



D3.1: Policy Landscape Review

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Abstract:

This report presents a concise yet comprehensive Policy Landscape Review (PLR) in relation to European Policies related to Open Science. The report focuses specifically on the role of Open Science policies as an instrument for development in the context of the knowledge economy and the global data value chain. For this reason, it links Open Science policies to the entirety of the European policies aiming at increasing the flow of data of different forms (research, public, private, personal, non-personal) and positions such policies within the broader framework of policies reducing transaction costs related to data in Europe and the world. The report mostly deploys a comprehensive collection of EU policies that is collected in Annex 1, as well as a set of interviews, which is summarized in Annex 2. EOSC is presented as a key initiative that seeks to bring different aspects of policies related to the free flow of data, information and knowledge together across the quadruple helix of Research, Public Sector, Private Sector and the Civil Society. Hence, it focuses on policies supporting the sharing of infrastructures and services, policies supporting the free flow of data, policies that improve skills and support data related education and finally policies regarding public procurement. The report concludes by making four suggestions for using EOSC in order to move relevant European policies forward. These include increasing policy consistency at all levels, standardize interactions between stakeholders through a common policy framework, support closer collaboration and flow of data as well as sharing of services and infrastructures within the quadruple helix and automate policy implementation through the design of policy compliant and compatible technologies.

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EXECUTIVE SUMMARY

This report presents the Policy Landscape Review for the Policy Work Package (WP3) of the EOSCpilot project. It draws from an extensive list of EU policy resources in order to provide the current status of European Policies related to the European Open Science Cloud.

The report takes as its starting point the key European Policies related to inclusive growth and development to then examine the ways in which they are implemented at the level of data value chain and knowledge economy policies. This forms the basis on which the report approaches the main European research policies, namely the European Research Area policy and the European Cloud Initiative. These are seen as policies that aim at supporting the data economy and, as such, they complement policies such as the Public Sector Information policies, the Copyright Reform Package Policies, the Data Protection Policies and the Free Flow of non-personal data policies. Overall, infrastructures and open data that conform to the FAIR principles are seen as an integral part of the broader European growth and digitalization policies.

The report is structured in the following parts:

Section One introduces us to the European policy landscape and clarifies the main concepts that relate to policy and are used in the EOSC project. It also highlights the methodological approach followed in this report as well as the key objectives of the report.

Section Two positions EOSC within the European policy landscape. It explains what EOSC is and then proceeds to a greater analysis of the European Cloud Initiative as a central knowledge economy, science enabling and growth fostering policy. Section Two also presents the effects of the EOSC as a policy framework and its objective in reducing friction and supporting the drivers to open science. Finally, it presents policies in four focus areas most relevant to open science: (a) policies for infrastructures and services (b) policies supporting the free flow of data (c) policies for improving skills and education and, finally, (d) policies regarding public procurement

Section Three presents the main conclusions and policy recommendations of the PLR. These may be summarised in the following areas: (a) increasing the policy consistency (b) Standardise policy related interactions (c) Support closer collaboration within the quadruple helix (d) develop platform related policies and (e) automate policy implementation through the use of technological means and design choices.

The PLR makes extensive referencing to a great array of material regarding policies that has been collected and collated in the course of producing the report. This material is contained in Annex 1 and includes 22 policy presentation sections. Each of the sections includes a presentation of the key issues, a short commentary, the key drivers and constraints that it entails in the open science context.

A table of the interviews conducted at this stage of the project may be found in Annex 2 of the PLR.

1 INTRODUCTION

1.1 Introduction

Work Package 3 (Policy) of the EOSCpilot project aims to identify the policy environment required for the effective operation, access and use of the EOSC, by lowering the barriers to interaction with the EOSC. It needs to:

- identify areas where policies need to be developed, and
- define relevant policy frameworks (specifications, scope, recommendations and supporting structures)

This will contribute to the development of a European open science policy framework that promotes making most research artefacts (data, publications, methods, models, software, etc.) open by default.

The work on WP3 relates to the governance framework of WP2 as well as the work on WP5.

As part of its work, the Policy Work Package has conducted a Policy Landscape Review. The present Deliverable reports on this work.

1.1. Objective

The Policy Landscape Review (PLR) forms part of the Policy Engagement work of Work Package 3. The work involved performing desk research to produce a landscape review and knowledge base charting the current state of affairs across countries, scientific domains and areas (e.g. research in different domains, Public Sector Information, industry), and examining existing frameworks for how they fit or can be adopted/adapted for the European Open Science Cloud. The work aimed to examine and identify different aspects **of policies** and to present them at the **appropriate level for the EOSC** and with respect to the relevant stakeholders.¹ The aim is to begin identifying those policy issues which need to be addressed in order to support the development and smooth functioning of the EOSC. A comprehensive, landscape review has been performed of the policies that relate to the activities of the European Open Science Cloud (EOSC). Such an endeavour needs to take into account both the high-level EU policies in relation to growth,² research and development³ and their implementation at sectoral level⁴. Hence, the Policy Landscape Review starts with a bird's eye view of the EOSC-related EU policies to then

¹ The key EOSC stakeholders are European e-Infrastructures, Data/Research Initiatives, Cloud providers Research funders, Cloud community, Research Communities and Institutions, Research Infrastructures (RIs) and Policy makers

² See 4.1 Development Policies, Europe 2020 and 4.2 Digital Agenda for Europe and Digital Single Market

³ See 4.3 Research and Innovation/ Innovation Union; 1.4 ERA

⁴ See for instance 4.5 Data Policies/ Data Economy and Connectivity; Annex 4.6 eGovernment; 4.7 PSI; 4.8 Geodata; 4.9 Statistical Data; 4.10 Cultural Data; 4.11 Language Resources

gradually explore the ways in which more specific policies, such as Open Science,⁵ Copyright,⁶ Patents⁷ and Trade Secrets⁸ or Data Protection⁹ and Ethics¹⁰ policies, relate to each other and form a coherent whole.

Relevant to Open Science European¹¹ policies seem superficially to have diverse and - sometimes - divergent objectives. For instance, Open Science and Intellectual Property Rights (IPR) protection seem to serve different policy goals, the former focusing on the increase of flow of content and data, the latter on the controlled flow of IPR-protected works. However, upon closer inspection of the policies and the instruments of their implementation, it can be seen that both policies serve the common purpose of facilitating the flow of data, information or knowledge at the minimum transaction cost in order to maximise value for the European citizen, organisation or researcher and support the vision of a common open European Digital Single market.¹²

The objective of the PLR is to make these broader policy connections apparent in the context of the EOSC and ensure that the drivers and constraints of Open Science are clearly highlighted and identified in the policy context.

1.2 Methodological Approach

In terms of the methodology followed for the completion of the Policy Landscape Review, we performed a comprehensive desk research of the key EU policy areas relevant to the EOSC ecosystem starting from horizontal policies and then gradually making a transition to more specific sectoral policies related to Open Science. Our approach took as its starting point the importance of reducing frictions and removing barriers for the free flow of knowledge¹³ in the EU, while at the same time providing systems of incentives for those seeking to open their research results.

Following this methodological approach this document initially makes a series of clarifications regarding the key concepts used in this document. More specifically it explains how the policies relate to the governance model and the Principles of Engagement¹⁴. We then proceed with the positioning of EOSC within the EU policy landscape. This includes an exploration of its linking,

⁵ See 4.18 Open Science

⁶ See 4.12 Copyright

⁷ See 4.13 Patents

⁸ See 4.14 Trade secrets

⁹ See 4.15 Personal Data

¹⁰ See 4.16 Ethics

¹¹ See 4.18 Open Science

¹² See A1.2 Digital Agenda for Europe (DAE) and Digital Single Market (DSM); 4.5 Data Policies/Data Economy and Connectivity

¹³ See Note 40 ee Janez Potočnik (2007) The EU's Fifth Freedom: creating free movement of knowledge, SPEECH/07/257, Informal Competitiveness Council, Wuerzburg (Germany), 26 April 2007

¹⁴ See EOSC WP2

mostly, with the Digital Single Market (DSM) strategy as well as its positioning with the European Cloud Initiative (ECI) context¹⁵. In addition, this section explains the EOSC policy objectives, mostly in relation to the production of data value chains and the broader relationship between EOSC policies and the Smart Specialization Strategy (S3) in Europe.¹⁶ The latter leads us to the following section which provides an overview of the four policy layers which are the focus of all EOSC related policies, i.e. Infrastructures, Data, Services and Skills. Each of these is analysed in a more comprehensive fashion to then provide a concise set of conclusions regarding the nature and focus of EOSC related policies. A comprehensive list of policy documents along with a concise analysis of their features is further presented in the Annex A. It contains a series of policy areas for each one of which a brief commentary, a list of policy documents, as well as a list of drivers and constraints is presented. Referencing to the Annex A is made where necessary in the different sections of this document.

1.3 Conceptual Clarifications

This policy¹⁷ analysis could then facilitate the comprehensive analysis of the policies relevant to the needs of different stakeholders comprising the EOSC ecosystem and also provide meaningful input with regards to the governance model and Principles of Engagement being developed for the EOSC.

EOSC policies also need to be differentiated from other **related concepts**:

- EOSC **policies** will set the ground rules that govern the Open Science ecosystem¹⁸ within the EOSC context. They will be an expression of the broader relevant EU and Member State policies, strategy and legislation and will be binding for the relevant EOSC stakeholders.
- EOSC **governance** refers to the steering, coordination and decision-making mechanisms. It may for example cover the following aspects:
 - o Formal participation with set rights and obligations
 - o Decisionmaking process at the strategic and tactical level
 - o Standard setting, acceptance and update process
 - o Policy setting, acceptance and update process
 - o Service definition, acceptance and update process
 - o Finances

¹⁵ See 4.19 European Cloud Initiative (ECI) – High performance Computing (HPC)

¹⁶ See A1.1 Development Policies, Europe2020; 4.20 Open to the World

¹⁷ We use the term Policy to generally refer to a deliberate system of principles to guide decisions and achieve rational outcomes. The term “macro-policies” refers to policies that are adopted at the EU or MS level, whereas the term “micro-policies” refers to statements of intent, that are implemented as a procedure or protocol, assist in objective decision making and are positioned at the stakeholder level.

¹⁸ See 4.17 Open Innovation; 4.19 European Cloud Initiative (ECI) – High performance Computing (HPC); 4.20 Open to the World

- Procurement
- Rules or **Principles of Engagement (RoE or PoE)**¹⁹ constitute a series of core principles in relation to the services and data provided through EOSC and which are binding for EOSC users and service providers. EOSC policies provide a broader framework within which the PoE operate, while PoE provide specific guidelines that can then be translated into specific institutional policies.
 - The PoE need to take into account the broader ecosystem of actors and structure the interaction of EOSC with them
 - PoE need to be consistent to the EOSC policies and functionally interact with the governance system.

¹⁹ We refer to principles of engagement, when we refer to more abstract principles that are closer to the EOSC policies; we refer to rules of engagement when we have sufficient detail to define the application of EOSC policies and principles of engagement in relation to a specific interaction or transaction with a third party.

2 Positioning EOSC in the EU policy landscape

2.1. What is EOSC?

The policy landscape review exercise has performed a detailed review of the European policy landscape - that is, EU or EC policies including legislation implemented (or in the course of implementation) at the member state level. This work is compiled in Appendix A. It identifies the main broad European policy directions of relevance to the European Open Science Cloud as being Europe 2020,²⁰ the Digital Single Market,²¹ and the European Research Area.²² Other policies' relevance relates largely to their contribution to these three overarching policies. The Digital Single Market programme in particular contains a number of policy initiatives which relate closely to the EOSC. Of these the most relevant is the Digitising European Industry²³ package published in April 2016, which included the European Cloud Initiative (ECI).²⁴

Understanding EOSC as part of the quadruple helix²⁵ is necessary to position it within the broader context of these EU policies, as this is illustrated in Figure I:

- As part of the ECI²⁶ and DSM²⁷ data-centric policies²⁸, it seeks to provide researchers with the digital environment to store, manage, analyse and re-use their data at an EU scale.²⁹

²⁰ See A1.1 Development Policies, Europe2020

²¹ See A1.2 Digital Agenda for Europe (DAE) and Digital Single Market (DSM)

²² See A1.3 Research and Innovation/ Innovation Union

²³ See 4.21 Digitalisation of the European Industry/ IoT/ Robotics/ Standards

²⁴ See 4.19 European Cloud Initiative (ECI) – High performance Computing (HPC)

²⁵ “Both the Triple Helix (TH) concept and the Quadruple Helix (QH) approach are grounded on the idea that innovation is the outcome of an interactive process involving different spheres of actors, each contributing according to its ‘institutional’ function in society. Traditional protagonists of the TH are University (UNI), Industry (IND), and Government (GOV). Civil society (CIV) is the additional sphere included in the QH. Contribution to innovation is envisaged in terms of sharing of knowledge and transfer of know-how, with the helices’ models assigning and formalising a precise role to each sphere in supporting economic growth through innovation. As society becomes more and more interactive, the role of knowledge as well as the number and scope of spheres to be included in the innovation-generating process have been increasing over time.” See EU Committee of the Regions Using the Quadruple Helix Approach to Accelerate the Transfer of Research and Innovation Results to Regional [Growth](https://cor.europa.eu/en/documentation/studies/Documents/quadruple-helix.pdf)

<https://cor.europa.eu/en/documentation/studies/Documents/quadruple-helix.pdf>

²⁶ See 4.19 European Cloud Initiative (ECI) – High performance Computing (HPC)

²⁷ See A1.2 Digital Agenda for Europe (DAE) and Digital Single Market (DSM)

²⁸ See 4.5 Data Policies/Data Economy and Connectivity

²⁹ See Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: European Cloud Initiative – Building a competitive data and knowledge economy in Europe, Brussels,

- As part of the European Research Area (ERA) policies,³⁰ EOSC supports seamless open access to a wide range of digital science services across the European Union for all researchers and scientists.³¹
- As part of the Digitizing European Industry policies,³² EOSC is the platform where, public sector data^{33,34} and services may be combined with research data and provide the means and the secure environment for the industry³⁵ to make use of all these resources in order to increase its productivity, create new jobs and foster an inclusive growth model for Europe.

19.4.2016 COM(2016) 178 final <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0178&from=EN> pg.6 “The European Open Science Cloud aims to give Europe a global lead in scientific data infrastructures, to ensure that European scientists reap the full benefits of data-driven science. Practically, it will offer 1.7 million European researchers and 70 million professionals in science and technology a virtual environment with free at the point of use, open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines.”

³⁰ See A1.4 ERA

³¹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Reinforced European Research Area Partnership for Excellence and Growth Brussels, 17.7.2012 COM(2012) 392 final http://ec.europa.eu/research/era/pdf/era-communication/era-communication_en.pdf

³² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Digitising European Industry Reaping the full benefits of a Digital Single Market (COM(2016) 180 final <https://ec.europa.eu/digital-single-market/en/news/communication-digitising-european-industry-reaping-full-benefits-digital-single-market>

³³ The Directive on the re-use of public sector information provides a common legal framework for a European market for government-held data (public sector information). It is built around two key pillars of the internal market: transparency and fair competition. <https://ec.europa.eu/digital-single-market/en/legislative-measures>

³⁴ See 4.7 PSI

³⁵ See e.g. FOKUS <http://open-data.fokus.fraunhofer.de/en/>

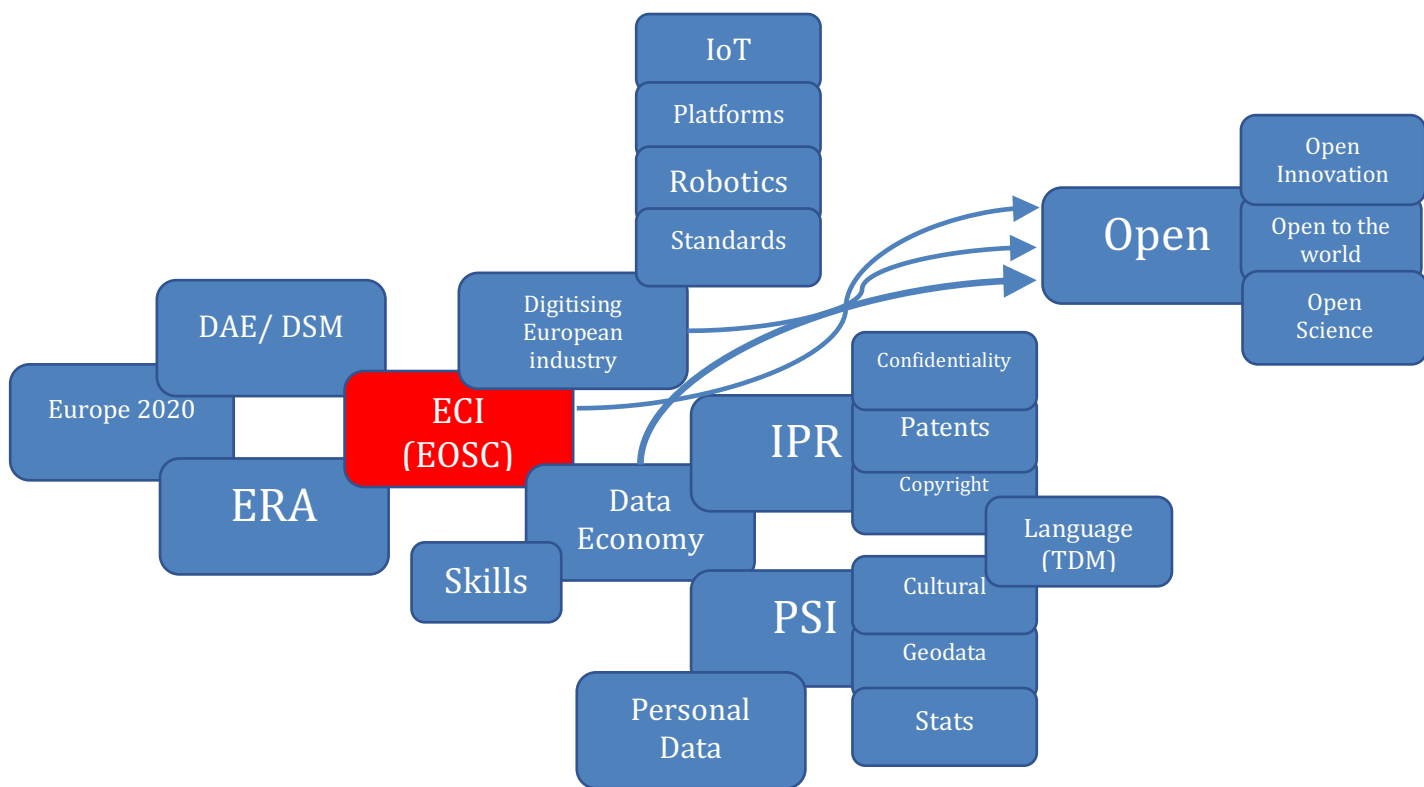


Figure I: EU Policy Landscape

EOSC is the technological, institutional, infrastructural and normative (to a degree, since it includes micro-policies and governance structures) manifestation of the European Cloud Initiative (ECI)³⁶ Policies. ECI aims at building a European Cloud infrastructure that will facilitate the development of a data and knowledge economy in Europe and is a key part of the Digital Single Market (DSM) strategy. Alongside EOSC, the ECI also proposed the development of the European Digital Infrastructure (EDI) which would boost Europe’s high-performance computing (HPC) capacity in conjunction with developing Europe’s high-speed networking and storage capacity.

The EOSC concept covers not only technological infrastructure but, as part of the ECI, is a manifestation of the broader ecology of open science in Europe ranging from infrastructures and data to services and skills, that seeks to build a globally competitive data and knowledge economy in Europe. In addition, it includes all policies, governance mechanisms, standards and principles of engagement for EOSC providers and users necessary for building such an open science ecology.

At the epicentre of this approach is an understanding of the free flow of data as a core means of supporting growth in Europe, as well as the key driver behind the advancement of science and research in the European developmental model.

³⁶ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: European Cloud Initiative – Building a competitive data and knowledge economy in Europe, Brussels, 19.4.2016 COM(2016) 178 final <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0178&from=EN>

2.2. ECI Policy Directions

More specifically, the ECI proposals may be seen as being relevant to four broad EC policy directions:

a. The support of e-science in Europe

this includes the end-to-end digitisation of the research process, from the infrastructures used to perform research, to the transport, storage, processing and dissemination of data. It also covers the services deployed in order to facilitate both the research process and its scholarly communication, the entirety of the education process and means and the support of citizen science as an instrument for the deeper engagement of local communities and the increasing of the impact of research results. In addition, the advancing of e-science may be seen as a way to increase cohesion and bridge the digital divide between more and less developed communities and regions.³⁷ In the context of the EOSC, policies for the development and usability of infrastructures - whether concerning consistent access policies, interoperability, or even availability for example - and for the re-use of research results are key to the development of e-Science in Europe.³⁸

b. The importance of Open Science³⁹

as a means for improving both the quality of scientific results and the use of such results by industry as a growth mechanism: Open Science allows the replication of research and, as such, goes back to the very basics of producing high quality research. Research by definition requires the engagement of community, demands peer review and is based on incremental and iterative development of a knowledge commons. As such, science and research require the technological, organisational and legal infrastructure that will allow and further support openness at all levels.

c. The centrality of Data in European Policies for Growth and Employment

³⁷ The EU e-Infrastructures programme states “By making every European researcher digital, e-infrastructures increase creativity and efficiency of research and bridge the divide between developed and less developed communities and regions.”

