DELIVERABLE

D2.13 Data Management Plan (FINAL)

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Responsible Partner:	POLIMI
Contributing Partners:	Francesco Molinari (POLIMI), Berdien De Roo (GEOS), Tomáš Řezník (HSRS), Matteo Satta (ISSY), Stanislav Štangl (SITMP), Andrew Stott, Joran Van Daele (Gent)
Reviewers:	Hugo Kerschot (ISP), Marina Klitsi (ATC), Lieven Raes (AIV), Matteo Satta (ISSY), Andrew Stott

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	Confidential – only consortium members and European Commission Services	

Revision History

Revision	Date	Author	Organization	Description
0.1	19/10/2020	Francesco Molinari	POLIMI	Initial draft
0.2	29/10/2020	Francesco Molinari	POLIMI	Reviewer comments taken
1.0	31/10/2020	Francesco Molinari	POLIMI	Final version

Every effort has been made to ensure that all statements and information contained herein are accurate, however the PoliVisu Project Partners accept no liability for any error or omission in the same.

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Glossary of used terms

Acronym	Definition
AI	Artificial Intelligence
API	Application Programming Interface
CA	Consortium Agreement
CSV	Comma Separated Values
DMP	Data Management Plan
DoA	Description of the Action
DPO	Data Protection Officer
EC	European Commission
EEA	European Economic Area
EU	European Union
GDPR	General Data Protection Regulation
H2020	Horizon 2020
HTTPS	Hyper Text Transfer Protocol Secure
ICT	Information and Communication Technology
IPR	Intellectual Property Rights
ORDP	Open Research Data Pilot
PDF	Portal Document Format
PSI	Public Sector Information
R&D	Research and Development
SLA	Service Level Agreement

Executive Summary

PoliVisu was an EU funded project aimed to establish the use of big data and data visualisation as an integral part of policy making, particularly, but not limited to, the local government level and the mobility and transport policy domain. The project's relation with data was therefore essential and connatural to its experimental research objectives and activities. This has been witnessed by the delivery of three previous editions of this document at months 6, 12 and 24.

The final edition of PoliVisu Data Management Plan takes some distance from the incrementally evolving, but also common structure of the previous three. More specifically, the focus here is set on the activities planned by the partners in relation to data management after the end of the period of the project grant.

The permanent legacy of the project is constituted by the PoliVisu Toolbox now up and running online at the following URLs: policyreadydata.org and policyvisuals.eu which are and will be owned and operated by the Greek partner ATC in the coming years. Apart from the different modules the PoliVisu Toolbox is composed of - WebGLayer, OpenMicka, Traffic Modeller Server, Traffic Modeller application, M³ Macq, Warp10 etc. - the site also stores a number of datasets, which have been used in different ways to serve specific demonstration needs within the project. Those datasets include:

- Municipal Police Events Data
- Survey Data
- Traffic Modelling Data
- Admin & Operational Data
- WiFi Sniffing Data
- Social Media Data
- Mobile Phone Data
- Road Sensor Data
- Road Accident Data
- Roadworks Data
- Floating Car Data
- Bike count data

The primary aim of the PoliVisu Toolbox is the provision of an environment where Public Sector decision makers can understand and learn how to use big data to create visualisations to support their policy work. The Toolbox acts as a shop window to the possibilities that data provides for policy making and enables users to browse through its contents freely and use elements as inspiration for using data for policy themselves.

For the purposes of data management, this requires adherence to the FAIR principles, making data findable, accessible, interoperable and re-usable. Therefore, this last edition of PoliVisu DMP has the main purpose of describing the way FAIR data management principles will be maintained after the project's end. Its structure as a Deliverable then follows the Guidelines on FAIR Data Management in Horizon 2020 (Version 3.0 - 26 July 2016) provided by the European Commission.

1. Data Summary

The following table lists the Data Types (see also https://policyvisuals.eu/dataset-type/) made available on the PoliVisu Toolbox.

