



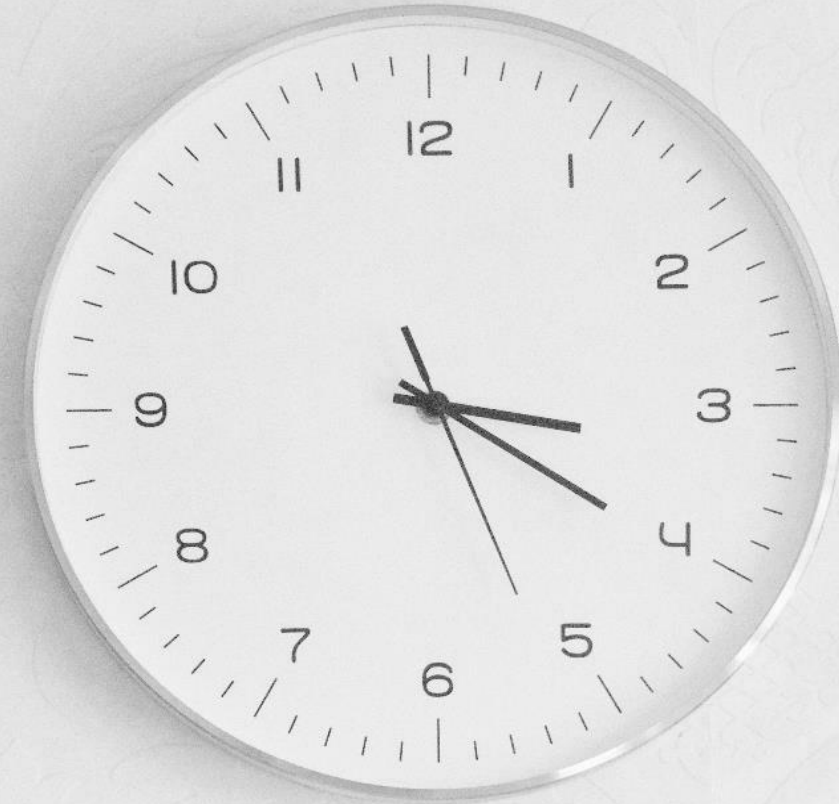
Validation workshop

Impact assessment study on the list of High Value Datasets to be made available by the Member States under the PSI Directive

28 July 2020

Agenda

- 12h45 — 13h00 Welcoming of the participants**
- 13h00 — 13h15 Presentation of the study and the framework for identifying HVDs**
- 13h15 — 14h30 Presentation of the thematic area: datasets in scope, high-level benefits and costs, and policy options**
- 14h30 — 14h35 Break**
- 14h35 — 15h15 Impact modelling and presentation of the policy packages**
- 15h15 — 15h55 Discussion**
- 15h55 — 16h00 Wrap-up and next steps**