³⁸ See 4.20 Open to the World

³⁹ See e.g. Research and Innovation (2014) Validation of the results of the public consultation on Science 2.0: Science in Transition <https://ec.europa.eu/digital-single-market/news/final-report-science-20-public-consultation>

free flow of data is a constituent part of the policies related to openness and a cornerstone for European development and inclusive growth policies. The recent European Data Market Study⁴⁰ has found that 6 million people in Europe worked in data-related jobs in 2015 and 6.16 million in 2016. As far as medium-term developments are concerned, it is estimated that under a high-growth scenario, the number of data workers in Europe will increase up to 10.43 million, with a compound average growth rate of 14.1% by 2020.” The importance of the free flow of data is also highlighted by the effort to introduce free movement of knowledge as a “Fifth freedom”⁴¹ in the EU, which has recently led to a proposal for a regulation⁴² on the free flow of non-personal data. A key driver for the ECI is the desire to unlock the full potential of data for the European economy.⁴³

d. The development of a comprehensive framework for the regulation of cloud services, platforms and the sharing economy as whole

While such policy goals are mostly related to the regulation of commercial players in the context of the Digital Single Market (DSM), for our purposes they need to be juxtaposed and assessed in relation to the development, deployment and use of the European Open Science Cloud. More specifically, it is necessary to appreciate the type of policies followed in relation to the regulation of commercial providers that offer information society services both to research and e-infrastructures as well as to Research Performing Organisations. Such services are a crucial part of EOSC and their supply and demand needs to be regulated in cases where market mechanisms do not ensure the adequate supply of such services or where they lead to dependencies or lock-ins that jeopardize the development of science in Europe and undermine European competitiveness globally, or the aggregation of supply or demand is necessary to achieve economies of scale with regards to infrastructure, data and service provision. Finally, the understanding of the sharing economy mechanisms and the way in which such platforms may be used at a European level is necessary for ensuring more effective and efficient research

⁴⁰ The objectives of the study are indicative of the EU policy directions “The study presents the findings of the monitoring tool on data workers, companies, users and markets among others. The findings will feed into further developing the Digital Single Market in the EU as data is a catalyst for economic growth, innovation and digitisation across all economic sectors, particularly for SMEs and start-ups.” <https://ec.europa.eu/digital-single-market/en/news/final-results-european-data-market-study-measuring-size-and-trends-eu-data-economy>

⁴¹ See Janez Potočnik (2007) The EU’s Fifth Freedom: creating free movement of knowledge, SPEECH/07/257, Informal Competitiveness Council, Wuerzburg (Germany), 26 April 2007 https://www.google.gr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKewioxuzpijDXAhULXhoKHWxkAUQQFggmMAA&url=http%3A%2F%2Feuropa.eu%2Frapid%2Fpress-release%2FSPEECH-07-257_en.pdf&usg=AOvVaw1bV7TzpyFLwfRRVRXyuD9L

⁴² See Proposal for a Regulation of the European Parliament and of the Council on a framework for the free flow of non-personal data in the European Union (COM(2017)495) <https://ec.europa.eu/digital-single-market/en/news/proposal-regulation-european-parliament-and-council-framework-free-flow-non-personal-data>

⁴³ See 4.5 Data Policies/Data Economy and Connectivity

coordination and collaboration, as well as the engagement of a multitude of actors through citizen science projects.

2.2.1. The Effect of EOSC

Hence, as a key part of the ECI, EOSC can be seen policy-wise as a center piece ecosystem for the production of data value chains⁴⁴ and the main support of research in the quadruple-helix structure for smart specialization.⁴⁵ In that sense, EOSC can be expected to have the following effect(s)

(a) It reduces frictions in the commercial and non-commercial flow of data, information and knowledge while:

- Respecting personal data (General Data Protection Regulation) and ethics rules
- Not foreclosing commercial exploitation (Public Sector Information Directive,⁴⁶ Proposal for a Regulation on the Free Flow of non-personal data,⁴⁷ IPR policies⁴⁸)
- Respecting 3rd party rights and increasing transparent, collective and machine-assisted management of rights (Copyright Reform package, including collecting societies directive and policies on Text and Data Mining Copyright exceptions)⁴⁹
- Supporting open access (open access policies in the sense of providing model policies and processes, infrastructures (including services), standards (technical, organizational and legal), training and skills supporting open access)

(b) It encourages different forms of e-infrastructure sharing and interoperation or procurement

⁴⁴ For data value chains see See also European Commission, DG CONNECT/ Unit G3 - Data Value Chain (2013) Elements of a Data Value Chain http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=3488

⁴⁵ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Regional Policy contributing to smart growth in Europe 2020 Brussels, 6.10.2010 COM(2010) 553 final http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/smart_growth/comm2010_553_en.pdf

⁴⁶See 4.7 PSI

⁴⁷See 4.5 Data Policies/Data Economy and Connectivity

⁴⁸See 4.12 Copyright; 4.13 Patents; 4.14 Trade secrets

⁴⁹See 4.11 Language Resources

- E-infrastructure sharing and interoperability of Europe-wide services via relevant European e-infrastructures and research infrastructures (e.g. GEANT,⁵⁰ EGI,⁵¹ OpenAIRE⁵², EUDAT,⁵³ CLARIN,⁵⁴ DARIAH⁵⁵, HELIX⁵⁶ etc)
- Trusted sharing between academia, the public and the private sector (PSI Directive,⁵⁷ Proposal for the free flow of non-personal data,⁵⁸ ISA2⁵⁹)

(c) It supports the use of Open and Findable, Accessible, Interoperable and Reusable (FAIR data)⁶⁰

- In the Research Sector (Open Science policies)
- In the Public Sector (PSI, INSPIRE⁶¹)
- In the private sector (Proposal for a regulation for the free flow of personal data)

For the European Open Science Cloud to have the hoped-for impact and support the realisation of the vision of an open science ecosystem for Europe, barriers which stand in its way need to be removed or, as much as possible, reduced. From the perspective of public policy, this primarily involves addressing barriers to the free flow of data and open access within a federated, interoperable and cross-border service environment. Examples include lack of consistency (or progress) in implementation of the General Data Protection Regulation, or the need to identify procurement processes for EOSC which respect European procurement legislation. The policy review, combined with contributions from policy specialists and input from interviews with policy experts within stakeholder groups and EOSCpilot Science Demonstrators, has begun the work of identifying and prioritising those policy issues which require to be addressed to best facilitate and encourage the establishment and growth of the EOSC. The work to date has resulted in the following policies being identified as the most relevant to the EOSC for their influence over the provision and use of services and resources in the EOSC.

⁵⁰ <https://www.geant.org/>

⁵¹ <https://www.egi.eu/>

⁵² <https://www.openaire.eu/>

⁵³ <https://eudat.eu/>

⁵⁴ <https://www.clarin.eu/>

⁵⁵ <https://www.dariah.eu/>

⁵⁶ <http://www.projecthelix.eu/>

⁵⁷ See <https://ec.europa.eu/digital-single-market/en/news/consolidated-version-psi-directive-now-available>

⁵⁸ See <https://ec.europa.eu/digital-single-market/en/free-flow-non-personal-data>

⁵⁹ See https://ec.europa.eu/isa2/home_en

⁶⁰ This may be considered as a subcategory of (a)

⁶¹ See <https://inspire.ec.europa.eu/>

2.3. Focusing on Specific Policy Areas

In considering the infrastructures, services, data and skills likely to constitute the EOSC,

- The focus in each case, in terms of achieving the EOSC, is in the free flow of data or their sharing over a secure environment
- Policies such as Public Sector Information, The General Data Protection Regulation, The free flow of non-personal data and the Modernising Copyright (collecting societies and copyright limitations and exceptions) are key to implementing them at the data and information/ content flow level
- Openness and Data Protection by design and by default are core policies aiming at increasing the flow of data and minimizing transaction costs.

The following policies are of most relevance in the sense of allowing the maximisation of interoperability of services, the seamless flow of data and the creation of common quality level of services across Europe:

(a) Policies for infrastructures and services

The most relevant policies here are the following:

- E-Infrastructure and Research Infrastructure policies: the European Strategic Forum on Research Infrastructure⁶² is the most relevant instrument for implementing the European Research Area policies in combination with the ECI and EDI policies, since it allows the coordination and alignment of different European RIs and e-Infrastructures. The eInfraCentral⁶³ project also operates as a stepping stone for the standardization and interoperability of e-Infrastructure services.
- The European Interoperability Framework 2 (EIF)⁶⁴ is the landmark initiative for the public sector ensuring the interoperability of EU Public Sector Bodies (PSB) services, as well as the interaction between PSB and private sector services
- The ISA2 (interoperability solutions for public administrations, businesses and citizens)⁶⁵ programme ensures the interoperability between different services of the European Public Sector as well as the ability to offer and consume e-services across the EU with the minimal transaction costs

(b) Policies fostering the free flow of data

This set of policies include mostly policies related to the reduction of frictions in the free flow of data. These policies cover a wide scope of data sources (Public Sector, Private Sector,

⁶² See https://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri

⁶³ See <http://einfracentral.eu/>

⁶⁴ See Communication (COM(2017)134) (http://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_1&format=PDF) and EIF2 (https://ec.europa.eu/isa2/eif_en)

⁶⁵ See https://ec.europa.eu/isa2/actions_en

Personal and non-Personal data) and in that sense they are the most relevant ones for fostering the free flow of data. The following key policies may be identified:

- Free flow of personal data in accordance to rules protecting personal data including Ethics (General Data Protection Regulation) and Professional standards ⁶⁶
- Free flow of nonpersonal data (proposal for a regulation for the free flow of non-personal data)⁶⁷
- Re-use of Public Sector Information⁶⁸
- Framework for the reuse of Geodata (INSPIRE)⁶⁹
- Policies for the free flow of cultural data (Europeana⁷⁰), particularly in relation to research⁷¹
- Policies for the free re-use of Language Data (ELRC)⁷²
- Policies regarding harmonization of orphan works,⁷³ collective rights management⁷⁴ regulations as well as copyright limitations and exceptions⁷⁵, particularly in relation to text and data mining
- Policies for supporting open science⁷⁶

(c) Policies for improving skills and supporting the development of open educational resources

These are policies that aim at the introduction of the skills necessary for conducting open science as well as the introduction of open educational practices across all types and levels of education. The following initiatives are of the greatest importance:

- Policies of the European Research Area⁷⁷ supporting the development of open science related skills, mostly data related skills and schemes for linking professional development with the opening and sharing of research results, publications and methods, as well as supporting the portability of research and mobility of researchers

⁶⁶ http://ec.europa.eu/justice/data-protection/reform/index_en.htm

⁶⁷ <https://ec.europa.eu/digital-single-market/en/free-flow-non-personal-data>

⁶⁸ <https://ec.europa.eu/digital-single-market/en/european-legislation-reuse-public-sector-information>

⁶⁹ <https://inspire.ec.europa.eu/>

⁷⁰ <https://ec.europa.eu/digital-single-market/en/europeana-european-digital-library-all>

⁷¹ <https://pro.europeana.eu/what-we-do/academic-research>

⁷² <http://www.lr-coordination.eu/>

⁷³ http://ec.europa.eu/internal_market/copyright/orphan_works/index_en.htm

⁷⁴ <https://ec.europa.eu/digital-single-market/en/eu-copyright-legislation>

⁷⁵ <https://ec.europa.eu/digital-single-market/en/modernisation-eu-copyright-rules#improvedrules>

⁷⁶ These include all the aforementioned policies, mostly in relation to infrastructure, data and services but also skills and education.

⁷⁷ http://ec.europa.eu/research/era/index_en.htm

- Policies supporting the development of digital skills for the entirety of the population, such as the Digital Skills and Jobs Coalition⁷⁸
- Institutions supporting the use of open education resources across the EU, such as the European Schoolnet.⁷⁹

(d) Policies regarding Public Procurement in the EOSC context⁸⁰

While there is a broad and comprehensive work in terms of how Public Procurement operates in the EU context⁸¹ and considerable experience overall⁸², we still need to identify a workable mechanism for cross-infrastructure procurement of services as well as the procurement of services on behalf of a variety of user types. More specifically, the following areas need to be taken into consideration:

- Remain compliant with the Directive 2014/24/EU⁸³ on public procurement
- Facilitate the collective procurement of services to be consumed by EOSC
- Avoid State Aid issues when procuring or offering EOSC-related services at the Member State level

Further work is required in the context of the EOSC project in order to identify the procurement framework that will match the current institutional ecosystem and address the areas of priority for the EOSC stakeholders and their related services.

⁷⁸ <https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition>

⁷⁹ <http://www.eun.org/>

⁸⁰ For a greater detail of the issues related to Procurement in the EOSC context, see Annex C: Procurement in the EOSC Project

⁸¹ See for instance the Public Procurement Package: “To strengthen the Single Market and as part of the continuous effort to stimulate investment in the EU, today the Commission has put forward an initiative to carry out procurement more efficiently and in a sustainable manner, while making full use of digital technologies to simplify and accelerate procedures.”

http://ec.europa.eu/growth/content/increasing-impact-public-investment-through-efficient-and-professional-procurement-0_en

⁸² E.g. in the case of GEANT

⁸³ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02014L0024-20160101>

3 Conclusion

This Policy Landscape Review has presented the main areas of policy that set the ground rules for the development of the EOSC ecosystem and the ways in which they influence the provision of services and the making available of data to the relevant stakeholders.

It has focused foremost on:

- Identifying the policy framework within which EOSC operates, i.e. a European framework for inclusive growth, which aims at the seamless operation of the Quadruple Helix, i.e. the Public Sector, Academia, the Private Sector and Civil Society.
- The increase of interoperability between services provided and consumed by EOSC stakeholders
- The placing of the ECI and EDI policies within the ERA, DSM and Europe2020 policies
- The emphasis on the free flow of data as expressed in the PSI Directive, GDPR and the Proposed regulation for the free flow of non-personal data
- The importance of the development of skills for supporting this data-driven economy
- The need to develop common procurement policies in the EOSC context
- The relationship between the policy framework and the Governance Framework and Principles of Engagement
- The need to coordinate policies

We recommend the following policy actions which could decrease friction in the flow of data and increase value:

1. Produce consistent policies at the EU, the Member State and the institutional level

This is a general outcome of the Policy Landscape Review. The macro policies provide a harmonised framework to a certain degree, but this needs to be complemented by further measures at the micro level. This is a very clear need at the level of IPR policies, Data Protection and Ethics, Procurement policies and Open Science Policies.

- Focus on retaining coherence with EU policies at the MS policy level
- Monitor the implementation of the EU policies, particularly in areas where frictions may appear (e.g. licensing by Public Sector Organisations, implementation of the General Data Protection Regulation etc.)
- Use fora, along with instruments such as the Open Science Monitor and Registry, to harmonise micro-policies practices, such as licensing of data-sets, access to services through APIs, open access policies etc.

2. Standardise interactions at the organisational and institutional (micro) level

This policy proposal comes as a direct result of the work in the macro level and is in close relationship with the Principles of Engagement. It also derives from specific policies, such as Copyright, Open Science and Open Access Policies.

- Ensure that the Findable, Accessible, Interoperable and Reusable (FAIR) principles are consistently applied at different levels
- Ensure micro policies are standard, human readable, machine readable and interoperable
- Ensure the use of open and standard licences or at least standard commercial licensing framework for services consumption or data reuse
- Ensure the existence of Standard Operational Procedures that interoperate with each other
- Support massive and semi-automated rights clearance and licence interoperability resolution

3. Focus on the interactions with the four parts of the quadruple helix, particularly the interactions with the industry, where the greater inefficiencies currently exist

This proposal is mostly related to policies such as the Smart Specialization policies, the Digitizing the European Industry policies and the knowledge economy policies. We need to be very clear at this point that the scope of the EOSC pilot project remains within the realms of exploring the options regarding what such a framework of interactions entails rather than proposing its implementation.

- Increase the level of understanding and standardisation of interactions with the industry
- Support open innovation structures, especially through standard agreements and supporting information infrastructures
- Create data trusts⁸⁴
- Produce standard data, service and infrastructure sharing agreements

⁸⁴ We deploy the term “data trust” in the same way as it has been used in the 2017 “Growing the Artificial Intelligence Industry in the UK” report by Professor Dame Wendy Hall and Jérôme Pesenti

(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf): “These trusts are not a legal entity or institution, but rather a set of relationships underpinned by a repeatable framework, compliant with parties’ obligations, to share data in a fair, safe and equitable way. (...) A support organisation, the Data Trusts Support Organisation (DTSO) could be developed, which would lead on the development of tools, templates and guidance for those who want to share and use data, so data owners and consumers can come together to form data trusts as and when they wish to do so. This role could be provided by a neutral and expert organisation such as the Royal Society, the Royal Academy of Engineering, the Digital Catapult or the Open Data Institute, all of which have relevant expertise. Given the importance of trust, this role should be taken by an organisation which is already trusted both for security and operational effectiveness in relation to data.”

- Support co-financing (PPP) for research infrastructures and create model IPR-sharing schemes (e.g. licence pools)

4. Focus on interactions with platforms⁸⁵ (particularly in sharing economy context), in order to maximize value, protect data ownership and portability and avoid vendor lock-in

This proposal still needs further elaboration; however, it follows the overall policy developments and reports in relation to platforms at the EU level as well the interactions between the platform policies and the Industry 4.0 policies.⁸⁶

- Provide model agreements
- Produce guidelines for engagement with platforms
- Channel procurement and aggregate demand in order to reduce prices and increase negotiation leverage with big cloud and platform providers

5. Automate the application of policies supporting open science by increasing openness and supporting data protection by design and default, as well as data sovereignty for the user

This proposal is the result of the substantial work undertaken in the context of PSI and Data Protection policies. Its underlying assumption is the substantial reduction of transaction costs in the free flow of data.

- Focus on the semantic representation of licences⁸⁷ and policy documents so as to be able to easily search, identify, read and perform compatibility checks between material originating from different sources.
- Use standard model licences and prior informed consent forms
- Create and manage personal data stores⁸⁸ so as to be able to easily manage personal data when using different service providers and remain in compliance with GDPR.

⁸⁵ See 4.22 Platforms

⁸⁶ See 4.20 Open to the World; 4.21 Digitalisation of the European Industry/ IoT/ Robotics/ Standards; 4.22 Platforms.

⁸⁷ This means machine-readable expression of copyright licensing terms and related information (including policies). Classic examples, in the context of open licensing, include CCREL (<https://www.w3.org/Submission/2008/02/>), XrML (<https://mpeg.chiariglione.org/standards/mpeg-21/mpeg-21.htm>) and ODRL (<https://www.w3.org/TR/odrl-model/>)

⁸⁸ "A Personal Data Store or PDS helps you gather, store, manage, use and share the information you need to manage your life better. It provides you with tools to control what information you share with which people and organisations, when." See e.g. Mydex <https://pds.mydex.org/what-personal-data-store-0>. See also Alex Stobart (2017) "Person Centred Services for Citizens in Europe" eGovernment4EU, Futurium.

- Support Data sovereignty services following the Vendor Relationship Management (VRM)⁸⁹ model

6. Support the development of the e-infrastructures services that could use the EU GDPR as a competitive advantage

This is a proposal directly linked to the EU Personal Data Protection policies. It sees them as an enabler for the free flow of data and focuses on the benefits to the end user and the role that EOSC could play in supporting compliance with the GDPR in a frictionless and comprehensive fashion. The focus on the e-infrastructures is suggested to the extent that these offer horizontal services to more than one constituencies; however, this policy recommendation would be also applicable to any Research Infrastructure or EOSC related service. The crucial part of this recommendation is to focus on the provision of horizontal and replicable services in order to reduce transaction and other costs related to complying with the GDPR while increasing the free flow of data in lawful and ethical manner.

- a trusted environment and the clear guarantee of data subjects' rights as an incentive for investment
- the fact that by granting effective data protection the EU can enhance its leadership in this context.
- Providing both data protection and the free flow of data requires well-balanced policies and case-by-case-assessment
- Different types of personal and non-personal data require different levels of protection
- EU legislation and member state transposition/implementing acts vary a lot
- Develop fast dispute resolution mechanisms regarding infringements within EOSC
- State of the art ethical standards create trust. This is a major requirement for investment
- There is need for common (normative) standards for the development of EOSC

Work Package 3 will engage with policy experts from EOSC stakeholder groups to test and discuss this initial set of wide policy recommendations with a view to refining them and perhaps adding to them, and identifying a prioritised list of recommended policy actions within the scope of EOSCpilot- "low hanging fruit", so to speak - to support the establishment and development of the EOSC.

In parallel, it would also be helpful to intensify the collaboration with other related projects that are tackling issues related to those of the EOSCpilot Policy WP, such as e-Infracentral, EOSC Hub etc, as well as with key e-infrastructures that are in the form of a legal entity, such as EGI, GEANT, EUDAT, OpenAIRE etc.

The next steps in the development of WP3 are suggested to include the following elements:

- Further focusing on drivers and constraints as they have emerged from the work in the Policy Landscape Review as well as the interviews conducted to date with policy experts

⁸⁹ http://cyber.harvard.edu/projectvrm/Main_Page

- Continue desk research and the interviewing process with a range of policy experts from EOSC stakeholder groups to gather more information on drivers and constraints and to validate, refine and prioritise the drivers and constraints and the policy recommendations
- Further advance the work on institutional (micro) policies and compile a first list of Open Science Policy indicators. This may be further used by the Open Science Monitor and the Open Science Policy Registry in Task 3.2
- Revisit the Policy Recommendations in the framework of the Policy Landscape Review, drivers and constraints, the Open Science Monitor and the Open Science Policy Registry.