#	Description and URL	Reference partner
1	Road sensor data (live)	Pilsen
2	Road works data (live)	Pilsen
3	Municipal Police events	Pilsen
4	Traffic accidents data in the Czech Republic (owned by the police)	Pilsen
5	Average speed control data	Pilsen
6	Floating car data	Issy
7	Bike Count Data	Issy
8	Road accidents data	AIV
9	GIPOD – Public domain road works and PD occupation service	AIV
10	Pseudonymized ANPR data police zone Voorkempen (owned by the Police Zone Voorkempen)	AIV
11	Telraam traffic count data (owned by TML Leuven)	AIV
12	Flanders Traffic model (owned by Flemish Government – MOW)	AIV
13	Cellular data	Gent
14	Social media data	Gent
15	Survey Data	Gent
16	Administrative data	Gent
17	Wifi sniffing data	Gent
18	ANPR data	Macq
19	Traffic modelling data	P4All
20	Parking data (live)	Geos

The most updated description of the contents of these datasets (apart from the links provided, which directly point at the PoliVisu Toolbox) can be retrieved from the project's deliverable D8.9 Whitepaper: Visualization Techniques for policy-making, issued in September 2020.

The following table is directly borrowed (with some changes and adaptations) from that Deliverable and shows the direct relationship existing between the different data types and the PoliVisu pilots run during the project's

lifetime in seven European cities and/or regions. Each pilot dealt at least with one data type, but not all the above were actually used in the pilot sites. In fact, the overarching goal of PoliVisu pilots was to give inspiration, and a possible methodology, to policy makers wanting to understand and learn how to use big data to create visualisations in support of their work. This is reflected by the provision of case studies, which are also permanently available on the Toolbox website as well as on the other information distribution sources of the project (its official web pages and the Cordis portal).

Pilot sites	ANPR data (pseudony mized)	Telraam data (citizen science)	Floating car /Wifi sniffing data	Cellular data	Road/ traffic accidents data	Road sensor data	GIPOD / road works data	Traffic modeling data	Bike use count
Gent			Closed/ Personal	Closed/ Personal					
Mechelen (Telraam)		Closed/ Personal							
Mechelen (traffic model)							Open/ No Personal	Closed/ No Personal	
Voorkem pen (PZ)	Closed/ Personal								
Flanders					Closed/ Personal				
Pilsen					Open/ No Personal	Open/ No Personal		Closed/ No Personal	
Issy			Closed/ Personal				Open/ No Personal		Open/ No Personal

Key: (Green) open data / (Yellow) Closed data, no personal / (Red) Closed, personal/anonymized data
Table: Datasets used in the PoliVisu pilots

The table marks a difference between open data and closed datasets on the one side and datasets containing anonymised (source) personal data or no personal data, on the other side.

Especially the closed/personal header needs further explanation. Some commercially available or simply business confidential datasets are derived from pre-existing collections of personal data[1]. Good examples are those that use camera images and Artificial Intelligence to obtain anonymized (head counting) data. If personal data can no longer be attributed to a specific data subject without the use of additional information, the data can be used outside GDPR. The irreversibility in such a case must be assured.

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[1] 'Personal data' according to article 4 of the GDPR means 'any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person'.

The aforementioned PoliVisu White Paper extensively deals with the anonymisation[2] and pseudonymisation[3] techniques used during the project to protect the personal identities of those captured in the original datasets prior to data visualisation. However, generally speaking, the custodians of those datasets are the specific organisations (other than the PoliVisu Consortium members) dealing with their collection and storage for commercial or other purposes.

For additional information on these topics, the interested reader may also refer to PoliVisu deliverables D4.7 (final) and D4.5 (first version) being the Privacy rules and anonymization white paper. This report is related to subjects such as data accessibility, re-use and even interoperability.

2. FAIR Data

This section briefly explains how the FAIR principles, making data findable, accessible, interoperable and re-usable, will be enforced and implemented after the project's end.

2.1. Making data findable, including provisions for metadata

Metadata represents a common thread connecting data, policies, advanced visualisations, (traffic) models etc. A catalogue service through metadata enables a user to answer complex discovery-related queries, such as: "Which datasets, sensor measurements and traffic models can be used for a city of Antwerp to follow the European Noise Directive?" Moreover, such catalogue service may be connected to mainstream search engines like Google, Bing, Yahoo etc. Metadata thus acts as a bridge between the geospatial world and mainstream IT development.

