of copies thereof.	96/9/EC 5.1(c)	
Reproduction (permission)	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction , distribution, communication, display or performance to the public of the results of the acts referred to in (b). In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: temporary or permanent reproduction by any means and in any form, in whole or in part;	96/9/EC 5.1(e) 96/9/EC 5.1(a)	Act or process of reproducing the contents of the database. Applies to Derivative Work/Database and Original Work/Database. Consists of Temporary reproduction and Permanent reproduction.

5. Modelling the knowledge base of a legal domain, for example by creating **tables** of classes and objects and defining their properties and relationships with other classes and objects.

Table 25. Classes table

Explicit Concept	Definition by legal source	Normalised Definition	Equivalent to	Sub class of	Disjoint with	Link to normative/legal source
Distribution	"In respect of the expression of the database which is protectable by copyright...."	An act or process of transmission of database or copy of database (Also an act of making available database to the public)	none	None		96/9/EC 5.1(e)
Prohibition	none	The class is a part of the deontic rules used to express the obligations.	none	DeonticRules	Permission NoLicense PD_License	none

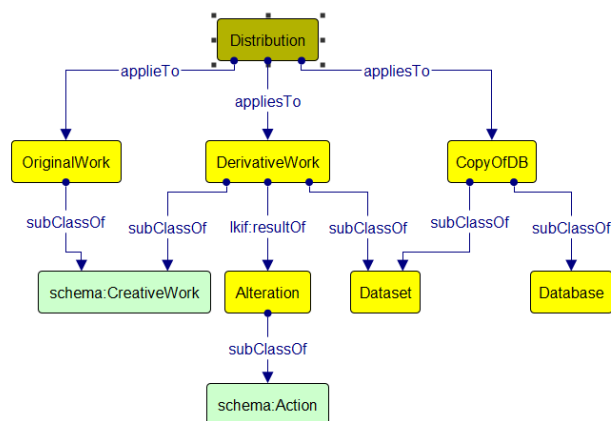


Fig. 3. Diagram in Grafoo of the Distribution Class

Table 26. ObjectProperty table

Property Name	Normalised Definition	Domain	Range	Inverse property	Characteristics	Super property or Parent
ObjectProperty: appliesTo	Apply some legal prescriptive norms or legal rules or policy	RequirementsToAdaptersLicense	ReuseOfAdaptedMaterial	ObjectProperty: appliedBy	Transitive NONE	none

6. **UML and OWL modelling** is a process dedicated to modelling the ontology in OWL. These tools are recommended for use: Protégé [16] or yED [17] with Grafoo [18] extension.
7. **The Test** step is dedicated to testing the ontology. The test is divided in two steps: first the authors model the Creative Commons licenses, Open Government License Canada v.2.0, UK OGL v.3.0 that are the use-cases chosen for the preliminary empirical testing. Secondly, using the LIME editor [23] we annotate and connect the OGDL4M classes to the texts. Thirdly, we test the ontology by selected parameters.
8. **Refinement** is a process to refine the ontology with the inputs from the Test step.
9. **Evaluation** is a step to evaluate the ontology using the previously described indicators.
10. **Publishing** and documentation is the concluding process, dedicated to documentation of the ontology with a tool called LODE [19] and publication of the ontology and connection with other ontologies.

4.4 The Informal Ontology of Open Government Data Licenses Framework for a Mash-up Model (iOGDL4M)

4.4.1 Description of the Ontology

Ontology name: Informal Ontology of Open Government Data Licenses Framework for a Mash-up Model (iOGDL4M). **Prefix:** “ogdl4m”.

The **problem(s):** Open Government Data (OGD) is usually released for re-use with legal terms or obligations from the legal domain at the national level. In most cases (56%) these legal terms/conditions are stated in a license; others are provided in a legal notice (27%) or conditions are not provided (17%). First, it is unclear what the conditions of re-use of the OGD are if the conditions are not provided by OGD releaser, e.g. does it mean that the dataset is “free of conditions” or the releaser was “not precise enough”, and can sanctions apply for violations of re-use norms? Second, OGD licenses are not unified, and this threshold problem requires a deep analysis of the licenses for every developer before starting to connect different datasets in a mash-up model. Third, current ontologies do not take into consideration the EU’s *sui generis* database rights, which can apply to OGD. Finally, licenses are designed as a tool to express copyright conditions, but not PSI re-use rules, so a deeper analysis of legal sources concerning PSI re-use is needed.

The **objective** of this ontology is to help create a theoretical model that can serve as a foundation for an automatic or semi-automatic computational model for checking the compatibility among different licenses and to produce a final license for the derivative work.

There must be a systematic way of:

- 1) Analyzing OGD licenses to understand the obligations and permissions, copyrights and *sui generis* rights of databases, including those from different jurisdictions, different actors, and different purposes of the mash-up;
- 2) Extracting clear information about conditions for mash-up for different datasets;
- 3) Providing semi-automatic functionalities for adding additional rights to mashed-up work and producing a final license for the mashed-up work.
- 4) Presenting the conditions that apply to re-use from national law in the EU.

The **research questions** are:

Q1: What are the legal rules that apply to Open Government Data sets?

Q2: What are the possible license conditions that can apply to Adapters?

Q3: Are the legal rules for different Open Government Data sets compatible?

Q4: Does a license for an Open Government Data set represent all the rules that apply to that dataset?

Use-cases

Use-cases are the Creative Commons licenses[100], Open Government License Canada v.2.0[171], and UK OGL v.3.0[102].

Firstly, each of the licenses was tested with preliminary empirical testing. The empirical tests compared different ontologies and represented mark-ups of the license results.

Table 27. An example of Empirical Test of the OGDL4M using part of Open Government License Canada v.2.0

License clauses	Class of OGDL4M	L4LOD	CopyrightOntology	ccREL
You are encouraged to use the Information that is available under this licence with only a few conditions .	Condition-OfPSIReuse PublicSectorInformation License	L4LOD:License	CopyrightOntology:DistributionContract schema:Offer	ccREL:License

Secondly, the LIME[172] editor was used for refinement, evaluation, and publication.

4.4.2 Definition of Evaluation Indicators

The Ontology could be evaluated by the following indicators:

- a) Copyrights, EU *sui generis* database right, and PSI requirements from the license are indicated;
- b) Theoretical model for checking the compatibility of conditions;

- c) Theoretical model for generating minimum conditions that apply to the new licensing of Adapted work;
- d) The conditions of cases when *sui generis* database rights are applicable;

Theoretical model of checking compatibility of conditions is an evaluation indicator that is the key indicator in the Ontology. It represents the theoretical model developed for the readiness of legal instruments (e.g. licenses) to participate in the process of mashing-up datasets. It should work with known legal instruments that are part of the Ontology and also be extendable to new legal instruments in the foreseeable future.

Theoretical model of generating minimum conditions applied to new license of Adopted work is an evaluation indicator created by the theoretical model to help generate an Adapter's License Template by including all necessary information from legal instruments of legally protected datasets.

The conditions of cases when *Sui Generis* Database Rights are applicable is an evaluation indicator that represents all requirements from the EU Database Directive and is designed to automatically apply *sui generis* database rights.

4.4.3 Related Ontologies

The OGD4M adapted some elements from other ontologies (see Annex 3 for a detailed list of re-used classes and properties). First of all, the purpose of OGD4M is not to re-invent ontology objects from the copyright domain. There are already two similar ontologies, the IPROnto and Copyright Ontology, which covers the general concepts of IP rights and copyrights. IP rights and the copyright domain are very complex and highly jurisdiction-dependent²⁸. This means that the specific regulation should be checked in every case. The Copyright Ontology[123] was selected because IPROnto is no longer available, and we have found it very useful to integrate moral rights and its component classes.

In the Ontology, moral rights are necessary to be represented: what kind of moral rights are applied to creative works, because licenses and L4LOD or ccREL ontologies focus on attribution right and integrity right (i.e. no derivative) but skips other rights, such as the withdrawal right. Also, moral rights explain who has the right to withdraw the moral rights, and that is very important for a licensor. When assigning a license to OGD, a licensor should be certain that no moral rights are violated and the type of license should be selected carefully, even if a Licensor has waived economic rights in the OGD.

Most classes in L4LOD could be adapted directly, but we found some differences in the *Prohibition*, *Permission*, and *Obligation* classes. These classes are also not re-used from the LKIF-core ontology or ccREL (*Permissions*, *Requirements*, *Prohibitions*) because of existing differences (shown in Figures. 4, 5, and 6). In OGD4M, *Permission*, *Prohibition*, and *Obligation* classes were represented as sub-classes

²⁸ For example, some municipality-level jurisdictions have their own unique IP and copyright-related rights concerning heritage (e.g. Bologna, Italy), and even some smaller entities have their own special legal regime (The State Cultural Reserve of Vilnius Castles in Vilnius, Lithuania). The US and EU copyright domains have different logical bases for implementation. Those problems demonstrate that to develop a concrete copyright ontology, there is a need for large resources, or contribution by many actors via crowd-sourcing platforms. Ontologies are still being developed based on the Berne Convention and other international treaties, so they will be suitable for general representation of the copyright domain.

of deontic rules, and the *Permission* class is disjoint with the *Prohibition* class. This is necessary to express the OGD re-use conditions.

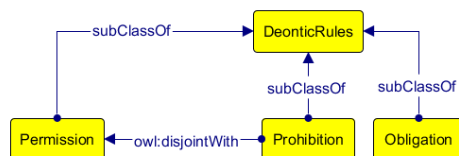


Fig. 4. UML (graffoo) schema of selection of DeonticRules, Permission, Prohibition and Obligation classes of the OGD4M

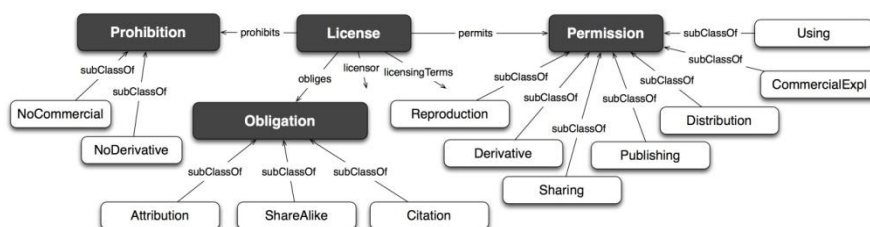


Fig. 5. The figure provides a schematic representation of the L4LOD vocabulary [112]

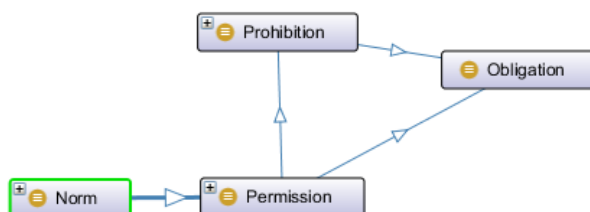


Fig. 6. OntoGraf schema of Norm, Prohibition, Obligation, Permission classes of LKIF ontology [128]

4.4.4 Formation of a List of All Relevant Terminology and Production of the Glossary

The OGD4M vocabulary is a knowledge base of the specific legal terminology relevant for the domain and the production of the glossary. It was compiled from terminology from shared domains, legal theory, deontic logic theory, legal norms, legislative materials, as well as from related ontologies.

Legal sources for the formation of the vocabulary were:

- Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases;
- Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information;
- Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the re-use of public sector;
- The Berne Convention and its amendments;

- Council Directive 92/100/EEC of 19 November 1992 on rental right and lending right and on certain rights related to copyright in the field of intellectual property;
- Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights;
- Directive 2011/77/EU of the European Parliament and of the Council of 27 September 2011 amending Directive 2006/116/EC on the term of protection of copyright and certain related rights;
- Directive 2012/28/EU of the European Parliament and of the Council of 25 October 2012 on certain permitted uses of orphan works;
- 17 U.S. Code § 101 et seq., (copyrights);
- WIPO Copyright Treaty (WCT).

The terminology was also inspired by the national PSI law of EU member states. For example, (Spanish) Law No 18/2015, of 9 July 2015, amending Law No 37/2007, of 16 November 2007, on the re-use of public sector information was used as example of the term *Attribution requirement*. Licenses CC-BY 4.0 International, Norwegian License for Open Government Data (NLOD), Data license Germany – attribution – non-commercial – Version 1.0 were used for building the terminology.

A glossary for the terminology was added to the table. It consists of these columns: term, definition by legal source (citing legal source, license, document, case-law, legal theory, or common sense of the legal domain), link to normative/legal source, normalized definition (definition of a term simplified or extended from a nominative/legal source to anticipate potential user expectations for methodologies by the author of the new ontology). The normalized definition is a natural language description of the legal text using subject, predicate, object, with the aim of re-using as much as possible the terminology of the glossary. In this way, a legal expert is forced to create triples that can be aggregated later on into more abstract assertions (TBox or ABox). In Table 27 a small part of the glossary is presented, which represent classes and properties from the legal source. A complete version of glossary is presented in Annex 3 (Glossary of terms).

Table 28. A part of the glossary.

Term	Definition by legal source	Link to normative/legal source	Normalized Definition
Display (permission)	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b). In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any communication, display or performance to the public; E.g. (US law): To display a work means "to show a copy of it, either directly or by means of a film, slide, television image, or any other device or process or, in the case of a motion picture or other audiovisual work, to show individual images non-sequentially	96/9/EC 5.1(e) 96/9/EC 5.1(d) [17 USCS § 101]	The act of displaying to the public (of database or part of it). Applies to Derivative Work/Database and Original Work/Database.
Distribution (permis-	In respect of the expression of the database which is	96/9/EC	An act or process of

sion)	<p>protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p> <p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any form of distribution to the public of the database or of copies thereof.</p>	<p>5.1(e)</p> <p>96/9/EC 5.1(c)</p>	<p>transmission of database or copy of database (Also an act of making available database to the public). Applies to Derivative Work/Database and Original Work/Database.</p>
Reproduction (permission)	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p> <p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: temporary or permanent reproduction by any means and in any form, in whole or in part;</p>	<p>96/9/EC 5.1(e)</p> <p>96/9/EC 5.1(a)</p>	<p>Act or process of reproducing the contents of the database. Applies to Derivative Work/Database and Original Work/Database. Consists of Temporary reproduction and Permanent reproduction.</p>

4.4.5 Modelling the Knowledge Base of a Legal Domain

Part of modelling the knowledge base of a legal domain is to build a conceptual model of the knowledge. The glossary terms are modelled in these tables: classes/concepts table and object properties table. The classes table (see example at Table 28) consists of the following columns: explicit concept, definition by legal source, normalized definition, equivalent to, subclass of, disjoint with, and link to normative/legal source. The Object property table (see example at Table 29) consists of these columns: property name, normalized definition, domain range, inverse property, characteristics, super property or parent. Completed tables are provided in Annex 3.

Table 29. Classes table

Explicit Concept	Definition by legal source	Normalized Definition	Equivalent to	Sub class of	Disjoint with	Link to normative/legal source
Distribution	"In respect of the expression of the database which is protectable by copyright...."	An act or process of transmission of database or copy of database (Also an act of making available database to the public)	none	none		96/9/EC 5.1(e)

Table 30. ObjectProperty table

Property Name	Normalized Definition	Domain	Range	Inverse property	Characteristics	Super property or Parent
<i>ObjectProperty: appliesTo</i>	<i>Apply some legal prescriptive norms or legal rules or policy</i>	<i>RequirementsToAdaptersLicense</i>	<i>ReuseOfAdaptedMaterial</i>	<i>ObjectProperty: appliedBy</i>	<i>Transitive NONE</i>	<i>None</i>

4.4.6 OWL Modelling

For **OWL modelling**, yED [173] with the Grafoo extension (developed by Silvio Peroni, UNIBO) [174] was used (see Fig. 7, 8). Modelled UML schema were transferred to OWL by using DITTO, which is a “Web application that is able to translate diagrams expressed either in E/R crow’s foot notation or Grafoo and created with yEd, an open source application to quickly and effectively generate high-quality diagrams, into OWL ontologies”[175].

In Figures 7 and 8, the nodes represent classes and edges represent object properties. Different colours of nodes represent different ontologies (yellow/#ffff00 – OGDLM, blue/#00ccff – copyright ontology, orange/#ff6600 – LKIF-core, green/#00ff00 – OWL, dark green/#99cc00 – DBPedia ontology, bright green/#ccffcc – schema.org, pink/#ff99cc – L4LOD and blue/#33cccc – TimeInterval).

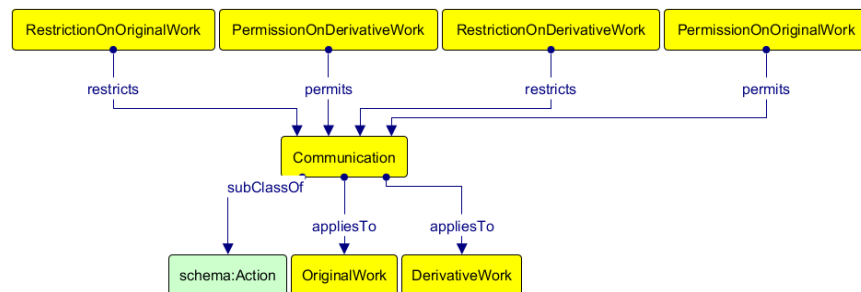


Fig. 7. Diagram in Grafoo of the *Communication* Class neighbourhood classes

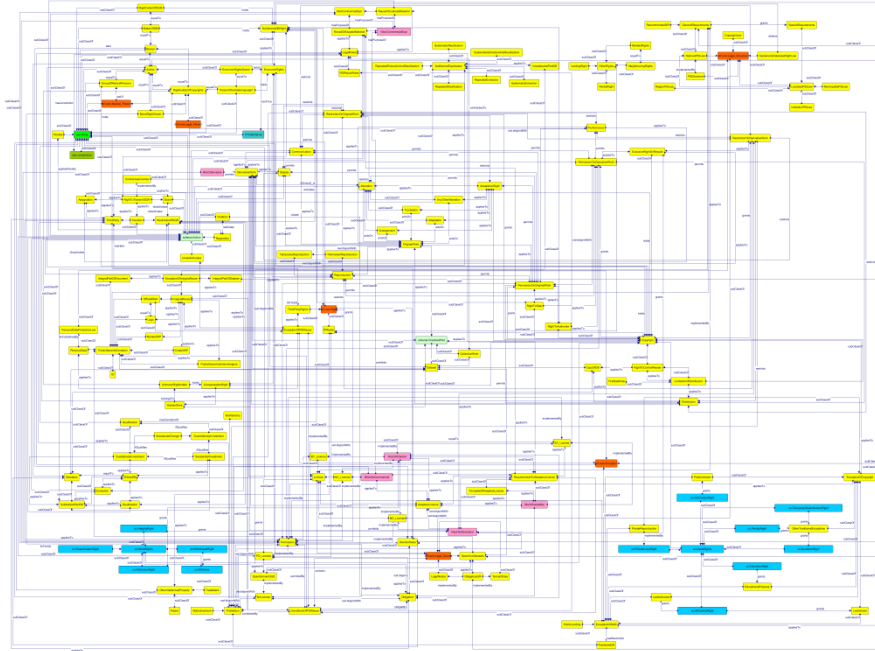


Fig. 8. Overview diagram in Grafoo of OGDL4M

4.4.7 Empirical Test

The empirical test was dedicated to testing the Ontology from a technical and legal point of view. We used a subset of the FOCA methodology evaluation criteria [176], and selected the following parameters:

- i) P1-Clarity: clear for legal experts;
- ii) P2-Accurateness: precision of the result from a legal point of view;
- iii) P3-Consistency/coherence: whether is it possible to reach contradictory conclusions from valid input definitions;
- iv) P4-Completeness: prove the incompleteness of an individual definition, and deduce the incompleteness of an ontology, and the incompleteness of an ontology if at least one definition is missing within the established reference framework;
- v) P5-Usability: whether a legal expert can recognise the legal terminology and methodology of the discipline in the ontology;
- vi) P6-Correctness: correct from a technical point of view (e.g., syntax).

Table 31. Table of qualification

UK OGL v.3 clauses	Class of OGDL4M	L4LOD
The Licensor grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information subject to the conditions below.	License, LKIF:LegalSource, GeneralRequirements, DBO:Jurisdiction	L4LOD:License
You are free to:	ti:TimeInterval, LegalRules DeonticRules, Permission, ConditionsOfPSIReuse	
	Permission, ExceptionOfSGR, ExceptionOf-	L4LOD:Permission,

<ul style="list-style-type: none"> •copy, publish, distribute and transmit the Information; •adapt the Information; •exploit the Information commercially and non-commercially for example, by combining it with other Information, or by including it in your own product or application. 	Copyright, L4LOD:Derivative, PermissionOnDerivativeWork, PermissionOnOriginalWork, ConditionsOfPSIReuse, DeonticRules, L4LOD:CommercialExpl, Non-CommercialExpl, ThirdParty, Copyright, RightToAuthorize, RightToSale, Reproduction, Distribution, Performance, Display, Communication, ExclusiveRightOnResults, Alteration	L4LOD:Reproduction, L4LOD:Distribution, L4LOD:Publishing, L4LOD:CommercialExpl, L4LOD:Derivative
You must (where you do any of the above): <ul style="list-style-type: none"> •acknowledge the source of the Information in your product or application by including or linking to any attribution statement specified by the Information Provider(s) and, where possible, provide a link to this licence; 	L4LOD:Attribution, CopyrightOntology:AttributionRight Obligation AdaptersLicense RequirementsToAdaptersLicense BY_License	L4LOD:Attribution L4LOD:Obligation
Non-endorsement This licence does not grant you any right to use the Information in a way that suggests any official status or that the Information Provider and/or Licensor endorse you or your use of the Information.	NoEndorsment, Prohibition	None
Exemptions This licence does not cover: <ul style="list-style-type: none"> •personal data in the Information; •Information that has not been accessed by way of publication or disclosure under information access legislation (including the Freedom of Information Acts for the UK and Scotland) by or with the consent of the Information Provider; •departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset; •military insignia; •third party rights the Information Provider is not authorised to license; •other intellectual property rights, including patents, trade marks, and design rights; and •identity documents such as the British Passport 	ExceptionOfPSIReuse InsigniaReuse CrestsOfIP NamesOfIP OfficialMark ID Logo ExceptionOfInsigniaReuse IntegralPartOfDocument IntegralPartOfDataset UnlawfulAccess PersonalData, ThirdPartyRights OtherIntellectualProperty Trademarks, Patents,	None
This licence is governed by the laws of the jurisdiction in which the Information Provider has its principal place of business, unless otherwise specified by the Information Provider	DBO:Jurisdiction	None

The empirical test was divided into the following steps: i) we had previously prepared some key questions (critical queries) for the test (e.g., Which obligations can be matched together?); ii) the author models the Creative Commons licenses, Open Government License Canada v.2.0, UK OGL v.3.0, that are the use-cases chosen for preliminary empirical testing, using the LIME [172] editor in order to connect the OGD4M classes to the text. The output is an Akoma Ntoso file associated with the classes of the

OGDL4M ontology; iii) a converter extracts the RDF triples and stores them in a SPARQL endpoint; iv) the queries are performed for testing the results; v) a legal expert provides an assessment of the results that will be used for fine-tuning the ontology. These test steps will be repeated for several cycles. The Evaluation results are provided in Annex 4.

Table 32. Queries for the test

Parameter	Question	Queries
P1, P2	Q1	What legal rules apply to the dataset released by any Public Sector Institution of EU Member countries?
P5	Q1, Q2, Q3, Q4	Are the ontology properties coherent with the domain?
P6	Q1, Q2, Q3, Q4	Does the reasoner bring modelling errors?
P1, P2, P3	Q2	What obligatory conditions apply to an Adapter's License?
P3	Q4	Does the license represent all legal rules applied to the OGD?
P1, P2, P3, P4, P5	Q2	What Database copyrights and EU <i>sui generis</i> database rights could apply the Adaptor?

Table 33. Table of the parameters and the research questions

Parameters	Research questions
P1-Clarity: clear for legal experts; P2-Accuratness: precision of the result from a legal point of view; P3-Consistency/coherence: whether it is possible to reach contradictory conclusions from valid input definitions; P4-Completeness: prove the incompleteness of an individual definition, and deduce the incompleteness of an ontology, and the incompleteness of an ontology if at least one definition is missing within the established reference framework; P5-Usability: whether a legal expert can recognise the legal terminology and methodology of the discipline in the ontology; P6-Correctness: correct from a technical point of view (e.g., syntax).	Q1: What are the legal rules that apply to an Open Government Data set? Q2: What are the possible conditions for an Adapter's license? Q3: Are the legal rules for different Open Government Data sets compatible? Q4: Does the license of an Open Government Data set represent all rules that apply to that dataset?

Table 30 shows the first and second steps of the testing. After analysing the UK OGL v.3.0 license and applying the ontologies to the license text, we produced the table, which shows a selected fragment of the classification. In Table 31, possible queries are shown to test different parameters, e.g., Q1 checks parameters Clearness (P1) and Accuratness (P2) (see Table 32).

4.4.8 Refinement

The Ontology should be updated with the results of the tests and after the new legislation related to the Ontology is implemented.

4.4.9 Evaluation

Evaluation results are published in Github[5]:

<https://github.com/martynui/OGDL4M/blob/master/Empirical%20Tests%20of%20the%20OGDL4M.pdf>.

4.4.10 Publishing

The iOGDL4M is published using GitHub[5]:

https://github.com/martynui/OGDL4M/blob/master/OGDL4M_20170428.graphml

The documentation will be produced using the LODE tool[170].

4.5 Summary of Chapter 4

We have presented the informal OGDL4M ontology in order to demonstrate that a more complex and articulated ontology is necessary to manage mashups of Open Government Data sets. Such Ontology should be able to model the multifaceted aspects of intellectual property rights that govern the use of OGD, including copyright and database rights. A deep legal analysis of all the concepts in IPR, copyright, PSI, database directives and Open Government Data regulation is necessary for producing a legally sound outcome, useful for RDF queries (e.g., SPARQL), OWL reasoners (e.g., Pellet, HermiT), and for producing inputs to legal reasoning (e.g., predicates). Narrowing one's perspective to only data licensing *per se*, without fully considering compliance with other factors coming from legislation, directives, and expert knowledge, ultimately will not yield reliable or actionable knowledge in a real-world legal context, due to the large number of interactions between legal concepts that affect meaningful utilization of the information. An interdisciplinary approach is fundamental for correctly representing machine-readable relationships between deontic operators and legal rules, including exceptions, violations, and reparations. Other important results are the analysis of the *disjointWith* and *equivalent* classes, and restrictions in the properties and data types.

The following criteria should be satisfied if we are to expect successful utilisation of the Ontology:

- 1) The Ontology should be updated to the latest known legislation related to the Ontology;
- 2) The legislation in the domain is particularly dynamic, so the legislation should be re-checked each time before starting to use the Ontology;
- 3) It important to identify the jurisdiction of the Open Government Data set by its country and to apply the legal rules from national PSI law;
- 4) It important to identify the specific PSI releaser if the country has not only a national PSI law, but also local PSI law, and to apply legal rules from the local PSI law as well.
- 5) The more legislation related to OGD regulation that is represented in the Ontology, the more possibilities to create automatic tools that will be able to extract concrete legal rules applied to the dataset.
- 6) The fully automated process of the ontology validation should correspond to the latest legislation if all needed legislation is available in XML format and there are direct links between the Ontology and the sources of legislative data.

In this chapter the research questions were answered by developing the Ontology and performing queries during the empirical test. Nevertheless, utilisation of the whole Ontology is difficult to support fully due to frequent updates by individual sources. Parts of the ontology related to stable and less-dynamic legislation (e.g. the EU Database Directive, the basic model of legal rules applied to datasets) should remain usable until such legislation changes.

Chapter 5 – Conclusions

In this research work, the licensing framework for Open Government Data was analysed and modelled. It discovered what legal rules in the EU apply to Open Government Data, compared how the regulation of re-use of PSI is different in individual EU member states, surveyed national OGD portals, analysed the compatibility of the six most-frequently used licenses and the CC-BY licenses, and developed an informal OGD4M Ontology that represents a basic model of legal rules that apply to OGD.

We expect the Ontology to be used to develop a tool that will be able to automatically or semi-automatically: 1) represent the legal rules that apply to different Open Government Data sets, 2) answer whether different datasets may be merged and under what conditions, and 3) help to develop new licenses for the resulting derivative works. The empirical tests have provided evidence that the Ontology is usable: it presents a general model for what legal rules apply to OGD, expresses which conditions are compatible and which are not, provides minimum requirements for licensing by OGD Adapters, and suggests all available options for EU copyright and EU *sui generis* database rights that may apply to derivative works.

This Ontology should be improved by referencing the conditions of PSI reuse from each country (and from each federal state, municipality, ministry, or PSI releaser, if applicable) by building on the examples provided in this research. This improvement can be performed by crowd-sourcing feedback or by involving the public in other ways to further refine the ontology.

Legislation and rules relevant to the Ontology should be updated frequently, ideally every day, since the OGD domain is subject to frequent changes in multiple jurisdictions. This monitoring could be automated where legislation is provided in XML format (e.g. AkomaNtoso) and where it is possible to establish direct connections to these databases.

The Ontology will continue to be improved by collecting feedback by legal practitioners, scholars, and by the releasers and re-users of OGD.

5.1 Contributions

5.1.1 Investigation of the OGD Licensing Domain

In the first paper[177], we discovered that the creation of the European digital single market without language barriers, high expectations for the economic value of the re-use of Public Sector Information in Europe, and the practical situation of the Open Data domain regarding problems from mash-ups, all force us to look for more **innovative** adaptation of the legal framework from copyright and *sui generis* database rights, which are used to ensure protection of creators' rights, innovation, and economic growth.

The process of licensing Open Government Data shows that Open Data principles are not always respected, and extra restrictions are often imposed on licenses. The preliminary investigation showed that the most popular licenses are *Creative Commons* licenses in the global scenario of Open Government Data. The CC-BY licenses are used with datasets frequently, but not all of them are compatible when the datasets are to be mashed-up together.

Making licenses comprehensible by automated tools could help solve many problems in the OGD domain by allowing technology to be applied to datasets and databases. Formalisation of the rules in effect establishes the ground rules for requiring the use of technologies to respect the rules. This could

energise the Open Data domain, because of the savings of time for investigating rights and the costs for creating the mash-ups.

In our second paper[178], we presented a Survey. The Survey underlines some important findings: i) the majority of the OGD does not fulfil the OD principle of free re-use of data, but in most cases the limitation of re-use requires only an attribution requirement and a link to the license or legal notice; ii) the legal notices fragment information on legal protection onto different parts of the web site containing the OGD, reducing the prospects for re-use; iii) there is the risk that datasets not covered by a license in an EU jurisdiction may be automatically protected by U.S. copyright; iv) the legal requirements in different jurisdictions preclude the adoption of a single license or contribute to an aversion to using a license altogether; v) the CC licenses are used as brands for communicating an outlook and philosophy rather than a real-world legal permission or an obligation framework; vi) the OGD licenses do not always comply with PSI re-use policy, e.g. there are restrictions for commercial re-use; vii) in the global scenario, most OGD datasets are covered by licenses that are ready for mash-up scenarios, but at a country level, the results may be different.

The regulation of OGD depends on national intellectual property, public law, database, and copyright regulation. The CC0 license could be used more as an exception in rare cases, than as a rule in investigated EU member states. The majority of U.S. federal datasets are in the public domain, but the U.S. OGD portal still sets an attribution requirement in the legal notice. In the EU for most cases, copyright is applied automatically to works without requiring a notice about copyright or registration. In contrast, many U.S. works receive the fullest level of protection by providing notice of copyright and registration, which may also be required for renewal of the copyright term.

Compatibility of rights among datasets is fundamental for the economical exploitation of the OD and for developing an inclusive society. Only a good license framework of the OGD can assure legal protection in the long-term and guarantee rights of the end-user in the chain of re-use (e.g. re-use of re-use, derivative works, etc.). In the future, development of an ontology of the global regulation of the OGD domain will be required. It could be used as a tool for automatic or semiautomatic mash-up of licensed and unlicensed Open Government Data.

5.1.2 Investigation of Legal Domain Applied to OGD

In the third paper[179], we presented a legal analysis of EU Member States' national PSI law and explained how the informal ontology could be used to present legal rules applied to OGD. The legal analysis of national PSI law identified the main problem: national law is not harmonized with EU law. That is why the situation in most EU countries is different and requires a deeper analysis of the national legal domain. The OGD4M ontology could be a very useful tool for evaluating each country's PSI policy, and could be used as a tool for automatic or semi-automatic evaluation of the legal regulation of datasets released by the public bodies of EU member states in the future.

5.1.3 Ontology

In the last paper[180], we presented a portion of the OGD4M ontology in order to demonstrate that a more complex and articulated ontology will be necessary to manage mash-ups of Open Government Data sets. Such an ontology should be able to model the multifaceted aspects of intellectual property rights that govern the use of OGD, including copyright and database rights. A deep legal analysis of all the concepts in IPR, PSI, database directives, and Open Government Data regulation is necessary for producing a le-

gally sound outcome, useful for the RDF queries (e.g., SPARQL), OWL reasoners (e.g., Pellet, HermiT), and for producing inputs to legal reasoning (e.g., predicates). Narrowing one's perspective to only data licensing *per se*, without fully considering compliance with other factors coming from legislation, directives, and expert knowledge, ultimately will not yield reliable or actionable knowledge in a real-world legal context, due to the large number of interactions between legal concepts that affect meaningful utilization of the information. An interdisciplinary approach is fundamental for correctly representing machine-readable relationships between deontic operators and legal rules, including exceptions, violations, and reparations. Other important results are the analysis of the disjointWith and equivalent classes, and the restrictions in the properties and data types.

5.2 Open Problems

In the following section, we propose open problems for future research.

5.2.1 Connecting Legal Resources through Ontologies

How to synchronize legislative documents with information systems, software agents, ontologies and other resources related to legislative documents in automatic or semi-automatic decision-making/supporting systems? There are no simple answers. In addition to technical problems, there are problems with legal interpretation, validity of legislation, and other problems.

First, technical problems include: 1) the text of legislation should be machine-readable and structured, and supported by metadata; 2) legal norms should be defined by their validity in time and jurisdiction; 3) legislation should be available with open access and frequently updated databases; 4) providing on-line 24/7 connection and support in times of hack-activism and cyber-terrorism is a challenge.

Second, the legal interpretation of legal texts in machine-understandable language is a challenge. A team of lawyers and computer scientists, and domain experts should be assembled to collaborate on this task. This research provides evidence of the need for participation of legal experts in ontologies relating to legal texts, because computer scientists are not trained or efficient at evaluating legal knowledge. On other hand, legal experts alone are unable to produce a good formal ontology because of the lack of knowledge from the computer science domain. Still, there is no mechanism of certification for legal ontologies, or ontologies related to the legal domain. Legal texts may be interpreted differently by lawyers, judges, domain experts, etc. Identical legislation may be interpreted differently in different jurisdictions, because of different legal domains, legal schools, decisional interpretation, and practice.

Third, when discussing cases how a machine should be able to understand the validity of legislation, it depends strongly on the informational infrastructure that accompanies the legislation. This includes not only the jurisdiction or dates written into the legal text, or legislative systems to express the validity of a legal act or its provisions. A judge, amendment, *force majeure* (war, terrorist attack, etc.), exit of/joining with a union/country, mistakes of legislators, international treaties, political crises (e.g. recent Polish Constitutional Court and Government crisis), and other reasons can affect the validity of a legislative act or its provisions. The validity of a legislative act should be readily represented by the information accompanying the legislation. The current situation of information systems for legislation is not effective enough to present the legal validity of legislation[181]. Moreover, different legislative information systems are not designed to work across borders, because of lack of standards and complexity from each country. A solution could be standardization[182], unification of legislation processes, information systems, and the tools of legislation[143].

Fourth, trust depends on information security, efficient support, customer experience, (social) media, and other criteria. Many parties contribute to building and maintaining trust in legislation-related ontologies: legislators, publishers of legislation, publishers of datasets, and providers of access to legislative information systems, and developers of ontologies, applications, software agents, etc. Every player has a role and responsibility in building trust in the final product. There could be always **man-in-the-middle** attacks or other risks. Digital signatures can be used to protect legal texts but they may not always protect associated metadata. Metadata may be altered automatically by machines, but digital signatures should be applied by humans. Trust depends of the design of application: if it frequently checks the validity of resources used to make the ontology or other decisionmaking-dependent information, and generates a log of the checks, such applications would be more trustable. Trust also depends on reliable support that is available 24/7. It is hard to say at this stage what resources should be committed to update a complicated legal ontology that incorporates legislation from different countries. Without such updates, however, legislation related to automated decision-making will not be effective. Nevertheless, it also depends on trust with other similar applications, e.g. if an autonomous vehicle from one company fails to incorporate new traffic rules on time, there could be a failure in traffic with different autonomous vehicles (whether updated and not). That failure could damage the trust of even well-maintained and frequently updated applications.

To sum up, many open questions remain to be discussed relating to legal-resource-dependent ontologies: technical, legal interpretation, validity of legislation, trust, and the other problems discussed above.

5.2.2 Improving the Legal Protection of Databases

Legal protection of databases is very dependent on jurisdiction. In the EU, databases are protected by the EU database directive, which was adopted more than 20 years ago. Since then, much has changed in the database domain. Our research has highlighted the problem that *sui generis* database rights may be transferred only by a contractual license. Mash-ups, clouds of data from open data, big data domains, and databases populated by crowd-sourced content machines will continue to present new challenges for legislators.