4 Annexes

4.1 Annex 1. Scoping document with extensive references

“Can we create a frictionless data life-cycle for open science?”

In order to further advance our understanding of the relevant to EOSC EU policies we have started with the policies providing the overarching policy framework for growth in Europe to then move to the data related policies at a horizontal and then vertical level to finally reach specifically related to research and innovation policies, where EOSC is positioned. For each of these cases we present the main policy focus and implementation mechanisms, their relationship with different EOSC components and the drivers and constraints they present in terms of open science.

4.1.1 Development Policies, Europe2020

Key Policy issues:

- Core EU policy in relation to growth and social progress
- Focus on “healing the wounds” from the economic crisis
- Global outlook
- Key Priorities:
 - Smart growth: developing an economy based on knowledge and innovation.
 - Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
 - Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

Focus on seven areas (Flagship initiatives):

- "Innovation Union" to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.
- "Youth on the move" to enhance the performance of education systems and to facilitate the entry of young people to the labour market.
- "A digital agenda for Europe" to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and firms.
- "Resource efficient Europe" to help decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernise our transport sector and promote energy efficiency.
- "An industrial policy for the globalisation era" to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally.
- "An agenda for new skills and jobs" to modernise labour markets and empower people by developing their skills throughout the lifecycle with a view to increase labour participation and better match labour supply and demand, including through labour mobility.
- "European platform against poverty" to ensure social and territorial cohesion such that the benefits of growth and jobs are widely shared and people experiencing poverty and social exclusion are enabled to live in dignity and take an active part in society.

Commentary:

EOSC serves different aspects of the Europe 2020 strategy, mostly:

- a. Innovation Union: it allows the more efficient interaction between the three elements of the triple helix, mostly through the more efficient flow of data and the sharing of infrastructures and services between different industry, the public sector and the private sector.
- b. Digital Agenda for Europe (DAE): DAE and DSM are the areas that relate most to the operation of EOSC. They are analysed comprehensively in the respective areas of this paper. The most important aspect of their interaction with EOSC relates to the degree to which EOSC may reduce frictions in the digital single market and support the accomplishment of cohesion and inclusive growth policies in the EU context.
- c. Industrial Policy for the globalisation era: EOSC mostly supports the data and infrastructure related aspects of the Industry 4.0 policies.
- d. Skills and Jobs: Data related skills are a core element of the Skills and Jobs flagship initiative and also a substantial part of the EOSC work both in terms of suggested policies and practices and in terms of requirements for its successful implementation.

Drivers:

The aforementioned four flagship initiatives, as well as the overall policy direction of Europe 2020 is a key driver for EOSC related policies. Of course, this is a rather high-level policy and it is its implementation layers which provide a more comprehensive set of Drivers and Constraints.

Constraints:

The most relevant constraint is that of the fragmentation of the policy initiatives, as they become more specialised and approach the implementation level. A single coordination centre with a focus on the EOSC initiative and with direct access to decision making would be essential to improve the effectiveness of the relevant policies.

Key Documents:

Title	Description	URL
COMMUNICATION FROM THE COMMISSION EUROPE 2020 A strategy for smart, sustainable and inclusive growth	Europe has identified new engines to boost growth and jobs. These areas are addressed by 7 flagship initiatives. Within each initiative, both the EU and national authorities have to coordinate their efforts so they are mutually reinforcing. Most of these initiatives have been presented by the Commission in 2010. Smart growth Digital agenda for Europe Innovation Union Youth on the move Sustainable growth Resource efficient Europe An industrial policy for the	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

	globalisation era Inclusive growth An agenda for new skills and jobs European platform against poverty	
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4.1.2 Digital Agenda for Europe (DAE) and Digital Single Market (DSM)

Key Policy issues:

- The European Commission has identified the completion of the Digital Single Market (DSM) as one of its ten political priorities. The DSM is also a key priority for the European Council and the European Parliament and has been highlighted in the Annual Growth Survey 2015.
- “A Digital Single Market is one in which the free movement of goods, persons, services and capital is ensured and where citizens, individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence. Achieving a Digital Single Market will ensure that Europe maintains its position as a world leader in the digital economy helping European companies to grow globally. A fully functioning DSM will present European businesses, particularly small and medium-sized enterprises (SMEs), with a potential customer base of more than 500 million people, enabling companies to make full use of ICT to scale up for productivity gains, creating growth along the way.”

Commentary:

DSM policies span across a wide range of issues that have a common target: how to accelerate the deep digitization of Europe’s industry, government and academia in order to enable sustainable growth.

Unrestricted flow of data is at the crux of the DSM approach, particularly in the context of the market, but also in terms of research and government. This is the perspective under which a series of other sectoral policies needs to be approached. We are exploring these policies in greater detail in subsequent parts of this document. The following policy areas are the most relevant in the EOSC context:

- Copyright policies:
 - Collective rights management: The policies aim at the establishment of rules that increase transparency and decrease transaction costs by allowing cross-border flow of rights and offering of online services. Such policies affect EOSC to the extent systems of collective management of author’s rights may interoperate with the EOSC e-infrastructures, especially in relation to rights management information.
 - Copyright Limitations and Exceptions (text and data mining): The introduction of a minimum of harmonization in relation to limitations and exceptions related to text and data mining is crucial for the increase of unrestricted TDM research, especially in the area of Language Resource processing.
 - Avoiding Geoblocking: need to allow the cross-border flow of content without any restrictions and discrimination on the basis of the relevant geographical area, where the user of the content is located.

- Licensing: this remains by and large the biggest actual copyright issue as the complexity of the licensing environment in Europe increases exponentially the transaction costs for all sides. In the EOSC context there is need to carefully balance between the need to rationalise, automate and make machine readable licences and the need to allow public domain and limitation and exceptions regimes to remain licence-free forms of activity.
- Next Generation Access to the Internet: The core objectives of this policy line may be summed up as follows:
 - A new rule book for providers of internet access and communication services - the European Electronic Communications Code
 - Common EU broadband targets for 2025
 - A plan to foster European industrial leadership in 5th generation (5G) wireless technology
 - A voucher scheme for public authorities who want to offer free Wi-Fi access to their citizens (WiFi4EU)
- These actions, while not within the scope of the EOSC project as such, constitute an important background to understand how (a) governance (b) principles of engagement and (c) e-infrastructure policies should be formed. More specifically, the provision of telecom services and rules related to the procurement of the services need to be adjusted in the broader EU Telecoms policy framework. There needs to be particular focus on the avoidance of any form of state aid through the procurement of broadband services and investigate the degree to which the research cloud and broadband services could contribute to the EU and national broadband plans. The 5G wireless technology plans that are a key part of the EU industrial policy need to be seen as part of a broader ecosystem for the acquisition and sharing of data. The WiFi4EU needs to be seen in conjunction with similar services offered by the research sector (e.g. Eduroam).
- The protection of personal data: The General Data Protection Regulation (GDPR) has to be seen as a set of rules that aim at the protection of personal data, but also as a means for the smoother flow of personal data across Europe in order to facilitate a balanced regulatory ecosystem where the data subjects are protected and value added data-services may be produced.
- Cybersecurity and the fight against cybercrime: This is again a very extensive policy area that touches upon EOSC in a number of ways. The most relevant are the following:
 - Adherence to the Network and Information Security (NIS) platform guidelines and principles and follow the NIS Directive
 - Ensure that security standards are followed in the interactions between academia, the industry and -where applicable- the public sector in order to create a trusted environment, especially in relation to Intellectual Property Rights.

- Online Platforms: This remains one of the most difficult to tackle policy areas as it covers a wide variety of issues and forms of technologies: “Online platforms can be described as software-based facilities offering two-or even multi-sided markets where providers and users of content, goods and services can meet. As such, the term can cover a wide range of different types of platform, whose functions and characteristics can differ considerably. Examples of types of platforms include: communications and social media platforms; operating systems and app stores; audiovisual and music platforms; e-commerce platforms; content platforms, which may include content aggregators as well as software/hardware solutions; and search engines. Besides the taxonomy outlined above there are other types of platforms, such as payment systems or those related to the sharing economy.” While all the types of platforms are not relevant to EOSC’s work, there is need to focus on the platforms offering academic/ research related services and actively examine the ways in which they engage with the EOSC stakeholders and services in order to devise specific policies and guidelines. Platforms such as Academia.edu and ResearchGate have to be seen as major players in the ecosystem and understand the ways in which EOSC interacts with them. The areas in which policy intervention are of the most pressing need are the following:
 - Data collection, accumulation and management
 - Interaction with EOSC services and scientific data suppliers
 - Terms Transparency issues
 - Data flow transparency issues
 - Data value issues
 - Pricing transparency issues
- Issues of liability of on-line intermediaries: While this is an issue that mostly relates to the liability of commercial Internet Service Providers (ISPs), it also needs to be taken into consideration by the e-Infrastructure and EOSC service providers in order to ensure (a) that they form content policies that protect different stakeholders and groups (from IP infringement, to minor protection and hate speech control) and (b) that they do not restrict key academic freedoms and rights, interfere with personal data or restrict open access to knowledge.
- Digital Services in the Data Economy: As mentioned at the outset of this section, data constitute the driver of the DSM. This set of policies mostly relate to the encouragement of the industry to use big data in their operations, business intelligence and decision making, but also to support Internet of Things (IoT) applications in order to collect and process data both in the manufacturing and service provision sections. Such an approach needs a response from EOSC in the following areas:
 - Provision of Research and e-Infrastructures that could be used in the industry 4.0 context

- Provision of secure and trusted (technically, organisationally and legally) platforms for the interaction between academia and industry
- Creation of common value production schemes and protocols for the collaboration between stakeholders in the Digital Services and Data Economy context.
- Digitization of Research: This remains the DSM area with the greatest relevance to EOSC constituting the policy canvas on which it is developed. The following policy elements are the most crucial ones:
 - Focus on Open Science as the key objective of the Digitization of Research initiative and appreciating that it goes beyond Open Access
 - Supporting the Findable, Accessible, Interoperable and Reusable (FAIR) principles for data and services.
 - Establish a European Open Science Cloud, including governance, policy and principles of engagement regimes
- Interoperability and Standards: Interoperability is an essential condition for materialising most of the DSM policies. It ensures that different services and infrastructures are interoperable and that data flows may take place at the minimum possible cost. Interoperability and standards policies are the technical counterpart of policies ensuring the flow of data in the legal level (particularly copyright, public sector information, personal data protection and open science policies). In the EOSC context we need to focus on the Interoperability policies that allow the interaction between different services and data as well as between different policies and organisational settings. The interoperability and standards policies also allow the inter-sectoral flow of information and need to be seen in conjunction with eGovernment and Industry 4.0 policies.
- Digital Skills: Digital Skills policies aim at fostering digital skills at a variety of levels and for a wide range of beneficiaries. Such policies are of relevance to EOSC in a number of ways. Open Science has a dual role to play: it requires digital skills in order to be performed, but it may also be used in order to increase digital skills both to the generic population and the scientists and researchers. More specifically:
 - General Population Digital Skills: citizen science is a key part of EOSC and Open Science in general. Policies that invite the more active participation of citizens in science projects as well as protocols of informing citizens regarding research with significant socio-economic impact are necessary in this context.
 - Scientists/ Researchers Skills: Comprehensive retraining schemes for scientists and researchers need to be put in place in order to ensure that all relevant infrastructures, services and data may be employed in the maximum possible extent.
 - Professionals' Skills: Advanced Digital Skills from the industry are necessary for researchers, both in basic and applied research and vice

versa. There is need for the development of structured knowledge exchange infrastructures for the mutual exchange and further development of such skills.

- Use of Open Education techniques, infrastructures and resources: digital skills of all the aforementioned kinds need to be disseminated through open educational schemes in order to ensure their maximum reception, adoption and collective improvement.
- eGovernment: The eGovernment policies that relate to EOSC are the ones that focus on the free flow of data or the openness of government (services, data and infrastructures). We highlight the following policies:
 - Once Only Principle: the principle of entering information to public administration e-Infrastructures only once is one that could also be followed in the research ecosystem. While this remains a more difficult aim when transposed to the more heterogeneous environment of research, it remains something to be actively sought.
 - Digital by Default: this is a principle that aims at reducing the costs of transforming analogue information into digital and is the foundation of the eGovernment DSM module. This again needs to be an active policy in the research context and be translated into a rule for research and scientific activity. In addition, it needs to be transposed in the cloud context, as what is produced in an off-line and non-interoperable environment is still not really re-usable and hence increases the costs of e-science.
 - Privacy by Default: trying to get a legal basis for lawfully processing personal data after the data have been collected is an expensive and sometimes futile exercise. Hence, the principle of Privacy by Default tries to make sure or relevant permissions or legal conditions have been obtained and ensured at the time of data collection on the level of legal instruments, digital technologies and organisational processes. This principle that is found in the eGov context need to be replicated in the open science and research context. In addition, interoperability mechanisms of PbD systems of eGov and EOSC need to be established.
 - Reuse of Public Sector Information: The PSI Directive has been one of the most crucial drivers of Open Data in Europe. The absence of equally hard rules in the context of Research Performing Organisations (RPOs), which are explicitly exempt from the scope of the Directive means that we either have sectoral policies, at the Member State level, which push for the release of open scientific data or that such effect is achieved through a mixture of incentives and penalty rules for researchers and RPOs to produce, share and release open data.

Drivers:

- Need to support the European Digital Single Market, research being one of its main pillars

- Focus on data driven economy that all in terms of infrastructures, services and technologies, data and human capital is highly dependent upon research
- International competition of data-driven applications and services
- Need to activate all three parts of the triple helix
- Emergence of international mega-platforms in industry and academia that affect society and economy

Constraints:

- Complex regulatory environment
- Fragmentation of policy initiatives and legislative regimes at the Member State
- Low understanding of the big picture by the majority of stakeholders
- Installed base in terms of legacy information systems
- Lack of digital skills
- Acoustic separation between the three parts of the triple helix

Key Documents:

Title	Description	URL
President Juncker's Political Guidelines	A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change. Political Guidelines for the next European Commission	https://ec.europa.eu/commission/publications/president-junckers-political-guidelines_en
Staff Working Document: A Digital Single Market Strategy for Europe - Analysis and Evidence Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and	The European Commission has identified the completion of the Digital Single Market (DSM) as one of its ten political priorities. The DSM is also a key priority for the European Council and the European Parliament and has been highlighted in the Annual Growth Survey 2015 1 . A Digital Single Market is one in which the free movement of goods, persons, services and capital is ensured and where citizens, individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal	http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX:52015SC0100

<p>Social Committee and the Committee of the Regions A Digital Single Market Strategy for Europe</p>	<p>data protection, irrespective of their nationality or place of residence. Achieving a Digital Single Market will ensure that Europe maintains its position as a world leader in the digital economy helping European companies to grow globally. A fully functioning DSM will present European businesses, particularly small and medium-sized enterprises (SMEs), with a potential customer base of more than 500 million people, enabling companies to make full use of ICT to scale up for productivity gains, creating growth along the way.</p>	
<p>A Digital Single Market Strategy for Europe</p>	<p>A Digital Single Market is one in which the free movement of goods, persons, services and capital is ensured and where individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence. Achieving a Digital Single Market will ensure that Europe maintains its position as a world leader in the digital economy, helping European companies to grow globally.</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX:52015DC0192</p>
<p>Mid-Term Review on the implementation of the Digital Single Market Strategy A Connected Digital Single Market for All</p>	<p>This mid-term review assesses progress towards the implementation of the Digital Single Market, identifying where more efforts are needed and where the changing digital landscape calls for new action at the EU level. It is accompanied by the 2017 European Digital Progress Reports 4 outlining the progress made at both EU and Member State level and a staff working document setting out the evidence that has informed this review. 5</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1496330315823&uri=CELEX:52017DC0228</p>
<p>Europe's Digital Progress Report SWD(2017) 160</p>	<p>`</p>	<p>https://ec.europa.eu/digital-single-market/en/news/europes-digital-progress-report-2017</p>

<p>COMMISSION STAFF WORKING DOCUMENT Accompanying the document COMMUNICATIO N FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS on the Mid-Term Review on the implementation of the Digital Single Market Strategy A Connected Digital Single Market for All</p>	<p>The EU economy and European society are in the process of radical economic and social transformation. Digital technologies and the amount of data they create trigger new innovations, products, services, business models, as well as new ways of interaction between people and machines. These technologies change the way citizens and business live, work, communicate, travel and consume.</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD%3A2017%3A155%3AFIN</p>
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4.1.3 Research and Innovation/Innovation Union

Key Policy issues:

Innovation Union forms one of the two elements of the “Europe2020” strategy; the second one is Digital Single Market. Open Innovation along with the Open Science and Open to the World goals, also known as “the three Os”, are the EU’s research and innovation policy enablers.

Commentary:

Innovation Union comprises of 30 actions that seek to support innovation in Europe using a variety of means and aiming at inclusive growth and creation of sustainable jobs. From the actions described in the Innovation Union the following are of relevance to EOSC:

- Promoting excellence in education and skills development
- Delivering the European Research Area
- Creating a single innovation market
- Promoting openness and capitalising on Europe's creative potential
- Reforming research and innovation systems

Drivers:

- Need to increase the innovation standing of Europe at a global level
- Need to translate innovation into growth and jobs
- Understanding of the link between open science and innovation

Constraints:

- Lack of comprehensive initiatives for overcoming the “death valley” problem between research and innovation
- Divergence between Research and Innovation advanced and lagging behind Member States
- Lack of harmonisation in policies, regulations and infrastructures

Key Documents:

Title	Description	URL
Innovation union: A pocket guide on a Europe 2020 initiative	Innovation Union is the European Union strategy to create an innovation-friendly environment that makes it easier for great ideas to be turned into products and services	https://publications.europa.eu/en/publication-detail/-/publication/6f270d5f-8086-4b70-82b2-c4353d253720

	that will bring our economy growth and jobs.	
State of the European Union 2015		http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2015/state_of_the_innovation_union_report_2015.pdf#view=fit&pagemode=none
Better Regulations for innovation-driven investment at EU level		http://ec.europa.eu/research/innovation-union/pdf/innovrefit_staff_working_document.pdf#view=fit&pagemode=none
Study on EU Positioning: An Analysis of the International Positioning of the EU Using Revealed Comparative Advantages and the Control of Key Technologies		http://ec.europa.eu/research/innovation-union/pdf/expert-groups/rise/final-report_eu_positioning.pdf#view=fit&pagemode=none
Regulation and R&I Policies: Comparing Europe and the USA		http://ec.europa.eu/research/innovation-union/pdf/expert-groups/rise/renda_innovation_report.pdf#view=fit&pagemode=none
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL	At a time of public budget constraints, major demographic changes and increasing global competition, Europe's competitiveness, our capacity to create millions of new jobs to replace those lost in the crisis and, overall, our future standard of living depends on our ability to drive innovation in products, services,	http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf

<p>COMMITTEE AND THE COMMITTEE OF THE REGIONS Europe 2020 Flagship Initiative Innovation Union</p>	<p>business and social processes and models. This is why innovation has been placed at the heart of the Europe 2020 strategy. Innovation is also our best means of successfully tackling major societal challenges, such as climate change, energy and resource scarcity, health and ageing, which are becoming more urgent by the day. Europe has no shortage of potential. We have world leading researchers, entrepreneurs and companies and unique strengths in our values, traditions, creativity and diversity. We have made great strides in creating the largest home market in the world. European enterprises and civil society are actively engaged in emerging and developing economies around the world. Many world-changing innovations can be traced back to Europe. But we can – and must do – much better.</p>	
<p>The Three Os – Open Innovation, Open Science, Open to the World</p>		<p>https://ec.europa.eu/research/openvision/index.cfm</p>

4.1.4 ERA

Key Policy issues:

The 7th Framework Programme (FP7) for monitoring OA that successfully launched in 2007 was only the beginning. It had a span of 6 years initially and a scope that focused on the accessibility and preservation of publicly funded scientific information. According to the first FP7 report published in 2015, the total percentage of success rates was 19% for proposals and EC funding and 22% for applicants.

Post-FP7 is still running today together with Horizon 2020 (2014-2020), the continuation of the European funding for OA which introduced Research Data Management to the research lifecycle and research data and metadata as indispensable parts of research outputs.

Commentary:

ERA is at the core of Innovation Union and is perceived to be a vision that, if successfully implemented, will achieve the so-called “5th freedom of the European Union”, that of the free movement of knowledge. ERA is therefore a unified virtual and real-life space in which researchers are free to move and conduct collaborative and interdisciplinary research while their knowledge and research outputs are equally freely distributed through open, interlinked and interoperable infrastructures in National, European as well as International levels.

Operating since year 2000, with achievements to involve the establishment of the European Research Council (ERC) and the European Strategy Forum for Research Infrastructures, ERA is leading the way under the new R&D Framework.

Drivers:

- Need for greater mobility of researchers, flow of research data and collaborative projects
- Drive by the industry for more inter-european and international projects
- Need for sharing resources, knowledge and human capital between major European research centers .