The developed PoliVisu catalogue is capable of answering the questions like: "Show me which resources are related to those sensor measurements." The results in such a case comprise links to e.g. a description of a traffic model that was used to process the measurements, an interpolated dataset originating from the measurements, map composition depicting the measurement as well as the interpolated dataset, legal act created upon the measurement, Web services publishing the sensor measurements and interpolated dataset, standardization document defining the framework for quality evaluation of such measurements, Website describing the purpose of the measurements and its outcomes to the public etc.

The Consortium has dealt with Metadata specifications since the early stages of the project's lifetime (see deliverable D4.2 for further information). A unified core metadata structure was then defined following the ISO 19115 Geographic Information – Metadata standard together with ISO 19100 family of standards, OGC

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[2] Anonymization is the process of either encrypting or removing personally identifiable information from data sets so that the people whom the data describes remain permanently anonymous. Both methods involve masking personal data by removing or encrypting the data that makes it possible to link the information to an individual, such as name, address, or credit card number. The key difference with pseudonymization (see next footnote) is that the latter can be reversed. Using separately held information, such as an encryption key, one can retrieve the identifiable information when needed to link the data back to an individual. Once data has been anonymized, however, it can never be linked back to an individual. Anonymization is permanent.

[3] 'Pseudonymisation' according to article 4 of the GDPR means 'the processing of personal data in such a manner that the personal data can no longer be attributed to a specific data subject without the use of additional information, provided that such additional information is kept separately and is subject to technical and organisational measures to ensure that the personal data are not attributed to an identified or identifiable natural person.'

implementation specifications and W3C recommendations. A guide to populating and managing the PoliVisu catalogue was written to support the common vision of metadata management.

The developed PoliVisu discovery concept comprises three layers. The first discovery layer is being used for backwards domain compatibility, based on the INSPIRE discovery services (backwards compatible to the OGC catalogue services) and CKAN domain-specific catalogues. The second discovery layer represents a gate to the world of Semantic Web through DCAT-AP[4], GeoDCAT-AP[5], RDF and Schema.org. The third discovery layer touches the users of mainstream full-text searching engines through the technologies like Google rich cards/snippets. Such 3-layered discovery concept enables to handle geospatial and non-geospatial resources homogeneously.

The **Micka tool** is a set of libraries and a web application for management and discovery of geospatial (meta)data, including RDF- and JSON- based semantics. The full documentation is stored at https://github.com/hsrs-cz/Micka. Micka provides back-end as well as front-end modular, scalable and customizable solutions. The main goal of Micka is to connect all the relevant kinds of resource (datasets, web services, sensor measurements, models, maps, other kinds of visualizations etc.) to provide answers, for instance, to the following questions: "Show me all data and (map) visualizations that were developed according to a certain legislation or show me what has been done with the certain sensor measurements (derived datasets, policies, link to e-shop selling the raw sensor measurements,…)". As such, Micka acts as a primary tool for discovery of various kinds of resources.

Contrary to Web search engines, Micka enables to define advanced (multiple) searching criteria, such as to draw a rectangle in a map to define the area that I am interested in, to define the quality of information I am interested in (such as spatial accuracy higher than one meter) or to define the responsible authority (e.g. I would like to obtain only noise measurements from official mapping authorities since 2014).

The user then obtains relevant (meta)information on all the available resources he/she was searching for. He/she may look into details as well as see all the related resources that provide links to other applications. E.g. a user discovers a NoiseDataset that fulfils all his/her criteria and would like to see a preview of such dataset on a map, see the legal act under which the dataset was created, have a link for the sensor measurement that was conducted in order to populate the NoiseDataset or use a link to the e-shop to buy the dataset.

From a producer's perspective, a producer may import his/her metadata from another system or create them manually. A producer then decides which metadata will be published, i.e. made available over the internet.

The following APIs are supported for the http://policyvisuals.eu Toolbox:
- (Open)Micka GUI A user interface for (Open)MicKA.
- OGC CSW API An interface for communication to other CSW servers and/or clients. The interface follows the full implementation of the OGC CSW 2.0.2 implementation specification including the ISO Application Profile 1.0.
- OGC WMS API An interface defined according to the OGC WMS 1.0.0 – 1.3.0 implementation specifications (including INSPIRE modifications) in order to automatically create metadata from a WMS instance.
- OGC WFS API An interface defined according to the OGC WFS 1.0.0 – 2.0.0 implementation specifications (including INSPIRE modifications) in order to automatically create metadata from a WFS instance.

