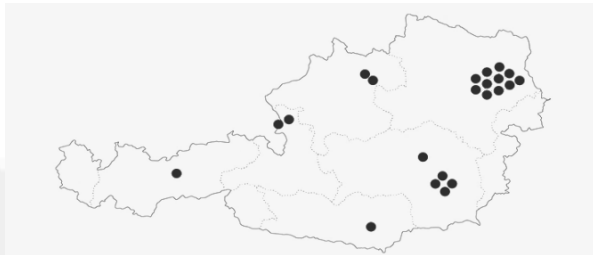


Architectures of Knowledge

Chapter I - Policies

*Setting the scene at local level for a common
Open Science cloud*



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TAIEX Expert



Abstract – Architectures of Knowledge – Setting the scene at local level for a common Open Science cloud.

The European Commission is promoting the European Open Science Cloud. This will be soon a reality. According to the Commission “the EOSC is not an actual cloud service, it is a kind of reengineering of existing e-infrastructures based on scientific data. The EOSC will be a federated environment for the sharing and re-use of scientific data, based on existing and emerging elements in the Member States, with lightweight international guidance and governance and a large degree of freedom regarding practical implementation”. In this context Open Science is seen in a visionary way, as a movement to make scientific research, data, and dissemination accessible at all levels of an enquiring society. This vision will be possible only if we understand how to manage and steer the different components and players, at all levels of the forthcoming Open Science Cloud. This presentation aims at analysing the setting of this management, first embedding it in a broader international context, and then describing in further steps the relevance of the main instruments that will enable the realisation of the Open Science vision at a local level: Research Data Management Policies, a common legal area, Good Governance Models, e-Infrastructure Commons, a Single Point of Entry as trusted service, common terminologies and good and versionable Data Management_Plans.

Why this slides?

*Understanding Policies,
Open Data, The European
Digital Single Market, Open
Science and the European
Open Science Cloud*

The European Digital Single Market

*Andrus Ansip,
Vice-President Digital Single Market*

*“If I had to express my views about the digital future – that of Europe or indeed, of the whole world - I could do it with one word: **data**.”*

*“ The digital economy revolves around **data**. It is the **driving force behind those three main elements of productivity, innovation and digitalisation**. Let’s not lose time being afraid - let’s build an open and vibrant data economy.”*

See: https://ec.europa.eu/commission/2014-2019/ansip/announcements/speech-vice-president-ansip-bruegel-annual-meeting-productivity-innovation-and-digitalisation-which_en

Open Science and the European Open Science Cloud

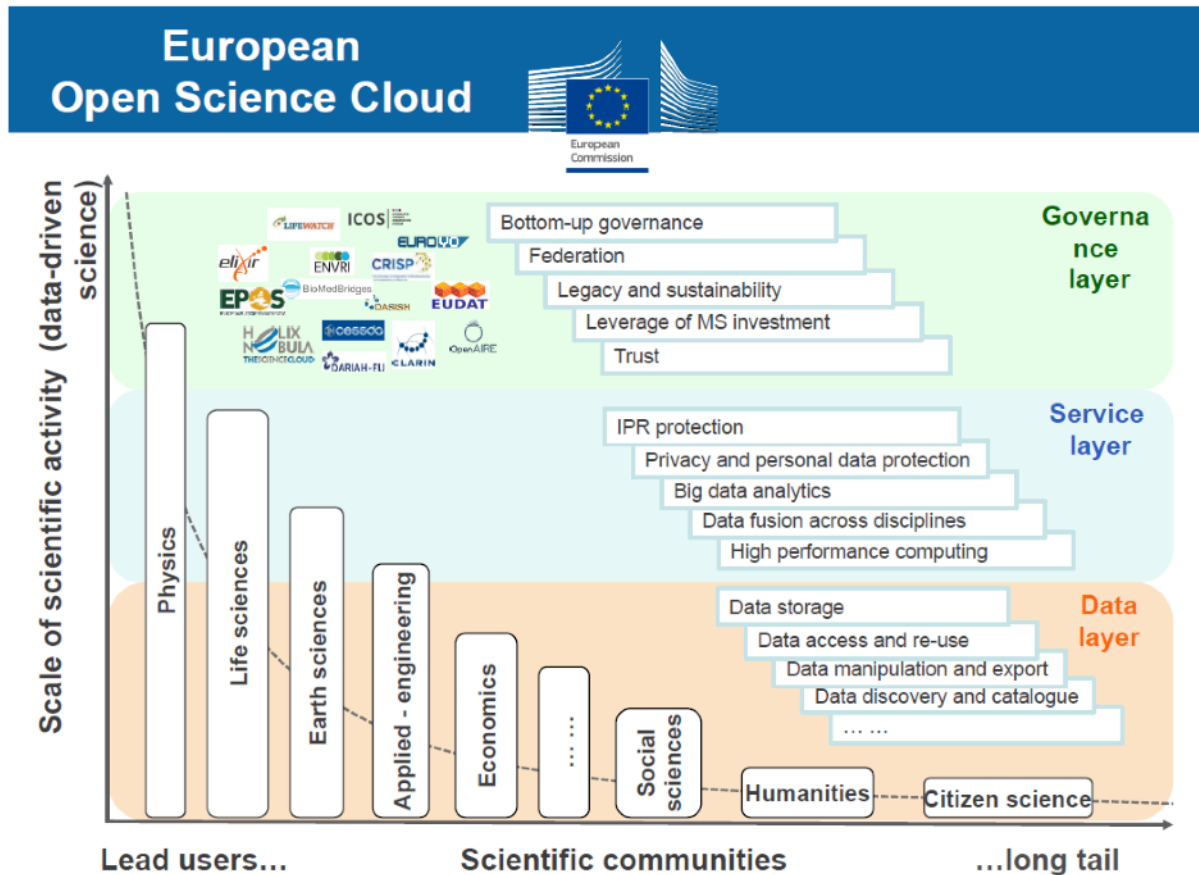
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In this context **Open Science** is seen as a movement to make scientific research, data, and dissemination accessible at all levels of an **enquiring society**. This vision will be possible only if we understand how to

manage and steer the different components and players, at all levels of the forthcoming Open Science Cloud.

See: <http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud>

European Open Science Cloud



Source: "Open Science policy: Results of the consultation on 'Science 2.0: Science in transition' and possible follow up." Presented by J.C. Burgelman, June 3 2015 at e-IRG workshop.