Constraints:

- Fragmented information infrastructures
- Lack of interoperability
- Different systems of professional development and institutional evaluation
- Inconsistent funding systems

Key Documents:

Title	Description	URL
COMMUNICATION FROM THE COMMISSION TO THE	Open national-level competition is crucial to deriving maximum value from public	http://ec.europa.eu/research/era/pd

<p>EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Reinforced European Research Area Partnership for Excellence and Growth</p>	<p>money invested in research. Best-practice performance in this respect which all Member States should attain involves: • Allocating funding through open calls for proposals, evaluated by panels of leading independent domestic and non-domestic experts (peer review²⁴) - this incites researchers to reach internationally-competitive levels of performance • Assessing the quality of research-performing organisations and teams and their outputs as a basis for institutional funding decisions - peer review can form a part of such assessment and, in the long-term, lead to organisational change</p> <p>The challenge is to improve on all these points to increase the quality and relevance of</p> <p>research. The Commission is already committed to ensure 40% of the under-represented sex</p> <p>in all its expert groups, panels and committees and will apply this particularly under Horizon</p> <p>2020</p> <p>Research and innovation benefit from scientists, research institutions, businesses and citizens accessing, sharing and using existing scientific knowledge and the possibility to express timely expectations or concerns on such activities. A major challenge is to broadly implement Open Access - i.e. free internet access to and use of publicly-funded scientific publications and data - given the uneven state of advancement of Member State policies in this area. More generally, to increase the economic impact of research, we need to foster Open Innovation, links between research, business and education (the knowledge triangle) as via EIT and in particular knowledge transfer between public research institutions and the private</p>	<p>f/era-communication/era-communication_en.pdf</p>
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	sector while respecting intellectual property rights. As most knowledge creation and transfer uses digital means, all barriers preventing seamless online access to digital research services for collaboration, computing and accessing scientific information (e-Science) and to infrastructures must also be removed by promoting a digital ERA. The different types of knowledge transfer, circulation and access should also be judiciously factored into research cooperation with non-EU countries.	
	ERA progress report documents	http://ec.europa.eu/research/era/era-progress_en.htm
ERA PROGRESS REPORT 2016 REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT The European Research Area: Time for implementation and monitoring progress	Document that describes the implementation and monitors progress of the national roadmaps 2015-2020.	https://ec.europa.eu/research/era/pdf/era_progress_report2016/era_progress_report_2016_com.pdf
	Roadmap 1	https://era.gv.at/object/document/1845
	Roadmap 2	http://data.consilium.europa.eu/doc/document/ST-8975-2015-INIT/en/pdf
The Lund Declaration: Europe Must Focus On The Grand Challenges Of Our Time	1. Jointly addressing grand challenges 2. Effective investment in and use of research infrastructures	http://www.vr.se/download/18.7dac901212646d84fd38000336/
European Charter for Access to Research		http://ec.europa.eu/research/infrast

<p>Infrastructures: Principles and Guidelines for Access and Related Services</p>		<p>tructures/pdf/2016_charterforaccessto-ris.pdf</p>
<p>The EU's Fifth Freedom: creating free movement of knowledge - speech by Janez Potočnik, European Commissioner for Science and Research</p>		<p>https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjNzo_igIzXAhVEOBoKHa41At8QFggrMAA&url=http%3A%2F%2F.europa.eu%2Frapid%2Fpress-release/SPEECH-07-257_en.pdf&usg=AOvVaw1bV7TzpyFLwfRRVRXyuD9L</p>
<p>COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE on scientific information in the digital age: access, dissemination and preservation</p>		<p>http://ec.europa.eu/research/science-society/document_library/pdf_06/communication-022007_en.pdf</p>
<p>Seventh FP7 Monitoring Report MONITORING REPORT 2013</p>		<p>http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf</p>
<p>REGULATION (EU) No 1291/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 establishing Horizon 2020 - the Framework Programme</p>	<p>Establishment of Horizon 2020</p>	<p>http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/fp/h2020-eu-establact_en.pdf</p>

for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC		
H2020 Programme Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020		https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
Fact sheet: Open Access in Horizon 2020		https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/FactSheet_Open_Access.pdf

4.1.5 Data Policies/Data Economy and Connectivity

Key Policy issues:

This is the most relevant policy in this report, since EOSC is one of the key instruments in order to support and further facilitate the free flow of data and increase connectivity, between public, private sector and academia in order to benefit society and economy. Today, the main obstacles that preclude free flow of data in the Digital Single Market are:

- Unjustified data localisation restrictions by Member States' public authorities,
- Legal uncertainty about legislation applicable to cross-border data storage and processing,
- A lack of trust in cross-border data storage and processing linked to concerns amongst Member States' authorities about the availability of data for regulatory scrutiny purposes
- Difficulties in switching service providers (such as cloud) due to vendor lock-in practices.

In order to overcome these obstacles, the EC has suggested the introduction of a regulation seeking to achieve the following objectives:

The new Regulation will ensure:

- Free movement of non-personal data across borders: every organisation should be able to store and process data anywhere in the European Union,
- The availability of data for regulatory control: public authorities will retain access to data, also when it is located in another Member State or when it is stored or processed in the cloud,
- Easier switching of cloud service providers for professional users. The Commission proposes a self-regulatory approach, encouraging providers to develop codes of conduct regarding the conditions under which users can port data between cloud service providers and back into their own IT environments,
- Full consistency and synergies with the cybersecurity package, and clarification that any security requirements that already apply to businesses storing and processing data will continue to do so when they store or process data across borders in the EU or in the cloud.

EU's commitment to support the free flow of knowledge as a key driver for economic development dates back from 2007 when the first policy traces of the free flow of data a core European Freedom (the 5th Freedom) were expressed by Janez Potočnik, then European Commissioner for Science and Research. These ideas have been of particular relevance to the Research Community, but have also been expressed in the public administration context with the introduction of the Public Sector Information 2013 Directive and then with the introduction of active open data policies. They have also influenced our understanding of IPR policies, supporting Text and Data mining exceptions and, more recently, our understanding of the need for free flow of non-personal data in the private sector and between the public and private sector and academia. The European Cloud initiative is at the crux of this process and EOSC the main instrument for materialising this policy.

Commentary:

The centrality of EOSC in the supporting process of “data-fication” of the EU economy is made clear by:

- The central role that EOSC plays in the context of the European Cloud initiative
- The focus of the EOSC on starting from academia but bringing together data both from the public and the private sector
- The reflection of this approach on at least four aspects of EOSC:
 - Policy: reflecting the broader EU policies on openness and sharing of data in order to make suggestions of open policies at the institutional level
 - Governance: ensuring all relevant stakeholders are taking part in an appropriate fashion in the process of decision making in the core of the European Data Infrastructure and European Cloud Initiative.
 - Interaction with third parties (principles of engagement): realising the need to interact with third parties and manage both the reception and provision of services, data and infrastructure from and to them. This is particularly relevant when the interaction involves platforms that rely on network effect and bring with them-at least potentially- vast numbers of users.

The main objective of all EOSC policies should thus be twofold:

- Reduce as much as possible all regulatory, transactional, organisational and infrastructural frictions with regards to the free flow of data, balancing this objective with the protection of other key rights (mostly Intellectual Property Rights, Security and Confidentiality, Personal Data).
- Increase the incentives of all participants of the data value chain to share, reuse and open data in order to increase social and economic benefits

Drivers:

- The need of the economy for free flow of data
- The maturity of sectors such as academia and the public sector in terms of both the technological and the regulatory environment in the sharing of data
- The strong political mandate at the EU level for the sharing and opening of data
- The existence of reliable data infrastructures

Constraints:

- The lagging behind of the private sector in opening and sharing data
- The lack of a clear regulatory regime for the trusted sharing of data between private and public sector and academia
- The fragmentation of legal regimes and policies at the inter-Member State level

- The nascent GDPR
- The fragmented IPR limitations and exceptions rules
- The lack of model contracts and other instruments for engaging multiple types of stakeholders in the sharing of data
- The lack of technological interoperability at the EU-MS and MS-MS level

Implications:

- Storage and location of literature and data. It is very common that national policies specify a central repository or data center to be the place where publicly funded research outputs are being stored and preserved. On the occasions where such platform doesn't exist, there are recommendations that promote more generic repositories like Zenodo or open repositories registries such as re3data. The same applies for institutional policies, that mandate or encourage the research artefacts to be kept in the organisation's institutional repository or in one of the aforementioned platforms.
- Technical provisions for interoperability: most of the national and institutional policies have already provisions on the technical architecture of the infrastructures, the protocols and standards that are being used in order for them to be interoperable and able to connect with similar ones.
- Professionalism: can be ensured with code of conduct agreements
- Lacks in provisions for internet connection and its procurement for infrastructures, services and organisations performing research.

Key Documents:

Title	Description	URL
Value of EU Data Economy	The study presents the findings of the monitoring tool on data workers, the value of the data market, the number of data user enterprises, the number of data companies and their revenues, and the overall value of the impact of the data economy on EU GDP. The findings will feed into further developing the Digital Single Market in the EU as data is a catalyst for economic growth, innovation and digitisation across all economic sectors, particularly for SMEs and start-ups.	https://ec.europa.eu/digital-single-market/en/news/final-results-european-data-market-study-measuring-size-and-trends-eu-data-economy
Free flow of Non-personal data (5th Freedom)	Free flow of non-personal data is a prerequisite for a competitive data economy within the Digital Single Market. To fully	https://ec.europa.eu/digital-single-market/en/free-flow-non-personal-data

	<p>unleash the data economy benefits we need to ensure a free flow of data, allowing companies and public administrations to store and process non-personal data wherever they choose in the EU.</p>	
<p>Building a European Data Economy</p>	<p>Building a European data economy is part of the Digital Single Market strategy. The initiative aims at fostering the best possible use of the potential of digital data to benefit the economy and society. It addresses the barriers that impede the free flow of data to achieve a European single market.</p>	<p>https://ec.europa.eu/digital-single-market/en/building-european-data-economy</p>
<p>Communication on European Cloud Initiative - Building a competitive data and knowledge economy in Europe</p>	<p>The European Cloud Initiative builds on the Digital Single Market (DSM) Strategy, which aims, inter alia, to maximise the growth potential of the European digital economy. It aims to develop a trusted, open environment for the scientific community for storing, sharing and re-using scientific data and results, the European Open Science Cloud. It aims to deploy the underpinning super-computing capacity, the fast connectivity and the high-capacity cloud solutions they need via a European Data Infrastructure. Focussing initially on the scientific community, the user base will be expanded to the public sector and to industry, creating solutions and technologies that will benefit all areas of the economy and society. Achieving this will require a collaborative effort open to all those interested in exploiting the data revolution in Europe as an essential component of global growth.</p>	<p>https://ec.europa.eu/digital-single-market/en/news/communication-european-cloud-initiative-building-competitive-data-and-knowledge-economy-europe</p>
<p>Staff Working Document on the free flow of data and emerging issues of the European data economy</p>	<p>The Staff Working Document on the free flow of data and emerging issues of the European data economy accompanies the Communication on Building a European Data Economy, adopted on 10 January 2017. The purpose of this Staff Working Document is to provide additional evidence and a detailed description of the</p>	<p>https://ec.europa.eu/digital-single-market/en/news/staff-working-document-free-flow-data-and-emerging-issues-european-data-economy</p>

	<p>emerging issues relevant for the EU data economy.</p> <p>The objective is to inform the debate and in particular the dialogue with stakeholders on the issues of free flow of data, access to and transfer of non-personal machine-generated data, data liability, as well as issues related to the portability of non-personal data. It builds on preliminary available evidence and a first set of stakeholder consultation meetings</p>	
European Open Science Cloud		
European Data Infrastructure		
<p>Communication on data driven Economy: Towards a thriving Data Economy</p>	<p>A coordinated action plan involving Member States and the EU can guarantee the necessary</p> <p>scope and scale of the required activities, such as the building of world-class connectivity,</p> <p>storage and supercomputing capacities for data or the identification of areas of strategic importance for the Union where breakthroughs can be made.</p> <p>By building upon ongoing sectoral activities already contributing to a data-driven economy,</p> <p>for example in the field of multimodal travel, this Communication seeks to initiate a debate</p> <p>with the Parliament, Council and other stakeholders, including the network of national digital</p>	<p>https://ec.europa.eu/digital-single-market/en/news/communication-data-driven-economy</p>

	<p>coordinators⁶ on developing such an action plan. To steer this debate, this Communication</p> <p>describes the characteristics of a data-driven economy and outlines a set of initial actions to</p> <p>help bring it about in Europe.</p>	
<p>Connectivity for a European Gigabit Society</p>	<p>The Commission has proposed a set of measures to ensure everyone in the EU will have the best possible internet connection, so they can participate fully in the digital economy.</p>	<p>1. Generic: https://ec.europa.eu/digital-single-market/en/connectivity-european-gigabit-society 2. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society - COM(2016)587 and Staff Working Document - SWD(2016)300 https://ec.europa.eu/digital-single-market/en/news/communication-connectivity-competitive-digital-single-market-towards-european-gigabit-society</p>

4.1.6 eGovernment

Key Policy issues:

The EU eGovernment 2020 Action Plan provides the main objectives of the EU policy in relation to eGovernment and gives us a solid understanding of the key priorities and state of the play in this area. More specifically the key objectives of the EU eGovernment 2020 Action Plan are as follows:

- Digital by Default: public administrations should deliver services digitally (including machine readable information) as the preferred option (while still keeping other channels open for those who are disconnected by choice or necessity).
- In addition, public services should be delivered through a single contact point or a one-stop-shop and via different channels.

Implications:

- Stakeholders: here the requirements of public administrations are being examined.
- It is most common that the regulations prevailing this section are mandatory, which can also be justified by the choice of wording: i.e. “should”, “default”.
- The types of EOSC-hosted content, in terms of eGovernment, are digital services and digital information.
- All public services should be part of relevant infrastructures but also be indexed and/or aggregated by others. For that reason, one could encounter here from single access point databases to aggregators as a service.
- Information provided and services have provisions that allow machine-readability and interoperability.
- Once only principle: public administrations should ensure that citizens and businesses supply the same information only once to a public administration. Public administration offices take action if permitted to internally re-use this data, in due respect of data protection rules, so that no additional burden falls on citizens and businesses.
- Stakeholders: citizens and businesses are also considered here, as the end users of the services.
- Closed data but their re-use from the public sector bodies is permitted without the subject’s consent
- professionalism: no burden on others
- lack of the once only principle

- Public administrations should design digital public services that are inclusive by default and cater for different needs such as those of the elderly and people with disabilities.
- Guidance for researchers lacks of accessibility provisions for minority groups
- Public administrations should share information and data between themselves and enable citizens and businesses to access control and correct their own data; enable users to monitor administrative processes that involve them; engage with and open up to stakeholders (such as businesses, researchers and non-profit organisations) in the design and delivery of services.
- Access control and personal data correction by citizens and businesses
- Monitoring of individuals’ administrative processes

- Transparency could be more prominent in some cases
- Public administrations should make relevant digital public services available across borders and prevent further fragmentation to arise, thereby facilitating mobility within the Single Market.
- Services to be available by “default” across Europe
- lacks on mobility
- Public services should be designed to work seamlessly across the Single Market and across organisational silos, relying on the free movement of data and digital services in the European Union.
- technical provisions for interoperability: mostly addressed within the context of the European Interoperability Framework
- All initiatives should go beyond the mere compliance with the legal framework on personal data protection and privacy, and IT security, by integrating those elements in the design phase. These are important pre-conditions for increasing trust in and take-up of digital services.
- preservation plan and location of deposit increases trustworthiness and security

The eGovernment Action Plan places particular emphasis on the further and substantial opening of data and the cross-border flow of data and services as well as the interoperability between different infrastructures of Member States, the once only introduction of information in the eGovernment infrastructures (that presupposed cloud services), the native digitization of data and services and the existence of Trust and Secure environment.

Commentary:

The eGovernment Action Plan has to be seen as part of the greater EU Digital Single Market plan that always aims at the cross-border delivery of services to all EU citizens and the support of a single market. As such, it is closely related to other policies, mostly the PSI and public open data policies, the European Cloud Initiative and the Industry 4.0 policies.

EOSC has a key role to play in this context particularly in relation to:

- a. The flow of data from the public sector to academia and vice versa.
- b. The interoperability of infrastructures (public sector and academia) and the services built on them (e.g. eIDAS) and the deployment of the European Interoperability Framework in the EOSC context
- c. The interoperability of at least three different types of data regulation regimes:
 1. Public Sector Information (including INSPIRE)
 2. The General Data Protection Directive
 3. The Copyright limitations and exceptions regime

Drivers:

- A growing body of eGovernment initiatives that aim at the digitisation of the full cycle of public sector information and services
- Common focus on opening up data and services

- Mature Interoperability Framework
- A series of open and sharing data initiatives

Constraints:

- Lack of comprehensive interaction framework between Government and academia
- Different standards and modes of operation in Government and research sector
- Hard regulatory instruments in academia vs. Soft regulatory instruments in research
- Fragmentation at the Member State level

Key Documents:

Title	Description	URL
Communication on EU eGovernment Action Plan 2016-2020 - Accelerating the digital transformation of government		https://ec.europa.eu/digital-single-market/news-redirect/30497
Staff working document on implementation and evaluation report		1. working document https://ec.europa.eu/digital-single-market/en/news/staff-working-document-implementation-and-evaluation-report-eu-egovernment-action-plan-2016-0 2. executive summary https://ec.europa.eu/digital-single-market/en/news/staff-working-document-executive-summary-implementation-and-evaluation-report-eu-egovernment

4.1.7 PSI

Key Policy issues:

The re-use of public sector information is the most important and mature policy in relation to the free flow of data across Europe. It sets as its basic rule that all information that has been produced by public sector bodies are in principle reusable, respecting rules regarding third parties intellectual property rights, confidential information and personal data protection rules. This re-usability of data is facilitated by legal means (standard licences) and technological measures (mostly open data portals). Public Administrations are encouraged to use metadata in order to describe the data-sets and services in order to make them re-usable by citizens and organisations across the European Union. Universities are excluded from the scope of the PSI 2013 Directive. The re-use of public sector information may take place in a commercial or non-commercial form. PSI policies are implemented both through the use of hard regulation (i.e. the PSI 2013 Directive) and softer forms of regulation (i.e. EU projects such as LAPSI and LAPSI2 and the establishment of the EU Open Data Portal). The PSI 2013 Directive is currently under review.

Commentary:

While PSI policies belong to the most advanced and long running policies regarding the re-use and opening of public sector data, they still need to coordinate more closely with policies of open in the area of research. Universities are exempt from the scope of the PSI Directive and Open Science policies do not always match the equivalent PSI policies, mostly because they come from different ministries at the Member State level and serve seemingly different policy areas. However, as the policy understanding of openness at the EU level converges independently of the area in which it was initiated (whether that is PSI, Open Science or Sharing Data in the private sector), a more comprehensive set of tools and guidelines is needed in order to achieve the desired policy objectives. More specifically there is need for:

- Comprehensive guidelines for the acquisition of data/ data services by Public Sector Bodies (PSBs)
- Licence compatibility tools
- Anonymization tools
- Consent management tools and privacy by design infrastructures for PSBs managing personal data
- Licence Frameworks for commercial re-use of data
- Framework agreements for collaboration with third parties (industry and academia)
- Interoperability guidelines

Drivers:

- Policy Maturity
- Hard regulation introducing obligations for the opening of data
- Open Data Portals

- Need for open data and reusable data by the industry and academia

Constraints:

- Need for more tools for assisting PSBs and reusers in the actual reuse of PSI
- Fragmentation of licensing policies and regimes
- Quality of data
- Reliability of PSI services
- Coordination of Open Data and Open Science Policies
- Need for tools for ensuring compliance with GDPR and PSI Directive

Implications:

- Stakeholders: Universities are excluded
- Content types: datasets, metadata
- Re-usability
- Closed data but their re-use from public sector bodies is permitted without the subjects consent
- Permissions with use of standard licenses
- Commercial, non commercial re-use

Key Documents:

Title	Description	URL
European legislation on re-use of public sector information	The Directive on the re-use of public sector information provides a common legal framework for a European market for government-held data (public sector information). It is built around two key pillars of the internal market: transparency and fair competition.	https://ec.europa.eu/digital-single-market/en/legislative-measures
Non-legislative measures for fostering Open Data	The European Commission works to overcome the barriers limiting the re-use of public sector information also through non-legislative measures.	https://ec.europa.eu/digital-single-market/en/non-legislative-measures-facilitate-reuse

Open Data Portals	<p>Open Data portals are web-based interfaces designed to make it easier to find re-usable information.</p> <p>Like library catalogues, they contain metadata records of datasets published for re-use, i.e. mostly relating to information in the form of raw, numerical data and not to textual documents. In combination with specific search functionalities, they facilitate finding datasets of interest. Application Programming Interfaces (APIs) are also often available, offering direct and automated access to data for software applications.</p>	<p>https://ec.europa.eu/digital-single-market/en/open-data-portals</p>
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4.1.8 Geodata

Key Policy issues:

Objective of the INSPIRE Directive and the European ecosystem of open and re-usable Geodata is to establish an EU wide infrastructure covering all the stages of the life-cycle of Geodata, metadata and services from their procurement and their sharing between public sector authorities and bodies to their dissemination for re-use by third parties. The comprehensive INSPIRE system has the benefit of a very clear structure that covers all aspects of geodata using hard regulation. However, it remains a heavy regulatory system that is sustained almost exclusively by government and PSBs.