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[4] https://joinup.ec.europa.eu/solution/dcat-application-profile-data-portals-europe/release/11
[5] https://inspire.ec.europa.eu/good-practice/geodcat-ap

- INSPIRE ATOM API An object oriented interface for a communication according to the ATOM Syndication format, in a version as defined in the INSPIRE Technical Guidelines for Download services.
- GEMET RDF API An interface designed and developed for communication to the GEMET thesaurus. The implementation follows guidelines for GEMET API as described under the URL: http://www.eionet.europa.eu/gemet/en/webservices/.
- JSON(LD) OpenSearch API An interface designed and developed to publish search results in a format suitable for syndication and aggregation.

The Micka tool is being offered in two licensing options. OpenMicka is freely available while Micka is a commercial tool. Customization and deployment are paid in both cases.

From the technical point of view, (Open)Micka could be integrated to any platform and/or system through Web services as far as the following requirements are met:
- any web server with mod_rewrite enabled,
- PHP 5.6.x with XSL extension,
- PostgreSQL >= 9.2,
- Composer (https://getcomposer.org/) – for installation of some components.

2.2. Making data openly accessible

All datasets and data visualisations available on the PoliVisu Toolbox are offered for free and open access for both commercial and non-commercial purposes. This obviously does not apply to those belonging to the commercial third parties mentioned in Section 1 of the present document.
However, the following terms and conditions apply, which are duly described on the respective web page:

Creation of a User Account
- To access some platform features registration with a User Account is required.
- This means to provide the User's legal full name, a valid email address and any other information required in order to complete the signup process. Accounts registered by "bots" or other automated methods are not permitted.
- The User is responsible for carefully guarding the security of his/her Account. PoliVisu cannot and will not be held liable for any loss or damage from the User's failure to comply with this security obligation.
- PoliVisu, in its sole discretion, has the right to suspend or terminate any User Account and refuse any and all current or future use of the Toolbox, for any reason at any time. Such termination will result in the deactivation or deletion of the User Account or access to it, and the forfeiture and relinquishment of all content in the Account.
- PoliVisu reserves the right to refuse service to anyone for any reason at any time.
- One can voluntarily terminate a User Account at any time by sending a written request to info@polivisu.eu . All content will be immediately deleted upon cancellation. This information cannot be recovered once an Account has been cancelled.
- Verbal, physical, written or other abuse (including threats of abuse or retribution) of any User, partner, member or affiliated person will result in immediate termination of the involved Account.

Uploading of User Content

- PoliVisu will claim no intellectual property rights over the content provided on User Accounts. Any third party profile and materials uploaded will remain theirs.
- Users are responsible for all content posted and activity that occurs under their Accounts.
- Users may not use the Toolbox for any illegal or unauthorized purpose, including to violate any laws in their jurisdiction, such as but not limited to copyright laws.
- Uploaded contents may not be used for any unlawful purpose. Use must comply with all local rules regarding online conduct and acceptable content.
- One must not upload, post, host, or transmit unsolicited email, SMS, or "spam" messages.
- One must not transmit any worms or viruses or any code of a destructive nature.
- PoliVisu may, but have no obligation to, remove the content and Accounts containing content that is determined in their sole discretion to be unlawful, offensive, threatening, libellous, defamatory, pornographic, obscene or otherwise objectionable or violates any party's intellectual property or these Terms of Service.
- While PoliVisu prohibits inappropriate conduct and content, it cannot be held responsible for the appearance of either on its Toolbox and that a User nonetheless may be exposed to inappropriate conduct or materials while using the Toolbox.