The European Digital Single Market Added Value for All

Compared to other regions across the globe, the European

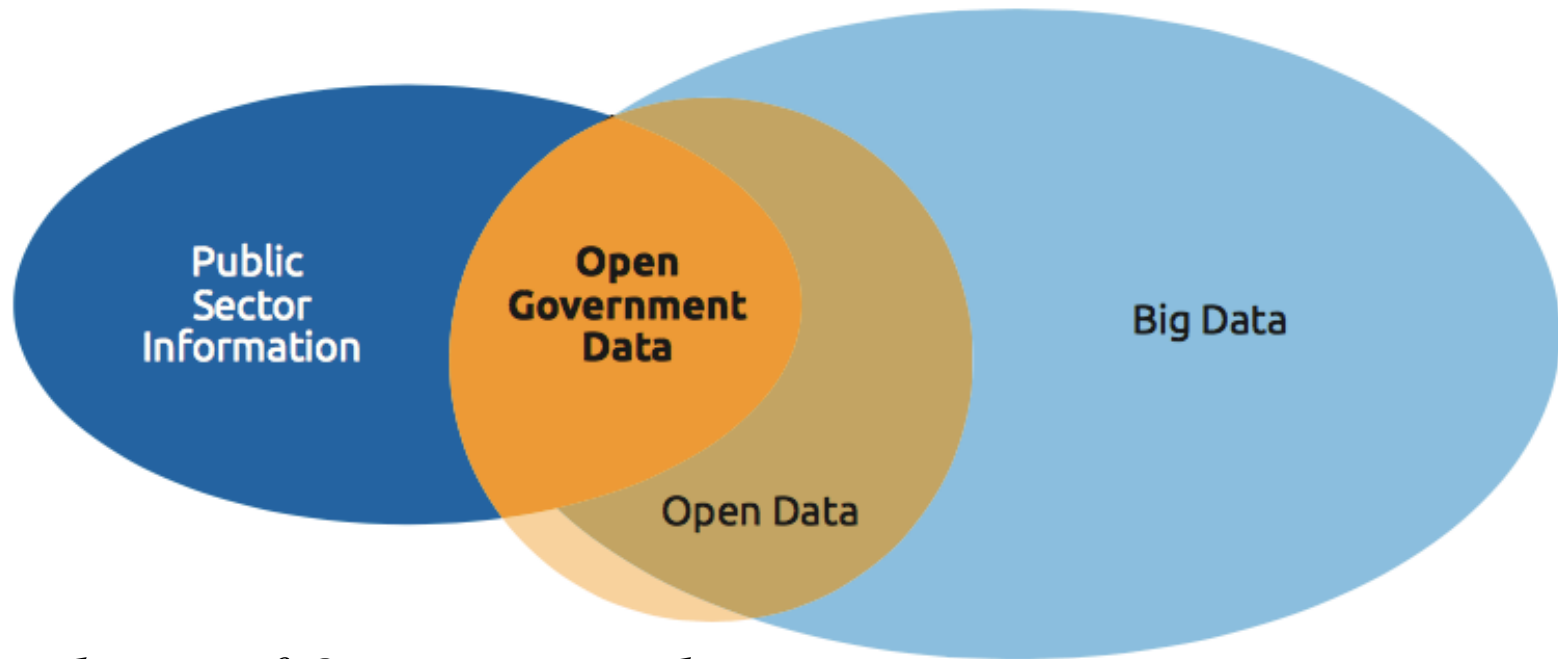
above-average participation of the public sector in the national economies, with common estimates of the public sector's stake in national GDPs ranging from 25% to 50% of

their respective economies, depending on the country and on the metrics used.² As a result, European administrations generally invest a significant budget in the creation of Public Sector Information (PSI), or Open Data. This information has a potential economic value that significantly exceeds its strict public sector utility.