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II. Publications

List of Publications

Conference Publications

1. Mockus, M.: Open Government Data Licenses Framework for a Mash-up Model. In: IRIS 2014 Proceedings of the 17th International Legal Informatics Symposium. pp. 209–216. Österreichische Computer Gesellschaft. (2014).
2. Mockus, M., Palmirani, M.: Open Government Data Licensing Framework. In: K\Ho, A. and Francesconi, E. (eds.) Electronic Government and the Information Systems Perspective: 4th International Conference, EGOVIS 2015, Valencia, Spain, September 1-3, 2015, Proceedings. pp. 287–301. Springer International Publishing, Cham (2015).
3. Mockus, M.: OGD4M Ontology: Analysis of EU Member States National PSI Law. In Research and Practical Issues of Enterprise Information Systems: 10th IFIP WG 8.9 Working Conference, CONFENIS 2016, Vienna, Austria, December 13–14, 2016, Proceedings 10. pp. 59-73. Springer International Publishing. (2016).
4. Mockus, M., Palmirani, M: Legal Ontology for Open Government Data Mash-ups. CeDEM17 Proceedings: 978-3-902505-90-3 and JeDEM - eJournal of eDemocracy and Open Government (2017).*

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Contributions:

- Single author.
- Definitions and principles of open data and open government data, survey of the open government data global scenario, compatibility of *Creative Commons* licenses, example of formulization of license.

Award:

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Open Government Data Licenses Framework for a Mash-up Model

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Keywords: *open data, licensing of open data, linked open data, mash-up*

Abstract: *This article analyses the problems coming from the intellectual work on mash-up of open government data, defines and describes open data principles, investigates the licenses of open government data, proposes how to use the technology as a tool to manage the problems and to enrich basic legal principles used in the copyright of databases. As example, CC-BY v.4.0 licenses are analyzed.*

Introduction

Probably, the most significant results coming from open government data can be extracted if the data is merged, connected, combined, mixed or other ways enriched and analyzed, but there exist legal problems which do not allow to do it smoothly.

Open data licenses are not unified and that problem influences a deep analysis of open data licenses for every developer before starting to connect different datasets in a mash-up model. It is not clear what kind of the new license could be applied for mixed, new-value added datasets. The copyright laws are not designed to protect fluent development of the intellectual work on mash-up [1]. A legal protection of the datasets connected and enriched by AI tools is also a “grey area” of the legal framework.

The objective of this research is to analyze the legal framework of the most frequent licenses adopted in open government data global scenario and to create the theoretical model, which will be able to inspire an automatic or the semi-automatic computational model that could check the compatibility among different licenses. Moreover, the legal framework should be able to create basic legal principles for defining the new license of the new dataset result of the mash-up or of the significant updating.

The research started with the survey of definition and principles of open data, and continued with the survey about the licenses used by the different governments (the research was limited to N. America, S. America, Europe and Australia) around the world in their open data portals. The most used licenses were identified and are presented in the article. Those licenses were analyzed, critical questions were formulated: (1) Is it possible to find the model to compare the licenses in order to discover which could be in compliance with each other? (2) Which permissions are allowed in case of compatibility or in case of conflicts? (3) Which license the new dataset should have in case of mash-up of different datasets with different licenses? (4) How to define “derivative work” and what happens to the ownership of the dataset? (5) How to model the evolution of the dataset over the time under the license point of view and so indicate appropriately the different contributions from the several actors?

An informal logical analysis of norms of each top-used license is on the process and available results are presented in this article. In parallel, the licenses in the future will be analyzed from the different per-

spective of the actors involved in the open datasets ecosystem (e.g. producer, user, enricher, enabler, etc.), to detect critical issues and weaknesses.

The results presented in the article could be useful for the other researchers in the open data and the copyright law domain, also for the representatives of public administration to gain deeper understanding of the problem of the multiplicity of licenses of open data.

In this article the order of investigations is as follows. In Section 2, definitions and principles of open data and open government data are described. Section 3 presents results of a survey of the open government data global scenario. In Section 4, the most popular *Creative Commons* licenses are analyzed and results of the investigation of licenses compatibility are presented. Section 5 introduces the technology and represents the example of formulization of licenses. In Section 6, conclusions and prospects for the future are presented.

Definitions and principles

Open data definitions come from different sources. E.g. Wikipedia uses this definition: “Open data is the idea that certain data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control” [2]. This definition is very ambitious and represents the main idea about the freedom of data, but in real life it is more complicated. The Open Knowledge Foundation proposes the more realistic description: “Open data is data that can be freely used, reused and redistributed by anyone - subject only, at most, to the requirement to attribute and share-alike” [3]. This definition represents the legal united conditions e.g. attribute or share-alike which comes from the legal domain of open data and it is represented through licenses. The definition of open data contains these principles:

- 1) Availability and Access – the data in a convenient and modifiable form should be available and downloadable over the internet all the time;
- 2) Re-use and Redistribution - the data must be provided under the terms that permit reuse and redistribution including the intermixing with other datasets for free of charge (no levy, no closed paid format of the data);
- 3) Universal Participation – the conditions of use, re-use and redistribution of data should be not restricted and should be allowed for everyone for all the purposes (e.g. commercial re-use);
- 4) Interoperability – the data should be open to interoperate – or intermix – different datasets in terms of technical and legal conditions [3].

An open government data definition comes from the public sector information re-use definition in the EU. Directive 2003/98/EC implements a main principle: “Member States shall ensure that, where the re-use of documents held by public sector bodies is allowed, these documents shall be re-usable for commercial or non-commercial purposes”. The Directive 2003/98/EC defines re-use of the public sector information (PSI): “re-use means the use by persons or legal entities of documents held by public sector bodies, for commercial or non-commercial purposes other than the initial purpose within the public task for which the documents were produced”. The Directive 2003/98/EC started a process of sharing PSI with private bodies, but it started to develop differently from the main principle implemented by the Directive 2003/98/EC in the Member States, e.g. imposing taxes for using data of Real Property Register and Cadaster in Lithuania or even forbidding re-using and re-selling data to third parties [4]. Those cases had influenced the European Commission to review the Directive 2003/98/EC and the European Parliament has updated it by adopting new Directive 2013/37/EU in 2013. In the revised Directive the definition of PSI re-use comes closer to the open data definition, but there are still special issues which allow

charges for PSI re-use: (1) Minimal restriction to re-use (3p.); (2) Interoperability (20p.); (3) Machine-readable format: (21p.); (4) Open licenses (26p.).

To sum up, open government data in the EU could be defined as the public sector information offered paid or non-paid for a non-commercial and commercial re-use, available in a machine-readable format, interoperable, covered likely by open licenses or minimal restrictions to re-use it. On the other hand, a condition which defines that the paid information is released in proprietary standard and covered by a special license, is converse to the open data definition. From that point of view, not all PSI could be defined as the open government data, but only that which corresponds to the open data definition.

Moreover, this definition is still more theoretical, and in practice government data “as open data” is not widely available. This is because de facto Member States are still not using the updated version of the Directive. It should be implemented by 18 July 2015 and revised before 18 July 2018.

Open Government Data in the U.S. is defined as Federal Government’s, executive departments and agencies information, which is publicly available data structured in a way, that enables the data to be fully discoverable and usable by end users. Open Government Data consists of these principles: (1) **public**: all the data except that data which is not allowed to be published by law should be available; (2) **accessible**: machine readable, indexed, open, not proprietary formats; (3) **described**: all expected data for the re-user should be provided, e.g. how to process, limitations, security requirements; (4) **reusable**: no restrictions to re-use are guaranteed by open license; (5) **timely**: data should be released as quick as possible; (6) **managed post-release**: there should be an interacting service provided to respond to complaints [5]. The U.S. and EU open government data definitions are not consistent. The U.S. definition is closer to the open data definition than EU definition.

According to Tim Berners-Lee [6], it is not only important to open the data, but also it is necessary to connect the data with links creating linked open data (LOD). His explanation about the 5 stars scheme of open data development fulfills the presented open government data definition from a developers’ point of view: (1) available on the web (whatever format) but with an open license, to be open data; (2) available as machine-readable structured data (e.g. excel instead of an image scan of a table); (3) as (2) plus non-proprietary format (e.g. CSV instead of excel); (4) all the above plus use open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff; (5) all the above, plus link your data to other people’s data to provide context” [6].

The Open Knowledge Foundation suggests the following definition of open government data: “Data produced or commissioned by government or government controlled entities and it can be freely used, reused and redistributed by anyone”. The following benefits of open government data are expected: transparency, released social and commercial value, and development of Participatory Governance [7].

In conclusion, the definition of open government data is not united, it’s differently understandable in government institutions, different regions and among the open data app developers community. This situation determines different expectations from the developers of open data apps and the public bodies, and it creates pluralism in the legal framework of open government data and does not solve the legal problems coming from the mash-up of open government data.

Variety of open government data licenses

The primary target of this work is to investigate the legal framework of licensing of open government data by collecting and comparing the different licenses and analyzing the possibilities of the different license combinations.

During October and November 2013 selective analysis of the open data portals has been conducted. The following methodology was used: there were selected randomly 30-50 different datasheets found in the open government data portals and the type of the license, which protects the datasheet, was identified. It gives us the results that confirm that the following different kinds of licenses are used to protect open government data:

- 12) CC0 licenses are used by public administration institutions in Italy, The Netherlands and Uruguay;
- 13) CC-BY licenses are used by public administration institutions in Australia (CC BY 3.0 AU), Austria (CC BY 3.0 AT), Chile (CC BY 3.0 CL), Germany, Italy, Portugal (CC BY 3.0 PT), New Zealand (CC BY 3.0 NZ) and also by Bahía Blanca (Argentina) municipal (CC BY 2.5 AR);
- 14) CC-BY-SA licenses are used by public administration institutions in Brazil (CC BY-SA 3.0) and Greece (CC BY-SA 3.0 GR);
- 15) CC-BY-NC licenses are used by public administration institutions in Italy and Germany (CC BY-NC 2.0);
- 16) ODBL licenses are used by public administration institutions in Argentina, Brazil and Chile;
- 17) PDDL licenses are used by Bahía Blanca (Argentina) municipal, Costa Rican public administration institutions and Metropolitan Municipality of Lima;
- 18) Local licenses are used by public administration institutions in Brazil (not openly licensed), Belgium, Canada (Open Government License), France (Open License), Italy (IODL v1.0 , IODL v2.0), Germany, Norway (NLOD), Moldova, Spain, UK (OGL), Uruguay (Uruguay Open Data License), U.S and also by European Commission and Rotterdam (The Netherlands) municipality (Open license).
- 19) Without protection of license we found some datasheets in U.S. and Uruguay;
- 20) Licensing depends on the providers of datasheets in Brazil, Belgium, Chile, Italy, Germany, U.S., Uruguay and also in the municipality of Bahía Blanca (Argentina);
- 21) Only one single kind of license we found in Australia, Austria, Canada, Costa Rica, France, Greece, Moldova, New Zealand, Norway, Portugal, UK, Spain, municipality of Lima, municipality of Rotterdam and European Commission (legal notice).
- 22) Central government and municipalities use different kind of licenses in Argentina (e.g. government use ODBL, Bahía Blanca municipality use CC BY 2.5 AR and PDDL) and The Netherlands (government use CC0, Rotterdam municipality use local license).

The results of this survey require future investigation of comparison of licenses and the effect on datasets coming from different jurisdictions and different permissions to use data. These results show that open data principles are not usually respected, e.g. by covering datasheets by attributes “non-commercial use only”. The most popular licenses are coming from *Creative Commons*.

Creative commons licenses v. 4.0

The Creative Commons Corporation in the end of the year 2013 released the version 4.0 of the licenses. Those licenses incorporate *sui generis* database rights and are more adopted for the international use of licenses. This survey presents comparison of CC-BY v. 4.0 licenses by main terms. The CC-BY 4.0 license respects the open data principles mostly and CC-BY-NC-ND 4.0 license -the least. The survey basically confirms the same discoveries made by Morando [8] in the previous versions of the *Creative Commons* licenses, except the datasets/databases covered by CC-BY-ND 4.0 and CC-BY-NC-ND

4.0 licenses cannot be used in a mash-up of datasets/databases models, because no modification is allowed, including arrangement with additional datasets. The results of the survey are:

- 10) The licenses which restrict to use the licensed material for commercial purpose are CC-BY-NC 4.0, CC-BY-NC-SA 4.0 and CC-BY-NC-ND 4.0.
- 11) The licenses which allow reproducing and sharing the licensed material, as a whole or in part are CC-BY 4.0, CC-BY-SA 4.0, CC-BY-ND 4.0, CC-BY-NC 4.0, CC-BY-NC-SA 4.0, CC-BY-NC-ND 4.0.
- 12) The licenses which restrict to share adapted material (modification) are CC-BY-ND 4.0 and CC-BY-NC-ND 4.0.
- 13) The licenses which require that the same terms or conditions should be provided on the modification are CC-BY-SA 4.0 and CC-BY-NC-SA 4.0.
- 14) CC-BY 4.0 can be used for a mash-up with other licenses, except those which do not allow modifying: CC-BY-NC-ND 4.0 and CC-BY-ND 4.0.
- 15) CC-BY-SA 4.0 license requires same BY-SA terms for the modifications, which does not allow to set the extra terms as non-commercial or no modifications. CC-BY-SA 4.0 license is combined only with CC-BY 4.0 and CC-BY-SA 4.0 licenses.
- 16) CC-BY-ND 4.0 and CC-BY-NC-ND 4.0 licenses cannot be used for a mash-up with the other licenses because it does not allow modifications.
- 17) CC-BY-NC 4.0 license can be used for a mash-up with the other licenses which allow setting extra terms as non-commercial or it has it already: CC-BY 4.0, CC-BY-NC 4.0 and CC-BY-NC-SA 4.0.
- 18) CC-BY-NC-SA 4.0 license can be used for a mash-up with the other licenses which allow setting extra terms as non-commercial and no modifications or it has it already: CC-BY 4.0, CC-BY-NC 4.0 and CC-BY-NC-SA 4.0.

From the perspective of a mash-up of the different datasets/databases the survey shows that not all CC-BY v. 4.0 licenses are compatible. E.g. if content covered by the CC-BY 4.0 license is mixed with content covered by the CC-BY-NC-SA 4.0 license, the new content should respect all CC-BY-NC-SA 4.0 license conditions. On the other hand, we can find that general terms of the CC-BY v. 4.0 licenses require to use the same license conditions for taken original content and to identify that content. Basically, the new license for the mixed content provided in the example should be covered by the CC-BY-NC-SA 4.0 license plus datasets/database which were covered by the different licenses must be identified and the information about the conditions of the primary license to the identified concrete content must be provided.

How to make licenses more suitable for mash-up models?

We can find that theoretically it is not a problem to mix two CC-BY v.4.0 licenses, but when we look at the practical use of mash-up models, we can discover these problems:

- 1) According to CC-BY v.4.0 licenses' general terms, every dataset requires identification and link to the primal original license. E.g. if there is a new database which contains 100 datasets from 100 different sources, then there should be 100 links to the original licenses with concrete identification of taken datasets in the new license. Practically, the end-user hardly can read and understand the terms. If we focus on the smart technologies based on the semantic web, those datasets numbers could be "uncountable", which makes the terms of use not understandable for end-users, re-users, providers, (e.g. application creator) and related third parties (e.g. Apple Inc.).

- 2) It is easy to understand whether CC-BY v.4.0 licenses are combinable or not, however, it is hard to distinguish if the other kind of licenses, that are not produced by Creative Commons Corporation, but by the governments, NGO’s and etc., are combinable or not. The language barriers, the different law systems, and the different regulations could make the mash-up very difficult and costly.

There are already the answers on how to solve these problems. Gangadharan G.R. et al. [9] announced “representing license terms in a **machine interpretable way** is a first step towards resolving the intellectual rights in mash-ups”. Governatori G. et al. [10] describes the model how **formalizing** the licenses by deontic logic using two heuristics AND and OR could automatically generate a set of licenses. To sum up, **the technology as a tool could be used for solving problems raised by the legal framework.**

By following the idea of Governatori G. et al. [10], CC-BY v.4.0 licenses could be formalized in the informal logical analysis. The results of such analysis are represented further.

CC-BY v.4.0 licenses have the common (general) rules, which are applied to all the kind of the CC-BY v.4.0 licenses, and specific rules, which are applied to licenses differently. We could extract these general CC-BY v.4.0 rules in this example:

- 9) **IF** *You Share the Licensed Material OR Modification, AND IF is NOT requested by the Licensor to remove any of the information THEN* You must provide the identification of the creator(s) **AND** a copyright notice **AND** a notice that refers to Primary License **AND** a notice that refers to the disclaimer of warranties **AND** the URI or the hyperlink to the Licensed Material to the extent reasonably practicable.
- 10) **IF** *You Share the Modification THEN* you must indicate **AND** retain an indication of any previous modifications.
- 11) **IF** *You Share the Licensed Material THEN* you indicate the Licensed Material is licensed under Primary License, **AND** include the text of, or the URI or hyperlink to, Primary License.
- 12) **IF** *You Share the Licensed Material THEN* every recipient of the Licensed Material automatically receives an offer from the Licensor to exercise the Licensed Rights under the terms and conditions of the Primary License.
- 13) **IF** *You Share the Licensed Material THEN* You may **NOT** offer or impose any additional or different terms or conditions on, or apply any Effective Technological Measures to, the Licensed Material if doing so restricts exercise of the Licensed Rights by any recipient of the Licensed Material
- 14) **IF** *You fail to comply with the Primary License, THEN* your rights under the Primary License terminate automatically. This rule doesn’t apply: automatically as of the date the violation is cured, provided it is cured within 30 days of your discovery of the violation; or upon express reinstatement by the Licensor.

Specific CC-BY v.4.0 rules are presented in the table:

Specific CC-BY v.4.0 rules\Licenses	C-BY 4.0	C-BY-SA 4.0	C-BY-ND 4.0	C-BY-NC 4.0	C-BY-NC-SA 4.0	C-BY-NC-ND 4.0
Reproduce and Share the Licensed Material, in whole or in part for any purpose	X	X	X			

Reproduce and Share the Licensed Material, in whole or in part for non-commercial purpose	X	X	X	X	X	X
Produce, Reproduce, and Share the Adapted Material	X	X		X	X	
IF You Share the Modification THEN 1) The Adapter's License You apply must be the Creative Commons license with the same License Elements, this version or later, or the Primary License Compatible License, AND 2) You must include the text of, or the URI or hyper-link to, the Adapter's License You apply. You may satisfy this condition in any reasonable manner based on the medium, means, and context in which You Share the Adapted Material, AND 3) You may not offer or impose any additional or different terms or conditions on, or apply any Effective Technological Measures to the Adapted Material that restrict exercise of the rights granted under the Adapter's License You apply.		X			X	

Table 1: Comparison of CC-BY v. 4.0 licenses by informal logical analysis of norms

After the deeper formalization of rules, the enrichment of semantics, and the involvement of the more and more kinds of licenses, transformation of licenses to the machine readable format, e.g. XML, the idea of the automated license terms operation by the multi-agents could be materialized. Scholars are working already by trying to solve these issues: G. Governatori, A. Rotolo, S. Villata and F. Gandon [11-12] are developing a very preliminary copyright ontology, Deontic Logic Semantics in open data licensing; Palmirani [13-16] is an expert of legal XML, LegalRuleML and is working on open data projects and already demonstrated in different papers how to use LegalRuleML for modeling rules of legal documents. Either, the related project "ENGAGE" is funded by the EU [17].

Conclusion and Perspectives for the Future

The creation of the European digital single market without language barriers, high expectation in economic value of the re-use of public sector information in Europe, and practical situation of open data domain dealing with problems coming from mash-ups, forces us to look for more **innovative** adaptation of the legal framework that is coming from the copyright and *sui generis* database rights which are used to ensure protection of creators' rights, innovation and economic growth.

The process of licensing of open government data shows that the open data principles are not respected enough and extra terms in licenses are included. The preliminary investigation shows that the most popular licenses are *Creative Commons* licenses in the global scenario of open government data, but not all CC-BY licenses are combinable together.

Making licenses understandable and compatible to machines, by which, as technology, datasets/databases are used, could help to solve the problems. Formalization of the rules in machine understandable and compatible language could set the requirement to use the technologies designed to respect the rules. On the other hand, this could energize the open data domain, because of the savings on investigation time and the costs for creating the mash-ups.

The future work could be to investigate the change of open government data's legal framework global scenario, to look for alternative ways of using technology to solve the problems, to enrich proposed technology by formulization of more popular licenses, developing of computational ontology, creating the theoretical model and legal principles for the mash-up of open government data.

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Contributions:

- Principal author.
- Chapters written by Martynas Mockus: Introduction to the problem, the survey of the licensing of open government data, analysis of the licenses for a datasets mash-up scenario, European case analysis(Lithuania and the United Kingdom), conclusions and future work, Annex A, Annex B.

Open Government Data Licensing Framework

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Abstract. The purpose is to analyze the licensing of Open Government Data (OGD). The problem is that different regimes of regulation of OGD in Europe create extra barriers for re-using OGD. The survey investigated OGD portals around the world and found out which different regulation regimes are applied on datasets and what the most popular licenses are. Compatibility of the leading licenses and legal notices and case analysis of Italy, Lithuania and UK is presented. This paper is organized: 1) definitions, principles and methodology; 2) results of a survey of the licensing of OGD; 3) analysis of the licenses; 4) case analysis; 5) conclusions and future work.

Keywords: Open Government Data · Licensing of Open Data · Creative Commons License · Copyright of Databases · Sui Generis Database Right · Public Domain

Introduction to the Problem

Since 2009 Open data domain was under the scope of scientists: more than 34,000 of the papers have been published and over 2,200 explicitly focused on *Open Government Data* [1]. But still there are lacks of investigations which focus to the legal side of opening the government data. According to the *Open Data* (OD) community opinion there is not much to discuss about: just “give us the data with an open license” and you will get the first star of five [2, 3]. But this investigation shows that it is not so simple task for the public administration institutions to deal with the legal issues of the open government data concerning the licensing. A lot of the *Open Government Data* (OGD) which is published in the governmental *Open Data* portals does not fulfill the requirements classified by the OD community as the simplest first step (the first star). Several definitions are used in this paper: for favoring the reader they are included in the Annex A below.

1.1 Principles

Analysis of the OD principles provided by Open data community, shows that freely reuse of data is necessary for open data idea.

The Universal Participation principle declares that everyone must be able to use, reuse and redistribute - there should be no discrimination against fields of endeavor or against persons or groups. For example, ‘non-commercial’ restrictions that would prevent ‘commercial’ use, or restrictions of use for the certain purposes (e.g. only in education), are not allowed [8].

The Open Knowledge Foundation suggests the following definition of the open government data: “Data produced or commissioned by government or government controlled entities and it can be freely used, reused and redistributed by anyone” [9].

Why freely reuse is so important? Reuse is one of the pillars of the interoperability and for producing a digital society ecosystem. It is so true that the Directive 2003/98/EC introduced first the concept of the re-use rather than concept of open data. Secondly, the Linked Open Data (LOD) provided a technical framework for supporting the re-use and stressed the freely re-use concept. This characteristic is funda-

mental for implementing the digital economy. The answer comes from the LOD domain. If there are no legal limitations to connect the datasets, then the LOD principles are satisfied. The LOD first step or first star requires the open license [3].

1.2 Goal, Research Questions and Methodology

Do governments respect the OD principles, or not? What are the tendencies? If not respects, then why? Those questions are too difficult to answer by doing analysis of few countries because the results could be misleading. Data cannot be stopped by borders, so the answers could be found only by the survey of the global OGD domain. The main goal of the Survey is to present the state of art of the current OGD licensing situation. In the paper we address several fundamental questions: does the OGD need legal protection; if so, what kind of licenses should be used; does the CC0 license fulfil the EU regulation? The OD community requires fewer barriers for re-using OD, so should the license be used?

The methodology was to check the legal protection status (license/no license/legal notice) of the datasets provided in the ODG national portals listed in the Annex B below. Because of lack of resources it was not possible to identify the all OGD in every country, so only the key OGD portals have been chosen. The criterions of choosing the portal were those: it should be presented by official public institution as the main OGD portal of the country or the federal state, also OGD portal held by European Commission. Land, state, municipality or other portals held by private and public initiatives were out of a scope of the investigation.

During the survey the condition of the datasets or the links to the datasets was not checked, only metadata was collected. In all cases there were datasets containers (collections of datasets) identified as the singular datasets. All information from the portals was taken as-is. Overall the information of the 435,682 datasets were classified and investigated.

In the absence of specific licenses, we have identified all the legal notices about the obligations, the limitations, the liability, the privacy rules, etc. published on the web in order to understand whether these fragmented legal regulations can fully replace the license instruments. The survey is a representation of the penetration of the license culture in the OGD and also underlines the misuse of the license instrument, which is often adopted as an *admission* rather than a *contract*, especially in the EU. Second, we investigated the principles coming from the OD domain and how they comply with re-use of PSI, copyright law and administrative law principles in the EU-level domain. We also evaluate the impact of the PSI and related licenses on a mashup scenario, presenting a comparative table concerning the compatibility of licenses with the main PSI and OD principles. Thirdly, we have analyzed case studies from Italy, Lithuania and the UK in an effort to model whether it is possible to release OGD without a license, with a CC0 license, with other CC licenses and the like with respect to principles originating from the corresponding jurisdiction and to detect are the OGD of these countries is ready for mash-up in the global OGD domain.

2 The Survey of the Licensing of Open Government Data

In January of 2015 the survey of the licensing of the OGD has been done. The goal of the survey was to collect state-of-art of licenses used in OGD portals to cover datasets.

During the first part of the survey it was checked in the OGD portals: 1) are there datasets covered by any license; 2) if a dataset is not covered by a license, are there any legal notice, conditions for re-use

applied to the dataset; 3) are there datasets without the license, or information about the license is not provided.

The results of the first part of the survey are those: a) 56% of all datasets from the investigated portals are covered by the license; b) 17% of all datasets are not covered by the license, or information about the license in the OGD portal is not provided, or there is any other conditions set of re-use of dataset or is license-free; c) 27% of all datasets are covered by legal notice in the portal or in the metadata of the dataset or indicated as legal notice. The legal notice is used in OGD portals of European Union (EU) (100%), Moldova (100%), Spain (11%), US Federal datasets (100%), other US datasets (0,3%) and Germany (only 3 datasets).

The second part of the survey is dedicated to multiplicity of the licenses in the global OGD phenomena. The varieties of the licenses were checked and the most popular licenses were identified. The licenses provided by the national authorities and applied only locally are named *local licenses* and it does not include *Creative Commons* localized licenses.

The results are these: 1) the most popular from the licenses are local licenses which covers 90% licensed datasets (e.g. Open Government License – Canada, License Ouverte, Open Government License (UK), Non-Open Government License (UK), Data license Germany – attribution – version 1.0 and 2.0, Italian Open Data License 2.0 and 1.0, NLOD, Uruguay Open Data License); 2) the second most popular (6%) from the licenses are CC-BY licenses, including localizations (e.g. CC BY 3.0 AU, CC BY 3.0 NZ, CC BY 3.0 AT, CC BY 3.0 CL, CC BY 3.0 GR and etc.); 3) the third most popular (2%) are licenses waiving copyrights to public domain CC0 and Open Data Commons *Public Domain Dedication and License* (PDDL); 4) all other licenses covers only 2% of the datasets. That 2% pie of the other licenses is divided: Open Data Commons Open Database License (ODbL) (45%), CC BY-NC (noncommercial) including versions and localizations (38%), CC BY-SA (attribution, share alike) including versions and localizations (10%), Open Data Commons Attribution (3%), GPL (2%), Against DRM (1%), CC BY-ND (no derivative works) (1%), CC BY-NC-ND (attribution, noncommercial, no derivative works), CC BY-NC-SA (attribution, noncommercial, share alike), *GNU Free Documentation License* (GFDL).

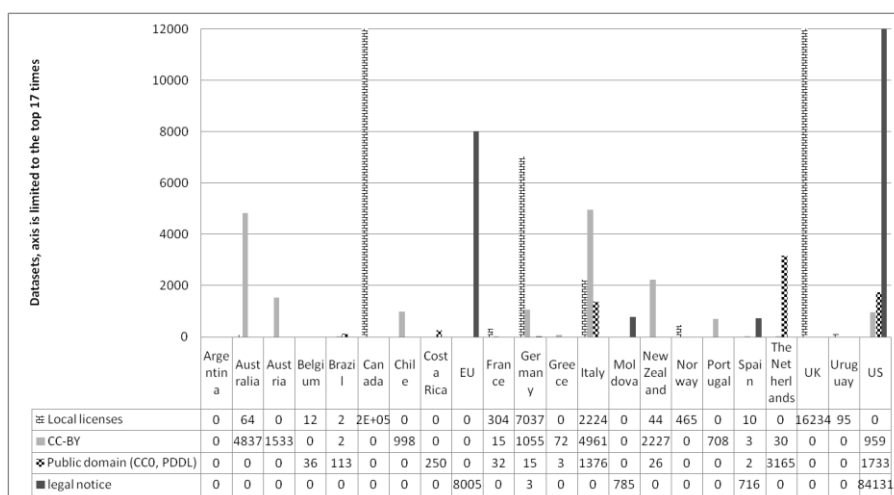


Fig. 9. This figure shows the most popular licenses and legal notices used in different countries.

Finally, the survey has discovered that in the global licensing scenario the incredibly huge part of the licenses are ruled by the local licenses. Only 17% of datasets are covered not by the license or the legal notice. Taking to the account that still there is developing stage of the OGD portals and ODG domain, the numbers should change in the coming future. The second important discovery is that CC-BY license is becoming more and more important and is understandable as a standard in the global OGD scenario. From Creative Commons copyright licenses CC-BY has least restrictions to re-use the dataset and is classified as the open license. The third discovery shows, that such countries as The Netherlands, U.S., Italy, Costa Rica, Brazil, Belgium, New Zealand, France, Germany, Greece and Spain release the datasets to the public domain. Last but not least, 27% of the investigated datasets is “covered” by the legal notices. This is emerging question: how to attach the legal requirements to the dataset in the LOD domain.

3 Analysis of the Licenses for the Datasets Mash-up Scenario

In the datasets mash-up scenario when two different datasets meet, analysis of licenses (or legal regimes applied to datasets) compatibility is needed. No need for it only if dataset is not covered by any license or legal notice or is covered by the license dedicated to the public domain, because these datasets are compatible with any dataset covered by the license.

The survey of the licensing of the OGD showed us 6 most popular legal regimes of the datasets. Compatibility of these licenses and legal notices are shown in a Table 1²⁹.

The results are joyful because the most datasets from the investigated OGD portals are compatible because of the correct license regime.

The only problem is to ensure the attribution requirements, which basically are statements about the source of the resource and links to the licenses.

Table 34. Top licenses comparison for mashup model

²⁹ Table 1 must be read from in this manner: licenses in horizontal line meet licenses in a vertical line, and the result represents conclusion of the requirements of mash-up of datasets protected by those two licenses.

License	Open Government Licence – Canada 2.0.	DATA.GOV Data Policy Statements	Licence Ouverte	Open Government Licence v3.0 (UK)	Legal notice (EU)	CC-BY 4.0.
Open Government Licence – Canada 2.0.	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
DATA.GOV Data Policy Statements	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
Licence Ouverte	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
Open Government Licence v3.0 (UK)	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution
Legal notice (EU)	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition	Yes, Attribution, Condition
CC-BY 4.0.	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution	Yes, Attribution, Condition	Yes, Attribution

On other hand datasets is not only important by quantity but also by quality. Still there are a lot of datasets which are covered by other licenses. Example of Creative commons licenses compatibility is shown in a Table 2³⁰.

In the table 1 is shown that not CC licenses are compatible, that means not compatible licenses is a barrier for LOD. Datasets covered by not compatible licenses are “out of the cloud of data” in OGD domain and will not create any value in mash-ups of the datasets. Contract type licenses also are a big barrier for LOD.

Table 35. Creative commons licenses comparison for mashup model

³⁰ Table 2 must be read from in this manner: licenses in horizontal line meet licenses in a vertical line, and the result represents conclusion of the requirements of mash-up of datasets protected by those two licenses. Conclusions about mashup possibility is dedicated to the licenses in a horizontal line.

License	CC-BY 4.0	CC-BY-SA 4.0	CC-BY-ND 4.0	CC-BY-NC 4.0	CC-BY-NC-SA 4.0	CC-BY-NC-ND 4.0	Conclusions
CC-BY 4.0	YES	YES, BY-SA terms	NO	YES, Non-commercial	YES, Non-commercial, BY-SA terms	NO	CC-BY 4.0 can be used for mashup with other licenses, except those which doesn't allow to modify
CC-BY-SA 4.0	YES, BY-SA terms	YES	NO	NO	NO	NO	CC-BY-SA 4.0 license requires same BY-SA terms for modifications, which doesn't allow to set extra terms as non-commercial or no modifications.
CC-BY-ND 4.0	NO	NO	NO	NO	NO	NO	CC-BY-ND 4.0 license can't be used for mashup with other licenses because it doesn't allow modifications
CC-BY-NC 4.0	YES, Non-commercial	NO	NO	YES	YES	NO	CC-BY-NC 4.0 license can be used for mashup with other licenses which allow to set extra terms as non-commercial
CC-BY-NC-SA 4.0	YES, Non-commercial, BY-SA terms	NO	NO	YES, Non-commercial, BY-SA terms	YES	NO	CC-BY-NC-SA 4.0 license can be used for mashup with other licenses which allow to set extra terms as non-commercial or no modifications.
CC-BY-NC-ND 4.0	NO	NO	NO	NO	NO	NO	CC-BY-NC-ND 4.0 license can't be used for mashup with other licenses because it doesn't allow modifications

Only when the contracts made by software agents will be recognized in PSI re-use domain, then the barrier disappears. Otherwise closed platforms as a pools of datasets could be used in specific re-use of PSI projects (e.g. in medicine, where sensual personal data is held and the identification and contracts are needed), or such platforms as ENGAGE [10] could be upgraded to solve contract problems by unifying them.

One of the biggest problems in mash-up scenario is legal notes, which are not unified, does not have common structure. Sometimes it is a document (e.g. EU legal notice), sometimes it is only one sentence (Spain, U.S. datasets) or just a note that legal note is applied (without a reference to that note). Those legal notes usually are placed separately from metadata of the dataset, it means that automatic process of connecting legal notes with dataset is very complicated; lifecycle of legal notes in mash-up scenario of datasets is hardly realizable.³¹

³¹ E.g. In u.s.gov portal there are 350 datasets covered by legal note which provide conditions of re-use: „The Minnesota Department of Natural Resources makes no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Department of Natural Resources assumes no responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.“

To sum up, the most used licenses and unified legal notes to protect OGD are compatible in global scenario. Some licenses (e.g. CC-BY-NC-ND) are not compatible in mash-up scenario. Still there exists a reasonable amount of datasets, especially in Spain, which are covered by not unified legal notes and such legal regime of legal protection of dataset is not suitable for lifecycle of dataset legal regulation.

4 European Case Analysis

4.1 Italy

OGD regulation

The Italian Open Government Data Legislation support Public Administrations to release open dataset at national, regional and local levels. The Italian process of open data is quite good at regional (22 bodies) and local level (62 bodies), less important at the ministerial side (26 bodies)³². The legal framework of the OGD is composed by several different Acts. The fundamental important pillars are: the legislative decree n. 82/2005 *Digital Administration Code* and modifications, the implementation of the Directive 2003/98/EU with the legislative decree n. 69/2009 and the legislative decree n. 33/2013, the *Transparency Act* [11][183][186][186][185][185][184][183][182][182][181][231][231][231][231]. The d.lgs. n. 82/2005 defines the Open Government Data modality, but there are two levels for releasing data: a) to release data using only a technical requirement using open formats (e.g., XML, CSV, etc.); b) to implement open data paradigm including licenses, reuse without commercial limitations, processes of production of the datasets, quality check. The d.lgs. n. 69/2009 provides the definition of public administration document and the modality and practical means for the public administration that permits the release of documents in open format. In d.lgs. n. 33/2013 we can read a long list of public documents that must be published in digital format in a specific part of the official web site of the public administration, following a strict hierarchical web site tree, but not mandatory in Open Data. The framework is sufficient for implementing a concrete plan of OGD, however the legal scenario is confusing and contradicting.

The Transparency Act is mandatory for each public administration and the prescription is stronger rather than the *Digital Administration Code*. It obliges to release a relevant number of documents/datasets, but limited to cope with the transparency finality (e.g., grant, budget, funds, accountability, performance), limited on time (after three years it is mandatory to move these data in another part of the web site for the *right to be forgotten*) and without any requirement about licenses. So the document/data are released in open format (e.g., XML), but the ownership and the control of the dataset/documents are in the hand of the public administration that can decide to remove all the information from the publication portal in any moment. The *Digital Administration Code* includes wider principles of open data paradigm including the economic benefits produced on the society, the improvement of the quality of life of the citizenships, the effectiveness of the services of the public administration in the governance of the territory. However it imposes to compliance more strict the rules about the privacy related to the *Italian Personal Data Protection Code* (d.lgs. 196/2003 and the connected Guidelines³³) and so the public administration can (not must) publish a large variety of data (not limited to the accountability matter) using the *Digital Administration Code* rules, but only anonymized. This double track is creating a confuse situation in the public administration about the licenses: the web site of the *Transparency Act* should usually apply *non-open data license* considering that we have sometime per-

³² <http://www.dati.gov.it/content/infografica> data related to February 2015.

³³ <http://www.garanteprivacy.it/web/guest/home/docweb/-/docweb-display/docweb/3134436>

sonal data included in the documents (e.g., payments, salaries, grants) and the Open Data portal must publish only using open data licenses. The risk is to have the same data/document released in different format (anonymized and not anonymized) with two different licenses (e.g., funds for natural disasters).