General conditions on existing content
- Data made available by PoliVisu through the Toolbox is provided 'as-is' without warranty or condition of any kind, either express or implied.
- Data is subject to any applicable data licence terms and copyright attribution as set out in the relevant data tab, license info tab and/or metadata option.
- Currently PoliVisu offers free and open access for commercial and non-commercial purposes. We reserve the right in the future to charge for use of or access to services currently provided free of charge.
- Use of PoliVisu Toolbox is at the User's sole risk. The service, including technical support, is provided on an "as is" and "as available" basis.
- One must not modify, adapt or hack any service or modify another website so as to falsely imply that it is associated with PoliVisu or its Toolbox.
- Users agree not to reproduce, duplicate, copy, sell, resell or exploit with malicious intent any portion of the platform.
- User contents are not pre-screened but PoliVisu and its designee have the right (but not the obligation) in their sole discretion to refuse, edit or remove any content that is available through the platform.
- Any content may be transferred unencrypted and involve transmissions over various networks and changes to conform and adapt to technical requirements of connecting networks or devices.

2.3. Making data interoperable

An important portion of PoliVisu research and innovation work has concerned data interoperability and the use of metadata standards. Deliverable D8.5 Standardisation White Paper (issued in December 2019) takes stock of existing knowledge on the usefulness of adopting new metadata based approaches inside and outside the spatial and open data domain, including linked open data and metadata publication on the web.

The Polivisu Toolbox as a derivative of its pilots uses semantic methods with the following purposes:

- To increase clarity of provided information by linking to resources describing further information;
- To provide relevant (meta)data regardless underlying (meta)data standards including easily added new (meta)data elements that were not foreseen by existing (meta)data standards;
- To change the paradigm of open data portals from "here is all you can download" to "you can download all of that, however, be aware that, e.g. your dataset was derived from these sensor measurements defined by that legislation";
- To advertise relevant (visual) policy-making datasets at Schema.org compliant search engines, like https://toolbox.google.com/datasetsearch;
- To ensure backwards compatibility of provided (meta)data with frameworks originating from the INSPIRE directive on EU spatial data infrastructure, EU/national open data portals etc;
- To lead to a user-friendly publication in the form of (Google) rich cards/snippets.

Created metadata types are (also) available in an interoperable structured format, such as XML, JSON etc.

The Toolbox APIs are clearly defined and originate from (international) standards. Metadata may be transferred from one system into another, related catalogues may be connected together etc.

2.4. Making data reusable (through clarifying licenses)

Section 2.2 above has already described the key terms and conditions accompanying the free and open access to the Toolbox contents. This together with the commitment to maintain the existing datasets and the related documentation (jointly referred to also as "the Services") freely available after the project's end constitutes the main contribution to reusability of the PoliVisu consortium.

Additional clauses related to reusability include the following:

- PoliVisu does not warrant that (i) the service will meet your specific requirements, (ii) the service will be uninterrupted, timely, secure, or error-free, (iii) the results that may be obtained from the use of the service will be accurate or reliable, (iv) the quality of any products, services, information, or other material purchased or obtained by you through the service will meet your expectations, and (v) any errors in the Service will be corrected.
- Users expressly understand and agree that PoliVisu shall not be liable for any direct, indirect, incidental, special, consequential or exemplary damages, including but not limited to, damages for loss of profits, goodwill, use, data or other intangible losses (even if PoliVisu has been advised of the possibility of such damages), resulting from: (i) the use or the inability to use the Services; (ii) the cost of procurement of substitute goods and services resulting from any goods, data, information or services purchased or obtained or messages received or transactions entered into through or from the Services; (iii) unauthorized access to or alteration of your transmissions or data; (iv) statements or conduct of any third party on the Services; (v) or any other matter relating to the Services.
- The failure of PoliVisu to exercise or enforce any right or provision of the Terms of Service shall not constitute a waiver of such right or provision. The Terms of Service constitute the entire agreement between a User and PoliVisu and govern the User's use of the Services, superseding any prior

agreement between the User and PoliVisu (including, but not limited to, any prior versions of the Terms of Service).

3. Allocation of resources

Content wise it was the responsibility of the City of Ghent to maintain the Toolbox during the project while the partner ATC was responsible for its technical development. After the project's end ATC on behalf of all PoliVisu consortium members committed to maintaining the Toolbox website up and running smoothly for a minimum period of five years.

Any further operation including data integration, modification, implementation and usage (both per a single partner's initiative and in execution of a third party's request) will be technically executed by ATC and/or the individual partner bearing direct interest in that operation.

As a general rule, each partner will bear its own costs deriving from such operations.