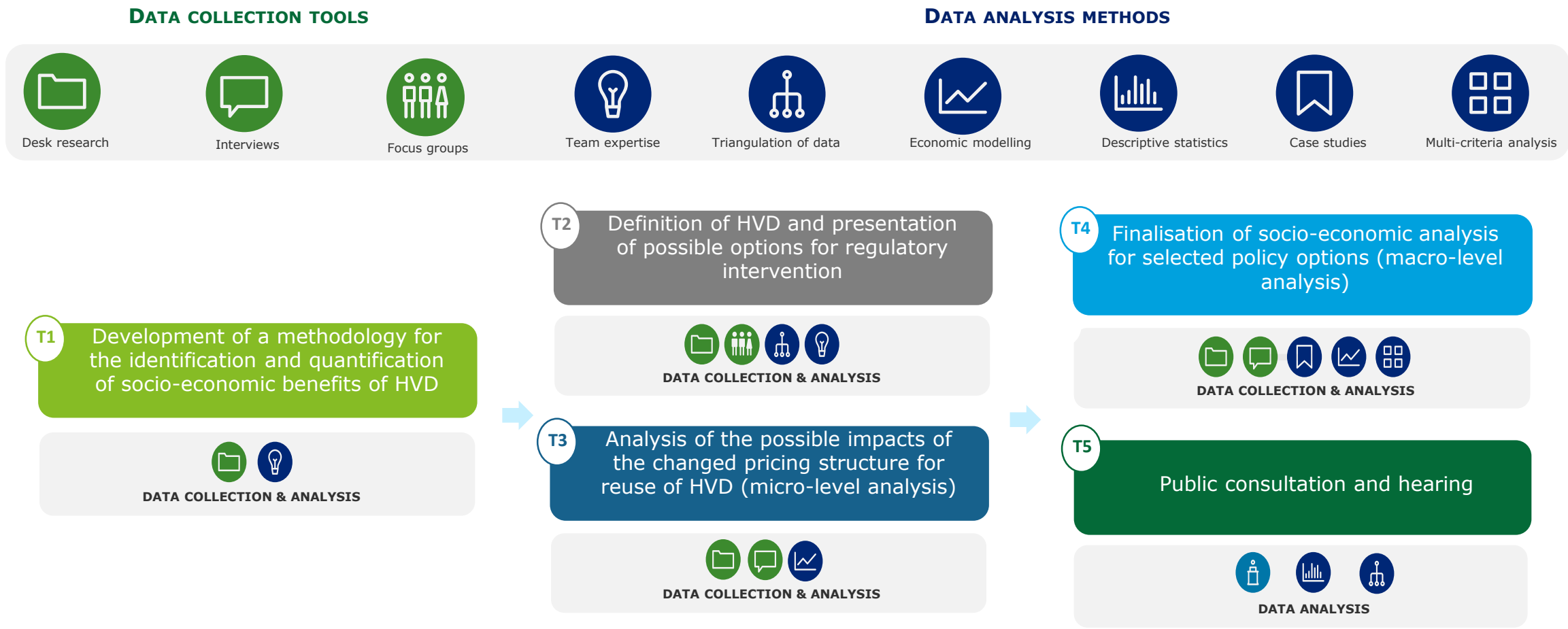


Welcome and introduction



Introduction to our study

Objectives, overall methodological data collection and analysis tools



House rules

The netiquette to follow for this online meeting

A **few simple rules** apply to this online focus group:

- **Mute yourself when you are not speaking** to avoid echoes and background noises.
- **The floor will be open for discussion** (last session). Please indicate in the chat that you would like to intervene, the moderator will then give you the floor.
- **Keep your intervention short and to the point.** This will allow us to stick to the time allocated for the sessions.
- **Enjoy the discussion!**











1. Value framework for HVDs



Finalised value framework for HVDs (1/9)

Methodology

A literature review was conducted to collate categories of value related to the **six macro characteristics of potential value**:

Climate Change 	Economic 	Innovation and AI 
Public Services and Administration 	Reuse 	Social 

The review carried out by the study team generated **32 categories of value, supported by 126 quantitative and qualitative indicators**, within the six characteristics.