Commentary:

Interaction with the INSPIRE system needs to be one of the key concerns of the EOSC ecosystem, as INSPIRE has a very well defined set of rules for the inclusion of geodata, their metadata and services in its domain. EOSC should in particular seek to establish rules of interoperability regarding:

- Geodata formats
- Licensing arrangements
- Interoperability with services
- Meta-data interoperability

Drivers:

- Well defined and mature regulatory system of hard regulation (INSPIRE Directive)
- Comprehensive treatment of geodata and related metadata and services
- Growing community of organisations and experts
- Network of Geodata portals across Europe
- Need by the industry and academia to reuse geodata

Constraints:

- Complex set of regulations that are not always easy to be used by PSBs
- Licence incompatibility
- Need for guidance at the data/ service procurement stage
- Need to reduce transaction costs in the commercial re-use of data
- Coordination with PSI and Open Science policies and infrastructures

Implications:

- Content types: not only the geodata but also publications and other relevant information behind them

- Data Management Plan: covers every step of the lifecycle
- Deposit at an EU infrastructure to hold and preserve geodata
- Technical provisions for interoperability particularly with respect to formats, services, metadata and licensing agreements to accommodate the networking needs of the portals as well as of the desirable infrastructure
- Stakeholders: researchers, public sector authorities, third parties
- Guidance for researchers at the data/service procurement stage
- Permissions regarding how dissemination and re-use takes place
- Commercial and non-commercial re-use
- Procurement to reduce transaction costs (in correlation with commercial re-use)

Key Documents:

Title	Description	URL
About INSPIRE	The INSPIRE Directive aims to create a European Union spatial data infrastructure for the purposes of EU environmental policies and policies or activities which may have an impact on the environment. This European Spatial Data Infrastructure will enable the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.	https://inspire.ec.europa.eu/about-inspire/563
INSPIRE Policy background	A significant part of all information used by public authorities and exchanged with the public refers to specific locations. Its quality depends on the availability of 'spatial data', which is collected and linked (geo-referenced) to location, and then processed to derive the information. Most environmental data, such as emission measurements, biodiversity observations, or environmental quality data is of a spatial nature.	https://inspire.ec.europa.eu/inspire-policy-background/27902

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)		http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0002&from=EN
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4.1.9 Statistical Data

Key Policy issues:

Policies related to statistical data are mostly expressed in terms of the ways in which such data are released through Eurostat. The relevant policies cover areas such as copyright, form, frequency and type of release, quality and statistical confidentiality. Such considerations cover the entirety of the life cycle of statistical data collected at the EU level and provide a framework for the treatment of statistical data at the national level by the independent statistical authorities of the Member States. The level of granularity is very close to that of the institution since policies are mostly related to the ways in which Eurostat releases data.

Commentary:

Statistical Data are relevant to EOSC to the extent that they are used for research purposes by RPOs or other related organisations. The key consideration for the different stakeholders is the adjustment of institutional policies so that they retain interoperability with the Eurostat modes of releasing data and that the principles of research quality and confidentiality are retained.

Drivers:

- Clear and simple policies
- Institutional setting both at the EU and MS level that ensures quality and mode of data dissemination
- Use of standard formats, interoperability structures and licensing terms
- Respect of confidentiality and personal data

Constraints:

- Variable technological maturity per Member State
- Limited reusability because of confidentiality issues
- Fragmentation of rules for the re-use of data (no extensive interoperability and data sharing agreements)

Implications:

- Content types: Statistical data
- Stakeholders: Member States' Statistical Authorities , researchers, RPOs
- Professionalism with codes of conduct
- Confidentiality issues
- Time of deposit and frequency of release
- Technical provisions on interoperability and machine-readability regarding technical communication between institutional platforms and Eurostat and the use of standard formats to release data

Key Documents:

Title	Description	URL
Copyright and Free use of statistical data	Eurostat has a policy of encouraging free re-use of its data, both for non-commercial and commercial purposes. All statistical data, metadata, content of web pages or other dissemination tools, official publications and other documents published on its website, with the exceptions listed below, can be reused without any payment or written licence provided that:	http://ec.europa.eu/eurostat/about/policies/copyright
Eurostat Statistical Confidentiality	This domain of statistics defines principles, concepts and procedures that keep data confidential while still permitting its use for statistical purposes.	http://ec.europa.eu/eurostat/web/research-methodology/statistical-confidentiality
Eurostat Research and Methodology Policy	Statistical methodology and research are key factors in efficiency gains and the harmonisation of statistics from different European countries.	http://ec.europa.eu/eurostat/web/research-methodology/overview
Eurostat Civil Servants Remuneration Policy	Remuneration statistics for administrative purposes are a set of indicators used to monitor the evolution of national and EU average civil servant remuneration, the evolution of consumer price levels relative to Brussels for intra-EU capital cities and Extra-EU capital cities (and selected other duty stations), the evolution of consumer prices in Brussels and Luxembourg, and related information.	http://ec.europa.eu/eurostat/web/civil-servants-remuneration/overview
Eurostat Quality Policy	Eurostat's mission is to provide high quality statistics for Europe. Accordingly, quality considerations play a central role with regard to Eurostat corporate management as well in the day-to-day statistical operations.	http://ec.europa.eu/eurostat/web/quality/overview

4.1.10 Cultural Data

Key Policy issues:

Openness remains a key objective in the EU digital culture policy, particularly in the context of the Digital Agenda for Europe and the Digital Single Market policies. As such, it is promoted through the work of Europeana, which aims at providing the legal and technological tools for cultural organisations that wish to expose and share their content and metadata and produce new services based on open APIs. Europeana draws its origins from the Gateway and Bridge to Europe's National Libraries (GABRIEL) which then (2005) was transformed into The European Library, a search engine and open data hub for library collections and from 2008 onwards it transformed into the Europeana prototype, being the main outcome of the European Digital Library Foundation. Since 2011 and after the release of the New Renaissance Report Europeana is the “the central reference report for Europe’s online cultural heritage”. In May 2015, the European Commission announced that Europeana was to become one of its Digital Service Infrastructures (DSI). As a DSI, “Europeana’s objectives are to innovate the aggregation infrastructure, boost the distribution infrastructure and work towards long-term financial stability through business model innovation.”

This gradual evolution of Europeana provides a good basis for understanding the open cultural policies in Europe. While in terms of hard regulation, the opening of cultural content has been primarily addressed through the PSI 2013 Directive that also explicitly included Museums, Libraries and Archives in its scope, it is soft initiatives such as Europeana that play the role of the driver of such policies.

European is explicitly related to research since it includes specific initiatives such as Europeana Research and Europeana Education seeking to link the open cultural data to research and teaching activities and the other way around.

Commentary:

Europeana’s and its predecessors’ extensive work in the cultural data and content area ensures this is a field where the relevant issues are quite mature and the community is aware of the possibilities and challenges of opening up their data. At the same time, Europeana has traditionally focused on opening data (particularly meta-data) to the general public by supporting with funding the institutions willing to take part to its programme. While this strategy has brought fruits in the sense of collecting over 50 million of resources and producing a number of very interesting collections, the relationship with academia remains limited and needs to be further explored. This is primarily an issue related to the connection between the research process and the actual use and re-use of Europeana resources. Digital humanities are to a great extent still related to specific institutions and make use of specialised platforms, software or processes that are not related to the more general audience oriented digital presence of Europeana. EOSC should seek to explore the specific interaction between digital humanities and science platforms and projects, particularly as expressed in the National Research Infrastructure roadmaps, to the Europeana platforms. In addition, EOSC could benefit from the very extensive experience of Europeana in issues of content opening policies, licensing and technological infrastructure (particularly the Europeana Data Model and the Europeana Data Sharing Agreements). Another substantial contribution is the rightsstatements.org which allows easy identification of different super-categories of rights.

Europeana as an instrument of policy implementation focuses mostly at the level of the micro-policy as it is addressed to organisations (Museums, Libraries and Archives). It provides a rather comprehensive set of tools (licences, policies, metadata schemes, ontologies, APIs, platforms).

Drivers:

- Great maturity of tools
- Driven by champions of the relevant communities (Museums, Libraries, Archives)
- Soft regulatory tools
- Targeted funding

Constraints:

- Not all the community views the opening of content as a desirable outcome
- Dependent of EU funding
- Gap between commercial organisations and public institutions
- Limited real link to research communities
- Limited link to the PSI community

Implications:

- Stakeholders: Museums, Libraries, Archives, Academia and Cultural organisations and ministries
- Content types: Cultural data, metadata, publications
- Deposit in cultural organisations' platforms, databases, repositories
- Technical provisions on interoperability and machine-readability regarding technical communication between cultural organisation services' and Europeana (as a Digital Service Infrastructure - DSI) primarily achieved with the use of open APIs, ontologies, metadata schemas and with following the Europeana Data Model
- Procurement towards long-term financial stability
- Linkage between cultural data, research and education
- Permissions with super-categories of rights (rightsstatements.org) and licensing as well as with Europeana Data Sharing Agreements

Key Documents:

Title	Description	URL
Europeana Annual Report 2016	This annual report shows our collaboration on the goals set out in both our long-term strategy and our 2016 yearly business plan.	https://pro.europeana.eu/files/Europeana_Professional/Publications/europeana-annual-report-and-accounts-2016.pdf

Europeana Publishing Framework	The Europeana Publishing Framework sets out four scenarios for sharing collections with Europeana	https://pro.europeana.eu/files/Europeana_Professional/Publications/europeana-publishing-framework-v1.1.pdf
Europeana Content Strategy	Our new Content Strategy will help our organisation and partners to identify what kind of content we need to expand	https://pro.europeana.eu/files/Europeana_Professional/Publications/Europeana%20Content%20Strategy.pdf
Europeana Publishing Guide	The Europeana Publishing Guide is a resource for data partners who share collections with Europeana.	https://pro.europeana.eu/files/Europeana_Professional/Publications/Europeana%20Publishing%20Guide%20v1.5.pdf
'Spreading the Word': Business Plan 2017	The 2017 business plan sets out how we'll align with the strategic priorities that we have developed in our 2020 Strategy to become efficient, engaging and impactful as Europe's platform for digital cultural heritage. To meet our audience demands and to increase our impact, we have chosen to organise our work around five key markets connected through our platform.	http://pro.europeana.eu/files/Europeana_Professional/Publications/europeana-business-plan-2017.pdf
Best Practices for Multilingual Access	This White Paper aggregates resources and best practices for realizing multilingual access to cultural heritage content in digital libraries. It offers recommendations and resources for overcoming challenges in letting users access content they might not understand. It addresses cultural heritage professionals and wants to give practical advice for common problems. It shows examples from the cultural heritage domain, lists research that addresses the implementation of multilingual access and gathers best practices from various projects within the domain.	https://pro.europeana.eu/post/best-practices-for-multilingual-access
European Search Strategy	This document discusses the question of the search and navigation paradigm required for a platform that attempts to represent not just an individual exhibition or organisation, but the GLAM sector as a whole. How does one navigate and discover 'culture', at scale?	http://pro.europeana.eu/publication/europeana-search-strategy

4.1.11 Language Resources

Key Policy issues:

Policies related to European Language Resources stem from the broader EU Multilingualism agenda which aims primarily at increasing the ability of the population to command more than one EU languages. It also relates to supporting research making use of Text and Data mining, the latter being a horizontal Technology for a great variety of technologies, including Big Data and Artificial Intelligence-based technologies and having thus a great impact both upon industry and research. In this context the EU has commissioned a series of studies and projects aiming at producing language technologies, resources, tools and infrastructures and has asked for policy and legal instruments recommendations. Projects such as METASHARE/ METANET, CLARIN, Future TDM and (European Language Resource Coordination) ELRC have produced all the aforementioned tools and made concrete suggestions in terms of policy and legal reform necessary to support the development of these technologies in Europe.

Commentary:

EOSC should make extensive use of the ELRC and CLARIN resources in order to further support Text and Data mining in the EU. This means coordinating the following policy areas:

- Introduction of Copyright limitations and exceptions that match the TDM practices
- Coordinate PSI release and licensing policies in order to reduce friction of PSI re-use
- Coordinate research and public infrastructures activities in order to ensure interoperability, appropriate response to the most pressing issues and avoiding re-inventing the wheel
- Ensure the creation of licensing, policy and technological schemes that allow the trusted interaction between the public sector, academia and the industry.
- Need to construct coherent policies in relation to the interaction with mega-platforms from the commercial sector, especially from overseas companies.

Drivers:

- Realisation of the need for cross sector collaboration by industry, the public and the private sector and hence the need to open data and share infrastructures and know-how
- Long standing experience by the academic sector in the reuse of its platforms and technologies by the commercial sector
- Substantial experience in policy work as well as in the development of policy and technological tools to support data interoperability

Constraints:

- Fragmentation of policies and tools particularly in the areas of
 - Copyright limitations and exceptions
 - Public Domain Definition

- Personal data policies especially at the organisational level
- Public Sector Information Licensing
- Need for a more workable framework for:
 - Orphan works
 - Licence compatibility and interaction
 - Machine readable licences and policies
- Lack of trusted environment for the interaction between industry and academia
- Lack of a comprehensive policy framework for the interaction with mega-platforms

Implications:

- Content types: Open data
- Technical provisions on interoperability and machine-readability in order to command more than one language by building a framework to allow language technologies, resources, tools and infrastructures to develop as well as to allow communication between the public sector, academia and industry
- Lack of a trusted environment between diverse stakeholders
- TDM exceptions
- Policy and legal reform
- Services that support TDM in the EU to coordinate policy-making
- Commercial re-use

Key Documents:

Title	Description	URL
EU Language Technology Resources	<p>An overview of Linguistic Resources and Tools (multilingual software, parallel corpora, and more) that are available for download from the webpages of the JRC's Competence Centre on Text Mining and Analysis.</p> <p>The data releases are in line with the general effort of the European Commission to support multilingualism, language diversity and the re-use of Commission information.</p>	<p>https://ec.europa.eu/jrc/en/language-technologies</p>

<p>Future Text and Data Mining</p>	<p>Text and data mining (TDM) has huge potential research and innovation, but the inhibitive European regulatory framework means that EU uptake remains low. The FutureTDM project will first identify these barriers, and then seek to dismantle them.</p>	<p>http://ec.europa.eu/research/in_focentre/article_en.cfm?artid=43716</p>
<p>Multilingualism</p>	<p>The European Commission is very keen to promote language learning and linguistic diversity across Europe so as to improve basic language skills. It is working with national governments to meet an ambitious goal: enabling citizens to communicate in 2 languages other than their mother tongue. This "Barcelona objective" was agreed in 2002 by the EU's heads of state and government. The 2008 Communication "Multilingualism - an asset for Europe and a shared commitment" outlines the Commission's activities in this area. Priorities include: helping EU countries develop new educational tools to ensure that school-leavers have better language skills gathering data to monitor progress in language teaching and learning - to encourage mastery of more than one language as a way of improving job prospects and enabling people to move around within the EU rewarding innovation in the language teaching and learning</p>	<p>https://ec.europa.eu/education/policy/multilingualism_en</p>

4.1.12 Copyright

Key Policy issues:

The key Copyright policy issues related to the EOSC have as follows:

- Harmonization of limitations and exceptions that relate to research, particularly Text and Data mining
- Harmonization of Public Domain definition across Europe
- Encouragement of standard, machine readable and interoperable licences, particularly open licences
- Improving Copyright enforcement without limiting research and academic freedom
- Make the Orphan works framework more workable
- Improve copyright literacy, particularly in relation to licensing

Commentary:

Copyright reform is a horizontal policy area that touches upon many other aspects of EOSC related policies (such as PSI, Open Science in general, Language Resources, Data-driven Economy etc). It is both very heavily dependent on macro-policies (such as the position the EU and member states adopt in relation to limitations and exceptions harmonisation), but also on micro-policies, especially in relation to licensing (compatibility, semantic representation, interoperability, management of rights, sharing of rights information etc). A great deal of research needs to be devoted in the development of sharing policies, arrangements and licence agreements, as well as on the interaction between open licensing and commercial exploitation of research results, as well as with different types of IP (especially patents in relation to the element of disclosure) and IP and data protection.

Drivers:

- Strong demand from Academia for copyright reform
- Strong demand from the industry for model co-operation agreements and cross-licensing arrangements
- Long running debate on copyright reform
- Long standing experience with Open access/ science/ source policy and licensing models

Constraints:

- Fragmentation of the limitations and exceptions regime
- Highly complex licensing arrangements
- “Licence pollution”: too many incompatible licences (especially open and copyleft licences) and licensing terms
- Cumbersome orphan work procedures

- High licence negotiation costs

Implications:

- TDM exceptions: “the right to read is the right to mine”
- Open licences instead of terms of use
- Technical provisions for interoperability, machine-readability with respect to licensing schemas
- Training and education of researchers
- Procurement for high licensing costs

Key Documents:

Title	Description	URL
EUIPO 2017 work programme	This Work Programme details the action to be undertaken in 2017 by the Office under SP2020, taking into account the key assumptions on volumes and their impact on our operations. During the period covered, the Office will continue to develop its workforce with a particular focus on supporting the best talent. Transparency and efficiency will be strengthened through the implementation of Activity Based Management and by streamlining vendor management and payment systems.	https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/contentPdfs/about_euipo/the_office/work_programmes/Work_Programme_2017_en.pdf
EUIPO 2016 annual report	The 2016 Annual Report provides an overview of the Office's activities in year of progress and transition, in which the Office finalised its first Strategic Plan and embarked upon its new vision for the following years under the Strategic Plan 2020.	https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/contentPdfs/about_euipo/annual_report/Obs_Annual_Report_2016_en.pdf
IPR DG MARKT landing page	In our increasingly knowledge-based economies, the protection of intellectual property is important for promoting innovation and creativity, developing employment, and improving competitiveness. The European Commission works to harmonise laws relating to industrial property rights in EU countries to	https://ec.europa.eu/growth/industry/intellectual-property_en

	<p>avoid barriers to trade and to create efficient EU-wide systems for the protection of such rights. It fights against piracy and counterfeiting and aims to help businesses, especially small businesses, access and use intellectual property rights more effectively.</p>	
<p>Communication, 'A single market for intellectual property rights: Boosting creativity and innovation to provide economic growth, high quality jobs and first class products and services in Europe'</p>	<p>Putting in place a seamless, integrated Single Market for Intellectual Property Rights (IPR) is one of the most concrete ways to release the potential of European inventors and creators and empower them to turn ideas into high quality jobs and economic growth. This Communication presents the Commission's overall strategic vision for delivering the true Single Market for intellectual property that is currently lacking in Europe – a European IPR regime that is fit for tomorrow's new economy, rewarding creative and inventive efforts, generating incentives for EU-based innovation and allowing cultural diversity to thrive by offering additional outlets for content in an open and competitive market.</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011DC0287&from=EN</p>

4.1.13 Patents

Key Policy issues:

The key elements of the Patent policies in Europe have as follows:

- Establishment of the Unitary Patent System and the Unified Patent Court
- Encouraging the development of high quality professional training for Patent Attorneys
- Increasing the quality and quantity of technological information for Research Performing Organisations and relate it to applied research
- Increase the number of patents by Research Performing Organisations
- Improve the quality of patents submitted by Research Performing Organisations
- Increase and improve the exploitation of patented inventions by RPOs
- Improve knowledge transfer between research and industry
- Use patent as a collateral for access to finance
- Create trusted environment for the collaboration between Research Performing Organisations and the Industry.

Commentary:

While patents appear only in the periphery of open science, when they are not presented as antithetical, in fact they share a number of common policy goals. First and foremost it is the dissemination of scientific and technological information, albeit with different means. There needs to be closer collaboration between the patent offices and the Open Science community in order to materialise a closer collaboration and transfer of know how both in terms of search techniques (with text and data mining playing a prominent role) but also in terms of making the state of the art truly accessible by using some of the open science techniques (from open licence publications to open patent meta-data and matching of the Patent Classification system to Frascati or other classification systems). Second, there is a need to *time* the open release of information so that it does not harm the potential of patenting a technology. This is something which is implied in the EU funding guides but needs to be made much more explicit and specific guidance needs to be given both to researchers and Research Performing Organisations as to how they will combine commercial exploitation and open science requirements.