In case of delivery of paid services (such as for the visualisation of specifically imported datasets), priority for cost reimbursement will be given to: i) the partner(s) who operated the service, including any subcontractor, then to ii) the partner(s) owning the licence/IPR of used resources, additional to the PoliVisu foreground, and possibly including third parties owning the specific datasets listed in section 1 above, and finally to iii) ATC in partial recognition of their costs for the management of the Toolbox website.

For the avoidance of any doubt, the PoliVisu Toolbox is composed of the following modules: WebGLayer, OpenMicka, Traffic Modeller Server, Traffic Modeller application, M³ Macq, Warp10 and the datasets stored on the platform are those listed in Section 1 of this document.

Additional SLAs and cooperation agreements will be freely designed and implemented by subgroups of PoliVisu partners depending on the circumstances.

4. Data security

The partner ATC on behalf of all PoliVisu consortium members will also guarantee the storage of data and information on specially protected servers, complying with EU and national (Greek) regulations.

According to those regulations, technical and organisational measures are in place to protect published data against loss, destruction, access, modification or dissemination by unauthorised persons.

Full backup copies are held of the Toolbox contents (including the personal data of registered users, if any) on secure servers at ATC.

5. Ethical aspects

Since May 2018, the European Union has created with the GDPR[6] one single regulation covering almost all aspects of privacy and data protection. The GDPR establishes data protection rules for all organisations operating in the EEA, wherever they are based. The stronger rules on data protection means that people have more control over their personal data and that businesses benefit from a level playing field[7]. In general, the GDPR Regulation does not concern the processing of anonymous information, including for statistical or research purposes.

As already mentioned in Section 1 above, a dedicated section of D8.9 Whitepaper: Visualization Techniques for policy-making (issued in September 2020) focuses on the practical use of privacy-sensitive data for policymaking without privacy invasion. Starting from transport-related datasets that are useful in a smart city context, different data anonymisation and visualisation techniques are described. Besides protecting privacy, even the aspect of trust building was taken into account. The White Paper reports about a number of approaches, best practices to use in other smart city related data driven policy visualisations in the mobility field and beyond. With the techniques described in the report, and by adopting a precautionary principle, it is possible to protect the privacy and anonymity of individual citizens. PoliVisu used this approach in the pilot projects. However an important concern is that the same personal data that appears to give public benefits for policymaking could also be used to target or disadvantage specific groups or minorities. For instance, data tracking the movements of an entire population at an individual level could also be used to track those coming out of a mosque, synagogue or political party meeting. It's therefore essential to be aware of this and to design privacy protection into all processes starting from the very first collection of data, and to minimise the amount of personal data that is available for subsequent processing. This also explains some of the terms and conditions limiting the extent of data usage as presented in section 2.2 above.

Although no personal data is stored as such in the gathered datasets from the pilot sites, a disclaimer in which the providers or brokers of PoliVisu Toolbox confirm that their data are compliant with GDPR rules is recommended.

Further to that, the Privacy Policy statement published on a dedicated webpage of the Toolbox explains what personal data of Toolbox users is collected and stored at policyreadydata.org and polivisu.eu, and how this information is used by ATC on behalf of the whole consortium. By visiting the platform and using any of its services, a User agrees to the terms and conditions of that Privacy Policy.

Personal data collected
- The e-mail addresses are collected of those who communicate with PoliVisu via e-mail,
- Aggregate information is also gathered on the pages that users access or visit (via Google Analytics), and
- Information volunteered by users, such as during onsite registration, is collected and stored.

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[6] https://eur-lex.europa.eu/eli/reg/2016/679/oj

[7] https://ec.europa.eu/info/priorities/justice-and-fundamental-rights/data-protection/2018-reform-eu-data-protection-rules/eu-data-protection-rules_en#abouttheregulationanddataprotection

The above personal data is only used to improve the content and quality of the platform services, and never shared with or sold to other organizations for commercial purposes, except if required to provide products or services the Users have requested, with their permission, or in order to investigate, prevent, or take action regarding illegal activities, suspected fraud, situations involving potential threats to the physical safety of any person, violations of Terms of Service, or as otherwise required by law.

Such information may be transferred if ATC is acquired by or merged with another company or if the role of managing the Toolbox is given to another partner or third party. In that event, PoliVisu will notify the Users before any information is transferred and becomes subject to a different privacy policy. Users will have the option to opt out of this agreement at any time by contacting PoliVisu.