Creating Value Through Open Data

Open Data is a sub-set of the commonly used term Big Data

→ Big Data, Open Data and ODGs are also produced at Research Institutions

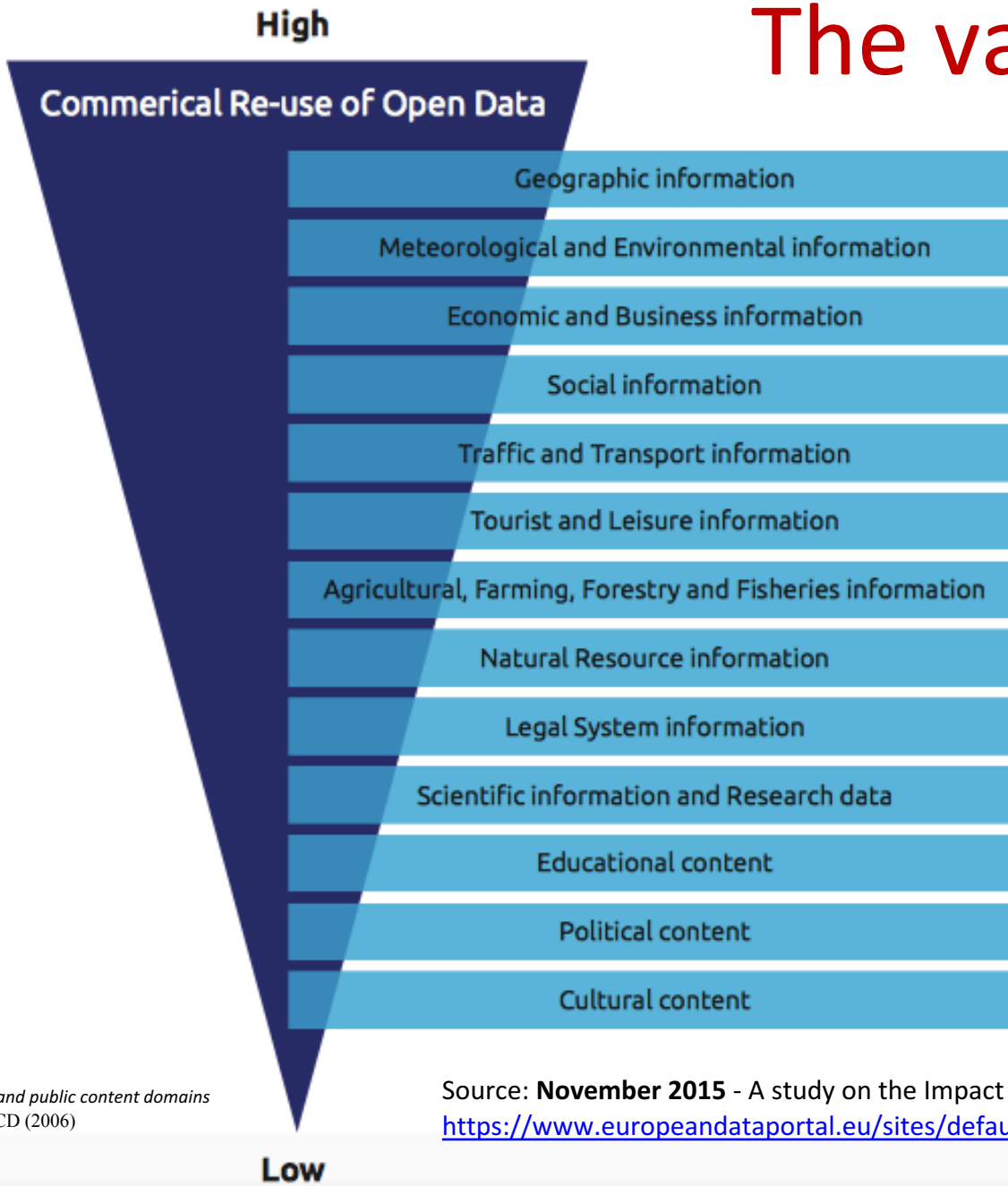


*Boundaries of Open Data and
Public Sector Information*

Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

https://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf

The value generated by Open Data



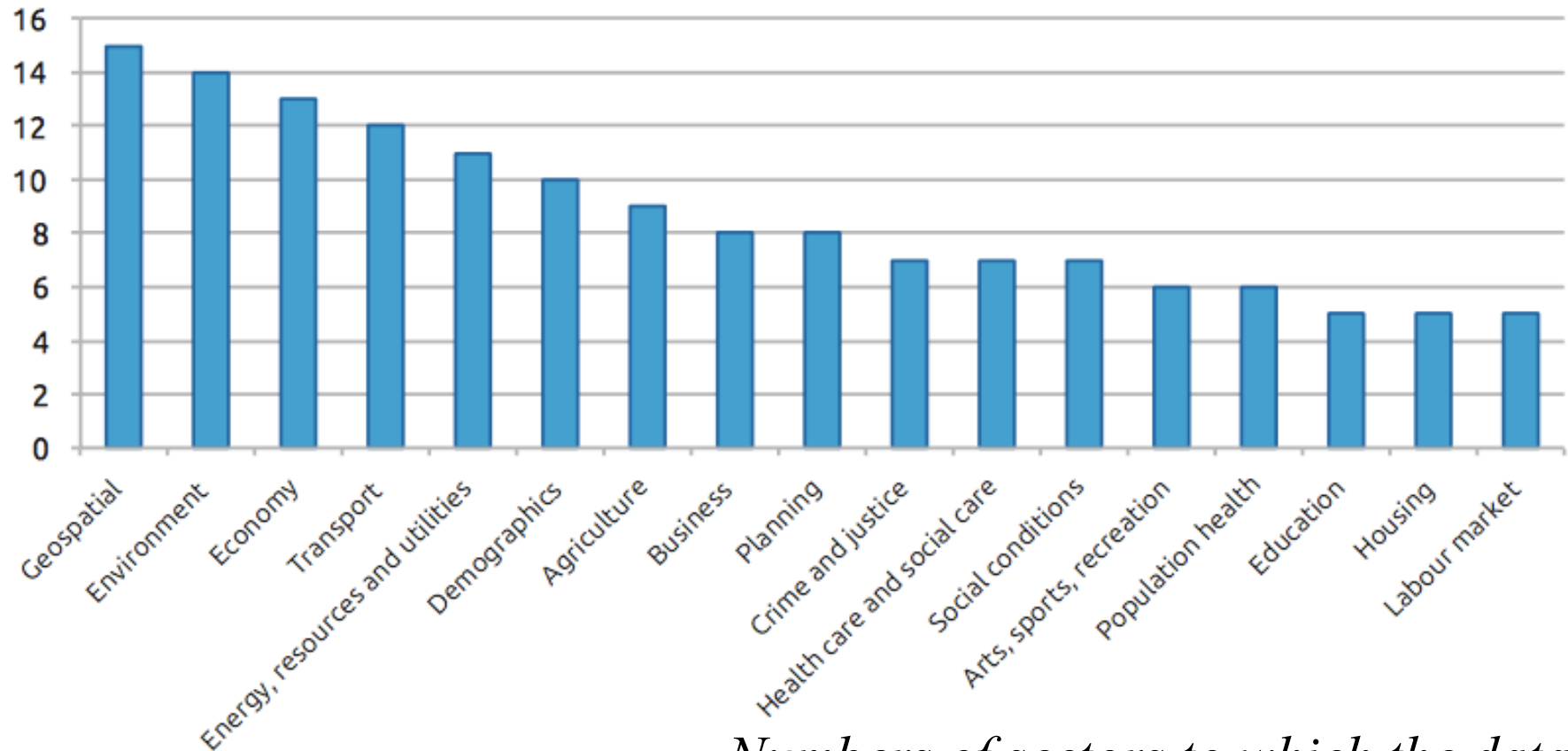
- *Open Data: relevant reuse divided by disciplines and sectors*
- *Data coming out of publicly funded research are to be considered PSI*

Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

https://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf

PSI and public content domains
OECD (2006)

Sectors most applicable to Open Data



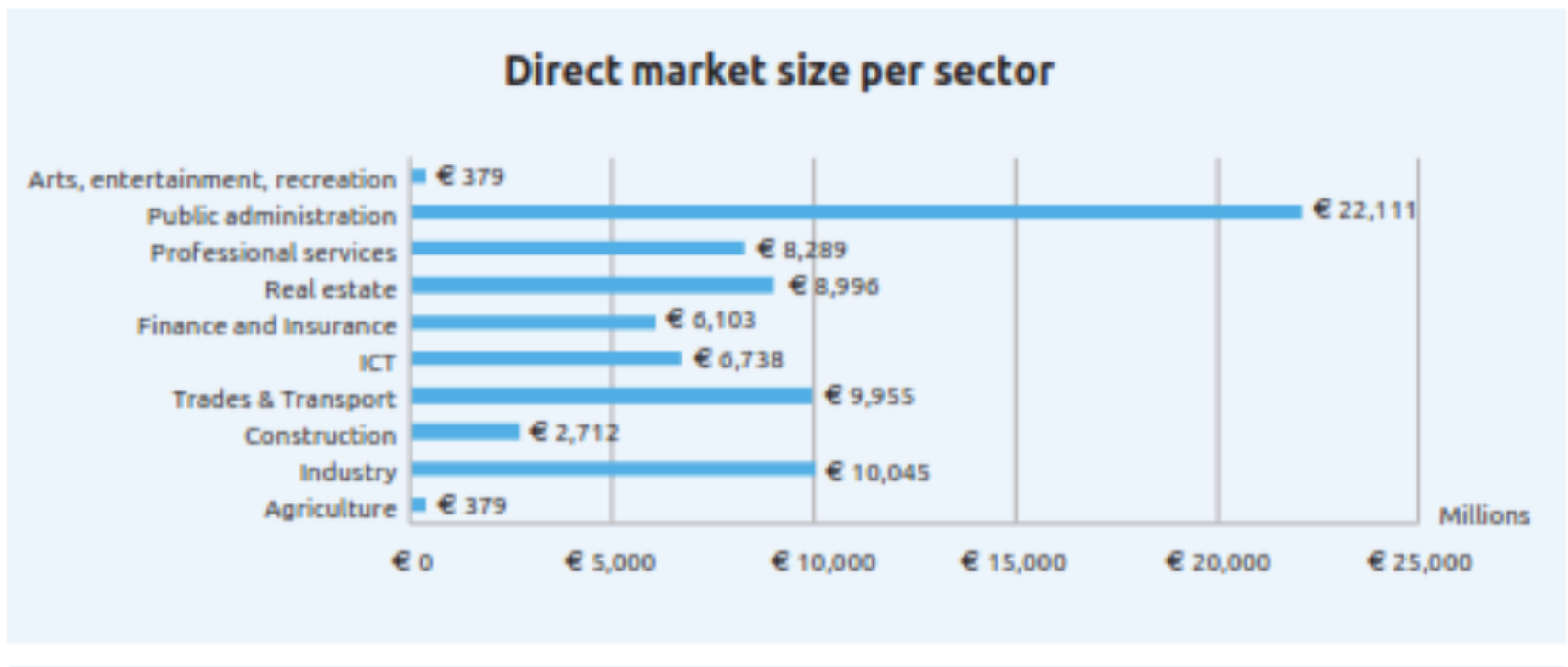
Numbers of sectors to which the data is applicable as identified by Deloitte , (Deloitte 2013)

Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

https://www.europeandataportal.eu/sites/default/files/edp_createing_value_through_open_data_0.pdf

The value generated by Open Data

Between 2016 and 2020 25,000 jobs directly related to Open Data will be created



Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

https://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf

Creating Legal Frameworks

On a high level two initiatives with related legal aspects have a huge impact on the architectures proposed by the EOSC initiative and the Open Science movement

1 The **SDG** (Sustainable Development Goals) of the U.N.

2 The **DIRECTIVE EU 2013/37** *amending Directive 2003/98/EC on the re-use of public sector information*

Creating Legal Frameworks

These **1+2 initiatives** contain crucial elements that are relevant.

Some of them contribute to support the creation of a legal frame for the creation and the distribution of data (→ [open data](#)), the creation of related services (→ [distributive by design](#)), and of course infrastructures (→ [accessible infrastructures for fair use](#))

DIRECT IMPACT:

This legal frame contributes to the creation of:

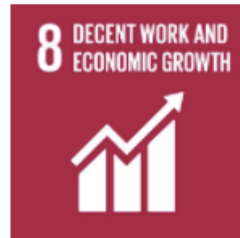
- a common legal space for *FAIR data* and *FAIR infrastructures*
- *crossborder services* and *related infrastructures*
- the use of *common terminologies*
- the *alignement of policies*
- the adoption of *good governance models* along the whole data value chain
- the adoption of *funding mechanism* that lead to the distribution of data



1



SUSTAINABLE DEVELOPMENT GOALS



→ Three SDG are relevant in this context: #9 #4 #5



INTERNATIONAL COOPERATION AND DEVELOPMENT
Building partnerships for change in developing countries

European Commission > International Cooperation and Development > Policies > The Sustainable Development Goals

Home | About Us | Policies | Sectors | Countries & Regions | Projects & Results | Funding | Library | News & Events

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POLICY

- European development policy
 - European consensus on development
 - The 2030 Agenda for Sustainable Development
 - The Sustainable Development Goals**
 - The ACP-EU Partnership after 2020
 - Policy Analysis
 - Agenda for Change
 - Policy coherence for development
 - The EU approach to aid

The Sustainable Development Goals

At the Rio+20 Conference, Member States decided to launch a process to develop a set of Sustainable Development Goals (SDGs), which were to build upon the Millennium Development Goals and converge with the post 2015 development agenda.