OGD Licensing Review

The Italian situation about the open data licenses is promising [12]. Since the 2010 Formez (the government agency for the public administration training and learning programmers) defined the IODL 1.0 (the Italian Open Data License). It is similar to a *cc-by-sa*, it imposes the same license for the derived works. In the 2012 Formez released the IODL 2.0 that removes *the Share Alike* clause. The current situation of the licenses in the open data portals in Italy is the following: the most adopted license by the public administration is the IODL, but in term of number of datasets the *cc-by* is the larger collection. This variety of licenses criteria creates the problem how to combine them in order to reuse different large datasets coming from different heterogeneous sources.

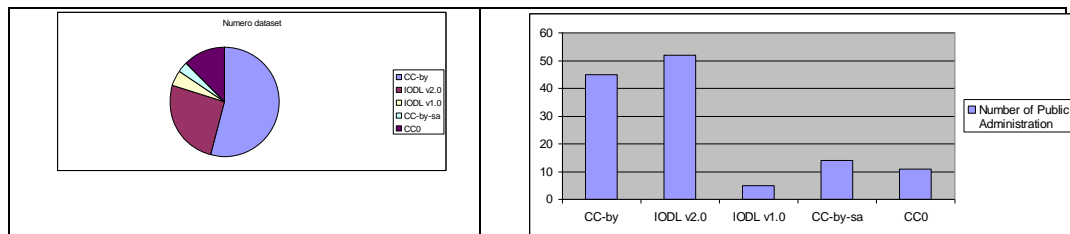


Fig. 10. Table of the statistics concerning the Italian licenses used in open data portals.³⁴

One of the most used license is the CC0 especially by the technical experts because it resolves the problem of the mash-up of dataset easily. However the CC0 is a waive license and the owner of the dataset frequently is the public administration. Following the public law the owner is the State or the local administration and for this reason the employer does not have the power to waive the rights of the IPR in favour of the community. The art. 10 and 53 of the *Cultural Heritage Code* d.lgs., 22 January 2004, n. 42, define the dataset and moreover the digital document as “digital patrimony” of the State and it is inalienable. For this reason is not appropriate to use CC0 for the OGD.

OGD Italian Portal

The data.gov.it portal is the national portal of open data and it hosts all the national, regional, local datasets in a unique central catalogue. We have more than 1,400 dataset and the most used format is CSV, JSON, XML. The license more used is *cc-by* with 6,527 dataset. The portal permits also to integrate the local open data portal using API in order to share the data and so to build the national catalogue in CKAN.³⁵

³⁴Dataset of data.gov.it visited February 2015.

³⁵ <http://www.dati.gov.it/content/ckan-datigovit>

4.2 Lithuania

OGD Regulation

Public sector information which could be provided for re-use is regulated by the Law on Management of State Information Resources. In Article 10 Section 1 part 8 describes important principle for re-use of PSI: *openness of the information resources, which means that favorable conditions for natural and legal persons are created for re-use of information managed by the institutions when carrying out statutory functions independently of the natural and legal persons legitimate operating objectives and legal form thereof*. In the Article 30 Section 3 it is noted, that information from state information systems shall prepared for PSI re-use.

The law divides PSI suitable for reuse by 3 parts: 1. data from state registers; 2. Data from state information systems; 3. Other PSI.

Article 26 Section 5 introduces obligations to re-users of data of state registers: *the recipient may not change the data obtained from the registry and the registry information and must indicate the data source when using them*. This obligation means that CC BY-ND 4.0 or similar local license covers data from state registers. Also, by the default information is provided for a charge, *except for the exceptions provided in this law and other laws of the Republic of Lithuania, European Union legal acts and the register's regulations* (Article 29).

Data from state information systems is provided free of charge. Article 35 section 5 sets same requirements as for data of registers: *the data obtained from an institution may not be changed and their source must identified when using the data*.

The conditions of re-use other PSI is not regulated by the law, but regarding openness principle, should be open without any restriction to use it, except if there are special requirements set by other law.

Requirement of the *contract* but not the license come from Article 37 section 3: “When information files containing information managed by the institution that is important for the entire state or several institutions are published on the institution's website and the Republic of Lithuania laws and (or) other legal acts provide for special conditions of the use of such information, the institution shall establish electronic authorization, which includes the terms of use of such information files that must be followed. Such information files shall be provided to persons after their electronically expressed consent with the terms of the electronic authorization.”

Data providers must put legal notice according to the Article 37 section 1: “The institution shall disclose on its website the information about its managed information, terms and conditions for the use of this information. In cases when pursuant to the laws of the Republic of Lithuania and other legal acts institution shall not continue to process, update, provide or publish its managed information, it shall announce about the aforementioned on its website no later than two months in advance.”

Table 36. Requirements to OGD coming from Law on Management of State Information Resources

Type of PSI	Requirement for electronic authorisation	Information is paid or free of charge	Free to adapt or NoDerivatives	Source must identified?
State registers	Yes	Paid, some exceptions	May not change the data	Yes
State information systems	Yes	Free of charge, some exceptions	May not change the data	Yes
Other PSI	No	Free of charge	Free to adapt	In general "no", except when the law requires "yes"

To conclude, OGD can come only from not important states information sources. The most valuable data from state registers and information systems is locked by "electronic authorization" and "click contract" (basically its electronic contract, not a license), re-user has obligation not change the data. Data of state registers is by default provided for a charge; exception can be made by law.

OGD Licensing Review

OGD without a license could be released, but there should be legal notice provided. Otherwise, there is a risk that copyright law can be applied automatically.

Copyright law does not cover legal acts, bills, drafts, official translations of law, administrative documents, official symbols and signs, and separate data (Article 5 of Law on Copyright and Related Rights). Therefore, CC0 or other public domain license could be applied only to datasets, which carry data not protected by copyright and not taken from state register or information system (e.g. legal acts register). Other OGD could be covered by CC-BY license, free of charge information from state registers and information systems could be covered by a contract similar to CC BY-ND. There is no law which forbids re-using PSI for commercial purpose. The draft of local license (by restrictions equal to CC-BY) was developed in 2013, but has been never adopted. To sum up, in Lithuania OGD development is a very politically related, most valuable government data has requirement of the re-use contract, cannot be modified, not valuable government data can be re-used freely without restrictions. Public domain license can be applied very rare only cases.

OGD Portal and Other Initiatives

The central OGD portal (<http://opendata.gov.lt>) actually is not designed as the OGD portal attractive for re-users but as a list of the PSI resources (implements only formally the Article 9 of PSI directive). The portal provides information only in a local language, and consists of 263 links to the data providers of the public data resources available for re-use. There also exist some institutional initiatives, e.g. the Ministry of Economy lead by pro-western politicians started the first in the country OGD portal (<http://data.ukmin.lt/duomenys.html>) but after 2012 the data is not updated (at that moment was set the new minister representative of Lithuanian Social Democrats Party, which roots comes from ex-communist party). Other initiatives are coming from the NGO's (e.g. „Transparency International“ Lithuania collects from the government information about mass media owners and provides it in the open datasets) and private sector (e.g. datasets on CKAN data management system is developed by private person <http://atviriduomenys.lt/dataset>; popular the OGD visualization project <http://freedata.lt/>).

4.3 United Kingdom

OGD Regulation

The main act concerning OGD is Protection of Freedoms Act 2012, which has updated Freedom of Information Act 2000. Also important acts are: the Re-use of Public Sector Information Regulations 2005 Act, the Copyright and Rights in Databases Regulations 1997, the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulations 1996. Freedom of Information Act 2000 regulates right of access to information held by public authorities. The Re-use of Public Sector Information Regulations 2005 Act (PSI Act) implements PSI directive. PSI Act 5(b) establish important exclusion when PSI may not be provided: public information for re-use may not provide if a third party owns: (a) copyright (within the meaning of section 1 of the Copyright, Designs and Patents Act 1988), (b) database right (within the meaning of regulation 13 of the Copyright and Rights in Database Regulations 1997), (c) publication right (within the meaning of regulation 16 of the Copyright and Related Rights Regulations 1996), and (d) rights in performances (meaning the rights conferred by Part 2 of the Copyright, Designs and Patents Act 1988). This exclusion shows, that OGD in the most cases will not have related to intellectual property rights (IPR) included material, otherwise IPR holder must give permission for re-use.

Protection of Freedoms Act 2012 (FA) has updated Freedom of Information Act 2000 and is designed for OGD. FA defines dataset in Part 6 Sec 102 Sub 2(c): “means information comprising a collection of information held in electronic form where all or most of the information in the collection (a) has been obtained or recorded for the purpose of providing a public authority with information in connection with the provision of a service by the authority or the carrying out of any other function of the authority, (b) is factual information which (i) is not the product of analysis or interpretation other than calculation, and (ii) is not an official statistic, and (c) remains presented in a way that (except for the purpose of forming part of the collection) has not been organized, adapted or otherwise materially altered since it was obtained or recorded.”

FA Part 6 Sec 102 Sub 3 describes how datasets containing copyright works should be released: “When communicating the relevant copyright work to the applicant, the public authority must make the relevant copyright work available for re-use by the applicant in accordance with the terms of the specified licence.”

In UK exists also unique Crown Copyright. It is applied to works made by “an officer of the Crown, this includes items such as legislation and documents and reports produced by government bodies. Crown Copyright will last for a period of 125 years from the end of the calendar year in which the work was made. If the work was commercially published within 75 years of the end of the calendar year in which it was made, Crown copyright will last for 50 years from the end of the calendar year in which it was published. Parliamentary Copyright will apply to work that is made by or under the direction or control of the House of Commons or the House of Lords and will last until 50 years from the end of the calendar year in which the work was made” [13]. OGD release also depends from the Data Protection Act 1998, the Freedom of Information (Scotland) Act 2002, the Environmental Information Regulations 2004 and the Environmental Information (Scotland) Regulations 2004. Further information concerning OGD could be found in UK Government Licensing Framework [14].

OGD Licensing Review

There exist 3 types of OGD licenses: the Open Government Licence, the Non-Commercial Government Licence and the Charged Licence. The first license is open license, second – applies limitation for commercial re-use and third is applied for information which is charged by Public body. Open Government Licence v3.0 (UK) satisfies open license criteria and is suitable for LOD domain. According to this, the movement to current versions of Creative Commons license is hardly likely. In 2018 there is planned to revise PSI directive; if decision to have one license in EU will be agreed, there could be changes. Realize of licenses dedicated to public domain or without a license is possible only to those datasets which do not have copyrighted materials or copyright and database rights have expired. E.g., this year Crown copyright is expired to works made until 1890, but taking to account that digitalized copy of work or adaptation of work suitable for OGD dataset also could be protected by Crown copyright, digital copies of works made until 1890 still can be protected by Crown copyright. To conclude, the release of OGD without a license or with public domain license without changing the regulation in this century is not likely.

OGD Portal

At 9th of January 2015 the OGD portal (<http://data.gov.uk/>) consist of 16234 datasets, 11679 datasets were covered by Open Government Licence v3.0 (UK) and 4555 datasets were covered by Non-Open Government Licence. Also there were 4074 unpublished datasets, which metadata is available in a portal and the reasons of not-publishing are provided. The OGD portal provides more than 350 apps from which the most popular is called Scope Nights: Astronomy Weather Reports.

5 Conclusions and Future work

The survey underlines some important findings: i) the majority of the OGD does not fulfil the OD principle of freely re-use of data, but mostly the limitation of re-use ends only with an attribution requirement and the link to the license/ legal notice; ii) the legal notices fragment the legal protection on different parts of the web site containing OD without any prospect of re-use; iii) there is the risk that datasets covered without a license in an EU jurisdiction could be automatically protected by the U.S. copyright; iv) the legal requirements in the different jurisdictions preclude the use of a singular license or contribute to an aversion to the use of the license altogether; v) the CC licenses are used as brands for communicating an attitude and philosophy rather than a real legal permission or an obligation framework; vi) the OGD licenses not always comply with PSI re-use policy, e.g. there are restrictions for commercial re-use; vii) in the global phenomena the most OGD datasets are covered by the licenses which are ready for the mash-up scenario, but in a country level the results could be different.

The regulation of the OGD depends of the national intellectual property, the public law and the database copyright regulation. The CC0 license could be used more as an exception in rare cases, than a rule in investigated EU member countries. The most U.S. federal datasets are in the public domain, but still the U.S. OGD portal sets the attribution requirement in the legal notice. In the EU the most cases copyright is applied automatically to the works without making a notice about copyright or registration. Differently in US, works are protected after making the notice that is copyright work and registration for the extension to copyright term is required.

The interoperability among datasets is fundamental for the economical exploitation of the OD and for developing an inclusive society. Only a good license framework of the OGD can assure legal protection in long-term and guarantee the end-user in the chain of the re-use (e.g. re-use of re-use, derivative works,

etc.). In a future, development of the ontology of the global regulation of the OGD domain is required. It could be used as a tool for automatic or semiautomatic mash-up of the licensed and not licensed open government data.

Annex A - Definitions

In this paper the term *Open Government Data* is used for identifying the complex phenomena where the data coming from the government and related bodies (the federal or the state public administration, the region administration, the municipalities, the state enterprises, the police and etc.) are published in open format and with a license in favor of the reuse. In some cases the OGD datasets can include also the copyright works belonging to the private or the public sector.

In the European Union the OGD is coming from the PSI directive 2003/98/EC (updated in 2013, 2013/37/EU) which is known as a re-use of public sector information (PSI) concept implementation. The OGD can be understood as PSI ready for re-use according to the Directive (Art.2 Para4.: “re-use’ means the use by persons or legal entities of documents held by public sector bodies, for commercial or non-commercial purposes other than the initial purpose within the public task for which the documents were produced” [4]). In the US the OGD is coming from the President Obama’s initiative [5] and known as *Open Data* for improving participation, transparency and cooperation between citizens and public administrations.

The OGD is as a part of the OD. The other parts of the OD can be identified as the OD coming from private business sector³⁶, NGO’s³⁷ and private citizens initiatives³⁸.

What is an *open licence* is analyzed by *The Open Knowledge Foundation*. One of the conditions of the open license is propagation: the rights attached to the work must apply to all to whom it is redistributed without the need to agree to any additional legal terms [2].

The EU *legal notice* is not a license, but has some attributes of the license, e.g. sets requirements of re-use the data. The requirements are explained in the Commission decision of 12 December 2011 on the reuse of Commission documents 2011/833/EU Article 6 Section 2. All requirements satisfy the propagation criteria except one: the obligation *not to distort the original meaning or message of the documents*. This obligation asks to agree an additional legal terms and is a place of wide interpretation in a datasets mash-up scenario. On other hand, 18 July 2015 is the date when Directive 2013/37/EU should be implemented. It supports the open license (recital N. 26) and hopefully irrelevant requirement from the Commission decision 2011/833/EU will be removed.

In the paper the *Creative Commons* (CC) [6] licenses are widely used. CC0 is a license dedicated to public domain. CC-By allows re-distribution and re-use of a licensed work on the condition that the creator is appropriately credited. CC-SA is a license which has the least restrictions to re-use the original creation. There are different versions of CC-SA and localizations adapted to each country law and lan-

³⁶ E.g. *JC Decaux*, Open data, <https://developer.jcdecaux.com/#/opendata/vls?page=static>, last accessed 15.12.2014 (2013).

³⁷ E.g. „*Transparency International*“ *Lithuanian branch*, Open data of mass media owners, <http://stirna.info/pages/apie>, last accessed 15.12.2014 (2013).

³⁸ E.g. *Zimnickas, Zemlys, Kilikevičius*, Open dataset of Lithuanian Parliament 2012 election results, https://www.google.com/fusiontables/data?docid=1vOawBGzp_0c-8jiKTyY5sJ8MjiWM8sBlbYoAo6s#rows:id=1 last accessed 15.12.2014 (2012).

guage. Further information concerning definitions of the CC licenses family are available in the creative common web site and in a previous work [7].

Annex B – Web site analyzed for the survey

Argentina (<http://datospublicos.gob.ar>), Australia (<http://data.gov.au/dataset>), Austria (<https://www.data.gv.at/katalog/>), Belgium (<http://data.belgium.be>), Brazil (<http://dados.gov.br>), Canada (<http://open.canada.ca/data/en/dataset>), Chile (<http://datos.gob.cl/datasets>), Costa Rica (<http://datosabiertos.gob.go.cr/home/>), EU (<https://open-data.europa.eu/en/data/>), France (<https://www.data.gouv.fr/en/>), Germany (<https://www.govdata.de>), Greece (<http://data.gov.gr>), Italy (<http://www.dati.gov.it/catalog/dataset>), Moldova (<http://date.gov.md/en/terms-and-conditions>), New Zealand (<https://data.govt.nz/catalog/>), Norway (<http://data.norge.no/>), Portugal (<http://www.dados.gov.pt>), Spain (<http://datos.gob.es/catalogo#>), The Netherlands (<https://data.overheid.nl/data/search>), UK (<http://data.gov.uk/data/search>), Uruguay (<https://catalogodatos.gub.uy/dataset>), US (<http://catalog.data.gov/dataset>).

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OGDL4M Ontology: Analysis of EU Member States National PSI Law

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Abstract. Developers of Open Government Data Mash-ups face the following legal barriers: different licenses, legal notices, terms-of-use and legal rules from different jurisdictions that are applied to an open datasets. This paper analyzes implementation of Revised PSI Directive in EU Member states, also highlights the legal problems. Moreover it analyzes how Public Sector Information is defined by the national law and what requirements are applied to the datasets released by public sector institutions.

The results of the paper show that PSI regulation in EU Member countries is very different and the implementation of revised PSI Directive is not successful. These problems limit the reuse of Open Government Datasets.

The paper suggests the ontology in order to understand the requirements that originate from the national EU Member countries law and which are applied to Open Government Datasets. Also, the ontology models different implementations of the EU PSI Directive in the Member countries.

Keywords: open data mashup, licensing of open data, ontology

Problem and motivation

Open data, open government data definitions and principles were presented in our previous work[1]. This paper will focus on how the technology could be used in dealing with a different regulation of the important subject – open government data (OGD).

In general, data is a fuel for Enterprise Information Systems. According to the Report[1] EU economy could potentially grow by 1.9 per cent GDB by 2020 as a result of reusing big & open data. In the ideal World the idea of Linked Open Data[2] could be realized easily, but the law and the regulation of data make this idea hard to accomplish in a real-life. Governments, municipalities and other public bodies are releasing Public Sector Information (PSI) under different legal and technical conditions, which are unstable and create artificial barriers to get benefits from the re-use of information. Probably, the most efficient results that follow from the use of open government data can be extracted when the data is merged, connected, combined, mixed or enriched and analyzed in other ways. However the legal problems, that do not allow to do it smoothly and to reach the expected economic benefits, exist.

Open data licenses (or other regulation as legal notices, terms of use) are not unified. This problem influences a deep analysis of open data licenses for every developer before starting to connect different datasets in a mashup model. The results of The Survey of the Licensing of Open Government Data [3] had discovered a critical situation concerning regulation (licensing) regime: the national open government data portals consist of datasets which are protected by different licensing regimes starting from 33 (Spain), 16 (Germany, Italy) and ending up to 1-2 (Austria, EC, Moldova, Portugal, UK) regimes.

Different licensing terms mean that: first of all it is not clear if the datasets can be merged, used for commercial purposes or are there any limitations applied to the mashup work protection, also if the different Adapters licenses can be used. The Survey [3] identified that OGD portals consists of the datasets,

which identify wrong licensing regimes, or do not identify any licensing regime at all (it is not clear if the link to regulation is missing, or there is no regulation applied), or the rules that come from national PSI law are not being copied. This situation creates a possible risk that government (the owner of OGD) could start legal procedures against the developers of OGD because of violation of the national PSI rules, even when notification about the licensing regime is provided not correctly by the government itself.

So how the developers of Enterprise Information Systems which use OGD could avoid investments to legal analysis of OGD regulation and to reduce risks coming from possible failure of misinterpretation of national law in the global environment? The possible solution is to force governments to withdraw all regulation of the OGD, or alternative solution is to have a tool which provides legal analysis of OGD automatically, or at least semi-automatically.

We believe that it is possible to create such a tool. We decided to deal with the legal problems coming from EU Member States in that way: 1) we have identified general problems existing in the PSI domain of EU (different regulation object in national law, PSI directive and Revised PSI directive is not implemented fully); 2) we have found what kind of specific legal requirements are applied to open government datasets by national PSI law and 3) we have tried to model those requirements in the Ontology aiming to create a useful tool to understand the complexity of OGD regulation on EU level.

This paper is organized: 1) introduction to the problem and motivation; 2) analysis of implementation of Revised PSI Directive; 3) analysis of EU Member States national PSI law; 4) ontology for the legal requirements of OGD; 5) conclusions and future work.

Open Government Data: legal problems coming from EU in re-use of PSI domain

In European Union the philosophy of re-use of public information and the main legal requirements applied to Open Government Data are coming from PSI Directive. If the concept of PSI Directive [2] (including Revised PSI Directive[3]) worked as it is planned, legal problems concerning the re-use of open datasets would not exist. Unfortunately the reality is different. EU Commission still has a lot of work to do in order to change the existing opinion, that the information hold by the public institution is the property of the state and “no one can touch it”.

Our investigation has found that the development of EU Commission supported PSI concept could be grouped as:

- 1) The period before the PSI Directive was adopted;
- 2) The period of implementation of the PSI Directive (~2003/2005-2013/2015);
- 3) The period of revision of the PSI Directive in 2013 and its implementation.

Before the PSI directive was adopted, the concept of PSI was developing de-centralized in EU member and pre-member countries. Every single country had its own independent concept which had created “Tower of Babel” effect. In 2003 the PSI Directive was published and should have been implemented until 2005. PSI directive sets a minimum harmonisation of national rules and practices of PSI concept and its re-use. Implementation of PSI directive wasn’t enough successful in Community and revision of PSI directive was made after 10 years. The revised PSI directive gives tools to EU Commission to control the implementation of the PSI directive and hopefully in the next years the united concept of PSI in EU could be found, if EU Commission could use those tools effectively.

Implementation of Revised PSI Directive

The survey investigated the laws of the national PSI law of Member states published in the Portal of European Commission[4].

Table 37. Implementation of Revised PSI Directive

Status of implementation	Countries
Have been implemented fully	Austria, Italy and Malta
Have been implemented all main terms and only minor regulation is not harmonized	Germany, The Netherlands and The United Kingdom
Have been implemented the main terms but some important are missing	Greece, Spain, Sweden
Have been implemented the different terms, even contra terms	Denmark, Hungary and Latvia
Have not been implemented Revised PSI directive by the term (18 July 2015)	Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Estonia, France, Ireland, Lithuania, Luxemburg, Poland, Portugal, Romania, Slovakia, Slovenia
Other	Finland

There are some explanations of the Table 1: 1) in Spain different charges for the commercial re-use may apply while Revised PSI Directive do not allow such an option; 2) in Latvia the re-use is allowed only for private individuals; 3) in Denmark charging principles are not applied; 4) in Hungary different terms of exclusive arrangements are provided from the 1st of January 2016 instead of the 17th of July 2013 and Hungary excludes libraries, museums and archives, university libraries from the duty to provide the information for the re-use and etc. 5) Finland has not implemented the PSI directive because it had already implemented their unique concept: PSI belongs to the public domain.

Analysis of National PSI Law

As we already have found the implementation of Revised PSI Directive was not successful, we continued the analysis of national PSI law to get a clear view regarding the legal framework and discover the differences that follows from the OGD regulation.

We have asked two questions to start the legal analysis of national PSI laws in EU Member States: 1) Does the investigation object – public sector information - is understood in the same way as it is defined in EU PSI Directive, if not? If yes, then - how it differs? 2) What are the legal requirements applied to OGD licensing?

Analysis of PSI term used in legal domain of EU Member countries

Analysis of the legal domain in EU and its member countries indicates that the main problem is that term “Public sector information” is differently understood in EU member countries, but EU legislation is trying to gather different concepts to one united concept of PSI.

In the wider approach, PSI concept could be found not only de-centralized or united, but also direct or expanded. Direct concept covers the idea of the concept which already comes exactly from the term “Public sector information” and includes different forms of information managed by Public sector. Expanded concept fulfills the direct concept by extra rules, exceptions and tasks.

There is a good example of direct PSI definition published by The Organization for Economic Cooperation and Development (OECD): Public sector information is “**information**, including information products and services, generated, created, collected, processed, preserved, maintained, disseminated, or funded by or for the Government or public institution” [5]. OECD PSI definition is clear enough and describes PSI basically as all the information that with holds the Public institution.

EU PSI Directive represents expanded form of PSI concept and presents a bit different concept of PSI (comparing to OECD), because the PSI concept has been developed from “the right to get access to public information” and it’s basically could be described shortly as *accessible information to public which can be re-usable by public and it is hold by Public institution*. This concept during 10 years has changed a bit from “**can** be re-usable” (in PSI Directive, 2003) to “**must** be re-usable” (in Revised PSI Directive, 2013).

The term ‘information’ got expansive meaning in nowadays and usually is used as synonym to data, records, documents and etc. Erik Borglund and Tove Engvall investigated how the open data discourse is communicated in legal text and they found out that there is no single term and the principal words are: record, information, document and data [6].

It is not a surprise that the terminology problems arrive to European Union, especially including its Member States’ legislation. In European Union Member States legislation **Public sector information (PSI)** definition is understood differently.

In Directive 2003/98/EC (PSI Directive) PSI is understood as a “**document**” and during revision of the directive the definition was not changed but concept was expanded in Directive 2013/37/EC (Revised PSI Directive). Implementation of PSI Directive and the Revised PSI Directive in the EU Member States still is developing, so the PSI definition is not yet harmonized by EU Member States national law.

Definition of the document is provided by Directive Article 2 Para 1 Sec 3: ‘Document’ means: (a) any content whatever its medium (written on paper or stored in electronic form or as a sound, visual or audiovisual recording); (b) any part of such content.”[2] So basically, Public sector information is understood as document or part of the document, no matter what form or content. In preamble of Directive term “document” used as synonym to *information* and includes also *data*.

In legal interpretation term “document” is more related to *legal responsibility* of institution or information holder comparing to other terms as “information” or “data”. Also, concept “access to documents” comes from “right to get information from public sector” and it was understood as right to get some concrete documents.

Secondly, after 10 years PSI directive was revised with an intention to harmonize more the PSI definition in member states. The legislators of Directive 2013/37/EU (revised PSI directive) noted: “since the first set of rules on re-use of public sector information was adopted in 2003, the amount of data in the world, including public data, has increased exponentially and new types of data are being generated and collected (recital 5).”[3] “At the same time, Member States have now established re-use policies under

Directive 2003/98/EC and some of them have been adopting ambitious open data approaches to make re-use of accessible public data easier for citizens and companies beyond the minimum level set by that Directive. To prevent different rules in different Member States acting as a barrier to the cross-border offer of products and services, and to enable comparable public data sets to be re-usable for pan-European applications based on them, a minimum harmonization is required to determine what public data are available for re-use in the internal information market, consistent with the relevant access regime. (recital 6)”[3]. On one hand, legislators expressed their good will to harmonize “public data” (it affects internal European information market) in preamble of Revised PSI Directive but, on other hand, important changes to definition was not done in the text of PSI Directive Article 2, only the concept of PSI was updated.

Thirdly, the PSI directive 2003/98/EC is implemented in all EU member countries and EEA countries (Iceland, Liechtenstein and Norway). The problem exists that “EU Member States have implemented the PSI Directive in **different** ways. 13 Member States have adopted specific PSI re-use measures: Belgium, Cyprus, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Romania, Spain, Sweden, United Kingdom. 3 Member States have used the combination of new measures specifically addressing re-use and legislation predating the Directive: Austria, Denmark and Slovenia. 9 Member States have adapted their legislative framework for access to documents to include re-use of PSI: Bulgaria, Croatia, Czech Republic, Estonia, Finland, France, Latvia, Lithuania, Netherlands, Poland, Portugal, Slovak Republic.”[4]

Deeper investigation of national EU member states law shows existing differences of PSI definition. Some countries use PSI definition as “document”, “information”, “data” or other.

These differences could be classified to those which are using: 1) **same definition** of PSI as it is provided in PSI Directive (Austria (including Vienna, Vorarlberg, Lower Austria, Tyrol, Styria, Salzburg and Upper Austria lands), Cyprus, Slovak Republic (from 2012), Greece (from 2006 till 2014), Luxembourg and Spain) and 2) those which have **adopted specific definition** (all others).

It could be classified also to 4 groups: **document group** (definition of PSI is strongly related to a document), **information group** (PSI is understood as some kind of information), **data group** (PSI is understood as a data, record, file and etc.) and **other group** (PSI is understood as representation of content, knowledge, matters and other).

A **document group** could be classified to the smaller parts: 1) Document (Austria (including Vienna, Vorarlberg, Lower Austria, Tyrol, Styria, Salzburg and Upper Austria lands), Cyprus, Slovak Republic (from 2012), Greece (from 2006 till 2014), Luxembourg, Spain used the same definition as it is provided in PSI Directive; 2) Documented information (Estonia defines it as information which is recorded and documented. It means that information which is not documented is not under the scope of PSI; Latvia it defines as “documented information – information whose entry into circulation can be identified”); 3) Administrative documents (France and Portugal it defines as “administrative documents”); 4) Documents, information and data (Greece (from 2014) implements Revised PSI Directive and provides updated conception of PSI: it is the documents, information and data which are made available online as a dataset or via programming interfaces in open machine-readable format which complies with open standards); 5) Documents, record and data (Ireland it defines as document and it means all or part of any form of document, record or data); 6) Document and any content (Romania it defines as a document and it means any content or part of such content).

An **information group** could be classified to: 1) Information and metadata (Czech Republic it defines as “publicly disclosed information”. Also includes metadata which is named as “accompanying information”); 2) Any information (Bulgaria defines it as any information collected or created by a public sector

body); 3) Public information (It is defined as public information in The Netherlands and Poland (all information about public matters constitutes public information) and Slovak Republic (till 2012) used very narrow definition of PSI limited to information only about public money, state/municipality property and concluded agreements); 4) Information in the form of a document, case, register, record and other documentary material (Slovenia it defines as information originating from the field of work of the body and occurring in the form of a document, a case, a dossier, a register, a record or other documentary material drawn up by the body, by the body in cooperation with other body, or acquired from other persons); 5) Information means content (UK 2015-2015 it defines as information and it means any content or part of such content).

A data group could be classified to these parts: 1) Data (Croatia defines it as any data owned by a public authority. It means that ownership of rights to data is important. Hungary 2005-2015 it defines as data of public interest and data made public on grounds of public interest); 2) Data collections (Denmark (from 2005) granted access not only to document but also to data collections. Exception was made to information produced for commercial activities of a public sector body's, or for which third parties hold a non-material right. "Data collection" means registers or other systematic lists for which use is made of electronic data processing); 3) Files (Denmark (till 1985) granted access to files only if a) they were the substance of the authority's final decision on the outcome of a case; b) the documents contain only information that the authority had a duty to record; c) the documents are self-contained instruments drawn up by an authority to provide proof or clarity concerning the actual facts of a case, or d) the documents contain general guidelines for the consideration of certain types of cases); 4) Any record (Germany it defines as any record stored in any way).

Another group consists of these parts: 1) Presentation and message (Finland it defines as "written or visual presentation, and also as a message"); 2) Presentation of acts, facts and information (Italy it defines as document and it means the presentation of acts, facts and information); 3) Any representation of content (Vorarlberg land (of Austria) till 2015 it defines as any representation of content, or part of it which public-sector body may decide whether to allow reuse); 4) Representation of acts, facts or information - and any compilation (Malta till 2015 it defines as document and it means any representation of acts, facts or information - and any compilation of such acts, facts or information); 5) Knowledge (Lithuania it defines as "document shall mean any information; information shall mean knowledge available to a State or local authority institution or body"); 6) Known factual statements on matters (Carinthia and Burgenland lands (of Austria) it defines as factual statements on matters which at the time of the request for information are known to the body); 7) Matter or recording and compilation of information (Sweden it defines as a document and it means any written or pictorial matter or recording which may be read, listened to, or otherwise comprehended only using technical aids. It also includes a compilation of information taken from material recorded for automatic data processing).

Analysis of definitions shows the most EU Member States use different terms to describe the Public sector information. Looking from open government data perspective it is not so important which term is used "document" or "data", but is more important to see can definition set *extra limits* which goes out of the scope of the PSI directive.

Firstly, it is risky to limit PSI definition only to administrative documents or documented information. Because there are plenty of information held by public bodies which are not administrative documents or just "documents", "documented information" in bureaucracy terms. E.g. *live traffic data from municipality's sensors/cameras do not fit the requirements of administrative documents*.

Secondly, the ownership of information should be also avoided (*ex. belongs to public sector institution*), because some works belongs to public domain and according to Revised PSI Directive it should be

provided (e.g. from archives, museums) as public domain works. Also, there are discussions [7] held by open data community: does PSI belongs to Public sector or it belongs to public domain (because it was produced by public money).

Thirdly, it is a common mistake, that PSI is defined as information given to re-use. E.g. “Document held by a public sector body: a “document” regarding which the public sector body is entitled to allow re-use” [8]. PSI limitation to only information which is provided for re-use by institution should be avoided, because it limits the right to get access to information and initiative to ask for new information which is not provided by institution. On other hand such limitation is right of each EU member country according to PSI Directive recital 9: “This Directive does not contain an obligation to allow re-use of documents. The decision whether or not to authorise re-use will remain with the Member States or the public sector body concerned. This Directive should apply to documents that are made accessible for re-use when public sector bodies license, sell, disseminate, exchange or give out information.”[2]

Finally, implementation of Revised PSI Directive makes changes in PSI terminology, because PSI concept was updated by including metadata, open and machine readable formats, and up-coming understanding what is open data. Example, Spain PSI regulation from 2015: *Document: All information or part thereof, whatever the medium or form of expression, whether textual, graphic, audio visual or audiovisual, including associated metadata and data content with the highest levels of accuracy and disaggregation.* [9]

There is a hope that the implementation of Revised PSI Directive will help for Community to adopt definitions of PSI, which will be constructed to support open data concept, e.g. as it did Greece [10].

Analysis of the legal requirements applied to OGD licensing in national PSI law

In each country all public sector data which is released as Open Government data (or, in other words, PSI ready for re-use) is regulated by national PSI law. Depending on the country there could exist also land’s (e.g. Wiener Informationsweiterverwendungsgesetz (WIWG)), municipality’s, public institution’s PSI laws, but those laws follows the federal or national PSI regulation. Our analysis is limited to the main national PSI regulation.

Analysis has discovered that there exist differences concerning legal requirements applied to OGD licensing among EU Member States. Those differences in the most cases are not significant and follows EU PSI Directive’s rules, but there exist some contradistinctive, e.g. in Spain re-user of PSI could be fined up to 100000 Eur for violation of re-use policy; in Croatia up to 100000 HRK/~13000Eur could be fined public authority which prevents or restricts the exercise of the right of access to information and re-use of information.

In order to make those requirements understandable in machine-readable format, primer version of the ontology has been developed.

The Ontology of Open Government Data Licenses Framework for a Mashup Model (OGDL4M)

The Ontology of Open Government Data Licenses Framework for a Mashup Model (OGDL4M) is an OWL ontology formalizing a legal knowledge of Open Government data licensing Framework to represent legal requirements applied to open government datasets in mash-up model. OGDL4M is still under development and we expect to present it by the end of 2016. This section describes a part of OGDL4M

which is dedicated to present legal requirements for open government data licensing, terms of use and sanctions for the violations which is coming from national re-use of public information (PSI) laws of EU Member States.

State of art

At the moment there are no similar ontologies representing EU Member countries national-level PSI domain, but there are ontologies which analyses licensing (L4LOD[11], RDFLicense[12]), intellectual property (IPRonto[13], CopyrightOnto[14]), linked data rights (ODRL v.2.1[15]), legal norms (LKIF[16]) and expression language ccREL[17].

Main scholars which are working on subject related to this ontology are M.Palmerani[18][19], S.Peroni, P.Casanovas[20], V.Rodríguez-Doncel[21], S.Villata, F.Gandon, A.Kasten, D.Paehler, R.García, J.Delgado.

Merged ontologies

OGDL4M Ontology re-use some elements of other ontologies:

Table 38. Merged ontologies objects

Ontology	Classes
L4ODL	Attribution, CommercialExpl, No-Commercial, NoDerivative, ShareAlike
LKIF	Exception, LegalPerson, LegalSource, Legal_Document, Natural_Person, Obligation, Permission, Prohibition, Right
Time (ti)	TimeInterval
Schema	Action, CreativeWork
CopyrightOnto	AttributionRight, DisseminationRight, EducationRight, InformationRight, IntegrityRight, MoralRight, OfficialActRight, ParodyRight, PrivateCopyRight, QuotationRight, TemporaryReproductionRight, UserRights, Withdraw, WithdrawalRight

Objective

The **objective** of this part of ontology is to help to create the theoretical model, which will be able to inspire an automatic or the semi-automatic computational model that could represent national law PSI rules of EU Member countries, especially when licensing regime is not clear, or when conditions for re-use are not provided.

Formation of list of all the relevant terminology and production of glossary

We have developed a table in which we indicate the terms, provide legal description, legal source and normalized definition.

Table 39. Example of the glossary

Term	Definition by legal source	Link to Normalized normative/legalDefinition source
Adaptation	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: translation, adaptation, arrangement and any other alteration; Authors of literary or artistic works shall enjoy the exclusive right of authorizing adaptations, arrangements and other alterations of their works.	96/9/EC 5.1(b) Berne convention §12

Overview

OGDL4M consist of core part, which presents general concept, and other parts based on each country profile.

In the Fig. 1 the fragment of core part of OGDL4M is presented. A class LKIF:LegalSource should be indicated as a source of all possible regulatory sources which could apply to dataset released by public sector. E.g. if information system wants to evaluate what are legal requirements (Class ConditionsOfPSIReuse) applied to dataset (class OpenGovDatasets), it must investigate all possible legal sources (class LKIF:LegalSource).