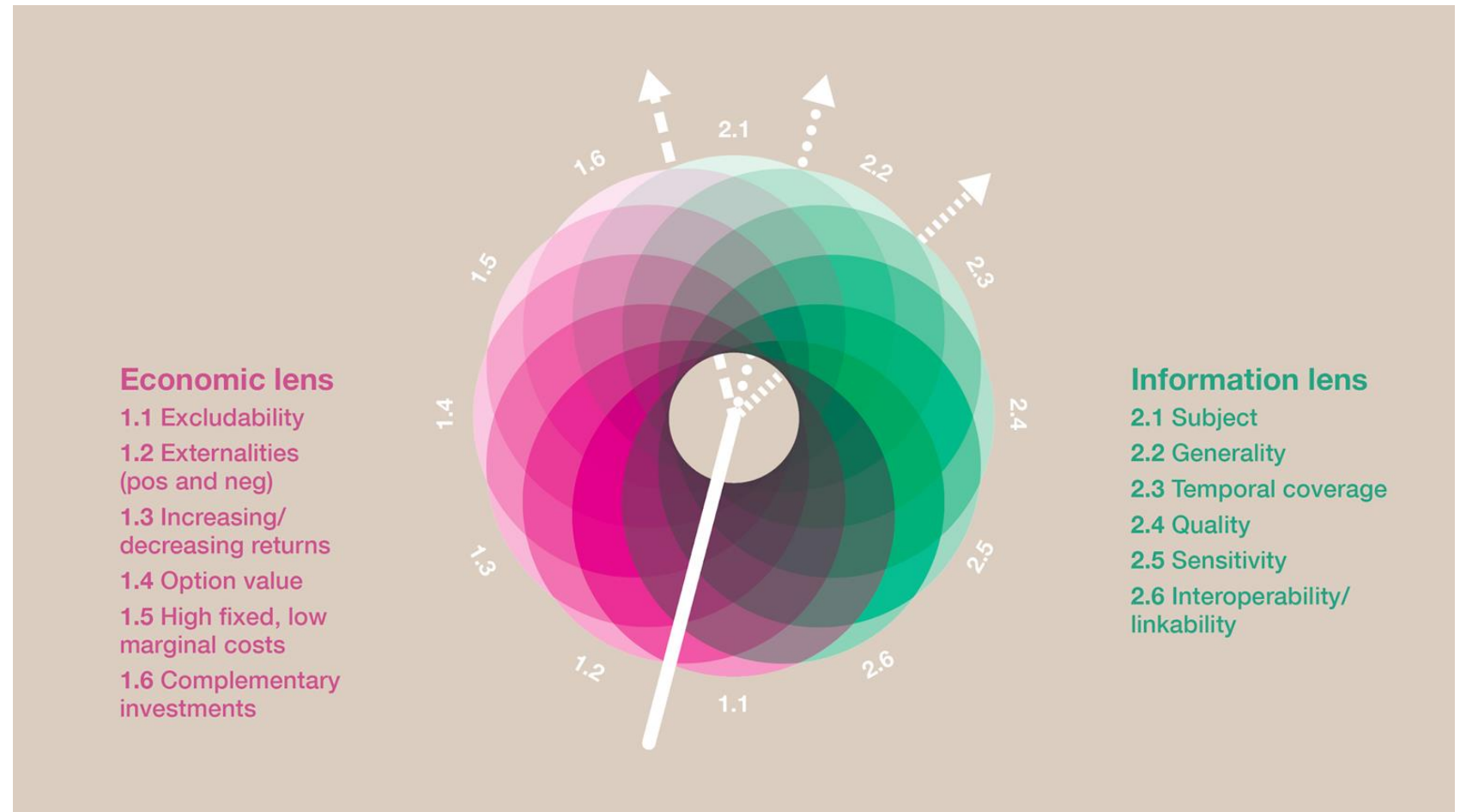
Finalised value framework for HVDs (2/9)