On 25 September 2015, the United Nations General Assembly formally adopted the universal, integrated and transformative [2030 Agenda for Sustainable Development](#), along with a set of **17 Sustainable Development Goals** and **169 associated targets**.

The adoption of the 2030 Agenda and its Sustainable Development Goals

development cooperation. **The EU has committed to implement the SDGs both in its internal and external policies.**

USEFUL LINKS

- Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS



Sustainable Development Goals (SDG) and EU-COM

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



Blending, which combines EU grants with loans or other public and private funding, is increasingly supportive of actions on infrastructure which have a multiplier effect on sustainable development in partner countries.

EU actions are geared towards inclusive and sustainable growth and economic integration, building on partner countries' comparative advantages in the manufacturing or services sectors. Other targets on access to financial services and technology are consistent with existing EU policy, including its involvement in initiatives such as the Global Partnership for Financial Inclusion.



AND IT IS ALL BASED ON DATA

Creating Legal Frameworks

In 2003, the EU issued legislation to govern the publication of Open Government Data in Member States via the so-called Public Sector Information (PSI) Directive 2003/98/EC.¹⁷ The main objective was to enable better access to Open Data by:

Stimulating the further development of a European Market for Open Data based services

Enhancing the cross-border use and application of Open Data in business processes

Encouraging competition in the internal market

Addressing the differences in rules and practices between Member States

2

Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

https://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf

Paolo Budroni, Architectures of Knowledge – Setting the scene for a common Open Science cloud.- Venice 16NOV2017

Creating Legal Frameworks

„The European PSI Directive was established on a minimum harmonisation basis allowing Member States to pave the way to the **interpretation and implementation of the framework**. The European Directive established framework rules regarding availability, accessibility and transparency of Open Data in Europe. In addition, it was recommended to have a standard electronic licence for the re-use of Open Data and to have a tool to access the relevant data sets via a list of portal websites.,,

→ in 2017: it is required that Data coming out of publicly funded research are to be considered Public Sector Information

2

Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

https://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf



The DIRECTIVE EU 2013/37

amending Directive 2003/98/EC on the re-use of public sector information

Among all legal instruments, the Directive EU 2013/37 - which amended the Directive 2003/98/EC on the re-use of Public Sector Information - has demonstrated to be a crucial instrument

According to paragraph (33) the objectives of Directive EU 2013/37 are to

- facilitate the creation of **Union-wide information products and services** based on public sector documents, and
- to ensure the effective **cross-border use** of public sector documents

(§3) Open Data Policies

27.6.2013

EN

Official Journal of the European Union

L 175/1

I

(Legislative acts)

DIRECTIVES

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

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 114 thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee ⁽¹⁾,

Acting in accordance with the ordinary legislative procedure ⁽²⁾,

Whereas:

(1) Documents produced by public sector bodies of the Member States constitute a vast, diverse and valuable pool of resources that can benefit the knowledge economy.

(2) Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information ⁽³⁾ establishes a minimum set of rules governing the re-use and the practical means of facilitating re-use of existing documents held by public sector bodies of the Member States.

(3) Open data policies which encourage the wide availability and re-use of public sector information for private or commercial purposes, with minimal or no legal,

technical or financial constraints, and which promote the circulation of information not only for economic operators but also for the public, can play an important role in kick-starting the development of new services based on novel ways to combine and make use of such information, stimulate economic growth and promote social engagement. However, this requires a level playing field at Union level in terms of whether or not the re-use of documents is authorised, which cannot be achieved by leaving it subject to the different rules and practices of the Member States or the public sector bodies concerned.

(4) Allowing re-use of documents held by a public sector body adds value for the re-users, for the end users and for society in general and in many cases for the public body itself, by promoting transparency and accountability and providing feedback from re-users and end users which allows the public sector body concerned to improve the quality of the information collected.

(5) 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. In parallel, we are witnessing a continuous evolution in technologies for analysis, exploitation and processing of data. This rapid technological evolution makes it possible to create new services and new applications, which are built upon the use, aggregation or combination of data. The rules adopted in 2003 no longer keep pace with these rapid changes and as a result the economic and social opportunities offered by re-use of public data risk being missed.

(6) 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

⁽¹⁾ OJ C 191, 29.6.2012, p. 129.

⁽²⁾ Position of the European Parliament of 13 June 2013 (not yet published in the Official Journal) and decision of the Council of 20 June 2013.

⁽³⁾ OJ L 345, 31.12.2003, p. 90.

→ The need of
“Open Data Policies which encourage the wide

availability of re-use of public sector information for private or commercial purposes, with minimal or no legal, technical or financial constraints, and which promote the circulation of information not only for economic operators but also for the public...”

(§3) Open Data Policies *and economic growth*

- (3) Open data policies which encourage the wide availability and re-use of public sector information for private or

technical or financial constraints, and which promote the circulation of information not only for economic operators but also for the public, can play an important role in kick-starting the development of new services based on novel ways to combine and make use of such information, stimulate economic growth and promote social engagement. However, this requires a

(§17) Harmonisation of rules and practices → *policies*

- (17) Since the differences in national rules and practices or the absence of clarity hinder the smooth functioning of the internal market and the proper development of the information society in the Union, minimum harmonisation of national rules and practices on the re-use of public cultural material in libraries, museums and archives should be undertaken.

The DIRECTIVE EU 2013/37

amending Directive 2003/98/EC on the re-use of public sector information

Furthermore the Directive explicitly recognizes the role of some major **stakeholder** in the processes of data creation, management and re-use.

The Directive does not only refer directly to the data, their use and maintenance, but it foresees the **automation of mechanisms** for the maintenance and the accessibility of data and it includes also the possibility of **PPP models** and resulting business models.

(§18) Scope II → *new roles for libraries*

- (18) The extension of the scope of Directive 2003/98/EC should be limited to three types of cultural establishments – libraries, including university libraries, museums and archives, because their collections are and will increasingly become a valuable material for re-use in many products such as mobile applications. Other