Drivers:

- Need to improve patent quality and reduce time of response of national patent offices
- Need to match more closely research with industry state of the art
- Need to improve text and data mining for patents

Constraints:

- Low level of understanding of the open science mechanisms and objectives by the patent community and vice versa

- Low level of integration between patent and research classification
- Conflicting strategies for commercial exploitation and open science requirements
- Absence of working hybrid patent/ open licensing models and low level of understanding for cross-licensing and licence pools regimes

Implications:

- Stakeholders: RPOs, Industry
- Training and education for Patent Attorneys on how commercial exploitation and open science requirements will be combined

Incentives for funding

- Open release vs patent; reduce procedural time of patenting offices
- TDM for patents

Key Documents:

Title	Description	URL
Patent protection in the EU: EC patents landing page	Patents are a key tool to encourage investment in innovation and encourage its dissemination. The European Commission constantly monitors the need for and effects of patent-related legislation across the EU. It is working to introduce cost-saving, efficient uniform patent protection across Europe and is looking at measures to enhance patent exploitation.	https://ec.europa.eu/growth/industry/intellectual-property/patents_en
COMMISSION STAFF WORKING DOCUMENT Towards enhanced patent valorisation for growth and jobs		http://ec.europa.eu/DocsRoom/documents/9963/attachments/1/translations
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE		https://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf

<p>EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Europe 2020 Flagship Initiative Innovation Union SEC(2010) 1161</p>		
<p>The Unitary Patent System (landing page)</p>	<p>The European Commission is active in the implementation of a patent package. When it comes into operation, it will establish a European patent with unitary effect (the 'unitary patent') and a new patent court. The unitary patent is a legal title that will provide uniform protection across 26 EU countries on a one-stop-shop basis, providing huge cost advantages and reducing administrative burdens. The package will also set up a Unified Patent Court that will offer a single, specialised patent jurisdiction.</p>	<p>https://ec.europa.eu/growth/industry/intellectual-property/patents/unitary-patent_en</p>
<p>Regulation (EU) No 1257/2012 of the European Parliament and of the Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection</p>	<p>Unitary patent protection should be achieved by attributing unitary effect to European patents in the post-grant phase by virtue of this Regulation and in respect of all the participating Member States. The main feature of a European patent with unitary effect should be its unitary character, i.e. providing uniform protection and having equal effect in all the participating Member States. Consequently, a European patent with unitary effect should only be limited, transferred or revoked, or lapse, in respect of all the participating Member States. It should be possible for a European patent with unitary effect to be licensed in respect of the whole or part of the territories of the participating Member States. To ensure the uniform substantive scope of protection conferred by unitary patent protection, only European</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012R1257&from=EN</p>

	<p>patents that have been granted for all the participating Member States with the same set of claims should benefit from unitary effect. Finally, the unitary effect attributed to a European patent should have an accessory nature and should be deemed not to have arisen to the extent that the basic European patent has been revoked or limited.</p>	
<p>COUNCIL REGULATION (EU) No 1260/2012 of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection with regard to the applicable translation arrangements</p>	<p>Implementing enhanced cooperation in the area of the creation of unitary patent protection with regard to the applicable translation arrangements</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R1260&from=EN</p>
<p>NOTICES FROM EUROPEAN UNION INSTITUTIONS, BODIES, OFFICES AND AGENCIES COUNCIL AGREEMENT on a Unified Patent Court</p>	<p>A Unified Patent Court for the settlement of disputes relating to European patents and European patents with unitary effect is hereby established. The Unified Patent Court shall be a court common to the Contracting Member States and thus subject to the same obligations under Union law as any national court of the Contracting Member States.</p>	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:42013A0620(01)&from=EN</p>
<p>Patents and Standards landing page</p>	<p>Standardisation based on patent-protected technologies is a key contributor to industrial innovation and competitiveness. The European Commission is examining ways to improve the framework governing the inclusion of patent-protected technologies into standards and to facilitate the licensing process for these technologies.</p>	<p>https://ec.europa.eu/growth/industry/intellectual-property/patents/standards_en</p>

4.1.14 Trade secrets

Key Policy issues:

These policies are set within the broader context of the European IPR policies and have to be seen, in our context, as policies supporting the trusted and lawful, yet free flow of data. The Trade Secrets Directive sets the framework for the sharing and management of valuable corporate information within a regulated and trusted legal framework and protect European companies against attacks over their knowledge capital that remain unprotected under the current IPR regime, since Copyright and Patent law do not cover the range and kind of information that the Trade Secret Directive does.

Commentary:

This policy has to be seen as belonging to the broader family of policies that seek to support rather than to restrict the flow of information and to substantially reduce transaction costs from such sharing. In that sense, Trade Secrets policies could be used particularly in the context of open innovation and cross-licensing/ licensing pools agreements in order to ensure that a trusted environment is created and that all participants to such a network are sharing information in a secure and trusted manner.

Drivers:

- The creation of a single pan-European framework for sharing confidential information
- The need for closer collaboration between the private, public and research sectors
- The increase in the open innovation structures and cross-licensing collaborations
- The multiplicity of contractual arrangements under which different Research Performing Organisations operate, particularly when collaborating with the private sector

Constraints:

- The lack of a clear understanding of how the Directive is to be implemented in the Member States
- The slow pace of the Directive transposition
- The need to create legal frameworks for Trade Secrets that remain compatible with the Open Science and Open Access Principles
- The need for practical tool-kits for RPOs to implement the Trade Secrets Directive in their context
- The lack of experience and expertise from the side of RPOs in relation to handling Trade Secrets in multilateral agreements involving a variety of stakeholders.

Implications:

- Content types: trade secrets
- Stakeholders: SMEs, RPOs, Funders, Private Sector, Public Sector Bodies
- Closed data need to be identified and related to open data as well as data that are shared in a trusted environment
- Permissions depending on the nature of the agreement between the parties.

Key Documents:

Title	Description	URL
Trade Secrets Directive	<p>A trade secret is a valuable piece of information for an enterprise that is treated as confidential and that gives that enterprise a competitive advantage. European companies are increasingly exposed to the misappropriation of trade secrets. Following a proposal from the European Commission, the European Parliament and the Council have standardised the existing diverging national laws on the protection against the misappropriation of trade secrets. This will enable companies to exploit and share their trade secrets with privileged business partners across the Internal Market, turning their innovative ideas into growth and jobs.</p>	<p>https://ec.europa.eu/growth/industry/intellectual-property/trade-secrets_en</p>

4.1.15 Personal Data

Key Policy issues:

The key policy issues relate to the introduction of a comprehensive system, directly applicable to the Member States, that is governed by the GDPR. The key innovations of the system relate to its focus on the free but regulated flow of personal data, to the focus on managing consent by the data subject, to the introduction of comprehensive rules regarding the Data Protection Officers, the introduction of Codes of Conduct that have a strong Ethics⁹⁰ dimension and finally the focus on the Privacy by Default and Privacy by Design rights, as well as of the right to be forgotten.

Commentary:

The impact of the GDPR is expected to be a major one for the research sector, as it is necessary to follow stricter research protocols and integrate such practices into the Information Systems of the relevant RPOs. In addition, it is expected to require the introduction of Data Protection Officers or the provision of such services in a more centralised fashion. The way in which legal, the technological, the administrative and the operational adjustment to such provisions is to take place still remains a major unknown. It is in all cases necessary to seek the introduction of horizontal services mostly by e-infrastructures and research infrastructures in order to ensure compliance with GDPR at a reasonable cost and the provision of interoperability and regulated sharing of data between collaborating organisations.

Drivers:

- a trusted environment and the clear guarantee of data subjects' rights as an incentive for investment
- the fact that by granting effective data protection the EU can enhance its leadership in this context.

Constraints:

- Providing both data protection and the free flow of data requires well-balanced policies and case-by-case-assessment
- Different types of personal and non-personal data require different levels of protection

⁹⁰ Examples of Codes of Conduct developed in the context of art.40 of the GDPR include:

- CISPE (<https://cispe.cloud/code-of-conduct/>, <https://cispe.cloud/wp-content/uploads/2017/06/Code-of-Conduct-27-January-2017-corrected-march-20.pdf>)
- EU CLOUD COC - C-SIG <https://eucoc.cloud/en/home/>
- Cloud Security Alliance: <https://www.prnewswire.com/news-releases/cloud-security-alliance-issues-new-code-of-conduct-for-gdpr-compliance-300560001.html>

There are also domain-specific codes of conduct, which may have consequences for application domains intending to use EOSC, such as the the Code of Conduct for Health Research: <http://code-of-conduct-for-health-research.eu/>

- EU legislation and member state transposition/implementing acts vary a lot
- How to deal with legal protection mechanisms especially regarding infringements within EOSC?

Implications

- Content types: personal vs non-personal data
- Incentives for investments, for EU leadership
- Well-balanced policies and assessment

Key Documents:

Title	Description	URL
Reform of EU data protection rules	The European Commission put forward its EU Data Protection Reform in January 2012 to make Europe fit for the digital age. More than 90% of Europeans say they want the same data protection rights across the EU – and regardless of where their data is processed.	http://ec.europa.eu/justice/data-protection/reform/index_en.htm
REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)		http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=EN
DIRECTIVE (EU) 2016/680 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the protection of natural persons with regard to the processing of personal data		http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L0680&from=EN

<p>by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, and repealing Council Framework Decision 2008/977/JHA</p>		
<p>Proposal for a Regulation on Privacy and Electronic Communications</p>		<p>https://ec.europa.eu/digital-single-market/en/news/proposal-regulation-privacy-and-electronic-communications</p>

4.1.16 Ethics

Key Policy issues:

Ethical issues are mostly related to the treatment of personal or other types of sensitive data in specific research domains. The introduction of the GDPR allows for a much more comprehensive and EU-wide treatment of such rules that mostly stem from professional bodies.

Commentary:

It is crucial to seek closer collaboration between different professional bodies and associations in order both to identify the different types of data and ethical rules and to see how there could be a common roadmap or set of roadmaps according to the area of activity in order to ensure that Codes of Conduct and Ethics will support rather than hinder the sharing of data.

Drivers:

- State of the art ethical standards create trust. This is a major requirement for investment
- Need for common (normative) standards for the development of EOSC

Constraints:

- - the availability of services (to all citizens) might be hindered due to different transposition/implementing acts in the member states

Key Documents:

Title	Description	URL
The European Group on Ethics and New Technologies (EGE)	The European Group on Ethics in Science and New Technologies (EGE) is an independent, multi-disciplinary body appointed by the President of the European Commission which advises on all aspects of Commission policies where ethical, societal and fundamental rights issues intersect with the development of science and new technologies. Since its inception in 1991, the EGE has provided the Commission with high quality and independent advice on these questions.	http://ec.europa.eu/research/ege/index.cfm
Ethics of New Health Technologies	Recent years have witnessed a wave of innovation in health technologies driven by new medical breakthroughs, novel scientific approaches and the rise of digital health technologies. Pioneering methods of drug development and disease	http://ec.europa.eu/research/ege/pdf/opinion-

<p>and Citizen Participation</p>	<p>diagnosis, the rise of 'big health data', and new means of providing networked care have led to predictions that European health systems are on the cusp of transformation. While much of the promise held in these technological innovations remains to be fully realised, the rise of new health technologies are accompanied by a profound set of shifts in the way individuals – whether as patients, citizens or consumers – engage with matters of health. From the consumer who orders a genetic testing kit online to the patient receiving genetically customised medication; from the diabetic monitoring her blood sugar level with a smartphone, to rare disease patients who mobilise online communities of sufferers to run a DIY clinical trials; individuals and collectives are participating in new and unprecedented ways in the conduct of health research, health policy, and health practice. The 'participatory turn' in health offers a number of new roles to citizens, whether as experimenters, stakeholders, purveyors of data, research participants, or users. It covers not only the gathering and volunteering of data, and the involvement of non-experts in scientific experimentation and analysis, but also the lobbying efforts of interest groups, public input into research and funding, as well as in the formulation and regulation of policies. Citizen involvement manifests at different stages in the process – from upstream interventions in priority setting, and influencing funding decisions to a more direct downstream involvement of citizens and patients in the use and application of medical knowledge and information. It covers both those active, informed participants who engage from a position of agency as well as those unaware of their contribution.</p>	<p>29_ege.pdf#view=fit&pagemode=none</p>
<p>Opinion on the ethical implications of new health technologies and citizen participation Executive summary and</p>		<p>http://ec.europa.eu/research/ege/pdf/opinion-29_ege_executive-summary-recommendations.pdf#view=fit&pagemode=none</p>

Recommendations		
Ethics of Security and Surveillance Techs	The present Opinion addresses the issues of security and surveillance technologies from an ethical perspective. Further to its Preamble and to introductory considerations, the present Opinion consists of four chapters and concludes with its Recommendations. The first chapter provides an overview and scrutiny of security and surveillance technology applications; the second chapter delves into the legal and regulatory dimension and presents the governance situation and challenges; the third chapter offers the ethical analysis, encompassing the historical and socio-political perspectives as well as the discussion of the ethical concerns, considerations and concepts; and the fourth chapter scrutinizes and defuses a set of overarching predicaments with regard to the ethics of security and surveillance technologies, leading to the Recommendations	https://publications.europa.eu/en/publication-detail/-/publication/6f1b3ce0-2810-4926-b185-54fc3225c969
Ethics of information and communication technologies	On 21 March 2011 President José Manuel Barroso asked the EGE to draft an Opinion on the ethical issues arising from the rapid expansion of information and communication technologies (ICT). President Barroso indicated that the Opinion could 'offer a reference point to the Commission to promote a responsible use of the Digital Agenda for Europe and facilitate the societal acceptance of such an important policy item.	https://publications.europa.eu/en/publication-detail/-/publication/c35a8ab5-a21d-41ff-b654-8cd6d41f6794
The Governance of Large Research and Medical Databases in Clinical and Research Multi-Centre Trials	The meeting of the International Dialogue on Bioethics addressed large research and medical databases in clinical and research multi-centre trials. Throughout the meeting, participants debated: (1) relevant initiatives on this specific research area in different countries; (2) ethics provisions adopted; (3) issues of major significance in bioethics where international and multi-centre trials are established.	http://ec.europa.eu/archives/bepa/european-group-ethics/docs/ibd/4th_ec_international_dialogue_on_bioethics.pdf

<p>Ethics of information and communication technologies</p>	<p>On 21 March 2011 President José Manuel Barroso asked the EGE to draft an Opinion on the ethical issues arising from the rapid expansion of information and communication technologies (ICT). President Barroso indicated that the Opinion could ‘offer a reference point to the Commission to promote a responsible use of the Digital Agenda for Europe and facilitate the societal acceptance of such an important policy item.</p>	<p>https://publications.europa.eu/en/publication-detail/-/publication/c35a8ab5-a21d-41ff-b654-8cd6d41f6794</p>
<p>Ethics of Synthetic Biology</p>	<p>The EGE is aware that synthetic biology raises philosophical, anthropological, ethical, legal, social and scientific issues. It is equally aware that the convergence of multiple technologies in synthetic biology, each based on different scientific paradigms, increases the complexity of assessing the ethics of synthetic biology and its products. The EGE has, however, agreed that, apart from safety issues associated with synthetic biology, an ethical, legal, and political governance of synthetic biology is needed in the EU and worldwide to ensure that the interests of society are respected. The Group has therefore accepted President Barroso’s request.</p>	<p>http://ec.europa.eu/archives/bepa/european-group-ethics/docs/opinion25_en.pdf</p>
<p>Pharmaceutical companies’ policies on access to trial data, results, and methods: audit study</p>	<p>To identify the policies of major pharmaceutical companies on transparency of trials, to extract structured data detailing each companies’ commitments, and to assess concordance with ethical and professional guidance.</p>	<p>http://www.bmj.com/content/bmj/358/bmj.j3334.full.pdf</p>

4.1.17 Open Innovation

Key Policy issues:

Reflect mostly on the aspects of current regulations regarding Innovation. The Policy Support Facility (PSF) seeks ways to “design, implement and evaluate ... the quality of their R&I investments, policies and systems” to become one of the Better Regulation Tools.

“Innovation Deals” is the name of the pilot. The interaction between innovators and new technologies/services was expected to conclude to some elements of the framework to feed the policies and regulations that need to be in place.

- Seal of excellence for alternative funding
- new models with private investments (EFSI funds etc)
- Pan-European VC Fund-of-Funds

Commentary:

Innovation as part of the Better Regulation Framework, sets priorities for the creation of an Open Innovation ecosystem in Europe. More stakeholders are involved, introducing new entrepreneurs which create new markets and excel by making use of the free flow of knowledge, data and of the new technologies. Funding systems are at the core of it in order to attract new and bigger investments.

Drivers:

- growth
- return on investment (especially from industry/non public domains)
- towards a less crisis-centric taxation system

Constraints:

- regulatory barriers
- small amount of investment which creates problems when/if enterprises scale up
- difficult to attract bigger investment/investors
- fragmentation, trans-national barriers

Key Documents:

Title	Description	URL
Regulatory Reforms		

Scientific Advice Mechanism	The aim of the Scientific Advice Mechanism is to support the Commission with high quality, timely and independent scientific advice for its policy-making activities. This will contribute to the quality of EU legislation, in line with the Better Regulation agenda.	http://ec.europa.eu/research/sam/index.cfm
Better regulations for innovation-driven investment	The Commission Staff Working Document 'Better regulations for innovation-driven investment at EU level' presents, for the first time, an in-depth analysis of how the regulatory environment at EU level can hamper, or indeed stimulate, innovation. It builds on the outcome of consultations that took place during the past year with Member States, and a range of organisations and industry stakeholders. These exchanges and the analysis performed by the European Commission services have helped build an evidence base, in the form of case studies, across different sectors and provide a basis for debate and action at political level.'	http://ec.europa.eu/research/innovation-union/pdf/innovrefit_staff_working_document.pdf#view=fit&pagemode=none
Policy Support Facility	To do so, the PSF provides Member States and countries associated to Horizon 2020 with access to independent high-level expertise and analyses through a broad range of services such as Peer Reviews of the national R&I systems, support to specific reforms or project-based mutual learning exercises. See also the Research and Innovation Observatory for H2020 Policy Support Facility	https://rio.jrc.ec.europa.eu/en
Boosting Private Investment in Research and Innovation		
European Venture Capital Fund of Funds	"Why a Fund of Funds? First, EU VC funds are still relatively small. Their average size is around only 60 million euros – just half the size of the USA's. This limits their ability to make the larger investments needed as companies scale-up. Second, this smaller market struggles to attract funds from major institutional investors (just a 5 billion euro market in Europe compared to 26 billion in the US). In fact, over	http://ec.europa.eu/research/index.cfm?&na=na-070217&pg=newsalert&year=2017

	30% of venture capital is funded by the public sector in Europe and that needs to change. Third, European VC funds still face many trans-national barriers.”	
Maximising the use of EFSI	EFSI (the European Fund for Strategic Investments) is an initiative launched jointly by the EIB Group - European Investment Bank and European Investment Fund - and the European Commission to help overcome the current investment gap in the EU by mobilising private financing for strategic investments. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around Europe to ensure that money reaches the real economy.	http://www.eib.org/efsi/
Seal of Excellence	The Seal of Excellence is a quality label awarded to project proposals submitted for funding under Horizon 2020 that succeeded in passing all of the selection and award criteria but which could not be funded with the available budget. The Seal identifies promising project proposals and recommends them for funding from alternative sources, whether public or private, national, regional, European or international.	http://ec.europa.eu/research/soe/index.cfm
European Innovation Council	Positive steps have been taken in recent years to integrate an innovation component into EU programmes and policies, in particular Horizon 2020. However, the array of support mechanisms can be difficult to navigate, and lacks the flexibility and responsiveness that disruptive innovation requires. Commissioner Moedas launched the Call for Ideas for a European Innovation Council to support Europe's most promising innovators at the Science Business Annual Conference in Brussels. He said that "Europe has excellent science, but we lack disruptive market-creating innovation. This is what is needed to turn our best ideas into new jobs, businesses and opportunities." The Call for Ideas is online and the deadline for responses is 29 April 2016.	https://ec.europa.eu/research/eic/index.cfm

Papers		
Framework conditions for R&I and the implications of emerging trends		
From the old ERA to the new ERA of Knowledge Creation in Europe	<p>This brief explains the dynamics behind the transition from the old policy narrative of European Research Area (ERA) to the new approach to be followed in Research and Innovation policy, namely "Open Knowledge Creation in Europe". The brief describes the origins of ERA policy, highlighting the importance of supply-side instruments and focus on collaborations followed on initial stages of policy development. It goes on to explain the new concept, elaborating on the notion of "openness", its international dimension and focus on science and innovation, and discussing it taking into account the development of digital single market, service innovation and disruptive technologies.</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/soete-era_open_knowledge.pdf#view=fit&pagemode=none</p>
A new role for the EU Research and Innovation in the benefit of Citizens	<p>The EU has a number of policy tools and instruments for addressing the supply side of R&I (i.e. Horizon 2020 and Structural Funds) but without a real explicit policy strategy steering them. There is actually no coherent policy framework putting the instruments into a context.</p> <p>The instrument-led focus of EU R&I policy has hampered the impact of the significant investments made (see Box 1) because first, such programmes are disconnected from a broader policy purpose and thus lack a long-term stable approach; second, implementation thereby triggers conservatism</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/weber-andree-llerena-new_rola_research.pdf#view=fit&pagemode=none</p>