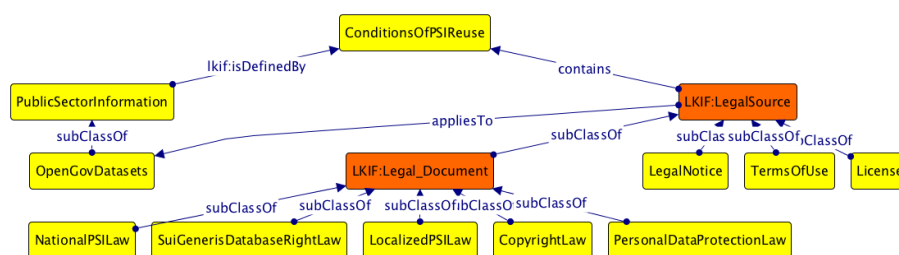


Fig. 11. The Fragment of OGDL4M core part: legal source.

Classes LegalNotice, TermsOfUse and License represent forms of regulation which are commonly used to express connection between dataset and legal regulation. Usually, by mistake those forms are applied without taking care of other important class LKIF:Legal_Document which represent different regulation coming from different legal areas: Personal data protection, Copyright law, EU Database sui generis right, and PSI law which is divided to country level (national PSI law) and lands, municipality, institutions PSI law level (localized PSI law).

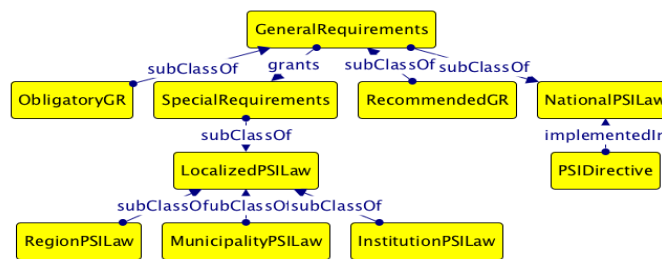


Fig. 12. The Fragment of OGDL4M core part: general requirements.

In the Fig. 2 the fragment of core part of OGDL4M is presented, which explains the model how different national PSI regulation could be explained. National PSI regulation provides rules which explain are those PSI re-use requirements are obligatory or only recommended, or maybe those (some/all/none) requirements are not regulated by national law, but must/ could be regulated by local PSI law.

Class NationalPSILaw represents National PSI law, which is legally binding and sets general countries legal rules applied to re-use of PSI conditions. The class GeneralRequirements is subclass of NationalPSILaw and represents general countries legal rules applied to re-use of PSI conditions. Those rules could be obligatory (class ObligatoryGR) or only recommended (class RecommendedGR) to apply. In those cases when rules are obligatory to apply, all other contra legal rules set on dataset is not valid. E.g. in Finland OGD could be released only as part of public domain, so no other rules can apply to OGD released by public institution in Finland, especially other license which do not represents public domain (like cc-by), or if there is licence missing it is clear that dataset is part of public domain.

In other cases when national PSI regulation only recommends to follow some rules, usually PSI policy is dedicated to the lower authority. The class of SpecialRequirements is used to present link to local psi law (of land, municipality, institution or other public authority) and limitation of possible use (without deeper analysis) of the ontology for current country profile.

OGDL4M model for the country profile

Legal requirements applied to OGD licensing in the national PSI law is modelled by identifying which requirements are obligatory to apply and which are recommended. Requirements are presented by identifying the legal source of the requirement (concrete part of the law). It is necessary for quick cross-checking and evaluation is that norm still valid. If there are sanctions of violation of PSI re-use policy class SanctioningRegime is used. In country profile ISO 3166 code is attached to PSILaw, Jurisdiction, GeneralRequirements classes.

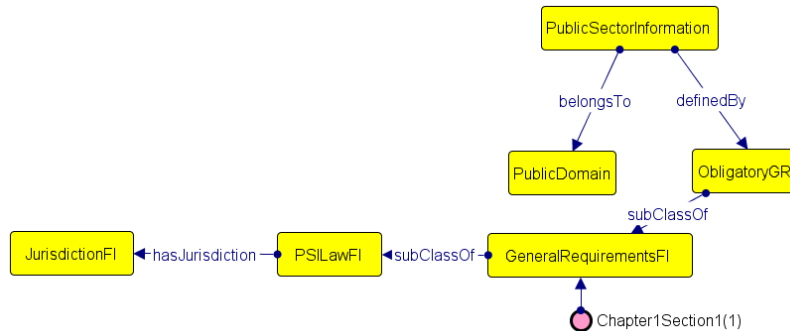


Fig. 13. The Fragment of OGD4M representing Finland's legal requirements to OGD.

In a Fig.2 the OGD4M model for Finland is presented. The class PSILawFI represents legally binding Finland's PSI law - Act on the Openness of Government Activities with its amendments [22]. The model explains that general requirements (class GeneralRequirementsFI) are set by Chapter 1 Section 1(1) of Act on the Openness of Government Activities and it is applied obligatory. Legal requirement is only one applied to OGD: PSI belongs to Public domain.

In a Fig.3 the OGD4M model for Spain is presented. The class PSILawES represents legally binding Spain's PSI law – Law on the re-use of public sector information it's amendments [9]. General requirements (class GeneralRequirementsES) are obligatory to apply. Model explains that: 1) there could OGD released by no conditions/license (class NoConditionsForReuse) or 2) OGD could be regulated only by standard license. Standard license has a bunch of conditions: license should be open, not limit competition, not restrict re-use and etc. The model explains that there could be only two licensing regimes in Spain, but in reality we found 33 during the Survey. Licensing regimes which do not follow Spain's PSI law's regulation are not correctly applied.

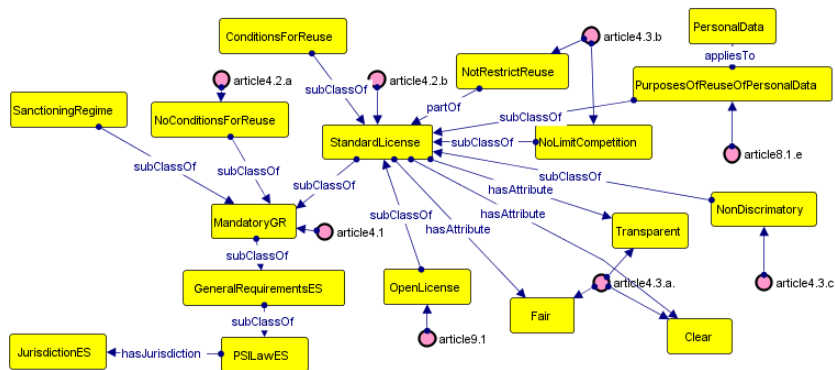


Fig. 14. The Fragment of OGD4M representing Spain's legal requirements to OGD.

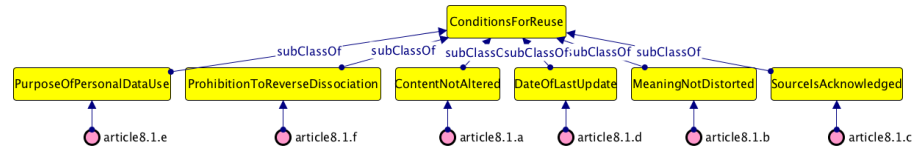


Fig. 15. The Fragment of OGD4M representing Spain's legal requirements to OGD.

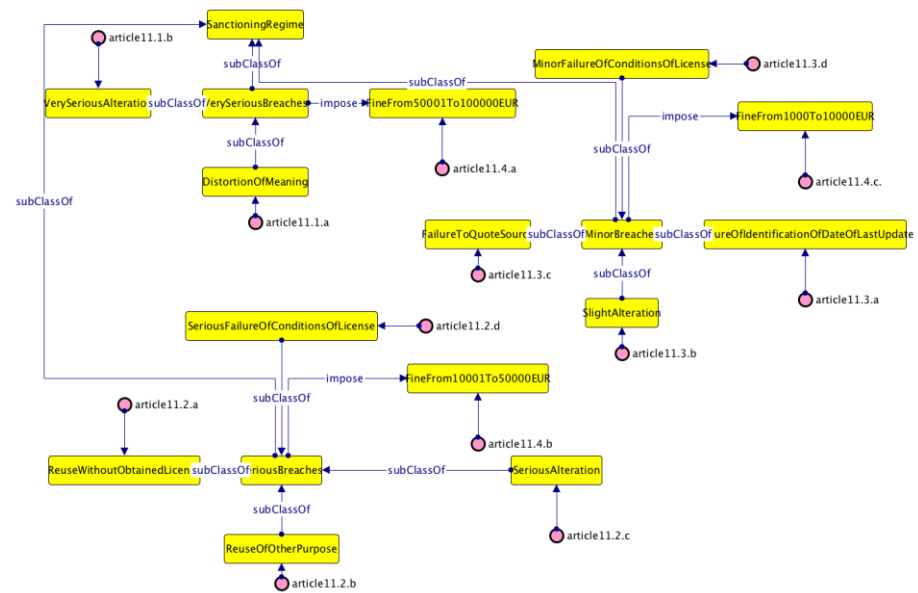


Fig. 16. The Fragment of OGD4M representing Spain's legal requirements to OGD.

In Fig.4 specific conditions for re-use is presented. Those conditions basically implement similar to non-derivative license conditions (cannot be altered). It means that licensed OGD released by public authority cannot be used in mash-ups in Spain. There is a conflict of legal norms which requires not limiting re-use of PSI and asks for not altering the PSI. The conditions which limits PSI re-use are supported by sanctions.

In Fig. 5 sanctioning regime is explained. If OGD released by Spain with a license, those sanctions should apply, e.g. failure to indicate the date of the latest update of information will cost to developer from 1000 to 10000 Eur.

Conclusions and future work

The legal analysis of EU Member States national PSI law has indicated the main problems: national law is not harmonized with the EU law, that's why situation in most EU countries is different and requires deeper analysis of the national legal domain. OGD4M ontology could be a very useful tool for evaluating country's PSI policy, and could be used as a tool for automatic or semi-automatic evaluation of the legal regulation of datasets released by the public bodies of EU Member countries in the future.

Moving forward we expect to enrich the ontology and present the completed version of OGDLM by the end of 2016.

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Contributions:

- Principal author.
- Written by Martynas Mockus: Introduction, related work, methodology (methodology is a joint work with Prof. M.Palmirani), ontology of Open Government Data Licenses Framework for a Mash-up Model, empirical test.

Legal Ontology for Open Government Data Mashups

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Abstract— An important pillar of Linked Open Government Data is to be able to mix datasets by using common ontologies in order to infer new knowledge. The open government datasets to be mashed-up by developers may be subject to distinct licenses, legal notices, terms of use, and applicable law and regulations from multiple jurisdictions. Within this complex ecosystem there is a need to create semi-automatic tools supported by an ontology to help technical reusers of Public Sector Information to utilize datasets according to their intended purpose and in compliance with the legal obligations that govern the rights to reuse the data. Unfortunately, some researchers may avoid considering all the legal frameworks that apply in the domain of Open Government Data and limit their investigation to only the area of licenses. To enable wider, compliant utilisation of mashed-up open data, we have analysed the European Union (EU) legal framework of reuse of Public Sector Information (PSI), the EU Database Directive and copyright framework and other legal sources (e.g., licenses, legal notices, terms of use) that can apply to open government Datasets. From this deep analysis we now model several major concepts in an Ontology of Open Government Data Licenses Framework for a Mash-up Model (OGDL4M). There have been earlier ontologies for creative commons or open licenses, but they did not anticipate the other legal constraints that arise from Open Government regulations. The OGDL4M ontology will be used for qualifying datasets in order to improve the accuracy of their legal annotation. The Ontology also aims to connect each applicable legal rule to official legal texts in order to direct legal experts and reusers to primary sources. This paper aims to present the modules of the OGDL4M ontology in depth and to describe some preliminary evaluation.

Keywords: open government data mash-up, licensing of open government data, legal ontology

Introduction

This paper builds on our earlier research, which aimed to develop a semi-automatic model for providing legal analysis applied to a concrete set of Open Government Data (OGD). Our first work [1] presented open data, open government data definitions and principles, and analysed the compatibility of Creative-Commons 4.0 version licenses. The second work [2] presented the results of the OGD survey, which showed a critical situation concerning the regulation (licensing) regime of OGD: the national Open Government Data portals consisting of datasets that are governed by competing and overlapping licensing regimes even within individual states, starting from 33 (Spain), 16 (Germany, Italy) and ending up to 1–2

(Austria, EC, Moldova, Portugal, UK). The complexity of the legal environment demonstrates the need for an ontology to enable automatic/semi-automatic analysis of licenses, legal notices and terms of use applied to sets of OGD. An early part of the ontology was presented in the third paper [3], which explained how Public Sector Information (PSI) is affected by EU regulation and national and local regulation by member states. The paper also presented some comparative legal analysis of national Public Sector Information (PSI) law in EU member states. In this paper we formalise a deep legal analysis of the domain using UML-Grafoo annotation [18], and synthesise the results as the Ontology of Open Government Data Licenses Framework for a Mashup Model (OGDL4M). The Ontology represents legal rules, copyright and database rights connected to deontic logic operators in order to represent legal information to be readily useful for legal logic reasoning applications. The goal of this paper is to demonstrate that to support OGD mashups, a larger and integrated ontology becomes necessary to produce usable and legally sound results. This Ontology can be used for annotating OGD licenses, legal notices, and contracts and to query the inferred legal knowledge for supporting decision-making by developers during the mashup process. Several technologies could use this Ontology: RDF triples repository using SPARQL queries for filtering the fitted legal information; OWL reasoners for inferring more knowledge (e.g., permission, obligations, exceptions); and legal reasoning engines [24] [25] using compliance-checking methods for combining different licenses.

Related work

Several scholars have worked on this subject (J. Breuker, A. Boer, R. Hoekstra [26], K. Berg [27] M. Palmirani [11][12], S. Peroni [13], P. Casanovas [13], V. Rodríguez-Doncel [14], A. Rotolo [28], S. Villata [4], J. Broersen, L. Torre [29], F. Gandon, A. Kasten, D. Paehler, R. García, J. Delgado [6], O. Seneviratne, L. Kagal, T. Berners-Lee [30]), and the authors have been inspired by their valuable research. However, the previous results address problems only partially and are not suited to the Open Government Data domain. For this reason a concrete empirical application to the most frequent licenses used in OGD [2] revealed some critical issues that our work intends to address.

We started our analysis with L4LOD [4], which is a simple ontology presenting a very general view of the licensing of open data. We have also found other useful ontologies that analyse licensing (RDFLicense [5]), intellectual property (IPRonto [6], CopyrightOnto [7]), linked data rights (ODRL v.2.1 [8]), legal norms (LKIF [9]) and expression language ccREL [10].

L4LOD is “a lightweight vocabulary for expressing the licensing terms in the Web of Data” [4]. L4LOD has limited usefulness, however, because some important basic elements are missing: copyrights, *sui generis* database rights, and special terms and conditions coming from the Open Government Data domain. There are obvious visible differences between the L4LOD:Permission concept and concept of permissions existing in a legal copyright and related rights domain, and some exclusive treatments coming from PSI domain, that are not incorporated in the L4LOD:Permission concept. The relationship between the Prohibition and Permission concepts has not been properly represented. When we have tried to apply L4LOD to the latest Creative Commons licenses, Open Government License Canada v.2.0 and UK OGL v.3.0, the results revealed that some important concepts are lacking in L4LOD: i) the *exceptions* concept exists in every investigated license (except CC0 1.0); ii) the *prohibition* concept needs to incorporate more classes, such as NoWarranty or NoEndorsment for governmental types of licenses; iii) the Attribution class lacks some important elements, such as CopyrightNotice, NoticeOfLicense, Identification, IdentificationOfLicensesMaterial, IdentificationOfModification, etc.

IPRonto has some valuable terminology and structure of the copyright domain. IPRonto also has a valuable approach to rights management. Linked Data Rights and related ODRL v.2.1 (certain proper-

ties, concepts, named individuals are common with the OGD4M ontology) could be linked to the OGD4M ontology.

RDFLicense could be used by looking up the name of the license associated with the work, linking to the license text via RDFLicense (although some texts are not available), and setting the jurisdiction of the license. The main problem with the RDFLicense is that the legal code is not structured, and it is not possible to link directly to a specific provision of the license text (e.g., section 5 of CC-BY 4.0. Disclaimer of Warranties and Limitation of Liability).

ccREL could be adapted by using suggested machine-readable expressions of copyright licensing terms and related information.

Methodology

The Methodology named MeLOn (Methodology for building Legal Ontology) was used to develop the OGD4M ontology. The MeLOn is a new empirical methodology for building legal ontologies developed by M. Palmirani in order to help legal experts model legal concepts using the principles of data modelisation. MeLOn has already been implemented by a few scholars [15], and it takes its inspiration from SAMOD [20].

MeLOn was developed after several years of empirical practice in CIRSIFID, and it aims to resolve typical issues working in the legal domain [31]: 1) Legal experts: they lack competencies in conceptual or data modelling, and they often adopt technical tools (e.g., Protégé [147]) without the necessary awareness of the technical consequences; 2) Legal domain sources: legal texts and other relevant sources (e.g., soft law, case law, interpretation, doctrines, social rules) are the main sources for developing a legal ontology, and it is essential to connect existing legal material (whether formalised or not) to the ontology; 3) Legal domain goals: ontologies are often designed teleologically from the start by formalising the goals to be addressed, although in the legal domain we are not limited to one particular application; rather, our aim is to model existing legal concepts “as is”; 4) Legal domain evaluation: evaluation is fundamental for testing the quality of an ontology, but it can be very difficult to evaluate legal concepts. There are problems of exceptions and interpretation, and special methodology should be defined for those use-cases.

MeLOn describes ten steps for creation of an ontology: i) description of the ontology goals and proposing in natural language the definition of some use-cases for the empirical test; ii) definition of evaluation indicators; iii) analysis of the state of the art for related ontologies; iv) formation of a list of all the relevant terminology and production of a glossary of the main legal concepts; v) modelling a knowledge base of the legal domain by creating the following tables (Concepts tables, Object properties, Data properties, Ontology restriction (Axioms)); vi) transforming the tables in UML and later in OWL in order to optimise the modelisation; vii) empirical testing of some scenarios and use-cases defined in step i); viii) refinement of the ontology based on the results of the empirical test, including the evaluation of legal experts; ix) evaluation on the basis of the indicators defined in step ii); and x) publishing and documentation (using LOD2 tool [19]).

1. **Description of the ontology** is a short description of the goal of the ontology in one page with the research questions that the ontology intends to address. Two or three use-cases are selected and described in details (storytelling). In our case the use-cases are Creative Commons licenses, Open Government License Canada v.2.0 and UK OGL v.3.0.
2. **Definition of evaluation indicators** defines some parameters/indicators for evaluating the ontology according to the intended end goal. In our case the indicators are the following: i) completeness of the legal concepts definition; ii) correctness of the explicit relationships between legal concepts; iii) coherence of the legal concepts modelisation; iv) applicability to concrete use-case; v) effectiveness for the goals; vi) intuitiveness for the non-legal experts; vii) computational soundness of the logic and reasoning; viii) reusability of the ontology and mapping with other similar ontologies.

3. **State of the art** of related ontologies describes the state of the art of related ontologies and answers these questions: Does any ontology already exist that can help to develop the new ontology? If there are any ontologies that can help to develop the new ontology, can the existing ontology be extended or linked to the new one? In our case several existing ontologies were taken in consideration and reused (e.g., L4LOD, LKIF, CopyrightOntology, Time [21], DBO [22]).

4. **Formation of a list of all the relevant terminology** and production of glossary is the process used to develop a knowledge base of the specific legal terminology relevant for the domain and to generate the glossaries. Legislative documents, case law and other sets of legal norms should be consulted for determining the specific legal terminology. A glossary of terminology has the form of a table with these column headings: term, definition by legal source (citing legal source, license, document, case law or legal theory, or common custom of the legal domain), link to normative/legal source, normalised definition (definition of term, made by the author of the new ontology, simplified or extended from a normative/legal source to fulfill the expectations of possible methodology users). The normalised definition should be a natural language description of the legal text using subject, predicate, object, with the aim to reuse the terms of the glossary as much as possible and avoid duplicative or ambiguous terminology. In this way a legal expert is forced to create triples that can be aggregated later on into more abstract assertions (TBox or ABox). Table 1 presents a representative part of a glossary, representing classes and properties coming from a legal source.

TABLE I. A PART OF THE GLOSSARY

Term	Definition by legal source	Link to normative/ legal source	Normalised Definition
Display (permission)	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p> <p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any communication, display or performance to the public; E.g. (US law): To display a work means "to show a copy of it, either directly or by means of a film, slide, television image, or any other device or process or, in the case of a motion picture or other audiovisual work, to show individual images nonsequentially</p>	<p>96/9/EC 5.1(e)</p> <p>96/9/EC 5.1(d)</p> <p>17 USC § 101</p>	The act of displaying to the public (of database or part of it). Applies to Derivative Work/Database and Original Work/Database.
Distribution (permission)	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p> <p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any form of distribution to the public of the database or of copies thereof.</p>	<p>96/9/EC 5.1(e)</p> <p>96/9/EC 5.1(c)</p>	An act or process of transmission of database or copy of database (Also an act of making available database to the public). Applies to Derivative Work/Database and Original Work/Database.
Reproduction (permission)	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any	96/9/EC 5.1(e)	Act or process of reproducing the contents of the database.

	<p>reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b). In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: temporary or permanent reproduction by any means and in any form, in whole or in part;</p>	96/9/EC 5.1(a)	Applies to Derivative Work/Database and Original Work/Database. Consists of Temporary reproduction and Permanent reproduction.
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5. Modelling the knowledge base of a legal domain, for example by creating **tables** of classes and objects and defining their properties and relationships with other classes and objects.

TABLE II. CLASSES TABLE

Explicit Concept	Definition by legal source	Normalised Definition	Equivalent to	Sub class of	Disjoint with	Link to normative/legal source
Distribution	“In respect of the expression of the database which is protectable by copyright....”	An act or process of transmission of database or copy of database (Also an act of making available database to the public)	none	None		96/9/EC 5.1(e)
Prohibition	none	The class is a part of the deontic rules used to express the obligations.	none	DeonticRules	Permission NoLicense PD_License	none

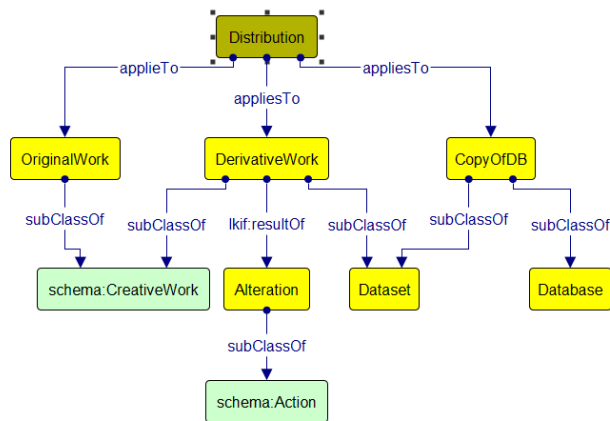


Figure 1. Diagram in Grafoo of the Distribution Class

TABLE III. OBJECTPROPERTY TABLE

Property Name	Normalised Definition	Domain	Range	Inverse property	Characteristics	Super property or Parent
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ObjectProperty: appliesTo	Apply some legal prescriptive norms or legal rules or policy	RequirementsToAdaptersLicense	ReuseOfAdaptedMaterial	ObjectProperty: appliedBy	Transitive NONE	none
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6. **UML and OWL modelling** is a process dedicated to modelling the ontology in OWL. These tools are recommended for use: Protégé [16] or yED [17] with Grafoo [18] extension.
7. **The Test** step is dedicated to testing the ontology. The test is divided in two steps: first the authors model the Creative Commons licenses, Open Government License Canada v.2.0, UK OGL v.3.0 that are the use-cases chosen for the preliminary empirical testing. Secondly, using the LIME editor [23] we annotate and connect the OGDLM classes to the texts. Thirdly, we test the ontology by selected parameters.
8. **Refinement** is a process to refine the ontology with the inputs from the Test step.
9. **Evaluation** is a step to evaluate the ontology using the previously described indicators.
10. **Publishing** and documentation is the concluding process, dedicated to documentation of the ontology with a tool called LODDE [19] and publication of the ontology and connection with other ontologies.

At present, we are at the stage of completing the UML formalisation and transforming it in OWL for technical optimisation.

Ontology of Open Government Data Licenses Framework for a Mash-up Model

In this part we present an important part of the Ontology of Open Government Data Licenses Framework for a Mash-up Model (OGDL4M). It connects legal rules with rights applied in Open Government Data, copyright, intellectual property and *sui generis* database domains. It adapts and extends L4LOD, LKIF, CopyrightOntology, Time, DBO and schema ontologies. The OGDLM is composed of about 200 classes and 30 predicates. Because of its size and complexity, the model is presented here by explaining classes and concepts in terms of its closest neighbourhood elements, using UML schemas. Not described classes and properties are then explained. The following concepts and classes will be presented: Legal Rules, DeonticRules, Obligation, Permission, Prohibition, Right, Intellectual Property Right, Copyright and the EU Sui Generis Database Right.

LegalRules class

A legal theory analysis of PSI and copyright domains explains how legal rules are used in the Ontology. Legal rules are limited by jurisdiction and time when legal rules are in force and in operation. The legal rules include deontic rules (e.g., obligations), PSI rules (e.g., reuse rules) and exceptions (e.g., derogation). The legal rules apply to actions related to the reuse of licensed material (copyrighted works, PSI protected data, etc.) and reuse of adapted material (mashup data, works). The UML schema is presented in Fig. 2, and a glossary of classes is explained as follows:

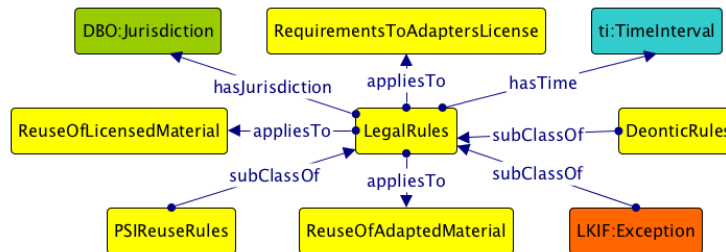


Figure 2. UML schema of neighbouring classes of LegalRules.

Classes

LegalRules – this class is used to express the applicable legal principles in force within a jurisdiction and the duration they are in effect. LegalRules has DBO:Jurisdiction and ti:TimeInterval. LegalRules are applied to RequirementsToAdaptersLicense, ReuseOfLicensedMaterial and ReuseOfAdaptedMaterial. LegalRules has the following subclasses: LKIF:Exception, PSIReuseRules and DeonticRules.

RequirementsToAdaptersLicense - this class is used to express requirements that are exclusively applied to licenses of derivative works created by Adapters. These requirements are applied to any Share-Alike License (SA_License), ReuseOfAdaptedMaterial and AdaptersLicense. This requirements class has subclass ConditionsOfPSIReuse.

ReuseOfAdaptedMaterial - this class is used to express an action of reuse of adapted material. The reuse can have different purposes: L4LOD:NoDerivative, L4LOD:NoCommercial, L4LOD:Attribution and L4LOD:ShareALike.

ReuseOfLicensedMaterial - this class is used to express an action of reuse of licensed material (legally protected and/or regulated).

DeonticRules - this class is used to express the deontic logic rules related to right, obligation, permission, prohibitions and related concepts. Properties include: Prohibition, Bearer, LKIF:Right, Permission, Obligation, LegalRules and ThirdParty.

PSIReuseRules - this class is used to express the rules that regulate how Public Sector Information should be reused. Properties include ConditionsOfPSIReuse and LegalRules.

Properties

hasTime - defines the association of the class with time entities (e.g., intervals);

hasJurisdiction - defines the association with a particular jurisdiction (e.g., supranational, national, provincial, federal state, Public Sector Institution, or ministry).

DeonticRules

Deontic rules are based on rights, obligations, prohibitions and permissions. The deontic rules define the relations between the Bearer and another party. The Ontology also provides for situations where a Third Party is subject to the rules. This information can be significant, for example, where reuse of PSI may not discriminate among parties, and the rules of reuse may apply equally to all parties involved (developers and users of original or mashup information). The UML schema is presented in Fig. 3 and glossary of classes is explained.

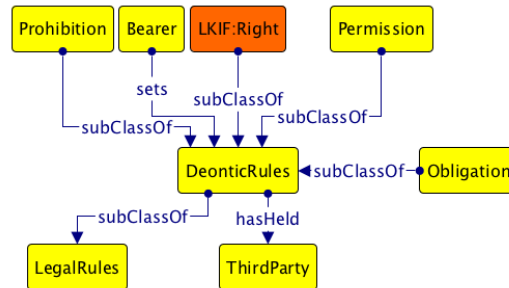


Figure 3. Neighbouring classes of DeonticRules

Classes: Permission - this class is used to express a part of the deontic rules used to express the permission. The class is disjoint with Prohibition. Prohibition - this class is used to express the part of the deontic rules used to express obligations. The class is disjoint with Permission. Bearer - this class is used to express the party that carries or holds rights. It is an equivalent class to RightholderOfCopyrights, MakerOfDB, and Author. Obligation - this class is used to express a part of the deontic rules used to express obligations. The class is disjoint with PDLicense and NoLicense. ThirdParty - this class is used to express an agent other than the agent primarily involved in a situation, e.g., the user of a mashup of datasets or the reuser of an original work or data.

Properties: sets - defines a class association with a legal power to apply the rules. hasHeld - defines a class association having legal rights and obligations.

Obligation

The basic model of obligations is modelled using classes of the L4LOD ontology. This basic model was expanded by adding connections to CopyrightOntology (e.g., moral rights) and PSI reuse (violation and conditions of PSI reuse) domains. Obligation is disjoint with public domain licenses (PD_License) and datasets that have no license (NoLicense). It is important to check the applicable local PSI regulation in case the OGD was issued without a license; if the OGD was released without a license (perhaps through an oversight), the regulation may automatically apply to the OGD. The UML schema is presented in Fig. 4 and a glossary of classes is provided below.

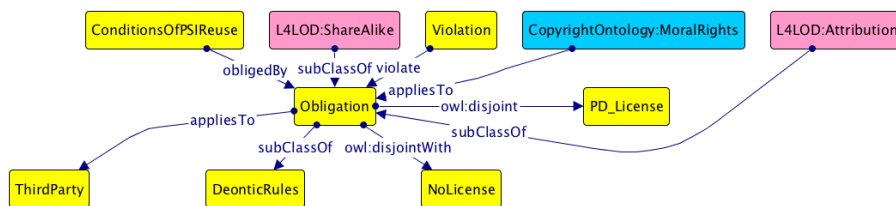


Figure 4. Neighbouring classes of Obligation

Classes: ConditionsOfPSIReuse – this class is used to express conditions that are applied to reuse of public sector information and/or Open Government Data. NoLicense - this class is used to represent cases when no license is applied to OGD to express the intent that the OGD be in the public domain, although it may be regulated by national PSI reuse law (e.g., Finland). The class does not apply in the cases when a license is not applied by mistake. PD_License - this class is used to represent a class of

licenses intended for the public domain. The class is disjoint with Obligation, Prohibition and IPRight. Violation - this class is used to express the act of doing something that is not allowed by a law or rule. Properties include Reparation and Obligation.

Properties: violates – defines association with violation. obligedBy - defines association with obligation.

Permission

The Ontology models the Permission concept as rules that permit the right to use an original work, adapted work, PSI, and/or database protected by *sui generis* rights. Permissions are implemented by licenses and permitted by conditions applied to PSI reuse. Permissions are classified by application to: 1) Original Works and 2) Derivative Works. The UML schema is presented in Fig. 5 and glossary of classes is explained.

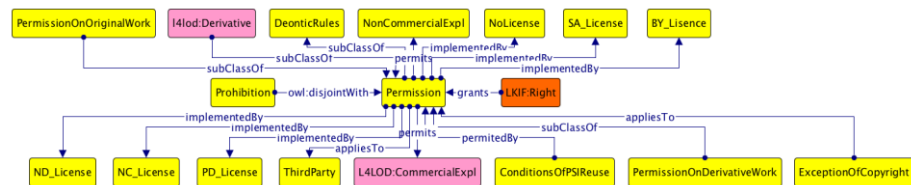


Figure 5. Neighbouring classes of Permission

Classes: ExceptionOfCopyright – this class is used to express exceptions in the copyright field. PermissionOnDerivativeWork - this class is used to express permissions applied to derivative works (mashup works, mixed data); the class is disjoint with PermissionOnOriginalWork. PermissionOnOriginalWork - this class is used to express permissions applied to original works (PSI, OGD). ND_License - this class is used to represent a class of licenses designed for non-derivative prohibitions. The class is disjoint with AdaptersLicense. BY_License - this class is used to represent a class of licenses designed for obligations to provide attribution. NC_License - this class is used to represent a class of licenses designed for certain prohibitions, such as restrictions against commercial use. SA_License - this class is used to represent a class of licenses designed for share-alike-type licenses. NonCommercialExpl - this class is used to express the permission to exploit the licensed data for non-commercial purposes.

Properties: grants - defines the association with a grant action. permittedBy - defines the association with the issuer of the permission. implementedBy - defines association with the object that is realised by the implementation. permits - defines the permissions associated to the actions and rights.

Prohibition

The OGD4M ontology models the Prohibition concept as rules that prohibit the use of original works, adapted works, PSI, and/or databases protected by EU *sui generis* rights. Specific prohibitions (no commercial exploitation, no derivative works) are often implemented in individual licenses, but, according to the PSI Directive, should be not applied to PSI reuse, although they are sometimes still applied via the national PSI law of EU member states. Prohibitions are classified by those which apply to: 1) original works and 2) derivative works. Specific types of prohibitions include those involving governmental endorsement, or expecting some type warranty on data; these may derive from national PSI law from EU

member states, but are not widely used. The UML schema is presented in Fig. 6 and a glossary of classes follows.

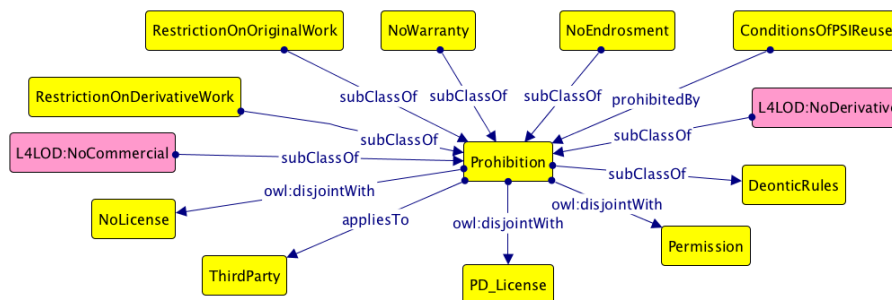


Figure 6. Neighbouring classes of Prohibition

Classes: **RestrictionOnDerivativeWork** - this class is used to express restrictions applied to a derivative work (mashup work, mixed data, extraction of databases); it is disjoint with **RestrictionOnOriginalWork**. It is equivalent to **L4LOD:NoDerivative**. **RestrictionOnOriginalWork** - this class is used to express restrictions applied to an original work (also a whole database or a copy of a database); it is disjoint with **RestrictionOnDerivativeWork**. **NoEndorsment** - this class is used to express the prohibition of unlawful endorsement by an information provider, e.g., when a license does not grant you any right to use the information in a way that suggests any official status or suggests that the information provider endorses you or your use of the information (e.g., UK OGL v3). Properties include: prohibition. **NoWarranty** - This class is used to express a prohibition against any warranty on information provided by the information provider, e.g., “The Information is licensed ‘as is’ and the Information Provider and/or Licensor excludes all representations, warranties, obligations and liabilities in relation to the Information to the maximum extent permitted by law. The Information Provider and/or Licensor are not liable for any errors or omissions in the Information and shall not be liable for any loss, injury or damage of any kind caused by its use. The Information Provider does not guarantee the continued supply of the Information.” (UK OGL v3).

Property: **prohibitedBy** - it defines the origin of the prohibition.

Right

The Ontology extends the LKIF:right concept by suggesting the conceptual relationship to permission: permission can be granted only if a right exists. It incorporates specific rights used in the Ontology like **ND_License**, **BY_license** and **NC_License**. The UML schema is presented in Fig. 7 and the glossary of classes is explained.

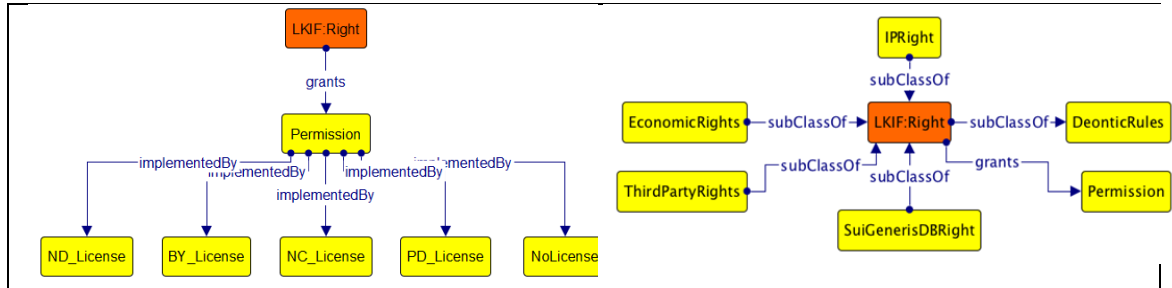


Figure 7. Neighbouring classes of LKIF:Right

Classes: *IPRight* – a class representing intellectual property. It is disjoint with *PD_License*. *SuiGenerisDBRight* – a class representing the European Union sui generis database right. *ThirdPartyRights* – a class representing third-party rights. *EconomicRights* – a class representing economic rights of copyright (in the EU) and sui generis database rights; it is disjoint with *CopyrightOntology:MoralRights*.