Methodology

The realisation of value with open data can be considered through **two lenses**

INFORMATIONAL

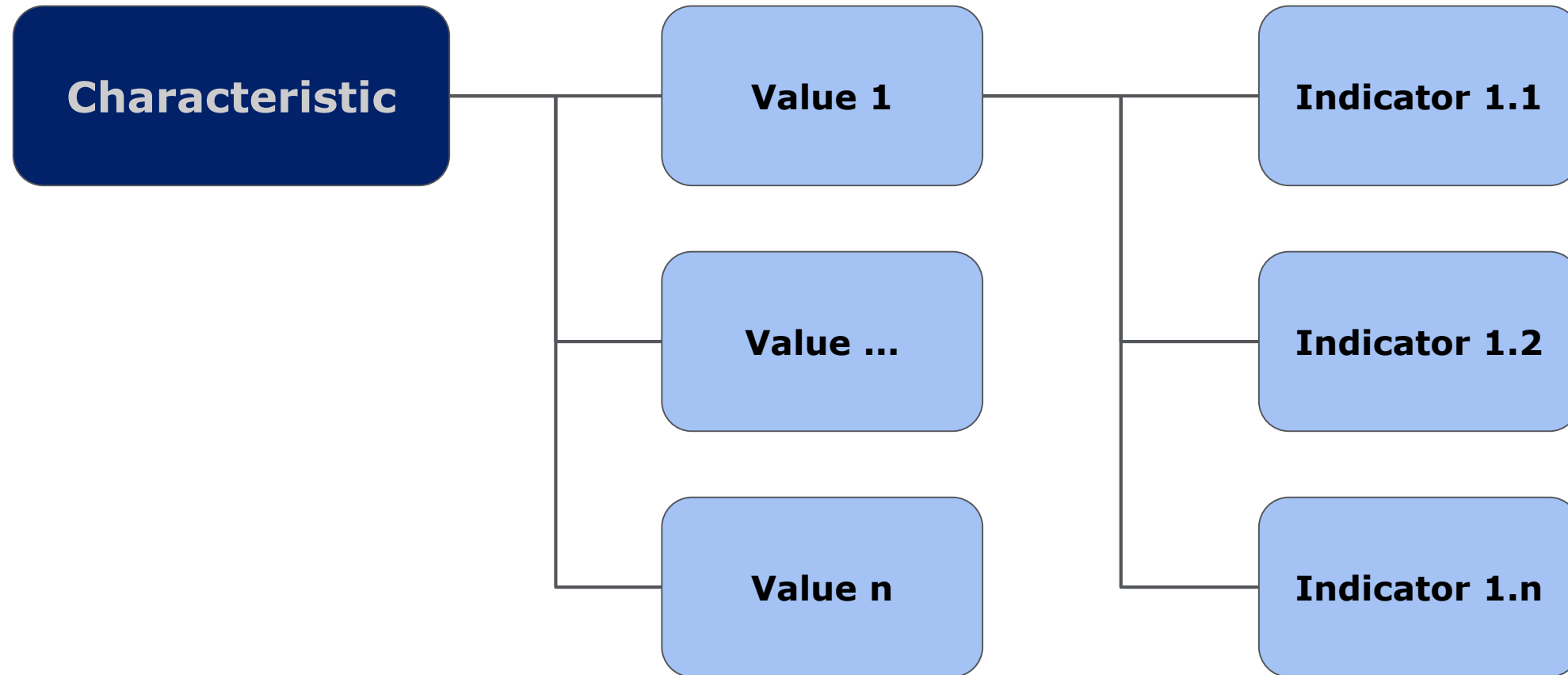
ECONOMIC



Open Data Institute & Nuffield Foundation (2020), "Valuing data: foundations for data policy",

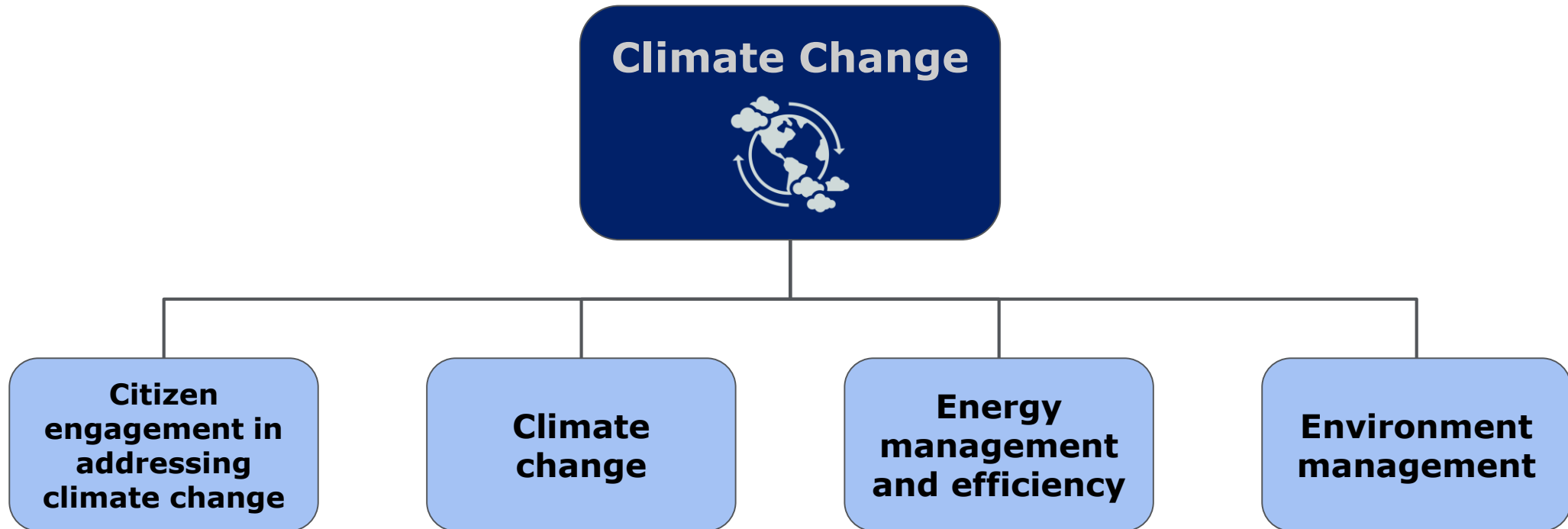
Finalised value framework for HVDs (3/9)