	<p>and is open to pressure from interest groups; and thirdly, this deficit is unlikely to be detected as</p> <p>the assessment of performance ignores often the quality of outputs and real success.</p> <p>While the move towards a challenge-driven approach in Horizon 2020 has been a good step forward, addressing now broader societal challenges, to have a real impact, such a programme will</p> <p>have to be truly “mission-oriented”, fitting in as an integral part of larger policy objectives. To achieve this, R&I will have to be linked closer to the other EU policies, defining concrete missions in</p> <p>the realm of a broader EU energy policy, transport policy, environment policy, etc. In other words,</p> <p>what is lacking is coordination and synergies between supply and demand of R&I.</p> <p>For this, the supply-side needs to be more mission-oriented, in the sense of engaging in resolute</p> <p>action addressing major societal challenges; while the demand-side must be smart, allowing</p> <p>disruptive innovations reaching out to the single market. Bottlenecks and the existing market</p> <p>framework may block disruptive innovation and prevent new innovation practices and business</p> <p>models to develop, for instance those responding to the sharing economy. A more focused</p> <p>demand-side policy would therefore address regulatory barriers and incentives for disruptive</p> <p>innovation. At the same time, open practices of research and innovation make it easier to interconnect</p>	
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	supply- and demand-side.	
Europe's twin deficits: Excellence and innovation in new sectors	<p>In order to promote innovation, the policy mix should address Europe's twin deficits by strengthening both knowledge production and knowledge transformation.</p> <p>The EU contributes to the global excellence of European research, in particular through the ERC. It should precisely monitor the impact of ERC on the performance of European research and step up its capacity to analyse the interactions between excellence and innovation.</p> <p>In order to update the diagnosis on European innovation systems and integrate new evidence into policy making, the EU should develop the analysis of the nexus of research, knowledge transformation and innovation. Detailed knowledge of scientific production seems particularly important. Relatedly, efforts to evaluate the impact of research and the impact of innovation policies should take the quality of scientific production into account. In particular, the efficiency of policies in favour of public-private interfaces depends on the quality of research.</p> <p>The observation of countries' innovation performance should explicitly take into account countries' sector composition, which has a strong impact on some of the main indicators used to analyse innovation performance like R&D intensity and the propensity to patent or to export. A statistical</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/sachwald-twin_deficits.pdf#view=fit&pagemode=none</p>

	<p>analysis of the Innovation Union Scoreboard could in particular be conducted to generate a typology of countries and better adapt innovation policy design to the diversity of situations. It could also help reflect on the relevance of the indicators that are not correlated to the synthetic innovation index.</p> <p>The new evidence should generate a set of consistent stylised facts on the relationship between R&D intensity, research specialisation and innovation performance. It would provide a better basis to develop policies aimed at adapting the EU industrial structure to the knowledge based economy.</p> <p>At the regional level, similar evidence would be useful to monitor smart specialisation strategies.</p> <p>The European commission could launch the definition of a roadmap to produce new policy relevant data and indicators with a conference on the impact of research and its interactions with innovation.</p>	
<p>Leveraging research science and innovation to strengthen social and regional cohesion</p>	<p>The European Union (EU) has the objectives of enhancing the competitiveness of, increasing the productivity of and fostering employment in its member states with the ultimate goal of improving the well-being of its citizens and promoting sustainable, inclusive economic growth at both the national- and continental-level through the promotion of research and technological development</p>	<p>1. Policy paper: http://ec.europa.eu/research/openvision/pdf/rise/rodriguez-pose-leveraging_science.pdf#view=fit&pagemode=none</p> <p>2. Policy Brief: http://ec.europa.eu/research/openvision/pdf/rise/rodriguez-pose-leveraging_science-pb.pdf#view=fit&pagemode=none</p>

	<p>(RTD). This, however, is not the only priority of the EU; the goal of harmonious development and territorial cohesion is included in article 174 of the Treaty.</p> <p>These dual goals are not necessarily immediately reconcilable. Knowledge intensive, innovative activities have a tendency to concentrate in 'core' areas rather than peripheral ones meaning that</p> <p>EU efforts to foster research and innovation could significantly undermine the overall cohesion</p> <p>effort and contribute to an increase in the territorial gap between the countries and regions of</p> <p>Europe, ultimately jeopardizing the well-being of citizens living in the fringes of the EU. As such, policy makers need to walk a tightrope of sorts, devising strategies and policies that foster</p> <p>research and innovation without increasing the gap between core and peripheral areas.</p>	
<p>EU legislation in the European Research and Innovation Area?</p>	<p>This paper proposes a combination of a pragmatic and ambitious approach on how to progress with</p> <p>the European Research and Innovation Area as regards the use of legislation. Pragmatic in the sense that legislation should be a means to an end not an end in itself; ambitious in the sense to</p> <p>be brave and test new approaches.</p> <p>For the implementation of the ERA the anticipated ERA Roadmap in combination with establishing</p> <p>an effective High Level ERA Governance structure will be key to success. However, the long term</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/andree-eu_legislation.pdf#view=fit&pagemode=none</p>

	<p>sustainability of ERA cannot rule out legislation in the future</p> <p>The new Commission states as a first priority to stimulate investment for the purpose of job creation. Investors require long term stability and predictability and in order to attract investments</p> <p>in innovation a new mind-set is needed. This mind-set should include a new approach to legislation. Legislation should not always be used top-down but also to stimulate new markets. The</p> <p>lead-market concept was a forerunner in this context and a step in the right direction. This is also</p> <p>true for the European Innovation Partnerships introduced in 2010 in order to stimulate 'demand</p> <p>side in selected societal challenges. The weaknesses so far in different initiatives have been the</p> <p>that the approach to legislation have been from a 'demand-point' of view at a higher level</p> <p>(framework conditions) but misses the aspect of the use of legislation to stimulate innovation</p> <p>identifying barriers and to remove uncertainties, i.e. to give predictability for actors. In addition</p> <p>and maybe one of the major weaknesses is that the identification process has been mainly steered</p> <p>by various interests groups and not always with a clear European added value.</p> <p>This is the reason why a thorough 'screening process' is necessary to identify potential areas and in</p> <p>combination with establishing 'zones' where new concepts could be developed and tested. Initially</p>	
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	<p>such 'zones' could be established in 2-3 areas relevant for the challenges identified in Horizon 2020. In this respect the Investment Plan presented by the Commission at the end of November</p> <p>should include 'large scale demonstrators'. The 'screening process' identifying 'zones' should be forward looking and at the same time also take into account the planning of the next Framework Programme after Horizon 2020.</p> <p>Concrete recommendations are given in this paper regarding the development of the European Research and Innovation Area.</p>	
<p>Reinforcing Resilience in an Inter-connected World: Lifestyle Changes in Relation with Science and Innovation</p>	<p>Looking at changes in future generations (Gen Y, Gen Z) lifestyles some significant trends can be identified which will have a major impact on all societal spheres from education to work, from public to private life. Four key lifestyle trends are shaping values, attitudes and behaviour across Europe and the United States by 20201</p> <p>:</p> <p>First, we are going to live in an increasingly digitalised and interconnected world with powerful digital systems providing an invisible infrastructure for future societies. Despite or even because of this invisible character people expect that these systems are not operated top-down and optimized only for efficiency and profit. Instead, they should be inclusive and participatory, promote</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/stenros-heikinheimo-reinforcing_resilience.pdf#view=fit&pagemode=none</p>

	<p>innovation and well-being, and respond to the needs and wants of all citizens.</p> <p>Second, a shift from a consumer society to a producer society is taking place, following open source ideals and practices in every level of the society. This socio-economic system promotes the shared creation, production, distribution, trade and consumption of goods, services, governance and education.</p> <p>Third, in an increasingly complex and unpredictable world characterized by rapid change, people are turning to the principles of resilience. Adaptability, modularity, diversity, redundancy, and social capital are becoming key principles to help vulnerable individuals, organisations, communities, cities, and societies persist and thrive amid unforeseeable disruptions.</p> <p>Forth, while the meaning of traditional religious and societal institutions declines, the quest for purpose remains central in people's lives. Science and technology provide a vehicle for societal as well as political activism is moving to new forms outside the traditional democratic channels.</p> <p>As is obvious from the major lifestyle trends described above, it is not only research and innovation but many other governance areas that ought to be considered when searching for solutions to meet the challenges connected to these trends. Hence, this policy brief addresses not only DG RTD</p>	
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	but also an audience that is beyond a single directorate general.	
New Initiatives for Growth	<p>Against this background, this paper shall serve as starting point to identify challenges ahead as well as concepts able to support decision making by the EC with regards to rethinking innovation and growth – and as a consequence also of research and education.</p>	http://ec.europa.eu/research/openvision/pdf/rise/haering-weber-initiatives_growth.pdf#view=fit&pagemode=none
Pockets of excellence as drivers of regional growth	<p>This policy brief aims at investigating alternative ways for reconciling the persistence on RTDI support in LFRs with the recognition that in the context of the EU peripheral regions it often failed to produce the anticipated results. Empirical literature from the technologically advanced countries has beyond any doubt proven a statistically significant highly positive correlation between RTDI investment and economic prosperity (measured in productivity and/or GDP growth). However, transferring this experience to Southern Europe, through increased support for RTDI, has not produced the expected results. Sadly enough, less favoured regions did not behave as expected. This suggests that regional development policy cannot take the RTDI-economic growth relationship for granted; if we want sustainable convergence we need tailor-made tools.</p>	https://publications.europa.eu/en/publication-detail/-/publication/ad8e6dbe-0d40-11e7-8a35-01aa75ed71a1
Regulation and R&I Policies	<p>Regulation has for a long time been considered mainly as an obstacle to innovation, especially with respect to rules that create so-called “red tape”, or administrative burdens. However, academics have demonstrated that regulation can greatly facilitate innovation, by creating markets for existing ideas and stimulating entrepreneurship and inventions that contribute to social welfare (Ashford et al. 1985; Porter 1999). Pelkmans and Renda (2014) observe that regulation and the</p>	http://ec.europa.eu/research/openvision/pdf/rise/renda_innovation_report.pdf#view=fit&pagemode=none

	<p>overall legal environment affect both research and innovation, in many ways, and that the relationship between regulation and innovation is complex and ambiguous, which creates challenges for those that wish to use regulation as a pro-innovation tool.</p>	
<p>Study on Transatlantic Dynamics of New High Growth Innovative Firms</p>	<p>The Study focuses on the growing phenomenon of dual companies, i.e. high-tech startup companies that showed an international expansion towards the US since the initial phases of their life cycle, while maintaining a strong operational presence (such as R&D activities) in their country of origin and producing positive externalities on the local European ecosystems - in terms of employment, spin-off activities, payroll taxes, etc.</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/transatlantic-dynamics-final-report.pdf#view=fit&page mode=none</p>
<p>Study on Innovation in Horizon 2020 Projects</p>	<p>Horizon 2020 puts special emphasis on a number of cross-cutting issues that are intended to develop new knowledge, competences and technological breakthroughs with the aim to translate knowledge into economic and societal value. One of these cross-cutting issues focuses on facilitating innovation by bridging discovery with market application stages. This study provides an exploratory analysis of the current likelihood of innovation impact of a small subset of Horizon 2020 projects by studying 227 Innovation Action and six public procurement projects (PPP) for which contracts were signed in 2015. These actions have only started recently and are ongoing. It is therefore not possible to assess project outcomes ex-post. Rather, this study applies a</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/innovation_in_h2020_projects.pdf#view=fit&page mode=none</p>

	<p>forward-looking methodology by applying cognitive innovation impact indicators to the project proposals. It seeks to trace a project's likely innovation impact back to the attention various consortia devote to specific innovation aspects in their project proposals. Following the attention-based theory of organisational behaviour, dedicated attention of a consortium might have an impact on how it will act in the future.</p> <p>Consortia neglecting particular issues are unlikely to consider these issues throughout the project. Thus, it can be hypothesised that, on the basis of differences in the attention towards specific topics, heterogeneity between the consortia regarding their input decisions will occur, which, in turn, will lead to differences in project outcomes and likely innovation impact.</p>	
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4.1.18 Open Science

Key Policy issues:

- Open Science policies seek to ensure that access to the entire life-cycle of research remain fundamentally open and replicable in order to ensure the improvement of research quality, the replicability of research, its deployment by the public sector, its use in order to support innovation and development and its absorbing by citizens and the civil society. Open Science policies focus in particular on the sharing of research infrastructures in an open and uninhibited fashion, the free flow of research data and results, their sharing and reuse across contexts, the open access to scientific publications and research data and results, the application of the FAIR principles and finally the provision to researchers with the digital tools, processes and frameworks necessary for the conducting of open science.
- Open Science policies are a key driver for growth and complement Open Public Data (PSI) policies, Personal Data processing and flow policies, as well as policies related to the free flow of non-personal data.
- Open Science policies are mostly applied using incentives, either in the form of funding or in the form of the infrastructures necessary to conduct research in an open fashion.

Commentary:

- Open Science Policies operate only in conjunction with a broader set of policies that bring forward all elements necessary for the free flow of data, personal and non-personal, private, public, and research related in Europe.
- Open Science Policies are mostly implemented through soft regulatory means (e.g. funding, infrastructure and tools provision, guidelines etc) and hence (a) depend a lot more on institutional support compared to policies that are enforced through hard regulation (i.e. law); and (b) require a much more comprehensive set of tools, guidelines and technologies in order to be meaningfully applied.

Drivers:

- The need to have better research, i.e. replicable, verifiable and of the highest quality
- The changing nature of research requiring increasingly greater collaboration between researchers and research institutions
- The increased reliance on open information to produce new products and services
- The need to have a frictionless framework for the reuse of research data and the need to move from research to innovation

Constraints:

- The non-obligatory nature of most Open Science Policies
- The reliance of Open Science policies on other types of policies (e.g. Public Sector Information, Copyright, Funding and development policies etc)
- The fragmentation of policy tools and content
- The fragmentation of licensing agreements

- The lack of full understanding of the principles and mechanisms of open science, particularly in relation to the management of data, the provision of interoperable services and the sharing of infrastructures

Key Documents:

Title	Description	URL
Open Science General	<p>Open Science represents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools. The idea captures a systemic change to the way science and research have been carried out for the last fifty years: shifting from the standard practices of publishing research results in scientific publications towards sharing and using all available knowledge at an earlier stage in the research process. Open Science is to science what Web 2.0 was to social and economic transactions: allowing end users to be producers of ideas, relations and services and in doing so enabling new working models, new social relationships and leading to a new modus operandi for science. Open Science is as important and disruptive a shift as e-commerce has been for retail. Just like e-commerce, it affects the whole 'business cycle' of doing science and research – from the selection of research subjects, to the carrying out of research and to its use and re-use - as well as all the actors and actions involved up front (e.g. universities) or down the line (e.g. publishers).</p>	
High Level Expert Group on EOSC	<p>On 21 June 2017, the European Commission set-up the new High Level Expert Group European Open Science Cloud. Its mission is to advise the Commission on the measures needed to implement the European Open Science Cloud.</p> <p>The new group, chaired by Silvana Muscella, is composed of ten high-level experts from different European countries and two third-countries (Australia and US). Together, they have a complementary set of expertise related to various key aspects of the set-up of scientific data clouds, including standardisation, certification, procurement, delivery of federated services, business models,</p>	<p>http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud-hleg</p>

	management, governance and funding of national and European research data infrastructures and e-Infrastructures.	
Expert Group on the Future of Scholarly Publishing	<p>DG Research and Innovation (DG RTD) is setting up an Expert Group on the Future of Scholarly Publishing in order to support the research and innovation policy development on Open Science. The group's tasks shall be to assess emerging and alternative open access business models with the aim of establishing how an economically viable transition towards open access can be achieved. An important element of the group's work will be establishing general principles for the future of open access publishing and scholarly communication.</p> <p>The group shall consist of up to 12 members that can be either:</p> <p>individuals appointed in a personal capacity, who will act independently and in the public interest</p> <p>organisations, which will have to be registered in the Transparency Register.</p> <p>Interested individuals and interested organisations are invited to submit their application to DG RTD.</p>	http://ec.europa.eu/transparency/regexpert/index.cfm?do=news.open_doc&id=3925
Amsterdam Call for Action on Open Science		http://openaccess.nl/sites/www.openaccess.nl/files/documenten/amsterdam-call-for-action-on-open-science.pdf
Studies		
Study on Open Science	<p>Open Science represents a novel approach to scientific development, based on cooperative work and information distribution through networks using advanced technologies and collaborative tools. Open Science seeks to facilitate knowledge acquisition through collaborative networks and encourage the generation of solutions based on openness and sharing. In this context, this report seeks to answer the following key questions:</p> <p>What does Open Science actually encompass? How does it differ from traditional scientific modes and methods of knowledge acquisition, generation and dissemination? What are its</p>	http://ec.europa.eu/research/openvision/pdf/rise/study_on_open_science_impact_implications_and_policy_options-salmi_072015.pdf#view=fit&pagemode=none

	<p>main benefits compared to the mainstream scientific approach?</p> <p>What are the key issues that need to be taken into account when thinking about the impact of Open Science?</p> <p>How is Open Science likely to evolve in the near and medium future?</p> <p>What would be adequate conditions for effective development and implementation of Open Science? What are the policy implications of these developments?</p>	
Science Ecosystem 2.0: how will change occur?	<p>The report analyses the potential impact of a transition towards Open Science on the stakeholders of the research ecosystem. The following findings are discussed.</p> <p>Innovative digital tools that facilitate communication, collaboration, and the data analysis will enable Open Science practices.</p> <p>All stakeholders of the research ecosystem will benefit from Open Science, although it will change work habits and business models.</p> <p>Digital platforms will facilitate innovation by streamlining all phases of the innovation process, from the generation of ideas to experimental work and fundraising.</p> <p>Citizens will become new players of the research ecosystem. They will shape science policies and contribute to scientific research through citizen science actions and by funding researchers.</p> <p>Digital science start-ups will shape the future of Open Science and innovate in the exploitation of the flow of information made publicly available with the advent of Open Science.</p> <p>The EU can accelerate the transition towards Open Science thanks to its unique position as funder and policy maker. A three-step program is suggested that will: 1) support the on-going transformation; 2) make systemic change to open the way to fully implemented Open Science; and 3) unlock the societal and economic value of Open Science.</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/science_ecosystem_2.0-how_will_change_occur_crouzier_072015.pdf#view=fit&page=ode=none</p>
Impact of Open Science	<p>This report is about Open Science, how it changes research methods and practice, and the effect of</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/adams_impact_of_open_science</p>

<p>methods and practices on the economics of research and science</p>	<p>this on the economics of research. 'Economics' should not be understood as narrow accountancy. Research objectives become ever more ambitious, building on discovery and facilitated by innovation. The 'cost' of an activity - in time and consumables - is continually reduced by technology so the scope of the research enterprise can expand. The technological and sociological elements of an 'open science' economy affects research by enabling us to tackle entirely new challenges and its impact is not through reducing costs but through accelerating and amplifying benefits.</p>	<p>methods.pdf#view=fit&pagedmode=none</p>
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4.1.19 European Cloud Initiative (ECI)–High performance Computing (HPC)

Key Policy issues:

- The main objective of this policy is to provide a set of e-science services in a seamless fashion across the EU, while ensuring that open data are offered in accordance to FAIR principles and to encourage the development of HPC infrastructures in Europe.
- The objective of ECI, including HPC, is not merely to support the research community but also to ensure that the private and the public sector can collaborate with academia in order to share resources, infrastructures and services towards a common goal.

Commentary:

- ECI/ HPC policies are underlying the EOSC project
- They focus on the cloud not as a technical device but rather as a set of infrastructures, process, data and services that allow the seamless performance of open science across Europe

Drivers:

- Need to have access to high computing capacity, storage and services for performing e-science tasks
- Increasing adoption of Open Science as a policy by most of EOSC stakeholders
- Need to compete at a global level

Constraints:

- Fragmentation of policies, infrastructures and legal regimes
- Need for a clear governance mechanism
- Installed technological basis and institutional inertia
- Lack of a structure of incentives for scientists to support open science

Key Documents:

Title	Description	URL
Staff working document on Implementation of the Action Plan for the European High-Performance Computing strategy	High Performance Computing (HPC) is at the core of major advances and innovation in the digital age. In the massively connected digital economy, the exponential growth of data, networking and computing will continue to drive societal changes, scientific advances and productivity gains. The nature of computing is changing with an increasing number of data-intensive critical applications, and the intertwining of HPC with a growing number of industrial applications and scientific domains makes HPC the engine to power the new global digital economy, improving the scientific and	https://ec.europa.eu/digital-single-market/en/news/staff-working-document-implementation-action-plan-european-high-performance-computing-strategy

	<p>industrial innovation capability and the competitiveness of industries and SMEs, allowing better services for the citizens and better decision making. HPC is one of the key contributors to the Digital Single Market (DSM) strategy next to Cloud services, Big Data and Internet of things (IoT).</p>	
ETP4HPC	<p>European Technology Multi-annual Roadmap Towards Exascale Update to 2013 Roadmap</p>	<p>http://www.etp4hpc.eu/image/fotos/2016/01/ETP4HPC-SRA-2-Single-Page.pdf</p>
<p>Vision DocumentQ European Technology Platform for High Performance Computing</p>	<p>High Performance Computing (HPC) plays a pivotal role in stimulating Europe's economic growth. HPC is a pervasive tool allowing industry and academia to develop world class products, services and inventions in order to maintain and reinforce Europe's position on the competitive worldwide arena. HPC is also recognized as crucial in addressing grand societal challenges. "Today, to Out-Compute is to Out-Compete" best describes the role of HPC. The ETP strongly recommends launching a research program with an aim to develop European technology in all segments of the HPC solution value chain.</p>	<p>http://www.etp4hpc.eu/pujades/files/joint-ETP-Vision-FV.pdf</p>
<p>Overview of the EU funded Centres of Excellence for computing applications</p>	<p>Nine Centres of Excellence (CoEs) for computing applications are now running. They will help strengthen Europe's existing leadership in HPC (high-performance computing) applications and cover important areas like renewable energy, materials modelling and design, molecular and atomic modelling, climate change, Global System science, and bio-molecular research,</p>	<p>http://ec.europa.eu/programmes/horizon2020/en/news/overview-eu-funded-centres-excellence-computing-applications</p>

	and tools to improve HPC applications performance.	
HPC under Horizon 2020	HPC (High-Performance Computing) is a strategic resource for Europe's future as it allows researchers to study and understand complex phenomena while allowing policy makers to make better decisions and enabling industry to innovate in products and services. The European Commission funds projects to address these needs.	http://ec.europa.eu/programmes/horizon2020/en/h2020-section/high-performance-computing-hpc

4.1.20 Open to the World

Key Policy issues:

- How to make the EU globally competitive in the face of fierce competition from other regions and countries, notably the China, the US and South East Asia, but also how to enhance collaboration with such actors, both at the state and the institutional level.