Intellectual Property Right

The intellectual property right (*IPRight*) concept represents the theoretical intellectual property background in relation to copyright. The most common IP rights in the OGD domain are copyright and *sui generis* database rights. Other types of IP rights are used less frequently in the public sector, such as information involving cultural heritage cases and special datasets (e.g., museum datasets). The UML schema is presented in Fig. 8 and glossary of classes is explained.

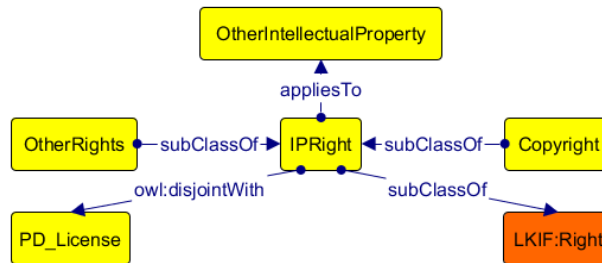


Figure 8. UML Schema: Neighbouring classes of *IPRight*

Classes: *OtherRights* – a class representing the main legal rights related to copyright (related copyrights, rental right, lending right), but not copyright per se. *OtherIntellectualProperty* – a class representing the field of intellectual property (e.g., patents, designs, plant variety sui generis rights, trademarks), excepting copyright and the EU sui generis database right.

Copyright

Copyright represents one of the most important parts of the Ontology. Copyrighted works can be contained within datasets, and even databases can be protected by copyright in the EU. The European and American approaches to copyright are quite different. In addition, even within Europe, particular aspects of copyright may be relevant at the level of member states, provinces or federal lands (*Länder*), or by

Public Sector Institutions (e.g., on specific heritage objects). This portion of the Ontology is based on the Berne Convention [33]. The UML schema is presented in Fig. 9 and the glossary of classes is explained as follows:

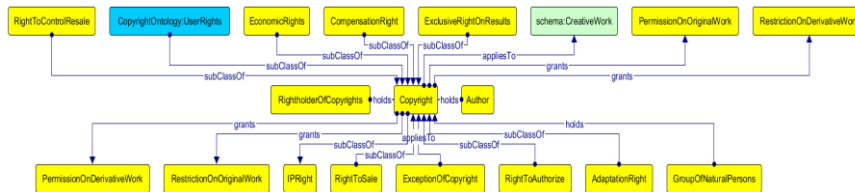


Figure 9. Neighbouring classes of Copyright

Classes: Author – the class represents the author. An author is a creator of creative work. The author of database is a creator or a rightholder of a database. It can be natural person, group of natural persons and successor of rights. If the legislation of the EU Member States permits, the rightholder can be also legal person. AdaptationRight – a class representing specific rights of copyrights that apply only to adaptations. CompensationRight – a class representing compensation of unauthorised use of Orphan Works. It is right of awarding to rightholders as a recompense for the use of copyrighted works. RightToAuthorize – a class representing the official permission made by the right holder, allowing someone to use the object protected by copyright or sui generis database right under the terms of the permission. ExclusiveRightOnResults – a class representing one of the copyrights, the legal right granted exclusively to an author or other rightholder to reproduction, distribution, communication, display or performance to the public of the results coming from his or her intellectual work. ExceptionOfCopyright – this class is used to express exceptions in copyright field. RightToControlResale – a class representing one of exclusive rights to control re-sale. RightToSale – it is a class representing the right to transfer copyrighted works for money or credit. RightholderOfCopyrights – a class representing the owner of the copyright, equivalent to the classes PersonWhoHoldsCopyright, Bearer and Author.

Sui Generis Database Rights

Sui generis database rights are applied to databases by the Database Directive in the European Union [34]. It is not unusual for a OGD to hold a *sui generis* database right: it could be applied if the dataset contains a database qualified to be protected by a *sui generis* database right. It is an important issue that *sui generis* database rights be transferred or granted only by contractual license. The *sui generis* database right is modelled as follows in Fig. 10, and the classes are explained in the following glossary:

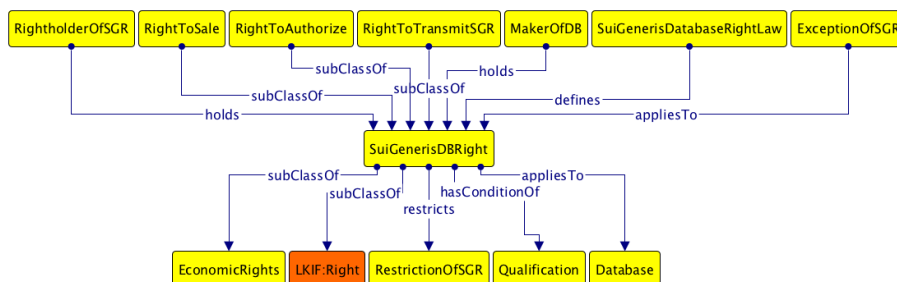


Figure 10. Neighbouring classes of SuiGenerisDBRight

Classes: *RightholderOfSGR* – a class representing the owner of the sui generis database rights. Properties include: *SuiGenerisDBRight*, equivalent to *MakerOfDB*. *RightToTransmitSGR* – a class representing the right to transmit, assign or grant Sui Generis database rights by transferring, assigning or granting them to the third party. *MakerOfDB* – a class representing the subject who made database: it is equivalent to *Bearer* and *RightholderOfSGR*. *SuiGenerisDatabaseRightLaw* – a class representing the law of the sui generis database right. In the European Union: the law is the Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases. In EU Member States: local law which implements the Directive 96/9/EC. *ExceptionOfSGR* – a class representing the limitation of the rights described by the Database Directive (96/9/EC). *RestrictionOfSGR* – a class representing a set of restricted actions granted by the EU Sui Generis Database Right. *Qualification* – a class representing an obligatory qualification to apply to the Sui Generis Database Right (EU). *Database* – a class representing Database, which is an organised collection of data and protected by the Database Directive in the EU, it is equivalent to *WholeDatabase* class.

Empirical Test

The empirical test is dedicated to testing the Ontology from a technical and legal point of view. We used a subset of the FOCA methodology evaluation criteria [32], and selected the following parameters:

- vii) P1-Clarity: clear for legal experts;
- viii) P2-Accuratness: precision of the result from a legal point of view;
- ix) P3-Consistency/coherence: whether is it possible to reach contradictory conclusions from valid input definitions;
- x) P4-Completeness: prove the incompleteness of an individual definition, and deduce the incompleteness of an ontology, and the incompleteness of an ontology if at least one definition is missing within the established reference framework;
- xi) P5-Usability: whether a legal expert can recognise the legal terminology and methodology of the discipline in the ontology;
- xii) P6-Correctness: correct from a technical point of view (e.g., syntax).

TABLE IV. TABLE OF QUALIFICATION

UK OGL v.3 clauses	Class of OGDLM	L4LOD
The Licensor grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information subject to the conditions below.	License, LKIF:LegalSource, GeneralRequirements, DBO:Jurisdiction ti:TimeInterval, LegalRules DeonticRules, Permission, ConditionsOfPSIRReuse	L4LOD:License
You are free to: •copy, publish, distribute and transmit the Information; •adapt the Information; •exploit the Information commercially and non-commercially for example, by combining it with other Information, or by including it in your own product or application.	Permission, ExceptionOfSGR, ExceptionOfCopyright, L4LOD:Derivative, PermissionOnDerivativeWork, PermissionOnOriginalWork, ConditionsOfPSIRReuse, DeonticRules, L4LOD:CommercialExpl, NonCommercialExpl, ThirdParty, Copyright, RightToAuthorize, RightToSale, Reproduction, Distribution, Performance, Display, Communication, ExclusiveRightOnResults, Alteration	L4LOD:Permission, L4LOD:Reproduction, L4LOD:Distribution, L4LOD:Publishing, L4LOD:CommercialExpl, L4LOD:Derivative
You must (where you do any of the above): •acknowledge the source of the Information in your product or application by including or linking to	L4LOD:Attribution, CopyrightOntology:AttributionRight Obligation AdaptersLicense RequirementsToAdaptersLicense	L4LOD:Attribution L4LOD:Obligation

any attribution statement specified by the Information Provider(s) and, where possible, provide a link to this licence;	BY_License	
Non-endorsement This licence does not grant you any right to use the Information in a way that suggests any official status or that the Information Provider and/or Licensor endorse you or your use of the Information.	NoEndorsment, Prohibition	none
Exemptions This licence does not cover: •personal data in the Information; •Information that has not been accessed by way of publication or disclosure under information access legislation (including the Freedom of Information Acts for the UK and Scotland) by or with the consent of the Information Provider; •departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset; •military insignia; •third party rights the Information Provider is not authorised to license; •other intellectual property rights, including patents, trade marks, and design rights; and •identity documents such as the British Passport	ExceptionOfPSIReuse InsigniaReuse CrestsOfIP NamesOfIP OfficialMark ID Logo ExceptionOfInsigniaReuse IntegralPartOfDocument IntegralPartOfDataset UnlawfulAccess PersonalData, ThirdPartyRights OtherIntellectualProperty Trademarks, Patents,	none
This licence is governed by the laws of the jurisdiction in which the Information Provider has its principal place of business, unless otherwise specified by the Information Provider	DBO:Jurisdiction	none

The test is divided in these steps: i) we had previously prepared some key questions (critical queries) for the test (e.g., which obligations could be matched together?); ii) the author models the Creative Commons licenses, Open Government License Canada v.2.0, UK OGL v.3.0, that are the use-cases chosen for preliminary empirical testing, using LIME [172] editor in order to connect the OGDL4M classes to the text. The output is an Akoma Ntoso file associated with the classes of the OGDL4M ontology; iii) a converter extracts the RDF triples and stores them in a SPARQL endpoint; iv) the queries are performed for testing the results; v) a legal expert provides an assessment of the results that will be used for fine-tuning the ontology. These test steps will be repeated for several cycles.

TABLE V. POSSIBLE QUERIES FOR THE TEST

Parameter	Question	Queries
P1, P2	Q1	When performance of derivative work is legal?
P3	Q2	Are the ontology properties coherent with the domain?
P6	Q3	Does the reasoner bring modelling errors?

Table IV shows an example of the first and second steps of testing. After analyzing the UK OGL v.3.0 license and applying the ontologies to the license text, and we have produced the table, which shows a fragment of the classification. In Table V, possible queries are shown to test different parameters, e.g., Q1 checks parameters Clearness (P1) and Accurateness (P2).

Conclusion and Future Work

We have presented a portion of the OGD4M ontology in order to demonstrate that a more complex and articulated ontology will be necessary to manage mashups of Open Government Datasets. Such an ontology should be able to model the multifaceted aspects of intellectual property rights that govern the use of OGD, including copyright and database rights. A deep legal analysis of all the concepts in IPR, PSI, database directives and Open Government Data regulation is necessary for producing a legal sound outcome, useful for the RDF queries (e.g., SPARQL), OWL reasoners (e.g., Pellet, HermiT), and for producing inputs to legal reasoning (e.g., predicates). Narrowing one's perspective to only data licensing *per se*, without fully considering compliance with other factors coming from legislation, directives, and expert knowledge, ultimately will not yield reliable or actionable knowledge in a real-world legal context, due to the large number of interactions between legal concepts that affect meaningful utilization of the information. An interdisciplinary approach is fundamental for correctly representing machine-readable relationships between deontic operators and legal rules, including exceptions, violations, and reparations. Other important results are the analysis of the disjointWith and equivalent classes, and the restrictions in the properties and data types.

In the coming future we expect to proceed in the following direction: i) test the Ontology and collect feedback from the legal expert using the LIME editor in order to permit crowdsourcing annotation of a sample of licenses; ii) optimise the UML-Grafoo modelisation, with the help of knowledge engineers in order to produce a sound and robust OWL representation; iii) use the crowdsourcing feedback to improve the Ontology.

Acknowledgment

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Annex 1. Revised PSI Directive Implementation

Note: Revised Psi directive is not implemented yet in Belgium, Bulgaria, Cyprus, Croatia, Czech Republic, Estonia, Finland, France, Ireland, Lithuania, Luxemburg, Poland, Portugal, Romania, Slovakia, Slovenia.

Revised PSI Directive	Implemented	Not implemented
“documents the supply of which is an activity falling outside the scope of the public task of the public sector bodies concerned as defined by law or by other binding rules in the Member State, or in the absence of such rules, as defined in line with common administrative practice in the Member State in question, provided that the scope of the public tasks is transparent and subject to review ”[20]	AT, ATW, ATV, ATL, ATB, ATS, ATA, ATU, GR, IT, MT	D, DK, HU(not subject to review) LV NL S SE UK
“documents which are excluded from access by virtue of the access regimes in the Member States, including on the grounds of: — the protection of national security (i.e. State security), defence, or public security, — statistical confidentiality, — commercial confidentiality (e.g. business, professional or company secrets)” [20]	AT, ATW ATV, ATL, ATA, ATU, ATB ATS D (not specificated) GR, IT, LV, MT, S, UK	DK HU NL SE
“documents held by educational and research establishments, including organisations established for the transfer of research results, schools and universities, except university libraries and;” [20]	AT, ATW ATV, ATL, ATB, ATS, ATA, ATU D, GR, IT, MT, NL, S, SE, UK	DK HU LV
“documents held by cultural establishments other than libraries, museums and archives. ” [20]	AT, ATW ATV, ATL, ATB, ATS, ATA, ATU, D, DK, GR, IT, MT, NL, S, SE, UK	HU
“This Directive builds on and is without prejudice to access regimes in the Member States.”; “ documents access to which is restricted by virtue of the access regimes in the Member States, including cases whereby citizens or companies have to prove a particular interest to obtain access to documents;” [20]	AT, ATW ATV, ATL, ATB, ATS, ATA, ATU, D(general rule, not specificated) GR, IT, LV, MT, S, UK	DK HU NL SE
“parts of documents containing only logos, crests and insignia;	AT, ATW ATV, ATL, ATB, ATS, ATA, ATU, D, GR, HU, IT, MT, NL, S, UK	DK, LV, SE

documents access to which is excluded or restricted by virtue of the access regimes on the grounds of protection of personal data, and parts of documents accessible by virtue of those regimes which contain personal data the re-use of which has been defined by law as being incompatible with the law concerning the protection of individuals with regard to the processing of personal data;”[20]	AT, ATW ATV, ATL, ATB, ATS, ATA, ATU, D(before), GR, IT, LV, MT, NL, S, UK	DK HU SE
<p>machine-readable format’ means a file format structured so that software applications can easily identify, recognize and extract specific data, including individual statements of fact, and their internal structure;</p> <p>‘open format’ means a file format that is platform-independent and made available to the public without any restriction that impedes the re-use of documents;</p> <p>‘formal open standard’ means a standard which has been laid down in written form, detailing specifications for the requirements on how to ensure software interoperability;</p> <p>‘university’ means any public sector body that provides post-secondary-school higher education leading to academic degrees.’</p>	<p>AT</p> <p>ATW (note: university term changed to higher education institution)</p> <p>ATV (except universities definition; all libraries of education sector, e.g. schools, are included)</p> <p>ATL</p> <p>ATB</p> <p>ATS</p> <p>ATA</p> <p>ATU</p> <p>D (except university definition)</p> <p>GR</p> <p>HU (machine-readable format is interpreted as “format automatically editable as an IT tool”)</p> <p>IT</p> <p>LV (open data and metadata terms are applied instead of the terms used in Directive)</p> <p>MT</p> <p>S</p> <p>UK</p>	DK SE
1. Subject to paragraph 2 Member States shall ensure that documents to which this Directive applies in accordance with Article 1 shall be re-usable for commercial or non-commercial purposes in accordance with the conditions set out in Chapters III and IV.	AT, ATW, ATV, ATL, ATB, ATS, ATA, ATU D, DK, GR, HU, IT, MT, NL, SE, UK	LV(re-use is allowed only to private individuals) S (different charges for commercial re-use may apply)
2. For documents in which libraries, including university libraries, museums and archives hold intellectual property rights , Member States shall ensure that, where the re-use of such documents is allowed, these	AT, ATW, ATV, ATL, ATB, ATS, ATA, ATU, D, HU (different interpretation: not “shall” but “may”) IT	GR, DK, S SE

documents shall be re-usable for commercial or non-commercial purposes in accordance with the conditions set out in Chapters III and IV.?	LV MT, NL UK	
In the event of a negative decision, the public sector bodies shall communicate the grounds for refusal to the applicant on the basis of the relevant provisions of the access regime in that Member State or of the national provisions adopted pursuant to this Directive, in particular points (a) to (cc) of Article 1(2) or Article 3. Where a negative decision is based on Article 1(2)(b), the public sector body shall include a reference to the natural or legal person who is the rightholder , where known, or alternatively to the licensor from which the public sector body has obtained the relevant material. Libraries, including university libraries, museums and archives shall not be required to include such a reference.	AT ATW (before) ATV ATL ATS ATA ATB ATU D (before) DK (before) GR HU (before) IT LV MT NL S SE UK	
Any decision on re-use shall contain a reference to the means of redress in case the applicant wishes to appeal the decision. The means of redress shall include the possibility of review by an impartial review body with the appropriate expertise, such as the national competition authority, the national access to documents authority or a national judicial authority, whose decisions are binding upon the public sector body concerned.?	AT(before) ATW (before) ATV ATL ATS ATA ATB? ATU? D(before) GR HU (before) IT (before) MT SE(before) UK	DK LV NL S
Available formats 1. Public sector bodies shall make their documents available in any pre-existing format or language,	AT ATW ATV	SE

<p>and, where possible and appropriate, in open and machine-readable format together with their metadata. Both the format and the metadata should, in so far as possible, comply with formal open standards.</p> <p>2. Paragraph 1 shall not imply an obligation for public sector bodies to create or adapt documents or provide extracts in order to comply with that paragraph where this would involve disproportionate effort, going beyond a simple operation.</p> <p>3. 3. On the basis of this Directive, public sector bodies cannot be required to continue the production and storage of a certain type of documents with a view to the re-use of such documents by a private or public sector organisation.’.</p>	<p>ATL ATB ATS ATA ATU D DK GR HU IT LV (only “if useful” condition applies) MT NL S UK</p>	
<p>Principles governing charging</p> <p>1. Where charges are made for the re-use of documents, those charges shall be limited to the marginal costs incurred for their reproduction, provision and dissemination.</p> <p>2. Paragraph 1 shall not apply to the following:</p> <p>(a) public sector bodies that are required to generate revenue to cover a substantial part of their costs relating to the performance of their public tasks;</p> <p>(b) by way of exception, documents for which the public sector body concerned is required to generate sufficient revenue to cover a substantial part of the costs relating to their collection, production, reproduction and dissemination. Those requirements shall be defined by law or by other binding rules in the Member State. In the absence of such rules, the requirements shall be defined in accordance with common administrative practice in the Member State;</p> <p>(c) libraries, including university libraries, museums and archives.</p> <p>3. In the cases referred to in points (a) and (b) of paragraph 2, the public sector bodies</p>	<p>AT ATW ATV ATL ATB ATS ATA ATU D GR IT MT NL S SE UK</p>	<p>DK HU (includes charges also for data processing; “a reasonable return on investment” is counted as “a profit margin of no more than 5%”) LV (includes charges also for data processing)</p>

<p>concerned shall calculate the total charges according to objective, transparent and verifiable criteria to be laid down by the Member States. The total income of those bodies from supplying and allowing re-use of documents over the appropriate accounting period shall not exceed the cost of collection, production, reproduction and dissemination, together with a reasonable return on investment.</p> <p>Charges shall be calculated in line with the accounting principles applicable to the public sector bodies involved.</p> <p>4. Where charges are made by the public sector bodies referred to in point (c) of paragraph 2, the total income from supplying and allowing re-use of documents over the appropriate accounting period shall not exceed the cost of collection, production, reproduction, dissemination, preservation and rights clearance, together with a reasonable return on investment. Charges shall be calculated in line with the accounting principles applicable to the public sector bodies involved.?</p>		
<p>Transparency</p> <p>1. In the case of standard charges for the re-use of documents held by public sector bodies, any applicable conditions and the actual amount of those charges, including the calculation basis for such charges, shall be pre-established and published, through electronic means where possible and appropriate.</p> <p>2. In the case of charges for the re-use other than those referred to in paragraph 1, the public sector body in question shall indicate at the outset which factors are taken into account in the calculation of those charges. Upon request, the public sector body in question shall also indicate the way in which such charges have been calculated in relation to the specific re-use request.</p> <p>3. The requirements referred to in point (b) of Article 6(2) shall be pre-established. They shall be published by electronic means, where possible and appropriate.</p> <p>4. Public sector bodies shall ensure that applicants for re-use of documents are informed of available means of redress relating to decisions or practices affecting</p>	<p>AT ATW ATV ATL ATB ATS ATA ATU D GR HU IT MT NL S SE UK</p>	<p>DK LV</p>

them.’.		
‘1. Public sector bodies may allow re-use without conditions or may impose conditions, where appropriate through a license. These conditions shall not unnecessarily restrict possibilities for re-use and shall not be used to restrict competition.’.	AT(before) ATW (before) ATV (before) ATL(before) ATA ATB? ATS? ATU? D DK (before) GR IT MT S SE(before) UK	HU LV (only requirement is not to restrict competition)
Practical arrangements Member States shall make practical arrangements facilitating the search for documents available for re-use, such as asset lists of main documents with relevant metadata , accessible where possible and appropriate online and in machine-readable format , and portal sites that are linked to the asset lists. Where possible Member States shall facilitate the cross-linguistic search for documents.’.	AT, ATW ATV ATL ATB ATS ATA ATU D (except cross-linguistic search) GR (except cross-linguistic search) IT MT S UK	DK HU LV NL SE
‘This paragraph shall not apply to digitisation of cultural resources.’; 2a. Notwithstanding paragraph 1, where an exclusive right relates to digitisation of cultural resources, the period of exclusivity shall in general not exceed 10 years. In case where that period exceeds 10 years, its duration shall be subject to review during the 11th year and, if applicable, every seven years thereafter. The arrangements granting exclusive rights referred to in the first subparagraph	AT ATW ATV ATL ATB ATS ATA ATU D DK GR	

<p>shall be transparent and made public.</p> <p>In the case of an exclusive right referred to in the first subparagraph, the public sector body concerned shall be provided free of charge with a copy of the digitised cultural resources as part of those arrangements. That copy shall be available for re-use at the end of the period of exclusivity.’</p> <p>Exclusive arrangements existing on 1 July 2005 that do not qualify for the exceptions under paragraph 2 shall be terminated at the end of the contract or in any event not later than 31 December 2008.’;</p> <p>Without prejudice to paragraph 3, exclusive arrangements existing on 17 July 2013 that do not qualify for the exceptions under paragraphs 2 and 2a shall be terminated at the end of the contract or in any event not later than 18 July 2043.’;</p>	<p>HU(exclusive arrangements existing on 17 July 2013 is modified to 1 January 2016)</p> <p>IT (except cadastral and mortgage documents: commercial re-users must pay the corresponding fee, plus 20 %; costs of data collection is included, non-commercial and commercial re-use applies to different fee rates)</p> <p>LV (without the deadlines to terminate exclusive arrangements)</p> <p>MT</p> <p>NL</p> <p>S</p> <p>SE (without the deadlines to terminate exclusive arrangements)</p> <p>UK</p>	
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Legend:

ATW-Wien
ATV- Vorarlberg
ATL- Lower Austria
ATB- Burgenland
ATS- Styria
ATA- Salzburg
ATU- Upper Austria
D-Germany
DK-Denmark
GR-Greece
HU-Hungary
IT-Italy
LV-Latvia
MT-Malta
NL- The Netherlands
S-Spain
SE-Sweden
UK-United Kingdom

Annex 2. The Survey

The document is published and provided in Github[5]:

<https://github.com/martynui/OGDL4M/blob/master/Annex%20%20Survey.pdf>

Annex 3. Connected Ontologies, Classes and Properties, Glossary of Terms, Concept Tables.

Connected ontologies, classes and properties

The document is published and provided in Github[5]:

<https://github.com/martynui/OGDL4M/blob/master/The%20classes%20of%20the%20connected%20ontologies.pdf>

Glossary of Terms

The document is published and provided in Github[5]:

<https://github.com/martynui/OGDL4M/blob/master/Glossary%20of%20terms.pdf>

Concept tables

Table 40. Concept tables

Explicit Concept	Definition by legal (or other) source	Normalised Definition	Equivalent to	Sub class of	Disjoint with	Link to normative/legal source
Distribution	“In respect of the expression of the database which is protectable by copyright....”	An act or process of transmission of database or copy of database (Also an act of making available database to the public)	none	None		96/9/EC 5.1(e)
Prohibition	none	The class is a part of the deontic rules used to express the obligations.	none	schema:Action	Permission NoLicense PD_License	None
Adaptation	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to	The act or process of modifying of the content of the Original Work/Database .		Alteration schema:Action		96/9/EC 5.1(b) Berne convention §12

	<p>authorize: translation, adaptation, arrangement and any other alteration;</p> <p>Authors of literary or artistic works shall enjoy the exclusive right of authorizing adaptations, arrangements and other alterations of their works.</p>					
AdaptedMaterial	<p>Adapted Material means material subject to Copyright and Similar Rights that is derived from or based upon the Licensed Material and in which the Licensed Material is translated, altered, arranged, transformed, or otherwise modified in a manner requiring permission under</p>	<p>Any reproduction, distribution, communication, display or performance to the public of the results of translation, adaptation, arrangement and any other alteration of the Original Work/Database .</p>	DerivativeWork			<p>CC BY-SA 4.0 1.a.</p>

	the Copyright and Similar Rights held by the Licensor. For purposes of this Public License, where the Licensed Material is a musical work, performance, or sound recording, Adapted Material is always produced where the Licensed Material is synched in timed relation with a moving image.	Equal to Derivative Work.				
AdaptersLicense	Adapter's License means the license You apply to Your Copyright and Similar Rights in Your contributions to Adapted Material in accordance with the terms and conditions of this Public License.	The license of adapted Material. Applies to Derivative Work.		License		CC BY-SA 4.0 1.b.
Alteration	In respect of the	The act or		schema:Action		96/9/EC 5.1(b)

	<p>expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: translation, adaptation, arrangement and any other alteration;</p> <p>Authors of literary or artistic works shall enjoy the exclusive right of authorizing adaptations, arrangements and other alterations of their works.</p>	<p>process of modifying, changing of the content of Original Work/Database without obliterating it.</p>				<p>Berne convention §12</p>
AnyOtherAlteration	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right</p>	<p>The act or process of modifying (except translation, adaptation or arrangement), chang-</p>		<p>schema:Action Alteration</p>		<p>96/9/EC 5.1(b)</p>

	to carry out or to authorize: translation, adaptation, arrangement and any other alteration.	ing of the content of the Original Work/Database without obliterating it.				
ApprovedByCreativeCommons	BY-SA Compatible License listed at creativecommons.org/compatiblelicenses , approved by Creative Commons as essentially the equivalent of BY-SA License.	Attribute of CC BY-SA Compatible License				CC-BY-SA 4.0
Archives	This Directive shall not apply to: documents held by cultural establishments other than libraries, museums and archives.	The class represents public archive.				2013/ 37/EU (1)(a)(v).
Arrangement	In respect of the expression of the database which is protectable by copyright, the author of a	The act or process of arranging of the Original Work/Database		schema:Action Alteration		96/9/EC 5.1(b)

	<p>database shall have the exclusive right to carry out or to authorize:</p> <p>(b) translation, adaptation, arrangement and any other alteration;</p>	.				
Assignment	<p>The right referred to in paragraph 1 may be transferred, assigned or granted under contractual license.</p>	<p>The act of assigning (sui generis rights of database). Applies to Third Party. Deactivates Restriction of Sui generis Database rights.</p>		schema:Action		96/9/EC 7.3
Authorisation	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to</p>	<p>Act or process of authorization. It acts on Permission on Derivative Work/Database and Original Work/Database</p>		schema:Action, Permission		96/9/EC 5.1

	authorize (...)	.				
BY_License	It's a class of attribution type of licenses, e.g. CC BY-SA 4.0, UK OGL v3	Attribution license		License		CC BY-SA 4.0, UK OGL v3
BY_SA_4.0_CompatibleLicense	BY-SA Compatible License means a license listed at creativecommons.org/licenses/by-sa/4.0/ approved by Creative Commons as essentially the equivalent of this Public License.	It is BY-SA Compatible License		TemplateOfAdaptersLicense SA_License		CC BY-SA 4.0
Bearer	A person or thing that carries or holds something.	A party that carries or holds rights and sets deontic rules.				Oxford Dictionaries
Collective work	Where collective works are recognized by the legislation of a Member State, the economic rights shall be owned by the person holding the copy-	Compilation or assemblage of individual works.		schema:CreativeWork dcat:Dataset		96/9/EC 4.2

	right.					
CommercialConfidentiality	<p>This Directive shall not apply to:</p> <p>documents which are excluded from access by virtue of the access regimes in the Member States, including on the grounds of:</p> <p>— commercial confidentiality (e.g. business, professional or company secrets);</p>	The class represents commercial confidentiality.				2013/ 37/EU (1)(a)(ii)
Communication	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize:</p> <p>any reproduction, distribution, communication, display</p>	The act of communicating the Derivative Work/Database or/and Original Work/Database .		schema:Action		96/9/EC 4.2

	or performance to the public of the results of the acts referred to in (b).					
CompensationRight	Member States shall provide that a fair compensation is due to rightholders that put an end to the orphan work status of their works or other protected subject-matter for the use that has been made by the organisations referred to in Article 1(1) of such works and other protected subject-matter in accordance with paragraph 1 of this Article. Member States shall be free to determine the circumstances under which the payment of such compensation may	Right to compensation. Applies to Orphan Work.		EconomicRights Copyright		2012/28/EU 6.5

	be organised. The level of the compensation shall be determined, within the limits imposed by Union law, by the law of the Member State in which the organisation which uses the orphan work in question is established.					
ConditionsOfPSIReuse	The conditions are regulated by PSI directive chapter III: available formats, principles governing charging, transparency, licenses and practical arrangements.	Conditions, which are applied to Public Sector Information. It is acting on Obligation, Permission and Prohibition.		PSIReuseRules		2003/98/EC Chapter III
ContractualLicense	The right referred to in paragraph 1 may be transferred, assigned or granted under contractual license.	A license which has attributes of a contract and is applied in case of transferring,	judo:Contractual_License	License		96/9/EC 7.3

		<p>assigning or granting sui generis database rights.</p> <p>It is equal to judo:Contractual_Agreement.</p>				
CopyOfDB	<p>The performance by the lawful user of a database or of a copy thereof of any of the acts listed in Article 5 which is necessary for the purposes of access to the contents of the databases and normal use of the contents by the lawful user shall not require the authorization of the author of the database.</p> <p>(...)any form of distribution to the public of the database or of copies thereof. The first</p>	<p>A duplicate or reproduction of whole original database; a duplicate of whole database; one type of expression of whole database.</p> <p>Performed by Lawful user.</p>		DatabaseEU dcat:Dataset		<p>96/9/EC 6.1 96/9/EC 5(c) 96/9/EC 7.2(b)</p>

	<p>sale in the Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;</p> <p>(...)The first sale of a copy of a database within the Community by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;</p>					
Copyright	<p>Copyright (or author's right) is a legal term used to describe the rights that creators have over their literary and artistic works. Works covered by</p>	<p>The legal right, defined by Copyright Law, granted to an author or other right-holder to exclusive publication, pro-</p>		IPRights	PD_License NoLicense	WIPO

	copyright range from books, music, paintings, sculpture, and films, to computer programs, databases, advertisements, maps, and technical drawings.	duction, sale, distribution of Original Work/database and distribution of Derivative Work/database. It applies to Creative Work. It grants Restriction on Original Work. It is implemented by First Sale Rule.				
CopyrightLaw	Law which regulates copyright	It is a Law, which regulates copyright		lkif-core:Legal_Document		<none>
CopyrightNotice	If You Share the Licensed Material (including in modified form), You must retain the following if it is supplied by the Licensor with the Licensed Material: a	A class which represents copyright notice.				CC BY-SA 4.0 3.a.1.A.ii.

	copyright notice.					
CrestsOfPSO	This licence does not cover: departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset.	The class represents crests of Public Sector Organisation.		InsigniaPartOf Document PublicSectorInformation		UK OGL v.3
CulturalEstablishments	This Directive shall not apply to: documents held by cultural establishments other than libraries, museums and archives.	The class represents public sector institution which belongs to cultural establishments. It has exception on archives, museums and libraries.				2013/ 37/EU (1)(a)(v).
CurrentModification	If You Share the Licensed Material (including in modified form), You must indicate if You modified the Li-	The class represents a current modification of Original Work/database.		DerivativeWork		CC BY-Sa 4.0 3.a.1.B.

	censed Material and retain an indication of any previous modifications.					
DatabaseEU	'Database' shall mean a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means in any form	The class represents database protected by EU Database Directive.	WholeDB	schema:CreativeWork dcat:Dataset		96/9/EC 1.2
DeonticRules	Deontic rules are rules which are concerned with obligation, permission, and related concepts.	The class represents deontic rules. Deontic rules has held by Third Party and set by Bearer. It is implemented by Prohibition, Permission and Obligation.		LegalRules		<none>
DerivativeWork	In respect of the expression of the	A class represents Deriva-	AdaptedMaterial	schema:CreativeWork	OriginalWork	96/9/EC 5.1(b)

	<p>database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: (...) translation, adaptation, arrangement and any other alteration</p>	<p>tive Work. It is disjoint with Original Work. It is a result of Alteration (translation, adaptation, arrangement and any other alteration).</p>		dcat:Dataset		
Display	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p>	<p>The act of displaying to the public (of database or part of it). Acts on Derivative Work/Database and Original Work/Database .</p>		schema:Action		96/9/EC 5.1(e)

Distribution	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).	An act or process of transmission of database or copy of database (Also an act of making available database to the public). Acts on Derivative Work/Copy of Database and Original Work/Copy of Database.		schema:Action		96/9/EC 5.1(e)
EconomicRights	Where collective works are recognized by the legislation of a Member State, the economic rights shall be owned by the person holding the copyright. Independently of the author's economic	Rights which are part of copyrights and which can be transferred or withdrew. It's withdraw by Authorisation, assigned by Assigantion, trasfered by		Copyright	co:MoralRights	96/9/EC 4.2 Berne Convention 6bis1

	rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.	Transfer, granted by Grant.				
EducationalAndResearchEstablishments	This Directive shall not apply to: (e) documents held by educational and research establishments, including organisations established for the transfer of research results, schools and universities, except university libraries	The class represents public sector institution which belongs to educational and research establishments (e.g. schools, universities). It has exception on university libraries.				2013/ 37/EU (1)(a)(iv).

	and;					
EducationalPurpose	<p>Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases:</p> <p>where there is use for the sole purpose of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved</p> <p>Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract</p>	<p>A limitation of copyright (economic rights) and/or sui generis rights for the sole non-commercial purpose of illustration for teaching or scientific research.</p> <p>It grants Lawful Access and used by Lawful User.</p>		<p>ExceptionOfSG R ExceptionOfCo pyright</p>		<p>96/9/EC 6.2</p> <p>96/9/EC 9.1(b)</p>

	<p>or re-utilize a substantial part of its contents:</p> <p>in the case of extraction for the purposes of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved;</p>					
Effective_Technological_Measures	<p>Effective Technological Measures means those measures that, in the absence of proper authority, may not be circumvented under laws fulfilling obligations under Article 11 of the WIPO Copyright Treaty adopted on December 20, 1996,</p>	<p>This class represents effective technological measures applied in copyright protection.</p> <p>It protects Copyright.</p>		NoDownstream Restrictions		<p>CC BY-SA 4.0 1.e.;</p> <p>WIPO Copyright Treaty 11</p>

	and/or similar international agreements. Contracting Parties shall provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by authors in connection with the exercise of their rights under this Treaty or the Berne Convention and that restrict acts, in respect of their works, which are not authorized by the authors concerned or permitted by law.					
ExceptionOfCopyright	Exceptions to restricted acts 1 . The performance by the lawful	This class is used to express exceptions of copyright. Ap-		lkif-core:Exception		96/9/EC 6

	<p>user of a database or of a copy thereof of any of the acts listed in Article 5 which is necessary for the purposes of access to the contents of the databases and normal use of the contents by the lawful user shall not require the authorization of the author of the database. Where the lawful user is authorized to use only part of the database, this provision shall apply only to that part.</p> <p>2. Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases:</p>	plies to Copyright and Permissions.				
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	<p>(a) in the case of reproduction for private purposes of a non-electronic database;</p> <p>(b) where there is use for the sole purpose of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved;</p> <p>(c) where there is use for the purposes of public security of for the purposes of an administrative or judicial procedure;</p> <p>(d) where other exceptions to copyright which are traditionally authorized under national law are involved, with-</p>					
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	<p>out prejudice to points (a), (b) and (c).</p> <p>3 . In accordance with the Berne Convention for the protection of Literary and Artistic Works, this Article may not be interpreted in such a way as to allow its application to be used in a manner which unreasonably prejudices the rightholder's legitimate interests or conflicts with normal exploitation of the database.</p>					
ExceptionOfInsigniaReuse	<p>This licence does not cover: departmental or public sector organisation logos, crests and the Royal Arms except where they form</p>	<p>Exceptions applied to rules of insignia reuse. It allows use insignia when it is an integral part of</p>		<p>lkif-core:Exception InsigniaReuse</p>		<p>UK OGL v3</p>

	an integral part of a document or dataset.	document or dataset. It applies to Integral Part of Dataset and Integral Part of Document.				
ExceptionOfPSIR use	This Directive shall not apply to: (a) documents the supply of which is an activity falling outside the scope of the public task of the public sector bodies concerned as defined by law or by other binding rules in the Member State, or in the absence of such rules, as defined in line with common administrative practice in the Member State in question, provided that the scope of the public tasks is	The class represents exceptions applied to reuse of Public sector information. It applies to Insignia Reuse, Non-public Task Documents, Excluded from Access Documents , Unlawful Access, Personal Data, Educational and Research Establishments, Cultural Estab-		lkif-core:Exception		2003/98/EC 1.2 2013/ 37/EU 1.a.