Cookies
- A cookie is a small amount of data, which often includes an anonymous unique identifier that is sent to the User browser from a web site's computer and stored on the User's computer's hard disk drive.
- PoliVisu uses cookies to record session information such as pages consulted and date and time at which site visitors consulted them. This information will not be stored on any computer permanently and deleted after a certain (limited) period of time.
- Users are enabled to see the different kinds of cookies used, along with their descriptions and their session duration policy.

6. Other issues

This final version of PoliVisu Data Management Plan takes some distance from the incrementally evolving, but also common structure of the previous three editions of this document released at months 6, 12 and 24. This, however, does not mean that the contents provided therein are outdated or irrelevant. Indeed, PoliVisu was a EU funded project aimed to establish the use of big data and data visualisation as an integral part of policy making, particularly, but not limited to, the local government level and the mobility and transport policy domain. The project's relation with data was therefore essential and connatural to its experimental research objectives and activities. This has been witnessed by the previously delivered DMPs.

An important aspect of the activities planned by the partners in relation to data management after the end of the granted period includes the management of research data according to the principles of Green Open Access.

The following picture – borrowed from the official EU H2020 information portal[8] - identifies the positioning of the DMP in the context of projects that – like PoliVisu – voluntarily adhered to the Pilot on Open Research Data in Horizon 2020[9].

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[8] http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/open-access_en.htm

[9] Extended to all H2020 thematic areas since the start of the 2017 Work Programme, the focus of the Pilot is on "*encouraging good data management as an essential element of research best practice*". See European Commission (2017).
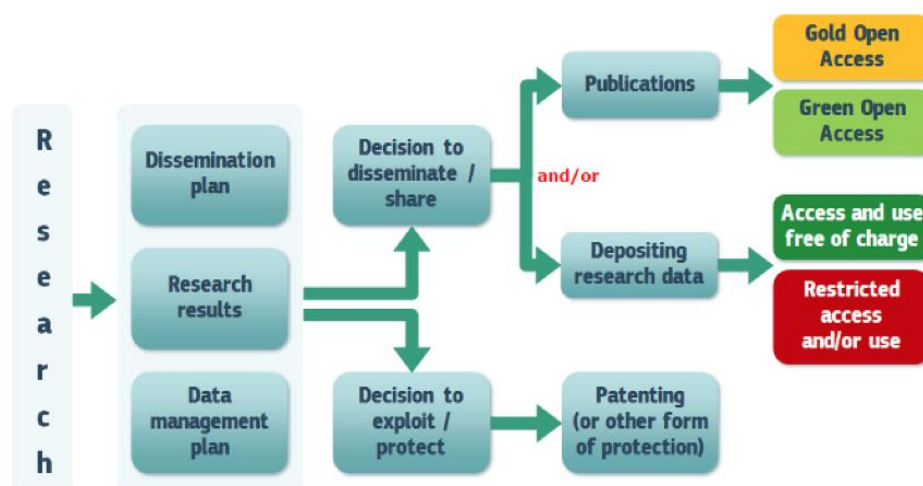
Figure : Open access to scientific publications and research data in the wider context of a project's dissemination and exploitation (source: EC, 2017)

As can be seen, a DMP holds the same status and relevance as the project's Dissemination Plan[10]. More specifically, in the former document, one should retrieve the full list of research data and publications that the project will deliver, use or reuse, as well as the indication of whether some data will be directly exploited by the Consortium, having been patented or protected in any other possible form. In the latter document, one should retrieve the Consortium's detailed provisions for all data and publications that can be shared with interested third parties, with or without the payment of a fee[11].