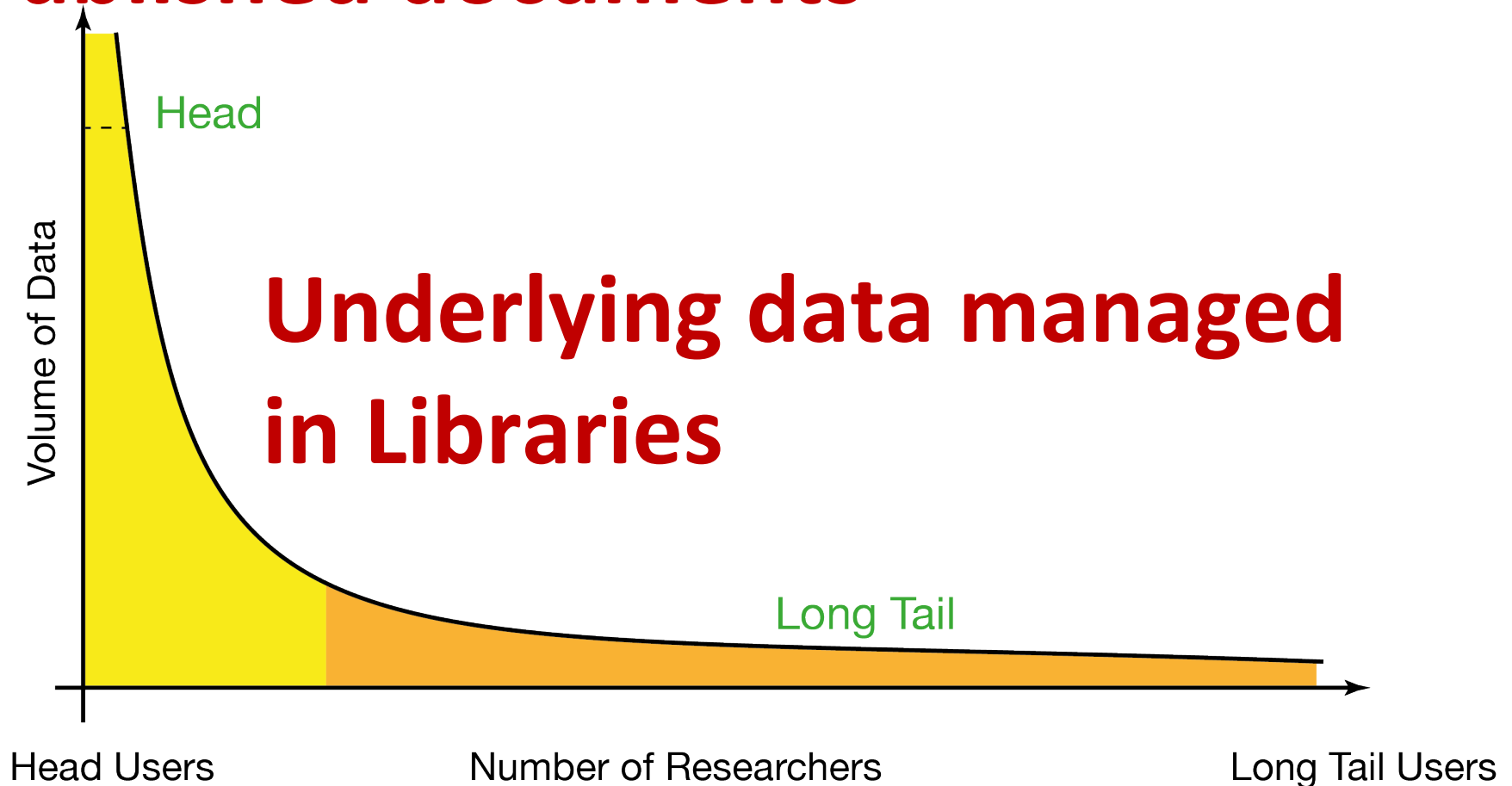
Among all stakeholder, the Directive assigns →
a relevant to **University Libraries**, quoted 8 times

Among all stakeholder, the Directive assigns →
a relevant to **University Libraries**,

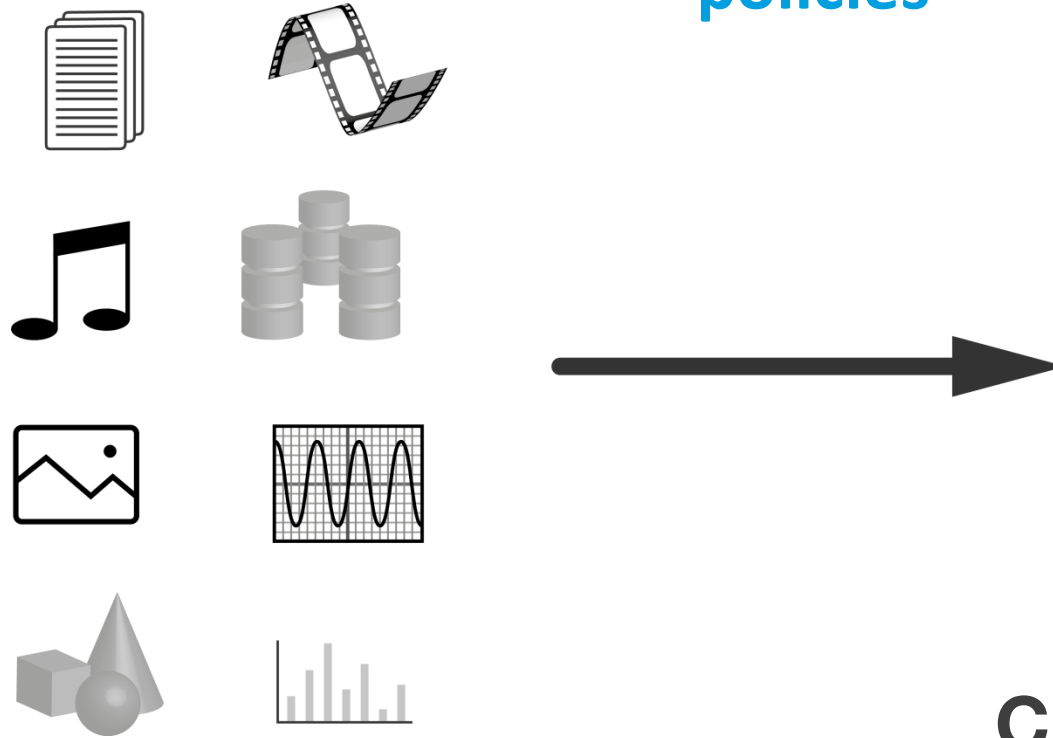
- » *(University) **libraries**, museums and archives are mentioned **eight times** in the directive itself and five times in the amendment of the Directive*
- » *University Libraries are relevant **stakeholders** in the Digital Single Market and in the European Open Science Cloud*
- » *They also play a relevant role in the Open Science mouvement because **they hold the data***
- » *They know how to **manage** them, to enrich them*
- » *They can assume roles of **brokerage of data and of services***
- » *Libraries are the main stakeholders of huge pan-European e-Infrastructures Projects like OpenAIRE, RECODE, PASTEUR4OA, LEARN or are represented in many initiatives led by LERU or LIBER*

Open Data / Research Data Libraries as Holders of Data

Published documents



A digital eco-system of connected services is needed.
Common understandable rules, good governance models,
policies

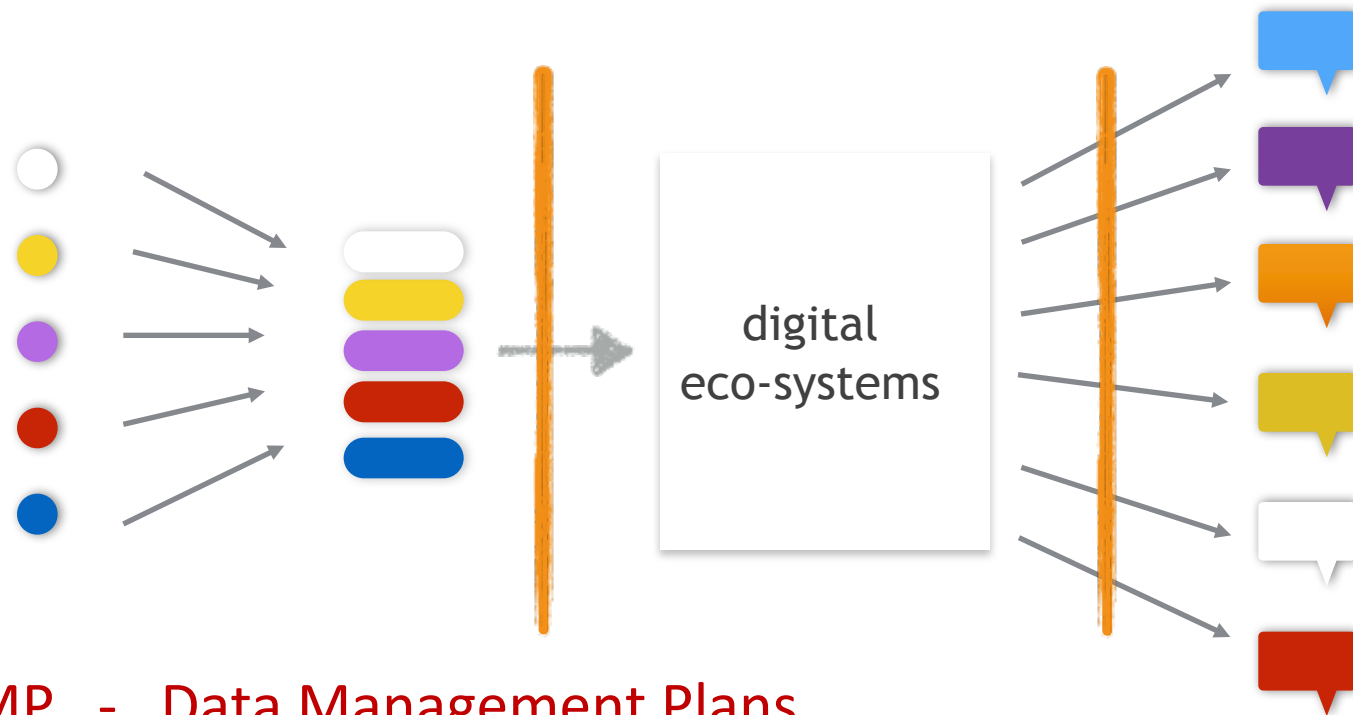


Graphic: Raman Ganguly, University of Vienna

Create to regenerate
→ **Regenerative by design**
Design to distribute
→ **Distributive by design**