	<p>transparent and subject to review;</p> <p>(b) documents for which third parties hold intellectual property rights;</p> <p>(c) documents which are excluded from access by virtue of the access regimes in the Member States, including on the grounds of:</p> <ul style="list-style-type: none"> — the protection of national security (i.e. State security), defence, or public security, — statistical confidentiality, — commercial confidentiality (e.g. business, professional or company secrets); 	<p>lishments, PublicService-Broadcasting-Data, Third Party rights and Other Intellectual Property.</p> <p>It is implemented by conditions of PSI reuse.</p>				
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	<p>(ca) documents access to which is restricted by virtue of the access regimes in the Member States, including cases whereby citizens or companies have to prove a particular interest to obtain access to documents;</p> <p>(cb) parts of documents containing only logos, crests and insignia;</p> <p>(cc) documents access to which is excluded or restricted by virtue of the access regimes on the grounds of protection of personal data, and parts of documents accessible by virtue of those regimes which contain personal</p>					
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	<p>data the re-use of which has been defined by law as being incompatible with the law concerning the protection of individuals with regard to the processing of personal data;</p> <p>(d) documents held by public service broadcasters and their subsidiaries, and by other bodies or their subsidiaries for the fulfilment of a public service broadcasting remit;</p> <p>(e) documents held by educational and research establishments, including organisations established for the transfer of research results, schools and</p>					
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	universities, except university libraries and; (f) documents held by cultural establishments other than libraries, museums and archives.					
ExceptionOfSGR	Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize a substantial part of its contents (...)	The class represents exceptions of published database applied to Sui Generis Database Right. It applies to Permission and Sui Generis Database Right.		lkif-core:Exception		96/9/EC 9
ExcludedFromAccessDocuments	This Directive shall not apply to: documents which are excluded from access by virtue of the access regimes in the Member	The class represents public sector documents, which are excluded from public access.				2013/ 37/EU (1)(a)(ii-iii)

	<p>States, including on the grounds of:</p> <ul style="list-style-type: none"> — the protection of national security (i.e. State security), defence, or public security, — statistical confidentiality, — commercial confidentiality (e.g. business, professional or company secrets); <p>(ca) documents access to which is restricted by virtue of the access regimes in the Member States, including cases whereby citizens or companies have to prove a particular interest to obtain access to documents;</p> <p>(cb) parts of docu-</p>	<p>It is excluded from access because of these reasons: Protection of National Security, Statistical Confidentiality, Commercial Confidentiality, Specific Access, InsigniaPartOf-Document, Personal Data.</p>				
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	<p>ments containing only logos, crests and insignia;</p> <p>(cc) documents access to which is excluded or restricted by virtue of the access regimes on the grounds of protection of personal data, and parts of documents accessible by virtue of those regimes which contain personal data the re-use of which has been defined by law as being incompatible with the law concerning the protection of individuals with regard to the processing of personal data;</p>					
ExclusiveRightOfResults	In respect of the expression of the database which is	Is a right applied only to translated,		Copyright		96/9/EC 5.1(e)

	<p>protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p>	<p>adapted, arranged or any other kind altered results of Original-Work/Database . It grants Restriction on Derivative Work. It holds Permission on Derivative Work. It is implemented by <code>lod:NoDerivative</code>. It applies to Derivative Work, Translation, Adaptation, Arrangement, Any Other Alteration and Alteration.</p>				
Extraction	'Extraction' shall mean the permanent or temporary trans-	The action or process of retrieving all or		NormalUse schema:Action		96/9/EC 7.2

	fer of all or a substantial part of the contents of a database to another medium by any means or in any form	substantial part of the contents out of database and transferring it permanent or temporary to another medium. It applies to Whole DB and Substantial Part DB.				
FirstSaleRule	The first sale in the Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community. 'Re-utilization' shall mean any form of making available to the public all or a substantial part of the contents of a	Special rule applied to the first sale of a copy of the database by the right holder or with his consent. It is performed by Right holder of SGR and/or Right holder of Copyrights. It affects Limitation of Distribution (DB). It				96/9/EC 5.1(c), 7.2(b)

	<p>database by the distribution of copies, by renting, by on-line or other forms of transmission. The first sale of a copy of a database within the Community by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;</p>	<p>applies to Copy of DB.</p>				
FreeArtLicense1.3	<p>The class of FreeArtLicense1.3 https://raw.githubusercontent.com/ZeroK-RTS/ZeroK/master/freeartlicense1.3.txt. Free Art License: The Free Art license 1.3 was declared a “BY-SA–</p>	<p>The class represents FreeArtLicense1.3. It has attribute Approved by Creative Commons.</p>		SA_License BY_SA_4.0_CompatibleLicense		<p>https://creativecommons.org/licenses/by-sa/4.0/</p>

	Compatible License” for version 4.0 on 21 October 2014.					
GPLv3	<p>The class of GPLv3 license https://www.gnu.org/licenses/gpl-3.0.txt. GPLv3: The GNU General Public License version 3 was declared a “BY-SA–Compatible License” for version 4.0 on 8 October 2015. Note that compatibility with the GPLv3 is one-way only, which means you may license your contributions to adaptations of BY-SA 4.0 materials under GPLv3, but you may not license your contributions to adaptations of</p>	<p>The class represents GPLv3 license. It has attribute Approved by Creative Commons.</p>		SA_License BY_SA_4.0_CompatibleLicense		<p>https://creativecommons.org/share-your-work/licensing-considerations/compatible-licenses/</p>

	GPLv3 projects under BY-SA 4.0.					
GeneralRequirements	General requirements of PSI reuse are those requirements which are applied in whole country level.	Requirements which has jurisdiction of whole country. It applies to Public Sector Information. It grants Special Requirements and Open Domain OGD. Is implemented by License, TermsOfUse and LegalNotice.		NationalPSILaw		<none>
Grant	The right referred to in paragraph 1 may be transferred, assigned or granted under contractual license.	Action or process of granting sui generis database rights. It deactivates Restriction of SGR and applies to Third Party.		schema:Action		96/9/EC 7.3

GroupOfNaturalPersons	The author of a database shall be the natural person or group of natural persons who created the base or, where the legislation of the Member States so permits, the legal person designated as the rightholder by that legislation	More than one natural person. It holds copyright. It is equal to Author of DB.	schema:Author			96/9/EC 4.1
ID	This licence does not cover: identity documents such as the British Passport.	The class represents Information of Identity Document, e.g. British Passport		ExceptionOfPSI Reuse		UK OGL v.3.0
IPRights	Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.	The class represents Intellectual Property rights. It applies to Other Intellectual Property.		lkif-core:Right	NoLicence PD_License	WIPO

IdentificationOf-Creator	If You Share the Licensed Material (including in modified form), You must retain the following if it is supplied by the Licensor with the Licensed Material: identification of the creator(s) of the Licensed Material and any others designated to receive attribution, in any reasonable manner requested by the Licensor (including by pseudonym if designated);	The class represents attribution requirement of identification of creator.				CC BY-SA 4.0 3.a.1.A.i
IdicationOfLicensedMaterialLicense	(...)indicate the Licensed Material is licensed under this Public License, and include the text of , or the URI or hyperlink to, this	The class represents attribution requirement of identification of Original Work/Database				CC BY-SA 4.0 3.a.1.C

	Public License.	License. It provides Text of License or URI of License.				
IdentificationOf-Modification	Indicate if You modified the Licensed Material and retain an indication of any previous modifications.	The class represents attribution requirement of identification of modification. It indicates Previous Modifications and/or Current Modification.				CC BY-SA 4.0 3.a.1.B
InsigniaPartOf-Document	This Directive shall not apply to: (cb) parts of documents containing only logos, crests and insignia;	The class represents a part of Public Sector Information which has Insignia and it is a part of document.				2013/ 37/EU (1)(a)(iii)
InsigniaReuse	Logos, crests and insignia is not a part of Public Sector Information. In	The class represents one of exceptions of PSI reuse: is		ExceptionOfPSI Reuse		2013/37/EU 1.a.iii.cb

	<p>general, it is not allow to reuse it. (...)parts of documents containing only logos, crests and insignia;</p>	<p>not allow reusing Logos, crests and insignia of Public Institutions. It applies to Public Sector Institution Insignia, Crests of Public Sector Institution, Names of Information Provider, Official Mark and Logo.</p>				
InstitutionPSILaw	<p>Institution PSI law is legal regulation of reuse of public sector information released by the institution itself. Sometimes it implements specific requirements of PSI reuse, if national PSI law it permits. Usually</p>	<p>The class represents law of Public Sector Information reuse applied by Institution (e.g. PSI Provider).</p>		LocalizedPSILaw		<none>

	attribution requirements are specified.					
Insubstantial-PartDB	<p>The repeated and systematic extraction and/or re-utilization of insubstantial parts of the contents of the database implying acts which conflict with a normal exploitation of that database or which unreasonably prejudice the legitimate interests of the maker of the database shall not be permitted.</p> <p>The maker of a database which is made available to the public in whatever manner may not prevent a lawful user of the database from extracting and/or re-utilizing insubstantial parts</p>	It's a part of database, but not a qualitatively or quantitatively significant part of the database.		SubstantialPart DB		<p>96/9/EC 7.5</p> <p>96/9/EC 8.1</p>

	of its contents, evaluated qualitatively and/or quantitatively, for any purposes whatsoever.					
IntegralPartOf-Dataset	This licence does not cover: departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset.	The class represents integral part of dataset.		OpenGovDatasets		UK OGL v.3
IntegralPartOf-Document	This licence does not cover: departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset.	The class represents integral part of document.		PublicSectorInformation InsigniaPartOf Document		UK OGL v.3
Jurisdiction_FI	Jurisdiction of Finland.	The class represents Jurisdiction of		dbo:Jurisdiction		

		Finland.				
Jurisdiction_UK	Jurisdiction of United Kingdom (UK): England and Wales, Scotland, Northern Ireland	The class represents Jurisdiction of UK (England and Wales, Scotland, Northern Ireland).		dbo:Jurisdiction		UK Government Licensing Framework
LaterVersionsLicense	The Adapter's License You apply must be a Creative Commons license with the same License Elements, this version or later, or a BY-SA Compatible License.	The class represents any later version of the CC BY-SA license. It has attribute Approved by Creative Commons.		BY_SA_4.0_CompatibleLicense		CC BY-SA 4.0 3.b.1
LawfulAccess	Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize	It is a legal condition to use limitation of exclusive copyrights and sui generis database rights. The limitation can be used only if it is set by law		ExceptionOfSGR ExceptionOfCopyright		96/9/EC 9.

	<p>a substantial part of its contents:</p> <p>(a) in the case of extraction for private purposes of the contents of a non-electronic database;</p> <p>(b) in the case of extraction for the purposes of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved;</p> <p>(c) in the case of extraction and/or re-utilization for the purposes of public security or an administrative or judicial procedure.</p>	<p>and must respect the conditions set by law.</p> <p>It is performed by Lawful User and grants Authorisation. It applies to NormalUse.</p>				
LawfulUser	The performance by the lawful user of a	It is a legal condition to use		ExceptionOfSG R		96/9/EC 6.1.

	<p>database or of a copy thereof of any of the acts listed in Article 5 which is necessary for the purposes of access to the contents of the databases and normal use of the contents by the lawful user shall not require the authorization of the author of the database.</p> <p>Where the lawful user is authorized to use only part of the database, this provision shall apply only to that part.</p> <p>Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization</p>	<p>limitation of exclusive rights and sui generis database rights. The limitation can be performed only by lawful user. It authorises Authorisation, and can access Database (EU).</p>		<p>ExceptionOfCopyright</p>		<p>96/9/EC 9.</p> <p>96/9/EC 8.1.</p> <p>96/9/EC 8.2.</p>
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	<p>of its maker, extract or re-utilize a substantial part of its contents (...)</p> <p>The maker of a database which is made available to the public in whatever manner may not prevent a lawful user of the database from extracting and/or re-utilizing insubstantial parts of its contents, evaluated qualitatively and/or quantitatively, for any purposes whatsoever. Where the lawful user is authorized to extract and/or re-utilize only part of the database, this paragraph shall apply only to that part.</p>					96/9/EC 8.3.
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	<p>A lawful user of a database which is made available to the public in whatever manner may not perform acts which conflict with normal exploitation of the database or unreasonably prejudice the legitimate interests of the maker of the database .</p> <p>A lawful user of a database which is made available to the public in any manner may not cause prejudice to the holder of a copyright or related right in respect of the works or subject matter contained in the database.</p>					
LegalNotice	Notice is the legal concept describing a	The class represents legal		lkif-core:Legal_Sou		Wikipedia

	<p>requirement that a party be aware of legal process affecting their rights, obligations or duties (source: Wikipedia).</p> <p>It is common to use legal notice as a tool to express legal rules applied to Open Government Data in OGD portals.</p>	notice.		rce		
LegalRules	<p>The rule of law is the legal principle that law should govern a nation, as opposed to being governed by arbitrary decisions of individual government officials</p>	<p>The class represents legal rules. It has jurisdiction, has valid TimeInterval, applies to Requirements of Adapters License, Reuse of Licensed Material and Reuse of Adapted Material.</p>				Wikipedia

LendingRight	<p>This Directive shall apply without prejudice to Community provisions relating to:</p> <p>rental right, lending right and certain rights related to copyright in the field of intellectual property.</p> <p>Lending means making available for use, for a limited period of time and not for direct or indirect economic or commercial advantage, when it is made through establishments which are accessible to the public.</p>	<p>A right to lend something, to make available for use, for a limited period of time and not for direct or indirect economic or commercial advantage, when it is made through establishments which are accessible to the public.</p>		lkif-core:Right		<p>96/9/EC 2.1(b)</p> <p>92/100/EEC 1.3</p>
Libraries	<p>This Directive shall not apply to: documents held by</p>	<p>The class represents public sector institution which</p>				<p>2013/ 37/EU (1)(a)(v).</p>

	cultural establishments other than libraries, museums and archives.	belongs to libraries.				
License	<p>The right referred to in paragraph 1 may be transferred, assigned or granted under contractual license.</p> <p>Public sector bodies may allow for re-use of documents without conditions or may impose conditions, where appropriate through a license, dealing with relevant issues. These conditions shall not unnecessarily restrict possibilities for re-use and shall not be used to restrict competition.</p>	It's a legal term describing a legal tool to provide authoritative permission, obligation and other conditions to use the work, data, database or other materials		lkif-core:Legal_Source		<p>96/9/EC 7.3.</p> <p>2003/98/EC 8.1.</p>
LimitationOfDis-	The first sale in the	It is limiting				96/9/EC 5.1(c),

tribution	<p>Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community.</p> <p>'Re-utilization' shall mean any form of making available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on-line or other forms of transmission. The first sale of a copy of a database within the Community by the rightholder or with his consent shall exhaust the right to control resale of</p>	<p>condition to reutilise DB or substantial part of DB or/and distribute copy of DB, while the first sale of DB is not permitted by the rightholder or with his consent.</p> <p>It prohibits Reutilization Distribution. It applies to Copy of DB, Substantial Part of DB and Whole DB.</p>				7.2(b)
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	that copy within the Community;					
LocalizedPSILaw	Localized PSI law is legal regulation of reuse of public sector information in lower than a country level. Sometimes it implements specific requirements of PSI re-use, if national PSI law it permits. E.g. land, municipality, institution PSI law	The class represents law of Public Sector Information reuse applied in a local level and not a national level (e.g. PSI Provider law, Lands PSI law, Municipality's PSI law).		SpecialRequirements		<none>
Logo	Logos of Information Provider is not permitted to reuse. E.g. licence does not grant you any right to use: the names, crests, logos, or other official symbols of the Information Provider	The class represents exception of PSI reuse because logos of Information Provider	OfficialMark	InsigniaPartOfDocumentPublicSectorInformation		Open Government Licence – Canada 2.0.
MakerOfDB	Member States shall	Maker of data-	schema:Author	RightholderOfSGR		96/9/EC 7.1

	provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.	base is a subject who made database. It holds Sui Generis Database Rights and Right to transmit Sui Generis Database Rights.				
MoralRightsOwner	The rights granted to the author in accordance with the preceding paragraph shall, after his death, be maintained, at least until the expiry of the economic	Moral rights owner is a lawful holder of the moral rights. It is author or successor(in case of authors		schema:Author		Berne convention 6bis2

	rights, and shall be exercisable by the persons or institutions authorized by the legislation of the country where protection is claimed.	death) or trustee (in case of adjudication of authors rights limitation).				
MunicipalityPSI-Law	Municipality PSI law is legal regulation of reuse of public sector information in a municipality level. Sometimes it implements specific requirements of PSI re-use, if national PSI law it permits.	The class represents law of Public Sector Information reuse applied in municipality.		LocalizedPSILaw		<none>
Museums	This Directive shall not apply to: documents held by cultural establishments other than libraries, museums and archives.	The class represents public sector institution which belongs to museums.				2013/ 37/EU (1)(a)(v).
NC_License	A non-commercial type of licenses.	It's a class of non-		License		<none>

		commercial type of licenses.				
ND_License	A non-derivative type of licenses	It's a class of non-derivative type of licenses. It's disjoint with Adapters License.		License	AdaptersLicense	<none>
NamesOfIP	Names of Information Provider is not permitted to reuse. E.g. licence does not grant you any right to use: the names, crests, logos, or other official symbols of the Information Provider	The class represents the names of Information Provider.		PublicSectorInformation		Open Government Licence – Canada 2.0.
NationalPSILaw	National PSI law is legal regulation of reuse of public sector information in a country level. In EU Member States is national law which	The class represents law of Public Sector Information reuse applied in a national level.		lkif-core:Legal_Document		<none>

	implements PSI Directive. E.g. In Spain PSI law: 1) LAW 37/2007 of 16 November 2007 on the re-use of public sector information; 2) Law No 18/2015, of 9 July 2015, amending Law No 37/2007, of 16 November 2007, on the re-use of public sector information.					
NeighbouringRights	In copyright law, related rights (or neighbouring rights) are the rights of a creative work not connected with the work's actual author. It is used in opposition to the term "authors' rights". Neighbouring rights is a more literal translation of the	A class representing the rights related to copyrights. Equal to RelatedRights.	co:RelatedRights	lkif-core:Right		Wikipedia

	original French droits voisins.[1] Both authors' rights and related rights are copyrights in the sense of English or U.S. law.					
NoDownstreamRestrictions	No downstream restrictions. You may not offer or impose any additional or different terms or conditions on, or apply any Effective Technological Measures to, the Licensed Material if doing so restricts exercise of the Licensed Rights by any recipient of the Licensed Material.	The class represents a requirement of no downstream restrictions.		RequirementsToAdaptersLicense		CC BY-SA 4.0 2.a.5.C
NoEndorsment	Non-endorsement: This licence does not grant you any right to use the Information in a way	The class represents prohibition of non – endorsement.		Prohibition		UK OGL v.3

	that suggests any official status or that the Information Provider and/or Licensor endorse you or your use of the Information.					
NoLicense	This class is used to represent cases when no license is applied to OGD to express the intent that the OGD be in the public domain, although it may be regulated by national PSI reuse law (e.g., Finland). The class does not apply in the cases when a license is not applied by mistake.	This class is used to represent cases when no license is applied to OGD. It's disjoint with Obligation and Prohibition.			Obligation IPRights Copyright Prohibition	<none>
NoWarranty	No warranty The Information is licensed 'as is' and the Information Provider and/or	The class represents prohibition to ask for warranty of OGD.		Prohibition		UK OGL v.3

	<p>Licensor excludes all representations, warranties, obligations and liabilities in relation to the Information to the maximum extent permitted by law.</p> <p>The Information Provider and/or Licensor are not liable for any errors or omissions in the Information and shall not be liable for any loss, injury or damage of any kind caused by its use. The Information Provider does not guarantee the continued supply of the Information.</p>					
NonCommercialExpl	This class is used to express the permission to non-commercially exploit the licensed	This class is used to express the permission to non-commercially		Permission		<none>

	data.	exploit the licensed data.				
NonPublicTask- Documents	This Directive shall not apply to: documents the supply of which is an activity falling outside the scope of the public task of the public sector bodies concerned as defined by law or by other binding rules in the Member State, or in the absence of such rules, as defined in line with common administrative practice in the Member State in question, provided that the scope of the public tasks is transparent and subject to review;	This class represents Non Public Task related Documents, which are excluded from Public Sector Information by law. It is disjoint with OpenGovData-sets			OpenGovData sets	2003/98/EC 1.2(a) 2013/ 37/EU (1)(a)(i)
NormalUse	The performance by the lawful user of a	An act of normal (lawful)		schema:Action	NotNormalExploitation	96/9/EC 6.1

	<p>database or of a copy thereof of any of the acts listed in Article 5 which is necessary for the purposes of access to the contents of the databases and normal use of the contents by the lawful user shall not require the authorization of the author of the database. Where the lawful user is authorized to use only part of the database, this provision shall apply only to that part.</p>	<p>use of database. It is disjoint with Not Normal Exploitation. Used by Lawful User.</p>				
NotNormalExploitation	<p>The repeated and systematic extraction and/or re-utilization of insubstantial parts of the contents of the database implying acts which conflict with</p>	<p>An act or process of prohibited actions of extraction and/or re-utilization of insubstantial parts.</p>		schema:Action	NormalUse	96/9/EC 7.5

	a normal exploitation of that database or which unreasonably prejudice the legitimate interests of the maker of the database shall not be permitted.	It is disjoint with Normal Use and applies to Insubstantial Parts of Database.				
NoticeOfDisclaimer	If You Share the Licensed Material (including in modified form), You must retain the following if it is supplied by the Licensor with the Licensed Material: a notice that refers to the disclaimer of warranties;	The class represents notice that refers to the disclaimer of warranties.				CC BY-SA 4.0 3.a.1.A.iv.
NoticeOfLicense	If You Share the Licensed Material (including in modified form), You must retain the following if it is supplied by the Licen-	The class represents notice that refers to this Public License.				CC BY-SA 4.0 3.a.1.A.iii.

	<p>sor with the Licensed Material: a notice that refers to this Public License.</p>					
Obligation	<p>It's the act of binding or obliging oneself by a promise, contract, license or other.</p>	<p>The act or process of officially binding or obliging someone to do a particular thing because of use of Original Work/Database and/or Derivative Work/Database or part of it.</p> <p>It's disjoint with NoLicense and PD_License. It applies to ThirdParty.</p>		schema:Action	NoLicense PD_License	<none>
ObligatoryGR	<p>General requirements are a set of rules, which are</p>	<p>The class represents general require-</p>		GeneralRequirements		Act of 24 June 2015 laying down rules on

	<p>obligatory to apply to reuse of PSI in jurisdiction of the country.</p> <p>E.g. “Bodies entrusted with a public task shall not make their authorisation of re-use subject to any licence conditions which unnecessarily limit the scope for re-use or restrict competition.”</p>	<p>ments which are obligatory to apply.</p>				<p>the re-use of public sector information (Act on re-use of public sector information) (Bulletin of Acts and Decrees of the Kingdom of the Netherlands)</p>
OfferOfLicense	<p>Offer from the Licensor – Licensed Material. Every recipient of the Licensed Material automatically receives an offer from the Licensor to exercise the Licensed Rights under the terms and conditions of this Public</p>	<p>The class represent obligations coming from Creative Commons licenses:</p> <p>1) automatically to exercise the Licensed Rights under the terms and conditions</p>		<p>Obligation RequirementsToAdaptersLicense</p>		<p>CC BY-SA 4.0 2.a.5.A-B</p>

	License. Additional offer from the Licensor – Adapted Material. Every recipient of Adapted Material from You automatically receives an offer from the Licensor to exercise the Licensed Rights in the Adapted Material under the conditions of the Adapter’s License You apply.	of the License to every recipient of the Licensed Material. 2) automatically to offer to use the same License of Licensed Material for every recipient of the Adapted Material.				
OfficialMark	The exclusive right conferred by a official mark. E.g. This licence does not grant you any right to use: Information subject to other intellectual property rights, including patents, trade-marks and official marks.	The class represents exception of PSI reuse because Official Mark.	Logo	ExceptionOfPSI Reuse		Canada Open Government License v.2.0
OpenDomainOGD	Official documents	This class		OpenGovDatas		Act on the

	shall be in the public domain, unless specifically otherwise provided in this Act or another Act.	represents Open Government Datasets, which belongs to Open Domain by law. It is implemented by NoLicense and/or PD_License.		ets		Openness of Government Activities (Finland) (621/1999; amendments up to 1060/2002 included) 1.1.
OpenGovDatasets	It is a dataset released as Open Government Dataset, which is a part of Public Sector Information.	It is a class of Dataset released under PSI reuse regulation.		dcat:Dataset PublicSectorInformation	NonPublicTaskDocuments	<none>
OriginalWork	An original work is one not received from others nor one copied from or based upon the work of others.	It is Licensed Work.		dcat:Dataset schema:CreativeWork	DerivativeWork	Wikipedia
OrphanWork	A work or a phonogram shall be considered an orphan work if none of the rightholders in that	It's an intellectual work which rightholders are not identified		dcat:Dataset schema:CreativeWork		2012/28/EU 2.1

	work or phonogram is identified or, even if one or more of them is identified, none is located despite a diligent search for the rightholders having been carried out and recorded in accordance with Article 3.	and/or located. It belongs to Unknown Rightholder.				
OtherIntellectual-Property	Other Intellectual Property classes, but not protected by copyright. E.g. patent, trademark and etc.	The class represents other Intellectual Property, except Creative Work.				<none>
OtherTraditionalExpectations	Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases: (...) where other exceptions to copyright which are tra-	Other traditional expectations to copyright which is set by EU member states national law		ExceptionOfCopyright		96/9/EC 6.2.d.

	ditionally authorized under national law are involved, without prejudice to points (a), (b) and (c).					
PD_License	It's a class of public domain type of licenses	It's a class of public domain type of licenses. It applies to Open Government Data which belongs to Open Domain.		License	IPRights SuiGenerisDB Rights Copyright Prohibition Obligation	<none>
PSIDirective	This class represents Directive 2003/98/EC on the re-use of public sector information and it's amendment Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending	This class represents Directive 2003/98/EC on the re-use of public sector information and it's amendment Directive 2013/37/EU of the European		lkif-core:Legal_Document		2003/98/EC 2013/37/EU

	Directive 2003/98/EC on the re-use of public sector	Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the re-use of public sector. It is implemented by National PSI law.				
PSIReuseRules	Are the rules, which regulate how public sector's information should be reused.	It are legal rules of Public Sector Information reuse.		LegalRules		<none>
Patent	A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. To get a patent, technical informa-	The class represent patent.		OtherIntellectualProperty		WIPO

	tion about the invention must be disclosed to the public in a patent application.					
Penalty	A punishment for breaking a law, rule or contract	The class represent penalty.				Oxford Advanced Learner's Dictionary
Performance	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).	Act of performing to the public (the database or part of it). It acts on Original Work/Database and Derivative Work/Database .		schema:Action		96/9/EC 5.1.e.
PermanenetReproduction	In respect of the expression of the database which is	Act of reproduction of the database or a		Reproduction	TemporaryReproduction	96/9/EC 5.1.a.

	<p>protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize:</p> <p>(a) temporary or permanent reproduction by any means and in any form, in whole or in part;</p>	<p>part of the database which lasts permanent. It is disjoint with Temporary Reproduction.</p>				
Permission	The act of permitting.	The act or process of officially permitting someone to do a particular thing with Original Work/Database and Derivative Work/Database or part of it.		schema:Action	Prohibition	Dictionary.com
PermissionOnDerivativeWork	In respect of the expression of the database which is protectable by copyright, the author of a	The act or process of officially permitting someone to do a particular		Permission schema:Action	PermissionOnOriginalWork	96/9/EC 5(e)

	<p>database shall have the exclusive right to carry out or to authorize:</p> <p>any reproduction, distribution, communication, display or performance to the public of the results of the acts referred to in (b).</p>	<p>thing with Derivative Work/Database or part of it.</p> <p>It permits Reproduction, Distribution, Performance, Display and Communication. It applies to Derivative Work. It is disjoint with Permission on Original Work.</p>				
PermissionOnOriginalWork	<p>In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize:</p> <p>(a) temporary or permanent repro-</p>	<p>The act or process of officially permitting someone to do a particular thing with Original Work/Database or part of it.</p> <p>It permits Alteration, Trans-</p>		Permission schama:Action	PermissionOnDerivativeWork	96/9/EC 5(a-d)

	<p>duction by any means and in any form, in whole or in part;</p> <p>(b) translation, adaptation, arrangement and any other alteration;</p> <p>(c) any form of distribution to the public of the database or of copies thereof. The first sale in the Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;</p> <p>(d) any communication, display or performance to the public;</p>	<p>lation, Adaptation, Arrangement and Any other alteration, Display, Performance, Distribution, Communication and Reproduction. It applies to Original Work.</p>				
PersonWhoHoldsCopyright	Where collective works are recog-	The person who owns	RightholderOf Copyrights			96/9/EC 4.2

	nized by the legislation of a Member State, the economic rights shall be owned by the person holding the copyright.	copyright of collective works. It holds economic rights. It is equal to Rightholder of Copyrights. It applies Effective Technological Measures.				
PersonalData	Data containing/related to personal information as it is defined by EU Directive 95/46/EC 'personal data' shall mean any information relating to an identified or identifiable natural person ('data subject'); an identifiable person is one who can be identified, directly or indirectly, in	The class represents personal data, regulated by EU.				95/46/EC 2.a. Regulation (EU) 2016/679 4.1 2013/ 37/EU (1)(a)(iii)

	<p>particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity;</p> <p>‘personal data’ means any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the</p>					
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	<p>physical, physiological, genetic, mental, economic, cultural or social identity of that natural person;</p> <p>This Directive shall not apply to:</p> <p>(cc) documents access to which is excluded or restricted by virtue of the access regimes on the grounds of protection of personal data, and parts of documents accessible by virtue of those regimes which contain personal data the re-use of which has been defined by law as being incompatible with the law concerning the protec-</p>					
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	tion of individuals with regard to the processing of personal data;					
PersonalDataProtectionLaw	A specific law subject dedicated to protection of personal data, e.g. 95/46/EC, Regulation (EU) 2016/679	The class represents law of personal data protection in EU. It defines Personal Data.		lkif-core:Legal_Document		
PortedVersionsOfBY_SA_License	Your contributions to adaptations of BY-SA 4.0 materials may only be licensed under: Ported versions of the BY-SA license (if any), version 4.0 or later	The class represents Ported Versions of CC BY-SA license. It has attribution Approved by Creative Commons.		SA_License BY_SA_4.0_CompatibleLicense		https://creativecommons.org/share-your-work/licensing-considerations/compatible-licenses/
PreviousModification	Indicate if You modified the Licensed Material and retain an indication of any previous modifications.	The class represents the previous modification(s) of Original Work.		DerivativeWork		CC BY-SA 4.0 3.a.1.B
PrivateReproduction	Member States shall have the option of	The class represents an		ExceptionOfSGR ExceptionOfCo		96/9/EC 6.2(a), 9(a)

	<p>providing for limitations on the rights set out in Article 5 in the following cases:</p> <p>in the case of reproduction for private purposes of a non-electronic database;</p> <p>Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize a substantial part of its contents:</p> <p>(a) in the case of extraction for private purposes of the contents of a non-electronic database;</p>	<p>exception of Copyrights and Sui Generis Database Rights in the case of reproduction/extraction for private purposes of a non-electronic database.</p> <p>It is implemented by co:PrivateCopy Right.</p>		pyright		
Prohibition	The class is a part of	The act or		schema:Action	Permission	<none>

	the deontic rules used to express the prohibitions/restrictions.	process of officially prohibiting someone to do a particular thing with Original Work/Database and Derivative Work/Database or part of it. It is disjoint with No License, Permission and PD License. It applies to ThirdParty.			NoLicense, PD_License	
ProtectionOfNationalSecurity	This Directive shall not apply to: documents which are excluded from access by virtue of the access regimes in the Member States, including on the grounds of: — the protection of national security	The class represents protection of national security as the reason why public sector documents, are excluded from public access.				2013/ 37/EU (1)(a)(ii)

	(i.e. State security), defence, or public security.					
PublicInterest	(...) in the case of extraction and/or re-utilization for the purposes of public security or an administrative or judicial procedure. (...) where there is use for the purposes of public security or for the purposes of an administrative or judicial procedure;	It's one of exceptions when copyrights or sui generis rights are limited: if it's necessary for the purposes of public security or an administrative or judicial procedure.		ExceptionOfSG R ExceptionOfCo pyright		96/9/EC 6.2(c), 9.1(c)
PublicLending	Public lending is not an act of extraction or re-utilization.	It's an act of lending of database for public purpose (e.g. libraries).		ExceptionOfSG R		96/9/EC 7.2
PublicSectorInformation	"Public sector information" is information, including information products and services, generated, created,	The class represents Public Sector Information regulated by PSI Directive		dcat:Dataset		OECD, 2003/98/EC, 2013/37/EU

	<p>collected, processed, preserved, maintained, disseminated, or funded by or for the Government or public institution.</p> <p>In EU is regulated by PSI Directive 2003/98/EC and amendment 2013/37/EU</p>	<p>2003/98/EC and amendment 2013/37/EU.</p> <p>It is disjoint with NonPublicTaskDocuments.</p>				
PublicSectorInstitutionInsignia	<p>This licence does not cover: departmental or public sector organisation logos, crests and the Royal Arms except where they form an integral part of a document or dataset.</p>	<p>The class represents logos, crests and the Royal Arms of Public Sector Organization. It has Jurisdiction_UK.</p>				UK OGL v3
PublicService-BroadcastingData	<p>This Directive shall not apply to: documents held by public service broadcasters and their subsidiaries,</p>	<p>The class represents information, databases or Creative Works held by public service broad-</p>				2003/98/EC 1.2(d)

	and by other bodies or their subsidiaries for the fulfilment of a public service broadcasting remit;	casters and their subsidiaries, and by other bodies or their subsidiaries for the fulfilment of a public service broadcasting remit.				
PublishedDB	<p>This is one of conditions to apply exception of sui generis right – database should be made available to the public.</p> <p>Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize a sub-</p>	The class represents database which is made available to the public.		DatabaseEU		96/9/EC 9

	stantial part of its contents (...)					
Qualification	<p>It is a class representing obligatory qualification to apply Sui Generis Database Right (EU).</p> <p>Any substantial change, evaluated qualitatively or quantitatively, to the contents of a database, including any substantial change resulting from the accumulation of successive additions, deletions or alterations, which would result in the database being considered to be a substantial new investment, evaluated qualitatively or quantitatively, shall qualify the data-</p>	<p>It is a class representing obligatory condition of qualification, which is necessary to apply Sui Generis Database Right (EU) to Database.</p>				96/9/EC 10.3

	base resulting from that investment for its own term of protection.					
QualitativelyInvestment	Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.	The class represents an investment qualified qualitatively. It applies to SubstantialPartDB, WholeDB.		Qualification		96/9/EC 7.1
QuantitativelyInvestment	Member States shall provide for a right	The class represents an		Qualification		96/9/EC 7.1

	for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively , of the contents of that database.	investment qualified quantitatively. It applies to SubstantialPartDB, WholeDB.				
RecommendedGR	Recommended requirements are a set of rules which are not obligatory to apply to re-use of PSI in jurisdiction of the country. E.g. "A public sector body may im-	The class represents general requirements which are recommended to apply.		GeneralRequirements		2015 No. 1415 Public sector information The re-use of public sector information regulations 2015 (UK)

	pose conditions on re-use (...)					
RegionPSILaw	<p>Region PSI law is a legal regulation of reuse of public sector information in a region, land level. Sometimes it implements specific requirements of PSI re-use, if national PSI law it permits. It's common in federal countries, or lands with high autonomous status.</p> <p>E.g. Vorarlbergland of Austria has PSI law: 42. Act: Document Reuse Act</p> <p>XXVIII.LT: RV 46/2006, 6th sitting for 2006</p>	The class represents law of Public Sector Information reuse applied in region or land.		LocalizedPSILaw		<none>
RentalRight	This Directive shall apply without prejudice to	It's a legal right to rent something by mak-		lkif-core:Right		96/9/EC 2.1(b)

	<p>Community provisions relating to:</p> <p>rental right, lending right and certain rights related to copyright in the field of intellectual property.</p> <p>Rental means making available for use, for a limited period of time and for direct or indirect economic or commercial advantage.</p>	<p>ing available for use, for a limited period of time and for direct or indirect economic or commercial advantage.</p>				92/100/EEC 1.2
Reparation	<p>Reparation is the process of restitution.</p>	<p>It is an act or process of restitution. It applies penalty to Penalty and repays Violation.</p>		schema:Action		<none>
RepeatedSystematicExtraction	<p>It's not authorized and forbidden by</p>	<p>It is an act or process of vio-</p>		NotNormalExploitation		96/9/EC 7(5)

	law repeated and systematic extraction of insubstantial parts of the contents of the database	lation, prohibited act by making not authorized repeated and systematic extraction of insubstantial parts of the contents of the database.				
RepeatedSystematicExtractionAndReutilization	The repeated and systematic extraction and/or reutilization of insubstantial parts of the contents of the database implying acts which conflict with a normal exploitation of that database or which unreasonably prejudice the legitimate interests of the maker of the database shall not be permitted.	It is an act or process of violation, prohibited act by making not authorized repeated and systematic extraction and reutilization of insubstantial parts of the contents of the database.		NotNormalExploitation		96/9/EC 7(5)