Commentary:

- The Open to The World policies seek to establish collaboration frameworks to increase the relevant strengths of Europe and make it globally competitive
- These policies see research as a cornerstone for increasing European competitiveness in a global knowledge economy
- The provision of an appealing regulatory regime supporting the free flow of data and services and the provision of seamless open science services across Europe will make Europe a globally attractive place for innovation agents, such as researchers, SMEs and technologies.

Drivers:

- Talent and resources of a global level
- A growing ecosystem of innovative SMEs
- Inviting European Policies

Constraints:

- Regulations still fragmented
- Lack of a single e-science and open science policy
- Need to support greater research mobility
- Need to provide a better ecosystem of innovative SMEs and Start Ups
- Need to support the scaling up of European Enterprises to compete at a global level

Key Documents:

Title	Description	URL
ERA Open to the World EU R&I strategy responding to globalisation	International Cooperation in S&T has for a long time been part of European FPs and now Horizon2020. At the same time globalisation accelerates via market forces but also via more and more countries being involved in international S&T cooperation. Common global societal challenges (like the ones that are high on the EU research agenda) as well as emerging disruptive economic changes (like all aspects of the shared economy) make international cooperation an increasingly important dimension not only for science but also for innovation, sectoral	http://ec.europa.eu/research/openvision/pdf/rise/tsipouri-era_open.pdf#view=fit&pagemode=none

	<p>policies and foreign affairs. Open science and open innovation are shaping new models of cooperation and competition at the global level. In this spirit the expert group reviewing S&T cooperation policy suggested that the key criteria for S&T cooperation should be achieving benefits for European stakeholders, effectively address global, grand challenges, and support the Union's external policies.</p>	
<p>Foresight to decision-making - lessons for policy-making from selected non-European countries</p>	<p>This study on "Bringing Foresight to decision-making - lessons for policy-making from selected non-European countries" serves as a background paper for a Position Paper of RISE. To gain additional information, it was decided to monitor new developments in Foresight in several non-European countries with a focus on Southeast Asia. This study gives some examples of the application of and impacts on policy-making that offer lessons which can be learned in their specific cultural and political context and help to better design the interface between Foresight and policy-making. The study is therefore highly selective. It is based on officially available publications, databases from own projects of RISE members (overview on the developments in the world, including the European Foresight Platform EFP), direct information from RISE members, unofficial papers by external experts and "insider knowledge" gained via short interviews and telephone discussions. The recommendations from the background study are transferred to a Position Paper.</p>	<p>1. Policy Paper: http://ec.europa.eu/research/openvision/pdf/rise/cuhls-lessons_policy_making.pdf#view=fit&pagemode=None 2. Policy Brief http://ec.europa.eu/research/openvision/pdf/rise/cuhls-foresight_into_decisions.pdf#view=fit&pagemode=None</p>
<p>Study on EU Positioning: An Analysis of the International Positioning of the EU Using Revealed Comparative Advantages and the Control of Key Technologies</p>	<p>In view of the year 2020 the overall framework conditions for research and innovation are changing. The international positioning of the EU in terms of trade and influence are challenged by the sustained competition with the USA and the rise of China and other countries as global economic players. Processes of digitalisation in the world economies are accelerating, thereby enhancing globalisation of research and innovation. Disruptive innovation addressing</p>	<p>http://ec.europa.eu/research/openvision/pdf/rise/final-report-eu-positioning.pdf#view=fit&pagemode=None</p>

	<p>societal grand challenges (SGCs) and global markets may likely emerge. Against this background the purpose of this study is to provide an assessment of the international positioning of the EU in the year 2020 with respect to research and innovation in each of the thematic areas funded in Horizon 2020. This includes an elaboration of strengths and weaknesses of the EU, an analysis of the comparative advantage of the EU today, an identification of the key enabling technologies for the 21st century, an identification of centres of excellence in the areas of Horizon 2020, an assessment of the EU's competitive position in 2020, and an assessment of possible impact of major EU initiatives for research and innovation.</p>	
<p>Tools for an EU science diplomacy</p>	<p>This report maps national Science Diplomacy tools used in a sample of EU Member States and some countries outside the EU. The examples of Science Diplomacy are classified in three categories: strategic tools, operational tools and support tools. Furthermore, more detailed descriptions of Science Diplomacy policies and practices are presented for some selected countries: Germany, Spain, France, Switzerland, the UK, the US and Japan. Based upon an assessment of what exists in the EU at national levels and what exists outside the EU, a set of six recommendations towards the EU is presented regarding the further development of an EU strategy for Science Diplomacy. These recommendations deal with how the EU can contribute to supporting the Member States Science Diplomacy policies and practices and with how an EU Science Diplomacy can be elaborated that is in tune with the EU's Foreign and External Relations policy. The report ends with a proposal regarding the strategic vision that should underpin the EU's efforts to enhance its Science Diplomacy capacities.</p>	<p>https://publications.europa.eu/en/publication-detail/-/publication/e668f8cf-e395-11e6-ad7c-01aa75ed71a1</p>

4.1.21 Digitalisation of the European Industry/ IoT/ Robotics/ Standards

Key Policy issues:

- Objective of these policies is (a) the establishment of a framework that allows the closer collaboration between the industry, the public sector and academia in producing innovative applications of automation (robotics), Internet of Things (IoT) and consequently to contribute to the deep digitization of the European Industry
- Core means for achieving this policy is the establishment of collaboration platforms and frameworks, as well as the encouragement of Public Private Partnerships (PPPs).
- Standardisation is also a core element ensuring interoperability between different components and services

Commentary:

- These policies strongly rely on the achievement of the goals of the ECI and EOSC policies as there is great need for a seamless flow of data or the sharing of data amongst trusted partners in order to design and implement a coherent digital industry policy.
- Industry 4.0 policies rely on the use of big data and the sharing of data amongst different partners in complex value and production chains.
- The Industry 4.0 policies further specialise and implement EOSC and open science policies

Drivers:

- Need to compete at a global level
- Existing Open Science and sharing data infrastructures
- Existing e-infrastructures and research infrastructures

Constraints:

- Early implementation of the framework for the collaboration between private and public sector in the context of the data value chains and the knowledge economy
- Lack of expertise at the level of Research Performing Organisations as to how they could structure their collaboration with the private sector
- Need to work closer on the issue of PPPs in areas of heavy innovation, such as Robotics and the Public Domain!

Key Documents:

Title	Description	URL
Communication from the Commission to the European Parliament, the Council, the European Economic and Social		http://eur-lex.europa.eu/legal-content/TXT/?uri=CELEX:52016DC0180

<p>Committee and the Committee of the Regions: Digitising European Industry Reaping the full benefits of a Digital Single Market (COM(2016) 180 final)</p>		
<p>Staff Working Document: "Advancing the Internet of Things in Europe"</p>		<p>http://eur-lex.europa.eu/legal-content/TXT/?uri=CELEX:52016SC0110</p>
<p>Robotics Public-private partnership in Horizon 2020</p>	<p>In the Public Private Partnership in Robotics (PPP), the European robotics industry, research, academia and the European Commission have joined together to launch a new research, development and innovation programme in order to strengthen the competitive position of the European robotics industry and to foster the excellence of its science base.</p> <p>The objective of the PPP is to provide a platform for the industrial and academic community to develop a common roadmap for robotics in Europe and to identify the means to realise this roadmap with public support.</p> <p>The initiative includes actions covering the full innovation cycle, from research to industry-led R&D down to testing and piloting in real settings of innovative robotic technologies. It also includes actions to ensure a faster uptake of innovations, such as support for pre-commercial procurement in areas of public interest (security, healthcare, etc.).</p>	<p>https://ec.europa.eu/digital-single-market/en/robotics-public-private-partnership-horizon-2020</p>
<p>EU Robotics</p>	<p>euRobotics AISBL (Association Internationale Sans But Lucratif) is a Brussels based international non-profit association for all stakeholders in European</p>	<p>https://www.eu-robotics.net/eurobotics/about/about-</p>

	<p>robotics. euRobotics builds upon the success of the European Robotics Technology Platform (EUROP) and the academic network of EURON, and will not only continue the cooperation but will also strengthen the bond between members of these two community driven organisations. Thus, leading towards the establishment of only one sustainable organisation for the European robotics community as a whole.</p> <p>One of the association’s main missions is to collaborate with the European Commission (EC) to develop and implement a strategy and a roadmap for research, technological development and innovation in robotics, in view of the launch of the next framework program Horizon 2020. Towards this end, euRobotics AISBL was formed to engage from the private side in a contractual Public-Private Partnership, SPARC, with the European Union as the public side.</p> <p>The association has been nurtured by the partners of euRobotics, a Coordination Action funded by the EC under FP7 which started in 2010 and ended in December 2012.</p>	<p>eurobotics/about-eurobotics.html</p>
<p>Strategic Research Agenda for Robotics Europe 2020</p>	<p>This document provides a high level strategic overview for the robotics community. It is also intended to act as an introduction to the European robotics community for non-robotic specialists, policy makers, entrepreneurs and industries intending to use or work within the robotics market.</p>	<p>https://ec.europa.eu/research/industrial_technologies/pdf/robotics-ppp-roadmap_en.pdf</p>
<p>Robotics 2020 Multi-Annual Roadmap For Robotics in Europe</p>	<p>This Multi-Annual Roadmap (MAR) is a companion to the Strategic Research Agenda (SRA) providing a greater level of technical and market detail. It is updated annually as priorities, technologies and strategic developments shape European research development and</p>	<p>https://www.eu-robotics.net/cms/upload/downloads/ppp-documents/Multi-Annual_Roadmap2020_ICT-24_Rev_B_full.pdf</p>

	<p>innovation (R&D&I). The annual update follows a process that utilises the expertise within Topic Groups formed by euRobotics aisbl and seeks open consultation.</p> <p>The priorities for R&D&I funding, including near market activities, will be derived from the MARs a part of the annual review cycle. The MAR is referenced within the Horizon 2020 ICT-24 work programme. The work programme shares a common descriptive framework with the MAR.</p> <p>Robotics is a diverse field and this roadmap relies on expert opinion in each domain and technical cluster to provide and verify the information within it. The annual review process examines each key technical and market area to ensure material is brought up to date at least once per annum.</p>	
Future Internet Public Private Partnership	The Future Internet Public Private Partnership (FI-PPP) aims to advance Europe's competitiveness in Future Internet technologies and to support the emergence of Future Internet-enhanced applications of public and social relevance.	1 https://ec.europa.eu/digital-single-market/en/future-internet-public-private-partnership 2. old site https://www.fi-ppp.eu/
Communication on ICT standardisation Priorities for the Digital Single Market	<p>In our digital future, there will be billions of connected devices – from smart appliances at home, to connected cars, or smart factories with fully digital supply chains.</p> <p>The Communication on ICT Standardisation Priorities for the Digital Single Market (COM(2016)176) aims to ensure that all these devices in the future will be able to connect and share data with each other – independently of manufacturer, operating system, or other technical details.</p>	https://ec.europa.eu/digital-single-market/news-redirect/30496

4.1.22 Platforms

Key Policy issues:

- Platforms are understood by European Policy Makers either as *lociof* concentration of offer and demand, a form of highly regulated by their operators forms of marketplaces and, hence, a place where the marketplace operator needs to compete with service or goods providers on equal terms.
- Most importantly platforms are also taken to refer to sharing economy infrastructures, where the excess capacity of the participants is collected in a structured fashion so as to contribute to the development of a common project.
- Platforms are either extractive, when the collected excess capacity is taken away from the contributors, or commons-based when it fully returns to them.

Commentary:

- Forms of commons or extraction based peer production are increasingly becoming a dominant form of production over digital networks, especially in knowledge or information intensive industries. As a result, the policies related to platforms are a crucial part of any knowledge policy.
- In addition, the procurement, particularly of cloud and computing services increasingly happens via mega-platforms which in most cases are non-european. As a result, there is need to provide policies both for the procurement and provision of such services and see how EOSC is positioned within such global ecosystem.

Drivers:

- The need to use platform-based services
- The growth of the sharing and platform economy in the knowledge context and the relevant demand by academic users
- The development of innovative platform and cloud services by the European academic and private sectors

Constraints:

- Economies of scale are on the side of incumbent non-European platforms
- Academic stakeholders often lack the capacity of offering services at a professional and globally competitive level
- Fragmented regulations often increase frictions and make even for free services to have a great transactional cost for the academic sector.

Key Documents:

Title	Description	URL
Commission Staff Working Document on Online Platforms, accompanying the document "Communication on Online Platforms and the	The purpose of this Staff Working Document is limited to providing a factual overview of the main characteristics of online platforms and their social	https://ec.europa.eu/digital-single-market/en/news/commission-staff-working-

<p>Digital Single Market" (COM(2016) 288)</p>	<p>and economic contribution in Europe. As such this document does not provide a legal assessment or impact analysis of potential problems that may be associated with online platforms. It is part of a broader assessment conducted by the European Commission which included a public consultation, Eurobarometer studies, and scientific workshops focusing on the impact of online platforms.</p>	<p>document-online-platforms</p>
<p>COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Online Platforms and the Digital Single Market Opportunities and Challenges for Europe</p>	<p>The objective of this Communication is twofold:</p> <ol style="list-style-type: none"> 1.To outline the key issues identified in the assessment of online platforms. 2.To present the Commission’s position on both the innovation opportunities and the regulatory challenges presented by online platforms, and to set out its approach to supporting their further development in Europe 	<p>http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1466514160026&uri=CELEX:52016DC0288</p>

5 Annex 2: Table of Interviews

Stakeholder/Case Study Name	Type/Discipline	Stakeholder Category	Interview conducted with	Interview conducted by
TEXTCROWD Science Demonstrator	SD Language Studies, humanities, heritage	Research Producing Organisations, Academic Institutions and Research Libraries?	Dr Thomas Zastrow, 8 Dec 2017	Jessica Parland-von Essen
WLCG Open Science Demonstrator	High Energy Physics	Research Infrastructure (CERN)	Jamie Shiers, 7 Dec 2017	Dale Robertson
Minedu, Finland (Finnish Ministry of Education and Culture)	Policy expert, Department of Higher Education and Science	National, Regional or Local Government Agencies	Sami Niinimäki, 20 Nov 2017	Jessica Parland-von Essen
Academy of Finland	Funder	National, Regional or Local Government Agencies (funder)	Heikki Mannila, Vice President for Research, Riitta Maijala, Senior Science Adviser Anu Nuutinen and Science Adviser	Jessica Parland-von Essen

			Jyrki Hakapää, 12 Dec 2017	
Generic Science Demonstrator: Frictionless data exchange across research data, software and scientific paper repositories	Generic Science Demonstrator: Scholarly communication, repositories. Any/all disciplines	Research Producing Organisations, Academic Institutions and Research Libraries, and also Service Providers	Petr Knoth, 24 Nov 2017	Bas Cordwener
EURORDIS	Patient organisation	Learned Societies, Research Communities, Scientific and Professional Associations	Virginie Bros-Facer, 27 Nov 2017	Serena Battaglia

6 Annex 3: Procurement Initial Scoping ⁹¹

Abstract

The purpose of this Initial Positioning Paper is to address two objectives:

1. Act as a point of reference to aid further discussion in the EOSC Pilot Project prior to submission of the formal deliverables in months 12, 16 and 22 of the project.
2. To provide input to the Activity Leader, Matthew Dovey to inform inputs to the EC prior to an EOSC Summit meeting on the 12th June 2017. The 12th June meeting is understood to have as an objective the commitment to a number of declarations being prepared by the EC. Thus this paper shall highlight key considerations from a procurement perspective to ensure that any Declarations are compliant with legislative constraints at an EU and national level. These are produced on the assumption that the EOSC has the following characteristics (“Use Cases”):
 - a. The users of EOSC may wish to collectively pool their procurement activity.
 - b. Suppliers to the EOSC may be state funded institutions as well as independent or commercial providers
 - c. Some users should also be able to act as suppliers of resources to other users within EOSC.
 - d. “Commons” – establishing an instance of a shared resource whereby services are maintained and sustained by collective actions of the users.

Stakeholder Analysis

The beneficiaries/users of EOSC are diverse and extensive in their number and characteristics including, but not limited to, Research Infrastructures, ERICs, NRENs, and Institutions, e.g. Universities and other education or research bodies. Further they may act in their roles to create a supply chain where one provides services to another. This paper considers procurement drivers and constraints on such a collective body wishing to access EOSC through procuring commercial services, selling services to one another or establishing commons.

The respective governance/legislative obligations are not universal within the group. Most are subjected to the EC Public Procurement Directive (Directive 2014/24/EU) as transposed into their national legislations, whereas others such as ERIC’s are exempt from such legislation, obligated to follow only the fundamental principles of the Directive. However even if an exemption applies the source of funding for such organisations, e.g. structural funds, may obligate a public procurement to mitigate against State Aid challenges.⁹²

⁹¹By Paul Rouse, Head of Procurement, GÉANT, Task Leader

⁹²<http://www.stjohnschambers.co.uk/dashboard/wp-content/uploads/Public-procurement-and-State-aid.pdf>

Thus it is proposed that Directive 2014/24/EU, hereafter called ‘the Directive’, be considered as the “limiting factor” for the EOSC pilot as it is the minimum requirement for many users to comply with in order to benefit from the services to be available under the EOSC.

Application of Directive 2014/24/EU to the three EOSC use cases

1) Aggregated or joint procurement through the establishment of a Central Purchasing Body (CPB)

Pooling needs/requirements and aggregating demand into limited number of procurements presents a number of benefits;

- Potential economies of scale;
- Ability to attract commercial providers who may not respond to smaller procurements;
- Reduction of the administrative burden compared with standard procurement,
- Reduction of the transaction costs, in terms of time and expenditure, of managing the procurement;
- Efficient use of scarce skills in carrying out public procurements and incorporating specialist requirements, as for example in data protection;
- Potential to tailor solutions to meet user requirements – for example in supply chain/payment mechanisms e.g. tokens/credits or exploiting delivery over existing R&E network infrastructure to avoid data egress costs.

The Directive sets out clear arrangements whereby contracting authorities (the term for entities/users are subject to the Directive) may pool procurement activity.

There are a number of models that are foreseen in the Directive, however given the scale of EOSC it is likely that one body within the project should conduct itself as a centralised purchasing body, carrying out a framework procurement on behalf of all potential users. The conduct of this procurement can be considered later and draw on experience from work done to date by GÉANT in the IaaS framework or by the Helix Nebula Science Cloud.

2) Users as suppliers

The Directive does allow for one contracting authority to provide services to another without need for the recipient contracting authority to undertake a procurement for such services.

There is a need to be exhaustive in the analysis of any particular arrangements (particularly compliance to national legislative requirements), however there are two general arrangements that can be considered as a guide of what is acceptable:

- Control arrangements – where one contracting authority exercises control over another (as though it were a part of their own organisation) then, subject to its internal procurement rules it can, according to the Directive procure without a formal procurement subject to their having no private equity in the supplying organisation. A good example is with NRENs, who in exercising control over

GÉANT, are able to procure connectivity from GÉANT without the need for procurement.

- Collaboration – contracting authorities may come together to share services where the activity is in the public interest, there is no private equity and the arrangement is on a non-commercial basis.
- Further as a general principle where there is a proprietary right or technical reason for a sole source then a contract can be awarded without a procurement. So for example if an infrastructure provided by one institution is the only place where certain data may be accessed then contracts can be awarded without a procurement.

3) Operating a commons

To ensure procurement compliance, operating a commons amongst a number of contracting authorities could be done via arrangement as described in 1 and 2 above.

Initial Conclusion

The establishment and operation of the EOSC will require, due to the nature of its users, that it be established in compliance with national transposition of the Directive.

A co-ordinated approach as envisaged through the EOSC pilot combined with the potential scale of requirement should allow for the delivery of a centralised arrangement that will enable the integration of commercial services into the EOSC in order to make them available to all users. This could be in the form of framework contracts, established by one contracting authority in the EOSC, that will allow easy access to commercial solutions that meet the community's needs in an efficient way under competitive terms.

Thus, Directive compliant contracts with commercial providers for use in building and operating an EOSC should be achievable with the right skills and resource and commitment from the EOSC user base for their utilisation, and not necessitate any particular legal form for EOSC, other than ensuring a body within the project can act as a Centralised Purchasing Body.

To allow existing/future public infrastructure to be shared amongst contracting authorities will require more detailed analysis on the form and structure for each particular scenario. Directive compliance is unlikely to be realised by a single legal form for a centralised/co-ordinating body in EOSC and each case will need to be considered on its merits. Existing infrastructures may be handled differently to future ones. As a final consideration, it is important in any procurement action to identify who will fund the procurement. This point has yet to be addressed in the context of the EOSC. The EC could fund the establishment of the procurement mechanism and subsidize the procurements but other stakeholders must also contribute financially if a suitable procurement model for the EOSC is to be found.

As a complementary consideration, the impact of indirect taxation should also be considered where resources are shared across borders.