Generic Digital Workflow Model

modular and traceable



DMP - Data Management Plans

Production and
Preingest

Ingest

Data and Services
Management

Distribution
Scenarios

The local level
Realization of the EOSC
Roles of support unites
and of libraries
as holders of data

The implementation of the EOSC at a research institution

The introduction of the EOSC at a local level at a Research Institution (RI) implies the definition and description of all criteria to be applied at the three layers of the EOSC:

1. Governance Layer
2. Service Layer and
3. Data Layer

Impact on the Governance Layer

Each RI must adopt a state of the art RDM-policy and take into account the following key issues:

- Good governance models
- Certification Processes
- Quality assurance processes
- Trust ensuring processes
- Rules of engagement
- **Realization, adoption of RDM-Policies**
- **Alignment of policies**

See also the recommendations of
H2020 Project LEARN www.learn-rdm.eu

Key Issues for the realization of EOSC at local level

- » Conception and adoption of RDM Policies and good governance models
- » Data Management Plans (DMP) adoption and continuous update and versioning
- » Creation of Single point of Entries as trusted services
- » Training of personnel involved in research support **according to the HLEG-EOSC reports**
<http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud-hleg>

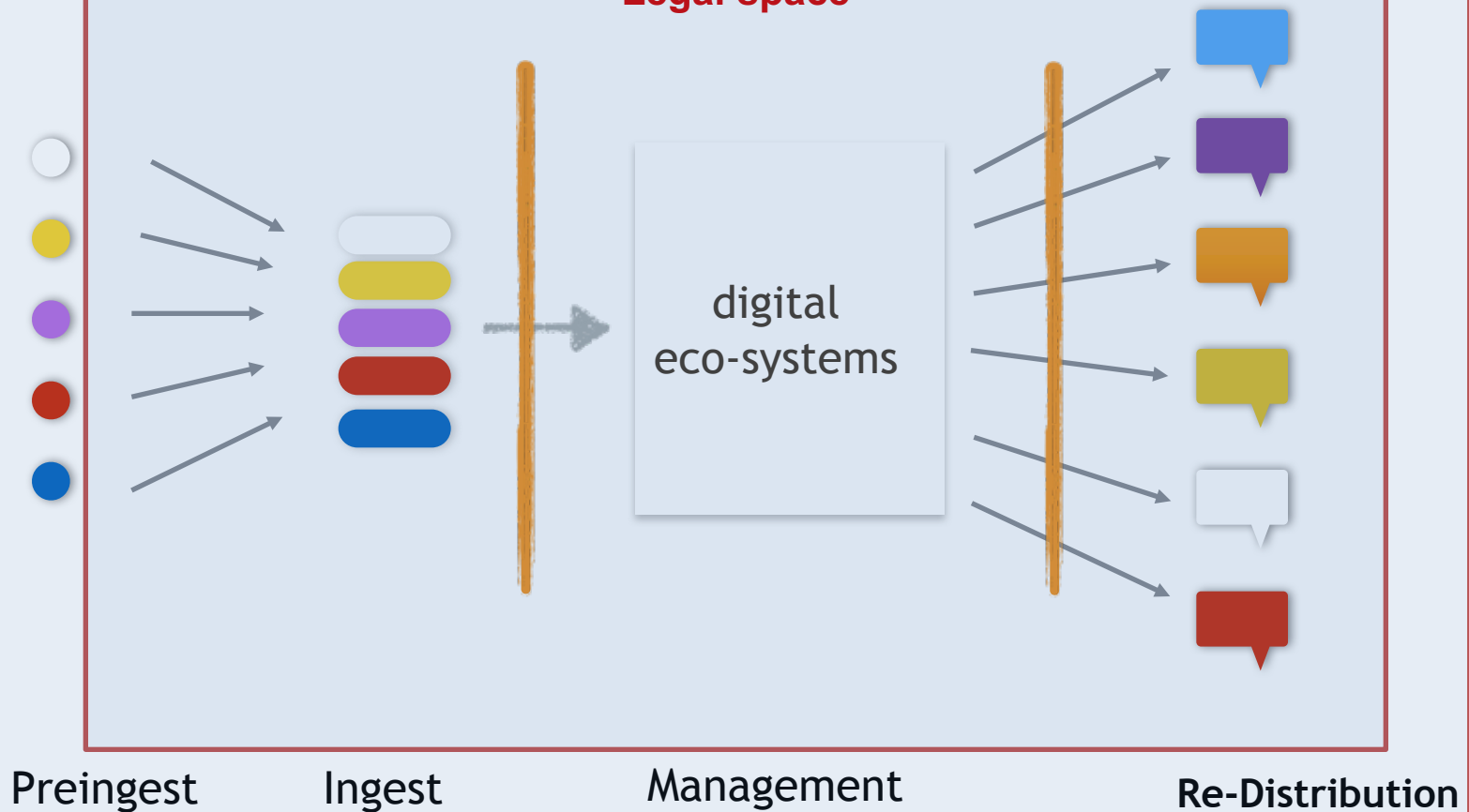
Understanding Policies: Conclusions

RDM-Policies

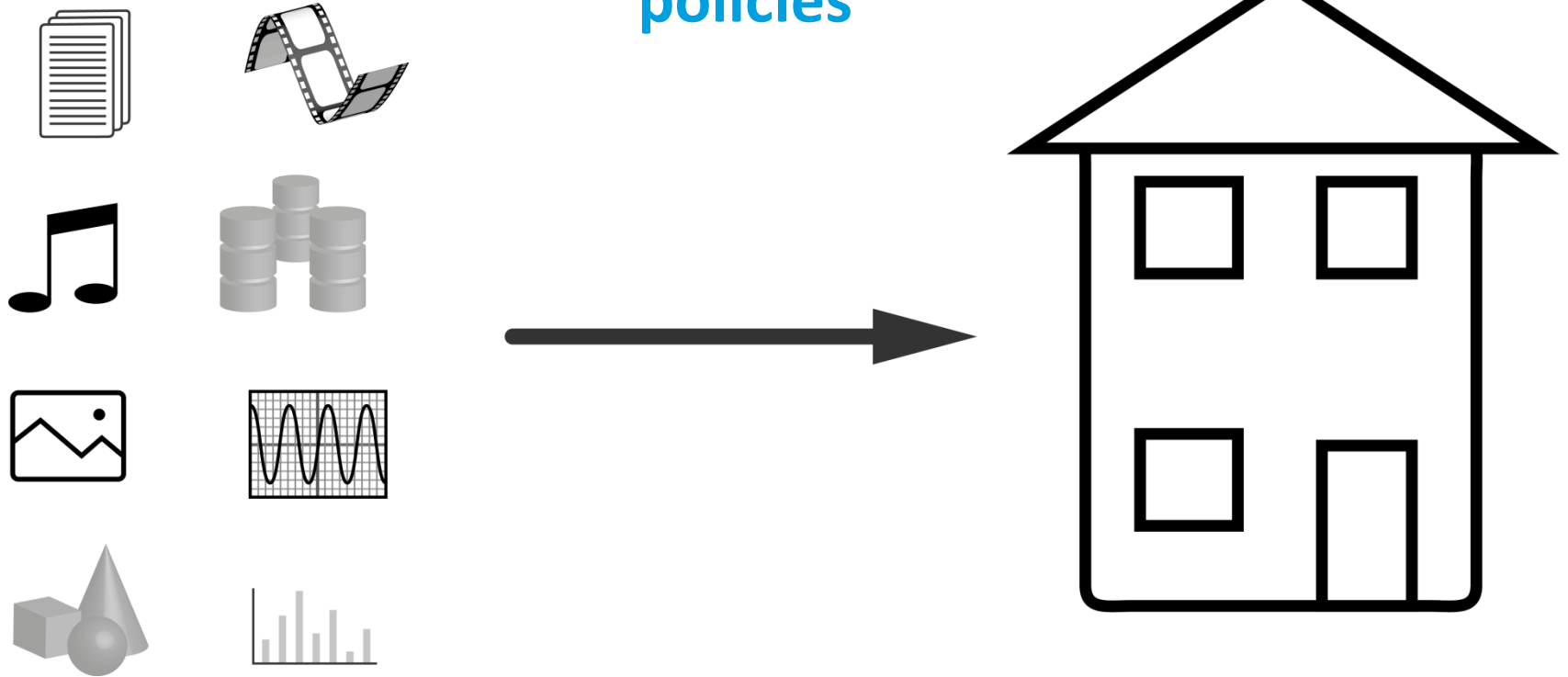
Good Governance Models and RDM- Policies