RepeatedSystematicReutilization	It's not authorized and forbidden by law repeated and systematic re-utilization of insubstantial parts of the contents of the database	It is an act or process of violation, prohibited act by making not authorized repeated and systematic reutilization of insubstantial parts of the contents of the database.		NotNormalExploitation		96/9/EC 7(5)
Reproduction	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize temporary or permanent reproduction by any means and in any form, in whole or in part. (...)any reproduc-	Act or process of reproducing the contents of the database. Acts on Derivative Work/Database and Original Work/Database . Consists of Temporary reproduction and Permanent reproduction.		schema:Action		96/9/EC 5(1a, e)

	tion, distribution, communication, display or performance to the public of the results of the acts referred to in (b).					
RequirementsToAdaptersLicense	Requirements which are exclusively applied to Adapters' license of derivative work (mashup).	The class represents Requirements which are exclusively applied to Adapters' license of derivative work. It applies to SA_License, AdaptersLicense.		ConditionsOfPS IReuse		<none>
RestrictionOfSGR	Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial in-	The act or process of officially prohibiting someone to do a particular thing with Database because of a limiting		Prohibition		96/9/EC 5., Chapter III

	vestment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.	conditions or measures granted by sui generis database right EU. It prohibits Reutilization, Extraction and Not normal Exploitation.				
RestrictionOnDerivativeWork	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize any reproduction, distribution, communication, display or performance to the public of the results of the acts referred	The act or process of officially prohibiting someone to do a particular thing with Derivative Work/Database or part of it. It prohibits Reproduction, Display, Distribution, Performance and Communica-	14lod:NoDerivative	Prohibition		96/9/EC 5.1(e)

	to in (b).	tion. It applies to Derivative Work/Database .				
RestrictionOnOriginalWork	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: (a) temporary or permanent reproduction by any means and in any form, in whole or in part; (b) translation, adaptation, arrangement and any other alteration; (c) any form of distribution to the public of the data-	The act or process of officially prohibiting someone to do a particular thing with Original Work/Database or part of it. It prohibits Alteration, Display, Performance, Reproduction, Communication and Distribution. It applies to Original Work/Database .		Prohibition		96/9/EC 5.1(a-d)

	<p>base or of copies thereof. The first sale in the Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;</p> <p>(d) any communication, display or performance to the public;</p>					
Reutilization	<p>any form of making available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on-line or other forms of transmission</p>	<p>The action or process of any form of making available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on-line or other forms of trans-</p>		NormalUse schema:Action		96/9/EC 7.2

		mission It applies to Whole DB and Substantial Part DB.				
RightToAuthorise	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize (...)	It is a class representing the official permission made by right holder and allowing someone to use the copyright or sui generis database right protected object under terms of the permission. It is implemented by Authorisation.		SuiGenerisDBR ights Copyright		96/9/EC 5
RightToControlResale	Any form of distribution to the public of the database or of copies thereof. The first sale in the	One of exclusive rights to control resale. It is implemented by		SuiGenerisDBR ights Copyright		96/9/EC 5.1(c), 7.2(b)

	<p>Community of a copy of the database by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community;</p> <p>(...) 're-utilization' shall mean any form of making available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on-line or other forms of transmission. The first sale of a copy of a database within the Community by the rightholder or with his consent shall exhaust the right to control resale of</p>	<p>Limitation Of Distribution and applies to Copy of Database.</p>				
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	that copy within the Community;					
RightToSale	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize (...)	It is a class representing the right to transfer of copyrights object for money or credit. It is implemented by Sale.		Copyright		96/9/EC 5
RightToTransmitS GR	The right referred to in paragraph 1 may be transferred, assigned or granted under contractual licence.	It is a class representing the right to transmit, assign, grant Sui Generis database rights by transferring, assigning or granting to the third party. It is implemented by contractual license. It applies to Assig-		SuiGenerisDBR ights		96/9/EC 7.3

		nation, Grant and Transfer.				
RightholderOfCopy rights	The author of a database shall be the natural person or group of natural persons who created the base or, where the legislation of the Member States so permits, the legal person designated as the rightholder by that legislation	Owner of the copyrights. It holds economic rights, right to sale, right to authorise. It is equal to Author. It applies Effective Technological Measures.	PersonWhoHoldsCopyright schema:Author	Bearer		96/9/EC 4.1
RightholderOfSGR	The first sale of a copy of a database within the Community by the rightholder or with his consent shall exhaust the right to control resale of that copy within the Community; The right provided for in Article 7 shall apply to database whose makers or	It is a class representing the owner of the sui generis database rights. It holds SuiGenerisDBRight and RightToTransmitSGR.		Bearer		96/9/EC 7.2.(b),11.1

	rightholders are nationals of a Member State or who have their habitual residence in the territory of the Community.					
SA_License	It's a class of share-alike type of licenses, e.g. CC BY-SA, GPLv.3	It's a class of share-alike type of licenses.		License		<none>
Sale	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize (...)	Is an act or process of transfer of copyrights object for money or credit. It acts on PermissionOn-Derivative-Work and PermissionOnOriginal-Work. It permits Non-Commer-		schema:Action		96/9/EC 5

		cialExpl and l4lod:Commerc ialExpl.				
SameLicense	The same version of the license	It's a class of same version of the license.		BY_SA_4.0_Co mpatibleLicens e		<none>
SpecialRequiremen ts	Special require- ments of PSI reuse are those require- ments which are applied in specific region of the coun- try, or institution, or applied to specific kind of information. Specific require- ments are granted by national PSI law. Specific require- ments are used not by all EU Member States.	Requirements which has ju- risdiction of specific region of the country, or institution, or applied to specific kind of information. It applies to OpenGovData- sets.				<none>
SpecificAccess	This Directive shall not apply to: (ca) documents access to which is restricted by virtue	The class represents spe- cific access restricted by virtue of the access regimes				2013/ 37/EU (1)(a)(iii)

	of the access regimes in the Member States, including cases whereby citizens or companies have to prove a particular interest to obtain access to documents;	as the reason why public sector documents, are excluded from public access.				
StatisticalConfidentiality	This Directive shall not apply to: documents which are excluded from access by virtue of the access regimes in the Member States, including on the grounds of: — statistical confidentiality.	The class represents statistical confidentiality as the reason why public sector documents, are excluded from public access.				2013/ 37/EU (1)(a)(ii)
SubstantialChange	Any substantial change, evaluated qualitatively or quantitatively, to the contents of a database, including any substantial change	Act or process of significant modification of contents of database which can be evaluated qualita-		schema:Action		96/9/EC 10.3

	resulting from the accumulation of successive additions, deletions or alterations, which would result in the database being considered to be a substantial new investment, evaluated qualitatively or quantitatively, shall qualify the database resulting from that investment for its own term of protection.	tively or (and) quantitatively. It applies to WholeDB and Substantial-PartDB. It qualifies QuantitativelyInvestment and Qualitatively-Investment.				
SubstantialInvestment	Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, veri-	Act or process of substantial investment which is protected by sui generis EU DB right and can be evaluated qualitatively or (and) quantita-		schema:Action		96/9/EC 7.1

	<p>fication or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.</p>	<p>tively. It applies to WholeDB and Substantial-PartDB. It qualifies QuantitativelyInvestment and Qualitatively-Investment.</p>				
SubstantialPartDB	<p>Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualita-</p>	<p>It's a qualitatively or quantitative significant part of the contents of the database</p>		DatabaseEU WholeDB		96/9/EC 7.1

	tively and/or quantitatively, of the contents of that database.					
SuiGenerisDBRights	Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.	The rights of the maker of the database granted by Database Directive 96/9/EC. It applies to DatabaseEU. It has condition of qualification. It grants RestrictionSGR. It is disjoint with PD_License. It is implemented by First-SaleRule.		lkif-core:Right	NoLicense PD_License	96/9/EC 7.1
SuiGenerisDatabaseRightLaw	Law of sui generis database right. In EU: Directive	The law which defines SuiGener-		lkif:Legal_Document		

	<p>96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases</p> <p>In EU Member States: local law which implements the Directive 96/9/EC.</p>	<p>isDBRights. In EU: Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases</p> <p>In EU Member States: local law which implements the Directive 96/9/EC.</p>				
TemplateOfAdaptersLicense	<p>It is a special requirement to use specific templates of Adapters license provided by share-a-like type licenses (e.g. CC-BY-SA 4.0).</p>	<p>Requirement to use specific templates of Adapters license provided by share-a-like type licenses (e.g. CC-BY-SA 4.0).</p>		RequirementsToAdaptersLicense		CC-BY-SA 4.0
TemporaryReproduction	<p>In respect of the expression of the</p>	<p>Not permanent act or process</p>		Reproduction	PermanentReproduction	96/9/EC 5.1(a)

	database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: temporary or permanent reproduction by any means and in any form, in whole or in part.	of reproducing the contents of the database.				
TermsOfUse	Terms of service (also known as terms of use and terms and conditions, commonly abbreviated as ToS or TOS and TOU) are rules, that one must agree to abide by in order to use a service. Terms of service can also be merely a disclaimer, especially regarding the use of websites.	The class represent Terms of use of Open Government Dataset.		lkif-core:Legal_Source		Wikipedia
TextOfLicense	(...) indicate the	This class		License		CC BY-SA

	Licensed Material is licensed under this Public License, and include the text of , or the URI or hyper-link to, this Public License .	represents text of the license.				
ThirdParty	(...)whereas the protection of databases by the sui generis right is without prejudice to existing rights over their contents, and whereas in particular where an author or the holder of a related right permits some of his works or subject matter to be included in a database pursuant to a non-exclusive agreement, a third party may make use of those works or subject matter subject to the re-	This class is used to express an agent other than the agent primarily involved in a situation, e.g., the user of a mashup of datasets or the reuser of an original work or data. It holds ThirdPartyRights and applies Effective Technological Measures.				96/9/EC rec.18

	quired consent of the author or of the holder of the related right without the sui generis right of the maker of the database being invoked to prevent him doing so, on condition that those works or subject matter are neither extracted from the database nor re-utilized on the basis thereof;					
ThirdPartyRights	This Directive shall not apply to: (b) documents for which third parties hold intellectual property rights;	It is rights which are hold by ThirdParty, e.g. intellectual property rights. It applies to Exception-OfPSIReuse		lkif-core:Right		2003/98/EC 1.2.
TradeMark	This Directive shall be without prejudice to provisions concerning in particular copyright, rights	It is the exclusive right conferred by a trademark.		OtherIntellectualProperty		96/9/EC 13, 2003/98/EC rec.22

	<p>related to copyright or any other rights or obligations subsisting in the data, works or other materials incorporated into a database, patent rights, trade marks, design rights, the protection of national treasures, laws on restrictive practices and unfair competition, trade secrets, security, confidentiality, data protection and privacy, access to public documents, and the law of contract.</p> <p>This Directive does not apply to documents covered by industrial property rights, such as patents, registered designs and trade-</p>					
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	marks.					
Transfer	The right referred to in paragraph 1 may be transferred, assigned or granted under contractual license.	The act or process of transferring (sui generis rights of database). Applies to Third Party. Deactivates Restriction of Sui generis Database rights.		schema:Action		96/9/EC 7.3
Translation	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: translation, adaptation, arrangement and any other alteration.	The act or process of translating of Original-Work/Database . It acts on OriginalWork		Alteration schema:Action		96/9/EC 5.1(b)
URIOfLicense	You must include the text of, or the URI or hyperlink to,	It is the URI or hyperlink to the License.				CC BY-SA 4.0 3.b.2

	the Adapter's License You apply.					
URIOfLicensed-Material	(...) a URI or hyperlink to the Licensed Material to the extent reasonably practicable;	It is URI or hyperlink to the Licensed Material				CC BY-SA 4.0 3.a.1.A(v)
URIToResource	You may satisfy the conditions in Section 3(a)(1) in any reasonable manner based on the medium, means, and context in which You Share the Licensed Material. For example, it may be reasonable to satisfy the conditions by providing a URI or hyperlink to a resource that includes the required information.	URI or hyperlink to a resource.				CC BY-SA 4.0 3.a.2
UniversityLibraries	This Directive shall not apply to: (e) documents held	The class represents public sector insti-				2013/ 37/EU (1)(a)(iv).

	by educational and research establishments, including organisations established for the transfer of research results, schools and universities, except university libraries and;	tution which belongs to university libraries.				
Unknown-Rightholder	A work or a phonogram shall be considered an orphan work if none of the rightholders in that work or phonogram is identified or, even if one or more of them is identified, none is located despite a diligent search for the rightholders having been carried out and recorded in accordance with Article 3.	A rightholder which is not identified, none is located despite a diligent search for the rightholders having been carried out and recorded. It holds CompensationRight.		RightholderOfC opyrights		2012/28/EU 2.1
UnlawfulAccess	This Directive	It is an action		Violation		2003/98/EC 1.3

	<p>builds on and is without prejudice to the existing access regimes in the Member States. This Directive shall not apply in cases in which citizens or companies have to prove a particular interest under the access regime to obtain access to the documents.</p> <p>(...)Use of any Information indicates your acceptance of the terms below.(...)</p>	<p>which describes not permitted access by law or license. It prohibits Permission.</p>		schema:Action		<p>Open Data Licence Agreement — Office of the Commissioner of Lobbying (Canada)</p>
Violation	<p>the act of doing something that is not allowed by a law or rule</p>	<p>It is an act or process of doing something that is not allowed by a law or rule. It violates Obligation.</p>		schema:Action		<p>Merriam-Webster's Learner's Dictionary</p>
WholeDB	In respect of the	It's a whole			DatabaseEU	96/9/EC 5.1(a)

	<p>expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: temporary or permanent reproduction by any means and in any form, in whole or in part</p> <p>Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a</p>	<p>unit of the database. It is equal to DatabaseEU.</p>				<p>96/9/EC 7.1</p>
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	substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.					
co:AtributionRight	Whereas the moral rights of the natural person who created the database belong to the author and should be exercised according to the legislation of the Member States and the provisions of the Berne Convention for the Protection of Literary and Artistic Works ; whereas such moral rights remain outside the scope of this Directive; Independently of the	The right to claim authorship of the work.		co:MoralRights		96/9/EC rec.28 Berne Convention for the Protection of Literary and Artistic Works 6bis1 Data license Germany – attribution – non-commercial

	<p>author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.</p> <p>“Any use for non-commercial purposes quoting the source for is permissible.</p> <p>Changes, editing, new designs or other amendments shall be marked with information in the</p>					<p>– Version 1.0</p> <p>Norwegian License for Open Government Data (NLOD)</p> <p>(Spanish) Law No 18/2015, of 9 July 2015, amending Law No 37/2007, of</p>
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	<p>source note about relevant changes, or the source note must be deleted if the entity keeping the data requires so.”</p> <p>“The licensee shall attribute the licensor as specified by the licensor and include a reference to this license. To the extent practically possible, the licensee shall provide a link to both this license and the source of the information.</p> <p>If the licensor has not specified how attributions shall be made, the licensee shall normally state the following: «Contains data under the Norwegian</p>					<p>16 November 2007, on the re-use of public sector information.</p>
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	<p>license for Open Government data (NLOD) distributed by [name of licensor]».</p> <p>If the licensor has specified that the information shall only be available under a specific version of this license, cf. Section 10, the licensee shall also state this.</p> <p>If the information has been changed, the licensee must clearly indicate that changes have been made by the licensee.”</p> <p>“Article 8. Conditions for re-use. The re-use of information of the public sector Administra-</p>					
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	<p>tions and bodies referred to in Article 2 of the present Law may be subject, among others, to the following general terms and conditions:</p> <ul style="list-style-type: none">a) That the content of the information, including its meta-data, is not altered.b) That the meaning of the information is not distorted.c) That the source is acknowledged.d) That the date of the latest update is mentioned.e) When the information contains personal data, the specific purpose or purposes for which future re-use of the data is possible.					
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	f) When despite being provided by a dissociated means the information were to contain sufficient evidence that would enable identifying the interested parties in the process of re-use, the prohibition to reverse the dissociation procedure through the addition of new data obtained from other sources.”					
co:DisseminationRight	<none>	The right to disclose the work.		co:MoralRights		<none>
co:EducationRight	Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases: where there is use	To illustrate for teaching and research, uses for reproduction and communication to the public in educational		co:UserRights		96/9/EC 6.2

	<p>for the sole purpose of illustration for teaching or scientific research, as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved</p> <p>Member States may stipulate that lawful users of a database which is made available to the public in whatever manner may, without the authorization of its maker, extract or re-utilize a substantial part of its contents:</p> <p>in the case of extraction for the purposes of illustration for teaching or scientific research,</p>	<p>institutions, libraries and archives.</p>				96/9/EC 9.1(b)
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	as long as the source is indicated and to the extent justified by the non-commercial purpose to be achieved;					
co:InformationRight	<none>	News incorporating other news and news incorporating other works.		co:UserRights		<none>
co:IntegrityRight	Independently of the author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.	The right to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the work which would be prejudicial to the author's honour or reputation.		co:MoralRights		Berne Convention 6bis1

co:MoralRights	Independently of the author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.	Moral rights are always held by the creator and cannot be commercially exploited. They are not present in all legal systems. However, WIPO treaties are promoting some of them in order to improve worldwide copyright law harmonisation.		Copyright	EconomicRights	Berne convention 6bis1
co:OfficialActRight	Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases: (...) where other exceptions to copy-	To use for certain administrative, judicial or security proceedings and religious or official ceremonies.		co:UserRights		96/9/EC 6.2.d.

	right which are traditionally authorized under national law are involved, without prejudice to points (a), (b) and (c).					
co:ParodyRight	Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases: (...) where other exceptions to copyright which are traditionally authorized under national law are involved, without prejudice to points (a), (b) and (c).	To use for parody and caricature.		co:UserRights		96/9/EC 6.2.d.
co:PrivateCopyRight	Member States shall have the option of providing for limitations on the rights set out in Article 5	To reproduce a work exclusively for the personal and private use of		co:UserRights		96/9/EC 6.2(a)

	<p>in the following cases:</p> <p>in the case of reproduction for private purposes of a non-electronic database;</p>	<p>the person who makes the reproduction, e.g. a backup.</p>				
co:QuotationRight	<p>Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases:</p> <p>(...) where other exceptions to copyright which are traditionally authorized under national law are involved, without prejudice to points (a), (b) and (c).</p>	<p>The making of quotations from a protected work, provided that the source is mentioned and that the extent of the quotation is compatible with fair practice.</p>		co:UserRights		96/9/EC 6.2.d.
co:RelatedRights	<p>This Directive shall apply without prejudice to Community provisions relating</p>	<p>There are the rights of other persons also involved in the exploitation of</p>	Neighbouring Rights	lkif-core:Right		96/9/EC 2.1(b)

	to: rental right, lending right and certain rights related to copyright in the field of intellectual property	works. Performers, producers and broadcasters make a significant contribution in order to make works reach end-users. Their contribution is also protected by some rights related to copyright, the Related Rights or Neighbouring Rights.				
co:TemporaryReproductionRight	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: temporary or permanent	To produce ephemeral reproductions required in order to facilitate some technological processes geared towards work usage, e.g.		co:UserRights		96/9/EC 5.1(a)

	reproduction by any means and in any form, in whole or in part.	internet caches.				
co:UserRights	<none>	End-users have some special permissions that grant them the possibility to perform some actions otherwise forbidden by copyright, although this does not mean that the user must pay a compensation if they are exercises, e.g. levies on digital recording equipment and media. These exceptions to copyright should be con-		Copyright		<none>

		sidered as end-user privileges and not rights. However, some of them are referred to as rights, e.g. the right to quote. Moreover, they are modelled as rights in this conceptualisation in order to build a more homogeneous model.				
co:Withdraw	Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases: (...) where other exceptions to copyright which are traditionally authorized under national law	-		schema:Action		96/9/EC 6.2.d.

	are involved, without prejudice to points (a), (b) and (c).					
co:WithdrawRight	Member States shall have the option of providing for limitations on the rights set out in Article 5 in the following cases: (...) where other exceptions to copyright which are traditionally authorized under national law are involved, without prejudice to points (a), (b) and (c).	The right to withdraw the work.		co:MoralRights		96/9/EC 6.2.d.
dbo:Jurisdiction	<none>	Jurisdiction is the practical authority granted to a formally constituted legal body or to a				<none>

		political leader to deal with and make pronouncements on legal matters and, by implication, to administer justice within a defined area of responsibility.				
dcat:Dataset	To prevent different rules in different Member States acting as a barrier to the cross-border offer of products and services, and to enable comparable public data sets to be re-usable for pan-European applications based on them, a minimum harmonisation is required to determine what public data are available for re-use	A collection of data, published or curated by a single agent, and available for access or download in one or more formats.				2013/37/EU Rec. 6

	in the internal information market, consistent with the relevant access regime.					
judo:Contractual_Agreement	The right referred to in paragraph 1 may be transferred, assigned or granted under contractual license.	-	ContractualLicense			96/9/EC 7.3
l4lod:Attribution	Where use is made of works in accordance with the preceding paragraphs of this Article, mention shall be made of the source, and of the name of the author if it appears thereon.	This class is used to express the obligation of attribution to author of the licensed data. Status: stable.		RequirementsToAdaptersLicense Obligation		Berne Convention for the Protection of Literary and Artistic Works 10.3
l4lod:CommercialExploitation	're-use' means the use by persons or legal entities of documents held by public sector bodies, for commercial or	This class is used to express the permission to commercially exploit the licensed		Permission		2003/98/EC 2.4

	non-commercial purposes other than the initial purpose within the public task for which the documents were produced.	data. Status: stable.				
l4lod:Derivative	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: (...) translation, adaptation, arrangement and any other alteration	This class is used to express the permission to distribute derivative works from the licensed data. Status: stable.		Permission		96/9/EC 5.1(b)
l4lod:NoCommercial	<none>	The class is used to express the prohibition of commercial use of the licensed data. Status: stable.		Prohibition Requirements To Adapters License		<none>
l4lod:NoDerivative	In respect of the	The class is	RestrictionOn	Prohibition	AdaptersLicense	96/9/EC 5.1(b)

	expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: (...) translation, adaptation, arrangement and any other alteration	used to express the prohibition of producing derivative work of the licensed data. Status: stable.	DerivativeWork	RequirementsToAdaptersLicense	se	
l4lod:ShareAlike	In respect of the expression of the database which is protectable by copyright, the author of a database shall have the exclusive right to carry out or to authorize: (...) translation, adaptation, arrangement and any other alteration	This class is used to express the obligation of for the derivative works be licensed under the same terms of the licensed data. Status: stable.		RequirementsToAdaptersLicense Obligation		96/9/EC 5.1(b)
lkif-core:Exception	Exceptions to restricted acts (...)	An exception is something that		LegalRules		96/9/EC 6

		is excluded from a general statement or does not follow a rule. In LKIF rules, an exception is a rule which has an exception relation to another rule (cf. Deliverable 1.1)				
lkif-core:Legal_Document	<none>	A legal entity is a natural person or a legal construct through which the law allows a group of natural persons to act as if it were a single composite individual for certain purposes. The most common purposes are lawsuits, prop-		lkif-core:Legal_Source		<none>

		<p>erty ownership, and contracts. Sometimes referred to as corporate personhood or legal personality, this concept allows for easy conduct of business by having ownership, lawsuits, and agreements under the name of the legal entity instead of the several names of the people making up the entity.</p> <p>A legal entity is not necessarily distinct from the natural persons of</p>				
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		<p>which it is composed. Most legal entities are simply amalgamations of the persons that make it up for convenience's sake. A legal entity that does have a separate existence from its members is called a company or corporation. This distinction gives the corporation its unique perpetual succession privilege and is usually also the source of the limited liability of corporate</p>				
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		members. Some other legal entities also enjoy limited liability of members, but not on account of separate existence (Source: Wikipedia.org)				
lkif-core:Legal_Person	The author of a database shall be the natural person or group of natural persons who created the base or, where the legislation of the Member States so permits, the legal person designated as the rightholder by that legislation.	A legal source is a source for legal statements, both norms and legal expressions. In a sense it is literally a 'source' of law		RightholderOfC opyrights		96/9/EC 4.1
lkif-core:Legal_Source	<none>	A legal document is a document bearing norms or				<none>

		normative statements. By virtue of this definition the norm-as-propositional-attitude is reified as norm-as proposition. In other words, the norm being expressed through the legal source is an expression of the propositional attitude.				
Ikif-core:Natural_Person	The author of a database shall be the natural person or group of natural persons who created the base or, where the legislation of the Member States so permits, the legal person designated as the rightholder by	A natural person is a human being perceptible through the senses and subject to physical laws, as opposed to an artificial person, i.e., an				96/9/EC 4.1

	that legislation.	organization that the law treats for some purposes as if it were a person distinct from its members or owner.				
lkif-core:Right	<none>	A right is the legal or moral entitlement to do or refrain from doing something or to obtain or refrain from obtaining an action, thing or recognition in civil society.				<none>
schema:Action	<none>	An action performed by a direct agent and indirect participants upon a direct object. Optionally				<none>

		happens at a location with the help of an inanimate instrument. The execution of the action may produce a result. Specific action sub-type documentation specifies the exact expectation of each argument/role.				
schema:Author	The author of a database shall be the natural person or group of natural persons who created the base or, where the legislation of the Member States so permits, the legal person designated as the rightholder by that legislation.	The author of this content or rating.	MakerOfDB			96/9/EC 4.1

<p>schema:CreativeWork</p>	<p>The expression “literary and artistic works” shall include every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression, such as books, pamphlets and other writings; lectures, addresses, sermons and other works of the same nature; dramatic or dramaticomusical works; choreographic works and entertainments in dumb show; musical compositions with or without words; cinematographic works to which are assimilated works expressed by a process analogous</p>	<p>The most generic kind of creative work, including books, movies, photographs, software programs, etc.</p>				<p>Berne Convention for the Protection of Literary and Artistic Works 2.1</p>
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	to cinematography; works of drawing, painting, architecture, sculpture, engraving and lithography; photographic works to which are assimilated works expressed by a process analogous to photography; works of applied art; illustrations, maps, plans, sketches and three-dimensional works relative to geography, topography, architecture or science.					
ti:TimeInterval	<none>	Any Region in a dimensional space that aims at representing time. It should be used when you want to talk about time as				<none>

		an object having some characteristics.				
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Object Properties

Property Name	Normalized Definition	Domain	Range	Inverse property	Characteristics	Super property or Parent
<i>ObjectProperty:access</i>	<i>Relates to action of access to the object</i>	<i>LawfulUser</i>	<i>DatabaseEU</i>	<i>accessedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:affects</i>	<i>Relates an agent to the propositional attitude it affects</i>	<i>FirstSaleRule</i>	<i>LimitationOfDistribution</i>	<i>affectedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:appliesTo</i>	<i>Apply some legal prescriptive norms or legal rules or policy</i>	<i>AdaptersLicense</i>	<i>DerivativeWork</i>	<i>appliedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>Assignment</i>	<i>ThirdParty</i>			
		<i>CompensationRight</i>	<i>OrphanWork</i>			
		<i>ConditionsOfPSIReuse</i>	<i>PublicSectorInformation</i>			
		<i>Copyright</i>	<i>schema:CreativeWork</i>			
		<i>DeonticRules</i>	<i>ThirdParty</i>			

		<i>ExceptionOfCopyright</i>	<i>Permission</i>			
		<i>ExceptionOfCopyright</i>	<i>Copyright</i>			
		<i>ExceptionOfInsigniaReuse</i>	<i>IntegralPartOfDataset</i>			
		<i>ExceptionOfInsigniaReuse</i>	<i>IntegralPartOfDocument</i>			
		<i>ExceptionOfPSIReuse</i>	<i>EducationalAndResearchEstablishments</i>			
		<i>ExceptionOfPSIReuse</i>	<i>CulturalEstablishments</i>			
		<i>ExceptionOfPSIReuse</i>	<i>PublicServiceBroadcastingData</i>			
		<i>ExceptionOfPSIReuse</i>	<i>ExcludedFromAccessDocuments</i>			
		<i>ExceptionOfPSIReuse</i>	<i>NonPublicTaskDocuments</i>			
		<i>ExceptionOfPSIReuse</i>	<i>OtherIntellectualProperty</i>			
		<i>ExceptionOfPSIReuse</i>	<i>UnlawfulAccess</i>			

		<i>ExceptionOfSGR</i>	<i>Permission</i>			
		<i>ExceptionOfSGR</i>	<i>SuiGenerisDBRights</i>			
		<i>ExclusiveRightsOnResults</i>	<i>Alteration</i>			
		<i>ExclusiveRightsOnResults</i>	<i>Translation</i>			
		<i>ExclusiveRightsOnResults</i>	<i>AnyOtherAlteration</i>			
		<i>ExclusiveRightsOnResults</i>	<i>Arrangement</i>			
		<i>ExclusiveRightsOnResults</i>	<i>Adaptation</i>			
		<i>ExclusiveRightsOnResults</i>	<i>DerivativeWork</i>			
		<i>Extraction</i>	<i>WholeDB</i>			
		<i>Extraction</i>	<i>SubstantialPartDB</i>			
		<i>FirstSaleRule</i>	<i>CopyOfDB</i>			

		<i>GeneralRequirements</i>	<i>OpenGovDatasets</i>			
		<i>GeneralRequirements</i>	<i>PublicSectorInformation</i>			
		<i>Grant</i>	<i>ThirdParty</i>			
		<i>IPRights</i>	<i>OtherIntellectualProperty</i>			
		<i>InsigniaReuse</i>	<i>PublicSectorInstitutionInsignia</i>			
		<i>InsigniaReuse</i>	<i>CrestsOfPSO</i>			
		<i>InsigniaReuse</i>	<i>NamesOfIP</i>			
		<i>InsigniaReuse</i>	<i>OfficialMark</i>			
		<i>InsigniaReuse</i>	<i>Logo</i>			
		<i>LawfulAccess</i>	<i>NormalUse</i>			
		<i>LegalRules</i>	<i>RequirementsToAdaptersLicense</i>			

		<i>LimitationOfDistribution</i>	<i>WholeDB</i>			
		<i>LimitationOfDistribution</i>	<i>SubstantialPartDB</i>			
		<i>LimitationOfDistribution</i>	<i>CopyOfDB</i>			
		<i>NotNormalExploitation</i>	<i>InsubstantialPartDB</i>			
		<i>Obligation</i>	<i>ThirdParty</i>			
		<i>Permission</i>	<i>ThirdParty</i>			
		<i>PermissionOnDerivativeWork</i>	<i>DerivativeWork</i>			
		<i>PermissionOnOriginalWork</i>	<i>OriginalWork</i>			
		<i>Prohibition</i>	<i>ThirdParty</i>			
		<i>Qualification</i>	<i>DatabaseEU</i>			
		<i>QualitativelyInvestment</i>	<i>SubstantialPartDB</i>			

		<i>QualitativelyInvestment</i>	<i>WholeDB</i>			
		<i>QuantitativelyInvestment</i>	<i>SubstantialPartDB</i>			
		<i>QuantitativelyInvestment</i>	<i>WholeDB</i>			
		<i>RestrictionOfSGR</i>	<i>DatabaseEU</i>			
		<i>RestrictionOnDerivativeWork</i>	<i>DerivativeWork</i>			
		<i>RestrictionOnOriginalWork</i>	<i>OriginalWork</i>			
		<i>Reutilization</i>	<i>WholeDB</i>			
		<i>Reutilization</i>	<i>SubstantialPartDB</i>			
		<i>RightToControlResale</i>	<i>CopyOfDB</i>			
		<i>RightToTransmitSGR</i>	<i>Assignment</i>			
		<i>RightToTransmitSGR</i>	<i>Grant</i>			

		<i>RightToTransmitSGR</i>	<i>Transfer</i>			
		<i>SpecialRequirements</i>	<i>OpenGovDatasets</i>			
		<i>SubstantialChange</i>	<i>SubstantialPartDB</i>			
		<i>SubstantialChange</i>	<i>WholeDB</i>			
		<i>SubstantialInvestment</i>	<i>SubstantialPartDB</i>			
		<i>SubstantialInvestment</i>	<i>WholeDB</i>			
		<i>SuiGenerisDBRights</i>	<i>DatabaseEU</i>			
		<i>ThirdPartyRights</i>	<i>ExceptionOfPSIReuse</i>			
		<i>Transfer</i>	<i>ThirdParty</i>			
		<i>co:DisseminationRight</i>	<i>Display</i>			
		<i>co:DisseminationRight</i>	<i>Performance</i>			

		<i>co:DisseminationRight</i>	<i>Distribution</i>			
		<i>co:MoralRights</i>	<i>Obligation</i>			
		<i>l4lod:Attribution</i>	<i>AdaptersLicense</i>			
		<i>l4lod:NoCommercial</i>	<i>AdaptersLicense</i>			
		<i>l4lod:ShareAlike</i>	<i>TemplateOfAdaptersLicense</i>			
		<i>l4lod:ShareAlike</i>	<i>AdaptersLicense</i>			
		<i>lkif:Legal_Source</i>	<i>OpenGovDatasets</i>			
		<i>lkif-core:Right</i>	<i>DeonticRules</i>			
<i>ObjectProperty: applies</i>	<i>Relates an agent to the propositional attitude it applies</i>	<i>PersonWhoHoldsCopyright</i>	<i>Effective_Technological_Measures</i>	<i>appliedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>RightHolderOfCopyrights</i>	<i>Effective_Technological_Measures</i>			
		<i>ThirdParty</i>	<i>Effective_Technological_Measures</i>			

<i>ObjectProperty: appliesPenalty</i>	<i>Relates an agent to the propositional attitude it applies penalty</i>	<i>Reparation</i>	<i>Penalty</i>	<i>isAppliedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: assignedBy</i>	<i>Specifies that some subjective entity is assigned by some thing</i>	<i>EconomicRights</i>	<i>Assignment</i>	<i>assigns</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: authorises</i>	<i>Relates an agent to the propositional attitude it authorise</i>	<i>LawfulUser</i>	<i>Authorisation</i>	<i>authorisedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>schema:Author</i>	<i>Authorisation</i>			
<i>ObjectProperty: contains</i>	<i>Relates an agent to the propositional attitude it contains</i>	<i>lkif-core:Legal_Source</i>	<i>ConditionsOfPSIReuse</i>	<i>containedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: contributesTo</i>	<i>Relates an agent to the propositional attitude contributes to</i>	<i>schema:Author</i>	<i>CollectiveWork</i>	<i>contributedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: hasRestriction</i>	<i>Specifies that some subjective entity has restriction</i>	<i>ExceptionOfSGR</i>	<i>PublishedBD</i>	<i>isRestrictionOf</i>	<i>Transitive NONE</i>	<i>none</i>

	<i>of some thing</i>					
<i>ObjectProperty: permits</i>	<i>The property defines the permissions, permit action</i>	<i>Authorisation</i>	<i>!4lod:CommercialExpl</i>	<i>permittedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>Authorisation</i>	<i>NonCommercialExpl</i>			
		<i>Authorisation</i>	<i>NormalUse</i>			
		<i>PermissionOnDerivativeWork</i>	<i>Reproduction</i>			
		<i>PermissionOnDerivativeWork</i>	<i>Distribution</i>			
		<i>PermissionOnDerivativeWork</i>	<i>Performance</i>			
		<i>PermissionOnDerivativeWork</i>	<i>Display</i>			
		<i>PermissionOnDerivativeWork</i>	<i>Communication</i>			
		<i>PermissionOnOriginalWork</i>	<i>AnyOtherAlteration</i>			
		<i>PermissionOnOriginalWork</i>	<i>Arrangement</i>			

		<i>PermissionOnOriginalWork</i>	<i>Translation</i>			
		<i>PermissionOnOriginalWork</i>	<i>Adaptation</i>			
		<i>PermissionOnOriginalWork</i>	<i>Alteration</i>			
		<i>PermissionOnOriginalWork</i>	<i>Display</i>			
		<i>PermissionOnOriginalWork</i>	<i>Performance</i>			
		<i>PermissionOnOriginalWork</i>	<i>Distribution</i>			
		<i>PermissionOnOriginalWork</i>	<i>Communication</i>			
		<i>PermissionOnOriginalWork</i>	<i>Reproduction</i>			
		<i>Sale</i>	<i>l4lod:CommercialExpl</i>			
		<i>Sale</i>	<i>NonCommercialExpl</i>			
		<i>l4lod:Derivative</i>	<i>DerivativeWork</i>			

<i>ObjectProperty: prohibits</i>	<i>The property defines the prohibition, prohibit action</i>	<i>LimitationOfDistribution</i>	<i>Reutilization</i>	<i>prohibitedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>LimitationOfDistribution</i>	<i>Distribution</i>			
		<i>RestrictionOfSGR</i>	<i>Reutilization</i>			
		<i>RestrictionOfSGR</i>	<i>Extraction</i>			
		<i>RestrictionOfSGR</i>	<i>NotNormalExploitation</i>			
		<i>RestrictionOnDerivativeWork</i>	<i>Reproduction</i>			
		<i>RestrictionOnDerivativeWork</i>	<i>Display</i>			
		<i>RestrictionOnDerivativeWork</i>	<i>Distribution</i>			
		<i>RestrictionOnDerivativeWork</i>	<i>Performance</i>			
		<i>RestrictionOnDerivativeWork</i>	<i>Communication</i>			
		<i>RestrictionOnOriginalWork</i>	<i>Alteration</i>			

		<i>RestrictionOnOriginalWork</i>	<i>Display</i>			
		<i>RestrictionOnOriginalWork</i>	<i>Performance</i>			
		<i>RestrictionOnOriginalWork</i>	<i>Reproduction</i>			
		<i>RestrictionOnOriginalWork</i>	<i>Communication</i>			
		<i>RestrictionOnOriginalWork</i>	<i>Distribution</i>			
		<i>UnlawfulAccess</i>	<i>Permission</i>			
		<i>l4lod:NoCommercial</i>	<i>l4lod:CommercialExpl</i>			
		<i>l4lod:NoDerivative</i>	<i>DerivativeWork</i>			
<i>ObjectProperty:actsOn</i>	<i>The prop- erty ex- press action on object</i>	<i>Adaptation</i>	<i>OriginalWork</i>	<i>isActedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>Alteration</i>	<i>OriginalWork</i>			
		<i>AnyOtherAlteration</i>	<i>OriginalWork</i>			