In particular, the following definitions – all taken from the aforementioned EU H2020 portal – apply to our discourse:

- **Access**: "*the right to read, download and print – but also the right to copy, distribute, search, link, crawl and mine*";
- **Research Data**: "*[any] information, in particular facts or numbers, collected to be examined and considered as a basis for reasoning, discussion, or calculation. In a research context, examples of data include statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images. The focus is on research data that is available in digital form*";
- **Scientific Publications**: "*journal article[s], … monographs, books, conference proceedings, [and] grey literature (informally published written material not controlled by scientific publishers)*", such as reports, white papers, policy/position papers, etc.;
- **Open Access Mandate**: "*comprises 2 steps: depositing publications in repositories [and] providing open access to them*". Very importantly, these steps "*may or may not occur simultaneously*", depending on conditions that will be explained below:
  - **"Green" Open Access (aka Self-Archiving)**: it is granted when the final, peer-reviewed manuscript is deposited by its authors in a repository of their choice. Then open access

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[10] In the PoliVisu project, this deliverable was named Impact Enhancement Roadmap (D8.1) and was issued at month 2 of the official work plan. The first edition of the DMP was drafted at month 6.

[11] This means that, at least in principle, some research data might also remain undisclosed, without undermining the Consortium's participation in the ORDP.

must be ensured within at most 6 months (12 months for publications in the social sciences and humanities). Thus, open access may actually follow with some delay (due to the so-called "embargo period");

o **"Gold" Open Access (aka Open Access Publishing)**: it is granted when the final, peer-reviewed manuscript is immediately available on the repository where it has been deposited by its authors (without any delay or "embargo period"). Researchers can also decide to publish their work in open access journals, or in hybrid journals that both sell subscriptions and offer the option of making individual articles openly accessible. In the latter case, the so-called "article processing charges" are eligible for reimbursement during the whole duration of the project (but not after the end of it).

In the PoliVisu DoA (2017), the following provisions for Open Access were defined, which have become part of the Grant Agreement (GA) itself: *"PoliVisu will follow the Open Access mandate for its publications and will participate in the Open Research Data pilot, so publications must be published in Open Access (free online access). Following the list of deliverables, the consortium will determine the appropriate digital objects that will apply to the Data Management Plan. Each digital object, including associated metadata, will be deposited in the institutional repository of Universitat Politècnico Milano, whose objective is to offer Internet access for university's scientific, academic and corporate university in order to increase their visibility and make it accessible and preservable."* Evidently, these provisions belong to the **"Green" Open Access** case.

As a matter of fact, Politecnico di Milano did not have an institutional repository of its own, which could be used to fulfil the Open Access requirements. Therefore, the PoliVisu consortium followed a two-pronged strategy, as follows:

1) a special section of the PoliVisu website (https://www.polivisu.eu) was dedicated to publishing the original materials produced during the project's lifetime, including copies of the public deliverables (also available on the Cordis website) and any other publication issued during the project's lifetime;

2) Third-party resources were also used such as Open Aire (https://www.openaire.eu/) and Zenodo (https://zenodo.org/), according to detailed instructions which were shared by POLIMI with all other partners since the project's inception, via a short booklet aiming to simplify and clarify the topic of Open Access in terms of its operational implications for the members of the PoliVisu consortium.

The polivisu.eu domain name was registered by Ministeries van de Vlaamse Gemeenschap. Similar provisions apply to its further management after the end of the EU granted period than those contained in the previous sections in relation to the PoliVisu toolbox. Even the terms of use of the project website contents closely reflect those commented above, as can be easily realised after reading the corresponding page: https://www.polivisu.eu/terms-of-use

As far as patenting or other form of **protection of research results** is concerned (the bottom part of Figure 1), the ground for this was paved by the PoliVisu Consortium Agreement (2017) - following the DoA, which recognises that *"formal management of knowledge and intellectual property rights (IPR) is fundamental for the effective cooperation within the project lifetime and the successful exploitation of the PoliVisu Framework and tools within and after the end of the project"*.

As a general principle, the GA article 26.1 is faithfully adopted in the PoliVisu CA, according to which "*Results are owned by the Party that generates them*". This is what article 8.1 states. And in addition, article 8.2

specifies that "*in case of joint ownership, each of the joint owners shall be entitled to Exploit the joint Results as it sees fit, and to grant non-exclusive licences, without obtaining any consent from, paying compensation to, or otherwise accounting to any other joint owner, unless otherwise agreed between the joint owners*".

7. Contact

For any further information regarding the contents of this DMP or the exercise of rights mentioned herein the reader is referred to the following contact person(s): Geert Mareels, Consortium coordinator and PoliVisu ethics manager. Email: geert.mareels@vlaanderen.be