Common terminologies

Legal space



A digital eco-system of connected services **is needed**.
Common understandable rules, good governance models,
policies



Graphic: Raman Ganguly, University of Vienna

DMP - Data Management Plans → Distributive by design

THE DATA WAY TO OPEN SCIENCE **RECOMMENDATIONS** IN PAVING THE WAY TO OPEN SCIENCE

Ten recommendations

1. EOSC will be a tangible reality in 2018: start to **reorganize now**
2. Enhance the shift of mentality from vertical based thinking to horizontal based thinking. Create and offer new horizontal cross disciplines services. **Make convergence of knowledge possible** and gather efforts into Reference Points for Research Support.
3. New roles assume appropriate **training and skill development**: offer them
4. Policy development and alignment at all levels, especially **RDM Policies**: introduce them
5. Generate and **adopt Data Management Plans**, support Data Stewardship

Ten recommendations /2

6. **Foster** the transition from “catalogue thinking management of data” to a “**web-based**” way of thinking at all levels of the organization
7. **Acknowledge the increasing relevance of the roles of research support units** versus the researcher community
8. **Activate all stakeholders** in your RI for the realization of the EOSC
9. **Get involved into the bottom-up processes** of EOSC
10. **Participate to the networks and initiatives** concerning the EOSC

A presentation produced by the Austrian Open Science Support Group (AOSSG) Coordination Team:

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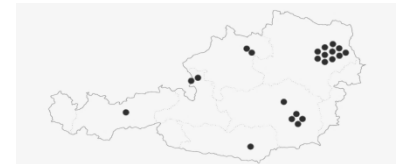
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Credits to Melanie Stummvoll, Vienna University Library and Archive Service, for the participation at the realisation of the slides concerning the EU Directive 2013/37

THANKS!

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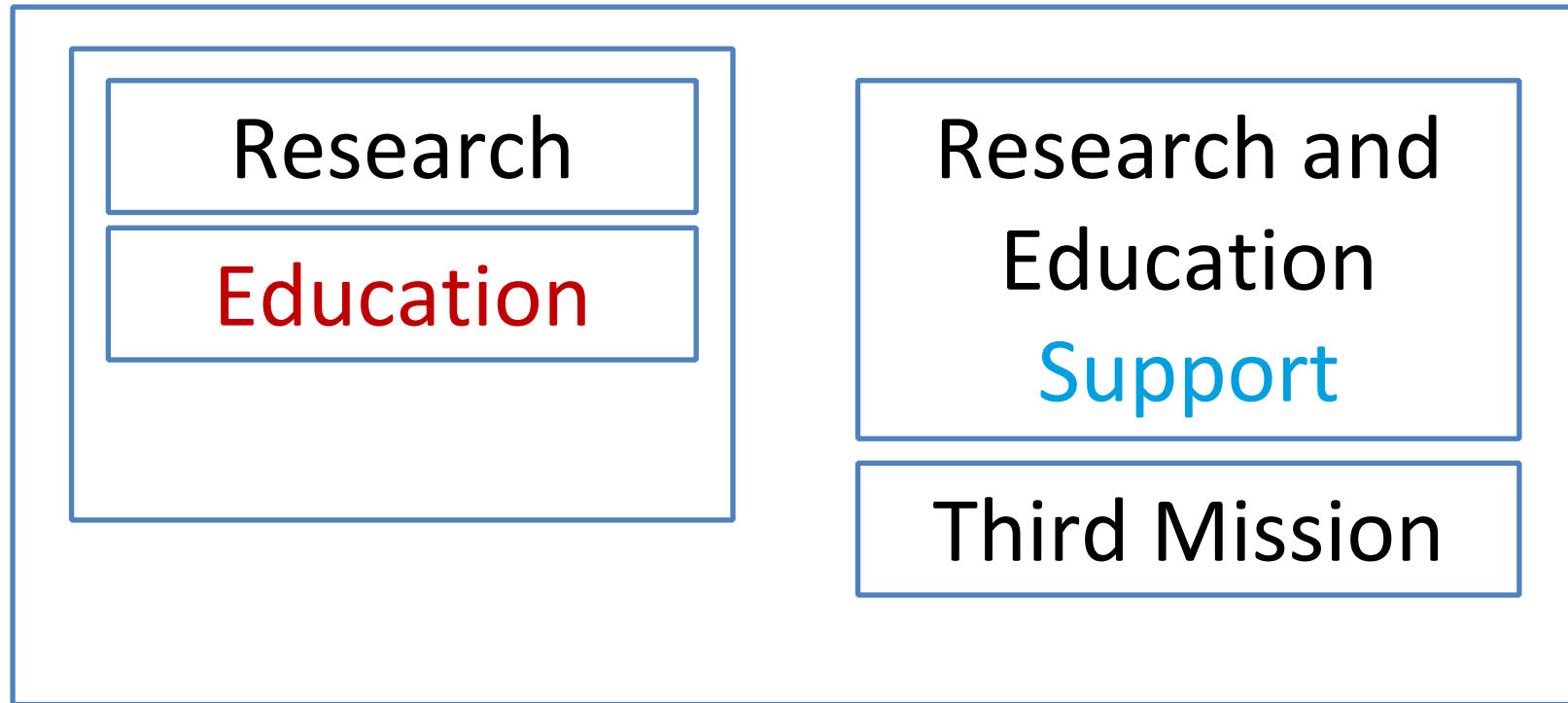
University of Vienna, Library and Archive Services
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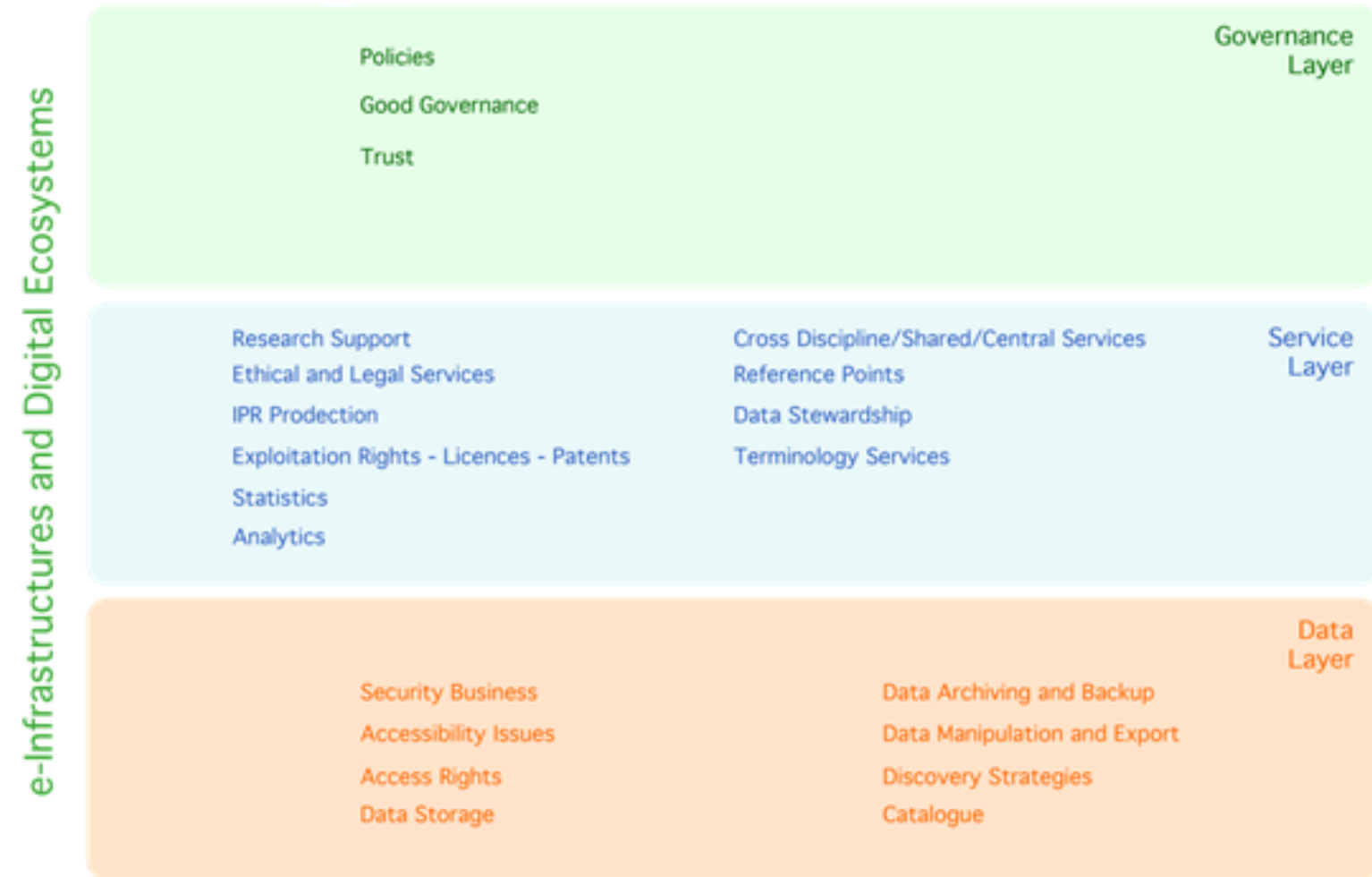
Additional slides - supporting discussion