		<i>Arrangement</i>	<i>OriginalWork</i>			
		<i>Authorisation</i>	<i>PermissionOnDerivativeWork</i>			
		<i>Authorisation</i>	<i>PermissionOnOriginalWork</i>			
		<i>Communication</i>	<i>OriginalWork</i>			
		<i>Communication</i>	<i>DerivativeWork</i>			
		<i>ConditionsOfPSIReuse</i>	<i>Obligation</i>			
		<i>ConditionsOfPSIReuse</i>	<i>Permission</i>			
		<i>ConditionsOfPSIReuse</i>	<i>Prohibition</i>			
		<i>Display</i>	<i>OriginalWork</i>			
		<i>Display</i>	<i>DerivativeWork</i>			
		<i>Distribution</i>	<i>OriginalWork</i>			

		<i>Distribution</i>	<i>DerivativeWork</i>			
		<i>Performance</i>	<i>OriginalWork</i>			
		<i>Performance</i>	<i>DerivativeWork</i>			
		<i>Reproduction</i>	<i>DerivativeWork</i>			
		<i>Reproduction</i>	<i>OriginalWork</i>			
		<i>Sale</i>	<i>PermissionOnDerivativeWork</i>			
		<i>Sale</i>	<i>PermissionOnOriginalWork</i>			
		<i>Translation</i>	<i>OriginalWork</i>			
<i>ObjectProperty:belongsTo</i>	<i>It represents relations between two objects, when one belongs to another</i>	<i>OrphanWork</i>	<i>UnknownRightholder</i>	<i>owns</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:grants</i>	<i>Relates an agent to the pro-</i>	<i>Copyright</i>	<i>RestrictionOnOriginalWork</i>	<i>grantedBy</i>	<i>Transitive NONE</i>	<i>none</i>

	<i>positional attitude it grants</i>	<i>EducationalPurpose</i>	<i>LawfulAccess</i>			
		<i>ExclusiveRightsOnResults</i>	<i>RestrictionOnDerivativeWork</i>			
		<i>GeneralRequirements</i>	<i>OpenDomainOGD</i>			
		<i>GeneralRequirements</i>	<i>SpecialRequirements</i>			
		<i>LawfulAccess</i>	<i>Authorisation</i>			
		<i>SuiGenerisDBRights</i>	<i>RestrictionOfSGR</i>			
		<i>co:WithdrawalRight</i>	<i>co:Withdraw</i>			
<i>ObjectProperty: grantedBy</i>	<i>Specifies that some subjective entity is granted by some thing</i>	<i>EconomicRights</i>	<i>Grant</i>	<i>grants</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: ifQualifies</i>	<i>Relates to condition of an evaluative attitude or qualifica-</i>	<i>SubstantialChange</i>	<i>QualitativelyInvestment</i>	<i>ifQualifiedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>SubstantialChange</i>	<i>QuantitativelyInvestment</i>			

	<i>tion to the proposition or thing being qualified</i>	<i>SubstantialInvestment</i>	<i>QualitativelyInvestment</i>			
		<i>SubstantialInvestment</i>	<i>QuantitativelyInvestment</i>			
<i>ObjectProperty:disactivates</i>	<i>Relates to action of disactivation of the object</i>	<i>Assignment</i>	<i>RestrictionOfSGR</i>	<i>disactivated_by</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>Grant</i>	<i>RestrictionOfSGR</i>			
		<i>Transfer</i>	<i>RestrictionOfSGR</i>			
<i>ObjectProperty:distributes</i>	<i>Relates to action of distribution of the object</i>	<i>Distribution</i>	<i>CopyOfDB</i>	<i>distruted_by</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: rdfs:isDefinedBy</i>	<i>Relates an evaluative attitude or qualification to the proposition or thing being qualified</i>	<i>Copyright</i>	<i>CopyrightLaw</i>	<i>defines</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>PersonalData</i>	<i>PersonalDataProtectionLaw</i>			
		<i>SuiGenerisDBRights</i>	<i>SuiGenerisDBRightsLaw</i>			
<i>ObjectProp- erty:implementedBy</i>	<i>Specifies that some subjective entity is implemented by</i>	<i>Copyright</i>	<i>FirstSaleRule</i>	<i>implements</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>DeonticRules</i>	<i>Permission</i>			

	<i>some thing</i>	<i>DeonticRules</i>	<i>Obligation</i>			
		<i>DeonticRules</i>	<i>Prohibition</i>			
		<i>ExceptionOfPSIReuse</i>	<i>ConditionsOfPSIReuse</i>			
		<i>ExclusiveRightsOnResults</i>	<i>!4lod:NoDerivative</i>			
		<i>GeneralRequirements</i>	<i>TermsOfUse</i>			
		<i>GeneralRequirements</i>	<i>LegalNotice</i>			
		<i>GeneralRequirements</i>	<i>License</i>			
		<i>OpenDomainOGD</i>	<i>PD_License</i>			
		<i>OpenDomainOGD</i>	<i>NoLicense</i>			
		<i>PSIDirective</i>	<i>NationalPSILaw</i>			
		<i>Permission</i>	<i>ND_License</i>			

		<i>Permission</i>	<i>BY_License</i>			
		<i>Permission</i>	<i>NC_License</i>			
		<i>Permission</i>	<i>SA_License</i>			
		<i>Permission</i>	<i>PD_License</i>			
		<i>Permission</i>	<i>NoLicense</i>			
		<i>RequirementsToAdaptersLicense</i>	<i>SA_License</i>			
		<i>RequirementsToAdaptersLicense</i>	<i>AdaptersLicense</i>			
		<i>RightToAuthorise</i>	<i>Authorisation</i>			
		<i>RightToControlResale</i>	<i>LimitationOfDistribution</i>			
		<i>RightToSale</i>	<i>Sale</i>			
		<i>RightToTransmitSGR</i>	<i>ContractualLicense</i>			

		<i>SuiGenerisDBRights</i>	<i>FirstSaleRule</i>			
		<i>co:AttributionRight</i>	<i>l4lod:Attribution</i>			
		<i>co:EducationRight</i>	<i>EducationalPurpose</i>			
		<i>co:InformationRight</i>	<i>PublicInterest</i>			
		<i>co:IntegrityRight</i>	<i>l4lod:NoDerivative</i>			
		<i>co:OfficialActRight</i>	<i>LawfulAccess</i>			
		<i>co:ParodyRight</i>	<i>OtherTraditionalExceptions</i>			
		<i>co:PrivateCopyRight</i>	<i>PrivateReproduction</i>			
		<i>co:QuotationRight</i>	<i>OtherTraditionalExceptions</i>			
		<i>co:TemporaryReproductionRight</i>	<i>OtherTraditionalExceptions</i>			
		<i>l4lod:Attribution</i>	<i>NoticeOfLicense</i>			

		<i>l4lod:Attribution</i>	<i>URIToLicensedMaterial</i>			
		<i>l4lod:Attribution</i>	<i>IndicationOfLicensedMaterialLi- cense</i>			
		<i>l4lod:Attribution</i>	<i>IndetificationOfCreator</i>			
		<i>l4lod:Attribution</i>	<i>IndicationOfModification</i>			
		<i>l4lod:Attribution</i>	<i>NoticeOfDisclaimer</i>			
		<i>l4lod:Attribution</i>	<i>CopyrightNotice</i>			
		<i>l4lod:Attribution</i>	<i>URIToResource</i>			
		<i>l4lod:Attribution</i>	<i>ND_License</i>			
		<i>l4lod:Attribution</i>	<i>NC_License</i>			
		<i>l4lod:Attribution</i>	<i>SA_License</i>			
		<i>l4lod:Attribution</i>	<i>BY_License</i>			

		<i>!4lod:NoCommercial</i>	<i>NC_License</i>			
		<i>!4lod:NoDerivative</i>	<i>ND_License</i>			
		<i>!4lod:ShareAlike</i>	<i>SA_License</i>			
<i>ObjectProperty:hasAttribute</i>	<i>Specifies that some subjective entity has attribute of some thing</i>	<i>FreeArtLicense1.3</i>	<i>ApprovedByCreativeCommons</i>	<i>isAttribute</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>GPLv3</i>	<i>ApprovedByCreativeCommons</i>			
		<i>LaterVersionsLicense</i>	<i>ApprovedByCreativeCommons</i>			
		<i>PortedVersionsOfBY_SA_License</i>	<i>ApprovedByCreativeCommons</i>			
<i>ObjectProperty:hasConditionOf</i>	<i>Specifies that some subjective entity has condition of some thing</i>	<i>SuiGenerisDBRights</i>	<i>Qualification</i>	<i>isConditionOf</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:hasException</i>	<i>Specifies that some subjective entity has exception of some</i>	<i>CulturalEstablishments</i>	<i>Archives</i>	<i>is Exception</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>CulturalEstablishments</i>	<i>Libraries</i>			

	<i>thing</i>	<i>CulturalEstablishments</i>	<i>Museums</i>			
		<i>EducationalAndResearchEstab- lishments</i>	<i>UniversityLibraries</i>			
<i>ObjectProperty: lkif:holds</i>	<i>Relates an agent to the propositional attitude it holds</i>	<i>ExclusiveRightsOnResults</i>	<i>PermissionOnDerivativeWork</i>	<i>held_by</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>GroupOfNaturalPersons</i>	<i>Copyright</i>			
		<i>MakerOfDB</i>	<i>RightToTransmitSGR</i>			
		<i>MakerOfDB</i>	<i>SuiGenerisDBRights</i>			
		<i>MoralRightsOwner</i>	<i>co:MoralRights</i>			
		<i>PersonWhoHoldsCopyright</i>	<i>EconomicRights</i>			
		<i>RightHolderOfCopyrights</i>	<i>RightToSale</i>			
		<i>RightHolderOfCopyrights</i>	<i>RightToAuthorise</i>			
		<i>RightHolderOfCopyrights</i>	<i>EconomicRights</i>			

		<i>RightHolderOfSGR</i>	<i>RightToTransmitSGR</i>			
		<i>RightHolderOfSGR</i>	<i>SuiGenerisDBRights</i>			
		<i>ThirdParty</i>	<i>ThirdPartyRights</i>			
		<i>UnknownRightholder</i>	<i>CompensationRight</i>			
		<i>schema:Author</i>	<i>ExclusiveRightOnResults</i>			
		<i>schema:Author</i>	<i>Copyright</i>			
<i>ObjectProperty: performedBy</i>	<i>Specifies that some subjective entity is performed by some thing</i>	<i>CopyOfDB</i>	<i>LawfulUser</i>	<i>performs</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>FirstSaleRule</i>	<i>RightholderOfCopyrights</i>			
		<i>FirstSaleRule</i>	<i>RightholderOfSGR</i>			
		<i>LawfulAccess</i>	<i>LawfulUser</i>			
<i>ObjectProperty:protects</i>	<i>Re-lates an agent to the propositional attitude it</i>	<i>Effective_Technological_Measures</i>	<i>Copyright</i>	<i>protectedBy</i>	<i>Transitive NONE</i>	<i>none</i>

	<i>protects</i>					
<i>ObjectProperty:indicates</i>	<i>Re-lates an agent to the propositional attitude it indicates</i>	<i>IndicationOfLicensedMaterialLicense</i>	<i>TextOfLicense</i>	<i>indicatedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>IndicationOfLicensedMaterialLicense</i>	<i>URIOfLicense</i>			
		<i>IdicationOfModification</i>	<i>PreviousModification</i>			
		<i>IdicationOfModification</i>	<i>CurrentModification</i>			
<i>ObjectProperty:violates</i>	<i>Re-lates an agent to the propositional attitude it violates</i>	<i>Violation</i>	<i>Obligation</i>	<i>violatedBy</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>Violation</i>	<i>Prohibition</i>			
<i>ObjectProperty:reasonOf</i>	<i>Specifies that some subjective entity has reason of some thing</i>	<i>ExcludedFromAccessDocuments</i>	<i>CommercialConfidentiality</i>	<i>isReason</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>ExcludedFromAccessDocuments</i>	<i>PersonalData</i>			
		<i>ExcludedFromAccessDocuments</i>	<i>SpecificAccess</i>			
		<i>ExcludedFromAccessDocuments</i>	<i>InsigniaPartOfDocument</i>			

		<i>ExcludedFromAccessDocuments</i>	<i>StatisticalConfidentiality</i>			
		<i>ExcludedFromAccessDocuments</i>	<i>ProtectionOfNationalSecurity</i>			
<i>ObjectProperty: lkif:result_of</i>	<i>Specifies that some participant is the result of a process, it might have existed before the process took place, but is in some way altered (an 'inanimate' goal of an act)</i>	<i>DerivativeWork</i>	<i>Alteration</i>	<i>hasResultOf</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: relatedTo</i>	<i>Specifies that some subjective entity is related to some thing</i>	<i>co:RelatedRights</i>	<i>Copyright</i>	<i>isRelatedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty: setOf</i>	<i>Specifies that some subjective entity is set of some thing</i>	<i>lkif:Natural_Person</i>	<i>GroupOfNaturalPersons</i>	<i>isSetBy</i>	<i>Transitive NONE</i>	<i>none</i>

<i>ObjectProperty:sets</i>	<i>Re-lates an agent to the proposi-tional atti-tude it sets</i>	<i>Bearer</i>	<i>DeonticRules</i>	<i>Set_by</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:transferredBy</i>	<i>Specifies that some subjective entity is transferred by some thing</i>	<i>EconomicRights</i>	<i>Transfer</i>	<i>transfers</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:hasTime</i>	<i>Specifies that some subjective entity is time de-pended</i>	<i>LegalRules</i>	<i>ti:TimeInterval</i>	<i>timedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProp-erty:hasJurisdiction</i>	<i>Specifies that some subjective entity is jurisdiction depended</i>	<i>ExceptionOfInsigniaReuse</i>	<i>Jurisdiction_UK</i>	<i>appliesJurisdic-tionTo</i>	<i>Transitive NONE</i>	<i>none</i>
		<i>ID</i>	<i>Jurisdiction_UK</i>			
		<i>LegalRules</i>	<i>dbo:Jurisdiction</i>			
		<i>OpenDomainOGD</i>	<i>Jurisdiction_FI</i>			
		<i>PublicSectorInstitutionInsignia</i>	<i>Jurisdiction_UK</i>			
<i>ObjectProperty:usedBy</i>	<i>Specifies that some subjective</i>	<i>EducationalPurpose</i>	<i>LawfulUser</i>	<i>uses</i>	<i>Transitive NONE</i>	<i>none</i>

	<i>entity is used by some thing</i>	<i>NormalUse</i>	<i>LawfulUser</i>			
<i>ObjectProperty: withdrawBy</i>	<i>Specifies that some subjective entity is withdrw by some thing</i>	<i>EconomicRights</i>	<i>Authorisation</i>	<i>withdraw</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProp-erty:ownsCopyrightOf</i>	<i>Specifies that some subjective entity owns copyright of some thing</i>	<i>PersonWhoHoldsCopyright</i>	<i>CollectiveWork</i>	<i>copyright-IsOwnedBy</i>	<i>Transitive NONE</i>	<i>none</i>
<i>ObjectProperty:repays</i>	<i>Re-lates an agent to the pro-posi-tional atti-tude it repays</i>	<i>Reparation</i>	<i>Violation</i>	<i>repayedBy</i>	<i>Transitive NONE</i>	<i>none</i>

Annex 4. List of Analyzed Legislative

The following legal documents were analysed from the EU, the national law of EU member states and international law domains:

European Union directives regulating the reuse of PSI:

Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information[19];

Directive 2013/37/EU of the European Parliament and of the Council of 26 June 2013 amending Directive 2003/98/EC on the re-use of public sector[20].

EU member state legislation and official translations regulating the reuse of PSI, including legislation at the level of provinces and federal states (*Bundesländer*) of Austria:

Austria:

Bundesgesetz über die Weiterverwendung von Informationen öffentlicher Stellen (Informationsweiterverwendungsgesetz - IWG) (Federal Law on the re-use of public sector information), BGBl. I nr. 135/2005, 18.11.2005 (Federal legislation)[36];

Bundesgesetz mit dem das Informationsweiterverwendungsgesetz geändert wird (Federal Act amending the law on the re-use of public sector information), BGBl I nr. 76/2015, 9.07.2015 (Federal legislation)[184];

Wiener Landesgesetz über die Weiterverwendung von Informationen öffentlicher Stellen - Wiener Informationsweiterverwendungsgesetz (Law on the re-use of public sector information of the Land of Vienna), LGBl. N° 52/2005, 20/09/2005 (Wien/ Vienna legislation)[37];

Gesetz, mit dem das Wiener Landesgesetz über die Weiterverwendung von Informationen öffentlicher Stellen - Wiener Informationsweiterverwendungsgesetz (WIWG) geändert wird (Law amending the Law on re-use of public sector information of the Land of Vienna), LGBl No. 29/2015, 24/07/2015 (Wien/ Vienna legislation)[185];

Kärntner Gesetz über Auskunftspflicht, Datenschutz und Statistik des Landes (Act on accountability, privacy and statistics of the Land of Carinthia) of 7/07/2005 LGBl. N° 70/2005, 17/10/2005 (Kärnten/ Carinthia legislation)[38];

Law No 22 of 29 October 2015 amending the Carinthian Information and Statistics Act, the Carinthian Provincial Archives Act and the Carinthian Provincial Museums Act (Kärnten/ Carinthia legislation)[186];

Gesetz über die Weiterverwendung von Dokumenten öffentlicher Stellen (Act on the re-use of documents held by public bodies, Land of Vorarlberg), consolidated version as per 18 August 2015 (Vorarlberg legislation)[39];

NÖ Auskunftsgesetz, Bundesland Niederösterreich (Information Act, Land of Lower Austria legislation)[187];

Gesetz über die Weiterverwendung von Informationen öffentlicher Stellen, Bundesland Tirol (Law on the reuse of public sector information, Land of Tyrol) consolidated version as per 10 November 2015(Tirol/ Tyrol legislation)[42];

Gesetz über die Auskunftspflicht, die Weiterverwendung von Informationen öffentlicher Stellen sowie die Statistik des Landes Burgenland (Law on accountability, the re-use of public sector information and the statistics of the Land of Burgenland), LGBl. N° 14/2007, 12/02/2007 (Burgenland legislation)[43];

Gesetz vom 26. März 2015, mit dem das Burgenländische Auskunftspflicht-, Informationsweiterverwendungs- und Statistikgesetz geändert wird (Law of 26 March 2015 amending the Law on accountability, the re-use of public sector information and the statistics); LGBl. No. 31/2015 of 3/06/2015 (Burgenland legislation)[188];

Gesetz über die Weiterverwendung von Dokumenten öffentlicher Stellen (Act on the re-use of documents held by public bodies, Land of Styria) of 27/03/2007, LGBl. N° 46, 13/06/2007 (Steiermark/ Styria legislation)[44];

Gesetz vom 19. Mai 2015, mit dem das Steiermärkische Dokumenten-Weiterverwendungsgesetz geändert wird (Law of 19 May 2015 modifying the Land of Styria law on the re-use of documents held by public bodies), LGBl. No. 41/2015, 03/06/2015 (Steiermark/ Styria legislation)[189];

Gesetz über Auskunftspflicht, Dokumentenweiterverwendung, Datenschutz, Landesstatistik und Geodateninfrastruktur, Fassung vom 06.08.2015 (Law on accountability, privacy, statistics and geo-data infrastructures, Land of Salzburg, as per 06/08/2015) (Salzburg legislation)[190];

Landesgesetz, mit dem das Oberösterreichische Auskunftspflicht- und Datenschutzgesetz geändert wird (Law amending the law on access to information and data protection, Land of Upper Austria), LGBl N°86/2006 (Oberösterreich/ Upper Austria legislation)[46];

Landesgesetz, mit dem das Oberösterreichische Auskunftspflicht-, Datenschutz- und Informationsweiterverwendungsgesetz geändert wird (Law amending the Upper Austrian law on access to information, on data protection and on re-use of public sector information) of 18/07/2015, LGBl. No. 68/2015(Oberösterreich/ Upper Austria legislation)[191].

Belgium³⁹:

Arrêté royal fixant la procédure et les délais de traitement des demandes de réutilisation d'informations du secteur public ainsi que la surveillance de l'obligation de mise à disposition des documents administratifs (Royal decree establishing the procedure and deadlines for processing applications for re-use of public sector information and monitoring requirements for the provision of administrative documents) of 29/10/2007, Moniteur Belge, 06/11/2007, p. 56338-56341[192];

Arrêté royal relatif à la composition et au fonctionnement de la Commission d'accès aux et de réutilisation des documents administratifs (Royal decree on the composition and functioning of the Commission for access to and re-use of admin-

³⁹ Only Belgian federal legislation was analysed. For a deeper investigation, regional legislation should be analysed for the Walloon region, Flanders, the French Community, the German-speaking Community and the Brussels-Capital Region.

istrative records) of 29/04/2008, Moniteur Belge, 08/05/2008, p. 24362-24368[193].

Bulgaria⁴⁰:

Act amending the Access to Public Information Act (promulgated in the State Gazette, Issue No. 55/year 2000; amended, SG No. 1 and No. 45/year 2002, SG No. 103/ year 2005, SG Nos. 24, 30, and 59/year 2006)[21].

Cyprus:

Re-use of Public Sector Information Act 2015 (Act 205(I)/2015), Cyprus Gazette, n° 4546 of 23/12/2015, p. 1442[194].

Croatia⁴¹:

Act Nr. 403/13 of 8 March 2013 on the right of access to information (Zakon o pravu na pristup informacijama)[22];

Extracts from the General Administrative Procedure Act (Zakon o općem upravnom postupku - Act Nr. 1065/2009 of 1 April 2009)[195].

Czechia⁴²:

Zákon ze dne 11. května 1999 o svobodném přístupu k informacím (Act on free access to information) of 11/05/1999 Sbirka Zakonu CR N° 106/1999, 08/06/1999[23];

Act of 3 February 2006 amending Act no 106/1999 on free access to information[196].

Denmark:

Forvaltningsloven (Public Administration Act), Lovtidende A n° 571, 19.12.1985)[197];

Lov om offentliggørelse af forvaltningen (Access to Public Administrative Documents Act), Lovtidende A n° 572, 19.12.1985[47];

Lov om videreanvendelse af den offentlige sektors informationer (Act on the re-use of public sector information) Lovtidende n° 596, 24.6.2005[48];

Lov om ændring af lov om videreanvendelse af den offentlige sektors informationer (Amended Act on the re-use of public sector information), Lovtidende A n° 551, 18/06/2008[198];

Lov om ændring af lov om videreanvendelse af den offentlige sektors informationer (Act amending the Act on the re-use of public sector information) of 2 June 2014[199].

Estonia⁴³:

⁴⁰ This legislation was not analysed: Закон за достъп до обществената информация (Act amending the Access to Public Information Act) of 07/07/2000 as last amended on 11/12/2015, Official Gazette N°97 of 11/12/2015[235].

⁴¹ This legislation was not analysed: Act of 15 July 2015 amending and supplementing the Act on the right of access to information (Zakon o izmjenama i dopunama zakona o pravu na pristup informacijama)[236].

⁴² This legislation was not analysed: Act of 12 August 2015 amending Act no 106/1999 on free access to information[237].

⁴³ This legislation was not analysed: Act of 15 December 2015 amending the Public Information Act and other related acts, RT I, 06.01.2016[238].

The Public Information Act (consolidated text March 2003)[24];
Act of 5 December 2012 amending the Public Information Act, RT I, 19.12.2012[200].

Finland:

Act on Transparency in Government (1999, as amended)[25];
Act on Criteria for Charges Payable to the State (1992)[201];
Act on Sovereignty of the Island of Åland (1991)[202].

France⁴⁴:

Décret n° 2011-577 du 26 mai 2011 relatif à la réutilisation des informations publiques détenues par l'Etat et ses établissements publics administratifs (Decree on the reuse of public sector information)[203];

Décret n°2005-1755 du 30 décembre 2005 relatif à la liberté d'accès aux documents administratifs et à la réutilisation des informations publiques, pris pour l'application de la loi n° 78-753 du 17 juillet 1978 (Decree on access to documents and on reuse of public sector information, specifying the provisions of law no. 78-753 of 17 July 1978)[204];

Act No 78-753 on freedom of access to administrative documents and the reuse of public information, consolidated version October 2013[26].

Germany:

Federal law transposing the PSI Directive – Re-use of Information Act (2006)[51];

Federal law amending the Re-use of Information Act (2015)[205].

Greece:

Για την περαιτέρω χρήση πληροφοριών του δημόσιου τομέα και τη ρύθμιση θεμάτων αρμοδιότητας Υπουργείου Εσωτερικών, Δημόσιας Διοίκησης και Αποκέντρωσης (Law on the re-use of public sector information and the regulation of issues within the competency of the Ministry of Interior, Public Administration and Decentralisation) of 15/03/2006, Efimeris Tis Kyvernisseos (FEKm Tefchos A) N°57 of 15/03/2006m p. 00587-00598[52];

Ρυθμίσεις θεμάτων Ανεξάρτητων Αρχών, Γενικού Επιθεωρητή Δημόσιας Διοίκησης, Σώματος Επιθεωρητών Ελεγκτών Δημόσιας Διοίκησης και λοιπών ζητημάτων αρμοδιότητας Υπουργείου Εσωτερικών (Amendment of the provisions of Laws 3320/2005 and 3448/2006, Article 11), of 21/11/2007, Efimeris Tis Kyvernisseos (FEK, Tefchos A), N°263 of 23/11/2007, p. 05077-05088[206];

Ανοικτή διάθεση και περαιτέρω χρήση εγγράφων, πληροφοριών και δεδομένων του δημόσιου τομέα, τροποποίηση του ν. 3448/2006 (Α' 57), προσαρμογή της εθνικής νομοθεσίας στις διατάξεις της Οδηγίας 2013/37/ΕΕ του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου, περαιτέρω ενίσχυση της διαφάνειας, ρυθμίσεις θεμάτων Εισαγωγικού Διαγωνισμού Ε.Σ.Δ.Δ.Α. και άλλες διατάξεις. (Law No. 4305 Open supply and re-use of public sector documents, information

⁴⁴ This legislation was not analysed: Code on the Relations between the Public and the Administration (Code des relations entre le public et l'administration), consolidated version January 2017[239].

and data, amendment to Law 3448/2006 (A 57), adaptation of national legislation to the provisions of Directive 2013/37/EU of the European Parliament and of the Council, further enhancing transparency, regulating matters relating to the Entry Examinations of the National School of Public Administration and Local Government and other provisions) of 30/10/2014, Efimeris Tis Kyvernisseos N°237 of 31/10/2014, p. 7499[53].

Hungary:

Act on the re-use of public sector information (Act LXIII of 2012)[54];

Act XCVI of 2015 amending Act CXII of 2011 on Informational Self-Determination and Freedom of Information and Act LXIII of 2012 on the Re-Use of Public Sector Information (2015. évi XCVI. törvény az információs önrendelkezési jogról és az információszabadságról szóló 2011. évi CXII. törvény és a közadatok újrahasznosításáról szóló 2012. évi LXIII. törvény módosításáról)[55].

Ireland⁴⁵:

The European Communities (Re-use of Public Sector Information) Regulations (2005)[56];

The European Communities (Re-use of Public Sector Information) Regulations, amendment of S.I. No. 103 of 2008 [207];

The European Communities (Re-use of Public Sector Information) Regulations, amendment of S.I. No. 525 of 2015[208].

Italy:

Attuazione della direttiva 2003/98/CE relativa al riutilizzo di documenti nel settore pubblico (Legislative Decree No 36 of 24 January 2006 implementing the Directive 2003/98 on the re-use of public sector information), 24/01/2006, Gazzetta Ufficiale della Repubblica Italiana N° 37 of 14/02/2006[57];

Article 45 of Law No 96 of 4 June 2010, amending Legislative Decree No 36 of 24 January 2006 on the re-use of public sector documents, Gazzetta Ufficiale della Repubblica Italiana N° 146 of 25/06/2010[209];

Decreto legislativo 18 maggio 2015, n. 102 - Attuazione della direttiva 2013/37/UE che modifica la direttiva 2003/98/CE, relativa al riutilizzo dell'informazione del settore pubblico (Legislative decree no 102 of 18 May 2015 implementing Directive 2013/37/EU amending Directive 2003/98/EC on the re-use of public sector information)[210].

Latvia⁴⁶:

⁴⁵ A new amendment was released but not analysed: European Communities (Re-use of Public Sector Information) (Amendment) Regulations 2015 of 24 November 2015[240].

⁴⁶ This legislation was not analysed: Kārtība, kādā tiek piešķirtas ekskluzīvas tiesības informācijas atkalizmantošanai un publiskota informācija par šādu tiesību piešķiršanu (Ministerial Order setting the procedure for awarding exclusive rights for re-use of information and for publication of information on the award of such rights), 22/05/2007, Latvijas Vēstnesis N° 89 of 05/06/2007[241].

Informācijas atklātības likums (Freedom of Information Act) of 29/10/1998, Latvijas Vēstnesis N° 334/335 of 06/11/1998[27];

Grozījumi Informācijas atklātības likumā (Amendments to Freedom of Information Act) of 22/12/2005, Latvijas Vēstnesis N° 1 of 03/01/2006[211];

Law of 3 September 2015 amending the Law on the freedom of information (Grozījumi Informācijas atklātības likumā), Latvijas Vēstnesis N°185 (5503), 22.09.2015[212].

Lithuania⁴⁷:

Law on State Registers (2004)[213];

Law of the Republic of Lithuania on the Right to Obtain Information From State and Municipal Institutions and Agencies (2000)[28].

Luxembourg⁴⁸:

Loi du 4 décembre 2007 sur la réutilisation des informations du secteur public (Law on the re-use of public sector information), 4/12/2007, Mémorial Luxembourgeois A N° 212 of 07/12/2007, p. 3694[58].

Malta:

European Union Act (Cap. 460) Re-use of Public Sector Information Order (2007) of 09/02/2007, the Malta government gazette N° 18033 of 09/02/2007, p. 00293-00305[59];

Act No. XXIX of 13 October 2015 to provide for the re-use of public sector information and for matters ancillary or consequential thereto⁴⁹[214].

Netherlands:

Wet van 24 juni 2015, houdende regels over het hergebruik van overheidsinformatie (Law of 24 June 2015 laying down rules on the re-use of public sector information)[215];

Amendment of the Government Information (Public Access) Act and a number of other Acts in connection with the implementation of Directive 2003/98/EC of the European Parliament and of the Council of the European Union of 17 November 2003 on the re-use of public sector information (Re-use of Public Sector Information (Implementation of Directive) Act)[29].

Poland⁵⁰:

⁴⁷ This legislation was not analysed: Law No VIII-1524 on the Right to Obtain Information from State and Municipal Institutions and Bodies (recast by Law No. XII-2666 of 11 October 2016)[242].

⁴⁸ A new amendment was released but is not analysed here: Loi du 23 mai 2016 modifiant la loi du 4 décembre 2007 sur la réutilisation des informations du secteur public (Law modifying the law on the re-use of public sector information), Mémorial Luxembourgeois A N° 93 of 26 May 2016, p. 1726[243].

⁴⁹ The legislation was adopted after the deadline of the Directive 2013/37/EU implementation date.

⁵⁰ A subsequent amendment was released, but which was not analysed: Ustawa z dnia 25 lutego 2016 r.o ponownym wykorzystywaniu informacji sektora publicznego (Act of 25 February 2016 on the re-use of public sector information), Dziennik Ustaw of 15 March 2016 [244].

Konstytucja Rzeczypospolitej Polskiej (Constitution of the Republic of Poland) of 02/04/1997, Dziennik Ustaw n° 78/483 of 16/07/1997[31];

Ustawa z dnia 14 czerwca 1960 r. Kodeks postępowania administracyjnego (Code of Administrative Procedure), of 14.06.1960, Dziennik Ustaw n° 2000/98/1071 of 17/11/2000[216];

Ustawa z dnia 6 września 2001r. o dostępie do informacji publicznej (Act on Access to Public Information) of 06/09/2001, Dziennik Ustaw of 08/10/2001[217];

Amendment to Act on Access to Public Information by Act of 16 September 2011[32].

Portugal⁵¹:

Law No. 46/2007 of 24 August governs access to and re-use of administrative documents, repeals Law No. 65/93, of 26 August, with the wording introduced by Laws Nos. 8/95, of 29 March and 94/99 of 16 July, and transposes into the national legal system Directive 2003/98/EC of the Parliament and of the Council of 17 November, 2003 on the re-use of public sector information[218].

Romania⁵²:

Lege privind reutilizarea informațiilor din instituțiile publice (Law on re-use of public institutions information) of 25/04/2007, Journal Officiel de Roumanie n° 300 of 05/05/2007, p. 2-3[219];

Lege pentru modificarea Legii nr. 109/2007 privind reutilizarea informațiilor din instituțiile publice (Law amending the Law on re-use of public institutions information) of 24/10/2008, Journal Officiel de Roumanie n° 737 of 30/10/2008, p. 3[220];

Slovakia⁵³:

Article 47 of the Code of Administrative Procedure[221];

341 Act of 18 October 2012 amending and supplementing Act No 211/2000 on freedom of access to information and amending certain other acts (Freedom of Information Act), as amended[82];

⁵¹ A later amendment was released, but which was not analysed: Lei n.º 26/2016 Aprova o regime de acesso à informação administrativa e ambiental e de reutilização dos documentos administrativos, transpondo a Diretiva 2003/4/CE [...] de 28 de janeiro, e a Diretiva 2003/98/CE [...] de 17 de novembro. (Law No 26/2016 Approves the rules on access to administrative and environmental information and re-use of administrative documents, transposing Directive 2003/4/EC [...] of 28 January, and Directive 2003/98/EC [...] of 17 November.) of 22/08/2016, Diaro da Republica, D.R 1a seria, n.º 160 of 22/08/2016, p. 2777[245].

⁵² A new amendment was released, but not analysed: Lege pentru modificarea si completarea Legii nr. 109/2007 privind reutilizarea informațiilor din instituțiile publice (Law No 299/2015 amending Law No 109/2007 on the re-use of information from public institutions), Journal Officiel de Roumanie no 898 of 07/12/2015[246].

⁵³ This legislation was not analysed: Act No. 211/2000 on the Access to Information, amending certain laws (Freedom of Information Act) of 17/05/2000 (as amended - consolidated version of 1 January 2016), Zbierka zákonov SR n° 92 of 13/07/2000[247].

Act No. 211/2000 on Free Access to Information and Amendments of Some Acts (The Freedom of Information Act)[34].

Slovenia⁵⁴:

Zakon o dostopu do informacij javnega značaja, UPB2, Official Gazette of the Republic of Slovenia, No. 51/06 / Law on access to Information of Public Character - Public Information Access Act (consolidated version 2006)[222];

“Uredba o posredovanju in ponovni uporabi informacij javnega značaja” Official Gazette of the Republic of Slovenia, No. 76/05, of 12 August 2005 Decree on the provision and re-use of public information (2005)[83].

Spain:

Ley 37/2007 sobre reutilización de la información del sector público (Law on the re-use of public sector information) of 16/11/2007, BOE n° 276 of 17/11/2007 n°19814, p. 47160–47165[62];

Ley 18/2015, de 9 de julio, por la que se modifica la Ley 37/2007, de 16 de noviembre, sobre reutilización de la información del sector público (Law 18/2015 of 9 July on the modification of Law 37/2007 of 16 Novembre on the re-use of public sector information) BOE no. 164/2015 of 10 July 2015, p. 57436[223].

Sweden:

Lag om vidareutnyttjande av handlingar från den offentliga förvaltningen - Lag SFS 2010:566 Utkom från trycket den 15 juni 2010 (Law on the re-use of public administration documents)[64];

Lag om ändring i lagen (2010:566) om vidareutnyttjande av handlingar från den offentliga förvaltningen (Law of 21 May 2015 amending the Law (210:566) on the re-use of public sector documents[224];

Förordning om ändring i förordningen (2010:1770) om geografisk miljöinformation (Ordinance of 21 May 2015 amending the Ordinance (2010:1770) on Spatial Information), SFS 2015:288[225];

Förordning om ändring i arkivförordningen (1991:446) (Ordinance of 21 May 2015 amending the Archive Ordinance (1991:446))[226];

The Freedom of the Press Act (2012)⁵⁵[84].

United Kingdom:

The Re-use of public sector information regulations of 10/06/2005, Her Majesty's Stationery Office (HMSO) n° 1515 of 01/07/2005[66];

The Re-use of public sector information regulations of 24/06/2015[227].

Other legislation related to the reuse of PSI:

The Berne Convention and its amendments[228];

⁵⁴ The following new amendments were released, but were not analysed: Act of 15 December 2015 amending the Public Information Access Act[248]; Decree on communication and re-use of public sector information (2016)[249].

⁵⁵ This legislation was omitted from the European Commission website. It was linked from Section 6th of Lag om vidareutnyttjande av handlingar från den offentliga förvaltningen - Lag SFS 2010:566 Utkom från trycket den 15 juni 2010 (Law on the re-use of public administration documents), and it defines PSI.

Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases[122];

Council Directive 92/100/EEC of 19 November 1992 on rental right and lending right and on certain rights related to copyright in the field of intellectual property[229];

Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights[230];

Directive 2011/77/EU of the European Parliament and of the Council of 27 September 2011 amending Directive 2006/116/EC on the term of protection of copyright and certain related rights[231];

Directive 2012/28/EU of the European Parliament and of the Council of 25 October 2012 on certain permitted uses of orphan works[232];

U.S. Copyright Act, 17 U.S.C. §§ 101 et seq. [233].

WIPO Copyright Treaty (WCT)[234].