Data → Services → Governance →



Distributive design and
empowerment of Stakeholders through
adoption of *policies*

Example of criteria to be assigned to the three layers of the EOSC



New roles in research support

All Support Units will demonstrate their ability to:

- Respond to important questions concerning their new roles
- Lead in strategy and innovation
- Create and adopt RDM-Policies
- support sustainability
- Create new and visionary settings
- Show leadership
- Build capacity
- Implement knowledge of research data management
- Manage large projects

Open Data Portals

There is a big difference between those countries looking at the progress they made so far with launching an Open Data portal. The first country to have an Open Data portal was Spain in 2009. They are also one of the frontrunners in terms of their Open Data policy.

2009	2010	2011	2012	2013	2014	2015	≥2016
Spain	Slovenia	Belgium		Austria	Bulgaria	Croatia	Iceland
	UK	Estonia		Denmark	Cyprus	Czech Republic	Latvia
		France		Germany	Finland	Hungary	Liechtenstein
		Italy		Greece	Ireland	Lithuania	Luxembourg
		Netherlands		Romania	Poland		Malta
		Norway		Slovakia			
		Portugal		Sweden			
				Switzerland			

Table 1 – Overview introduction national Open Data portal

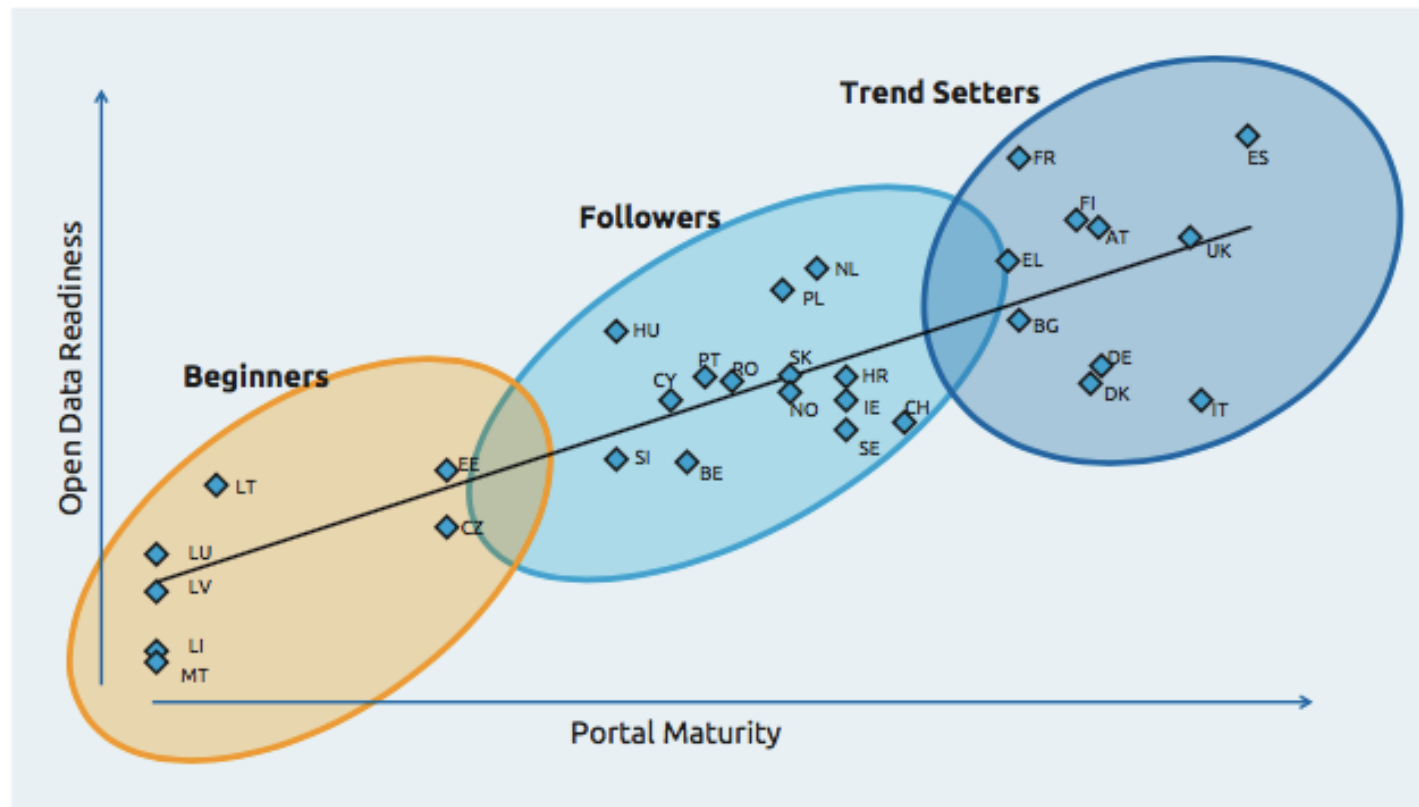
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Open Data Portals

Based on these results, the EU28+ countries are clustered into three different levels of Open Data Maturity.



Source: **November 2015** - A study on the Impact of Re-use of Public Data Resources

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