Framework



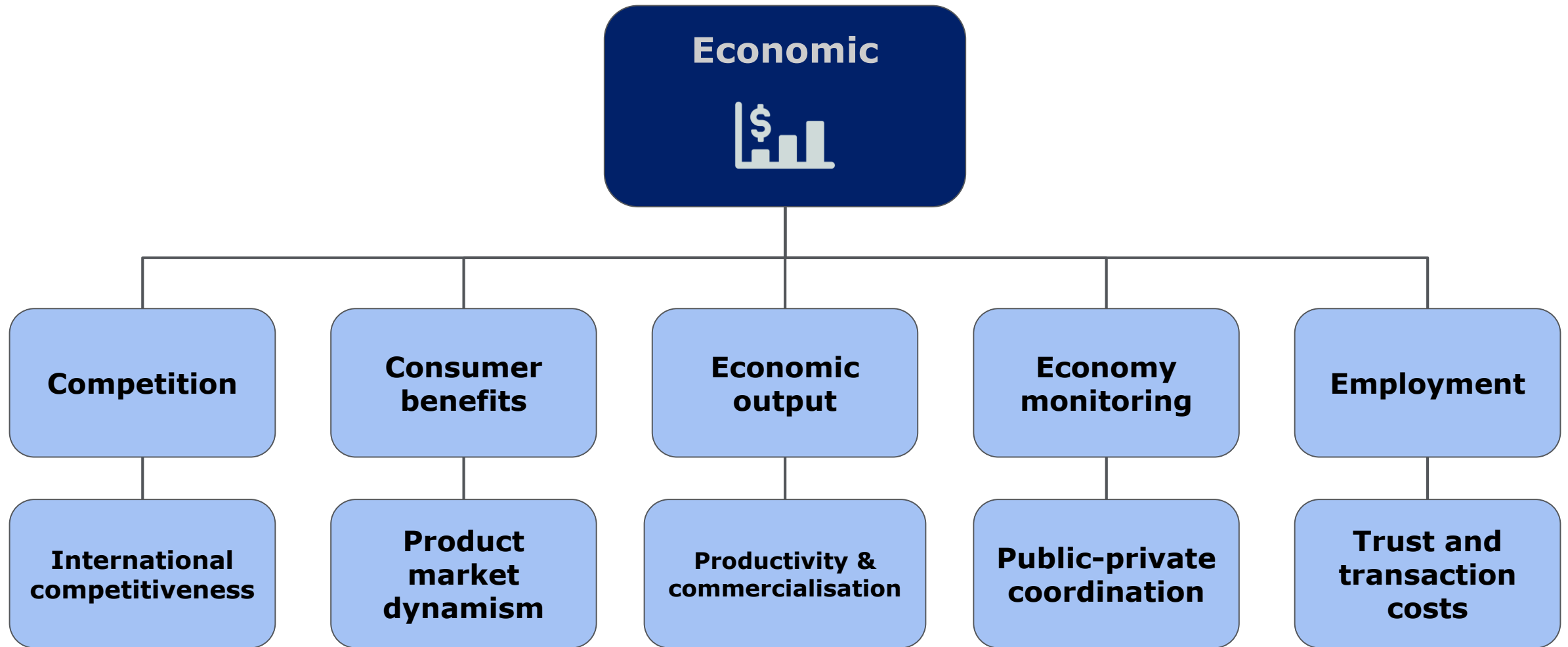
Finalised value framework for HVDs (4/9)

Framework



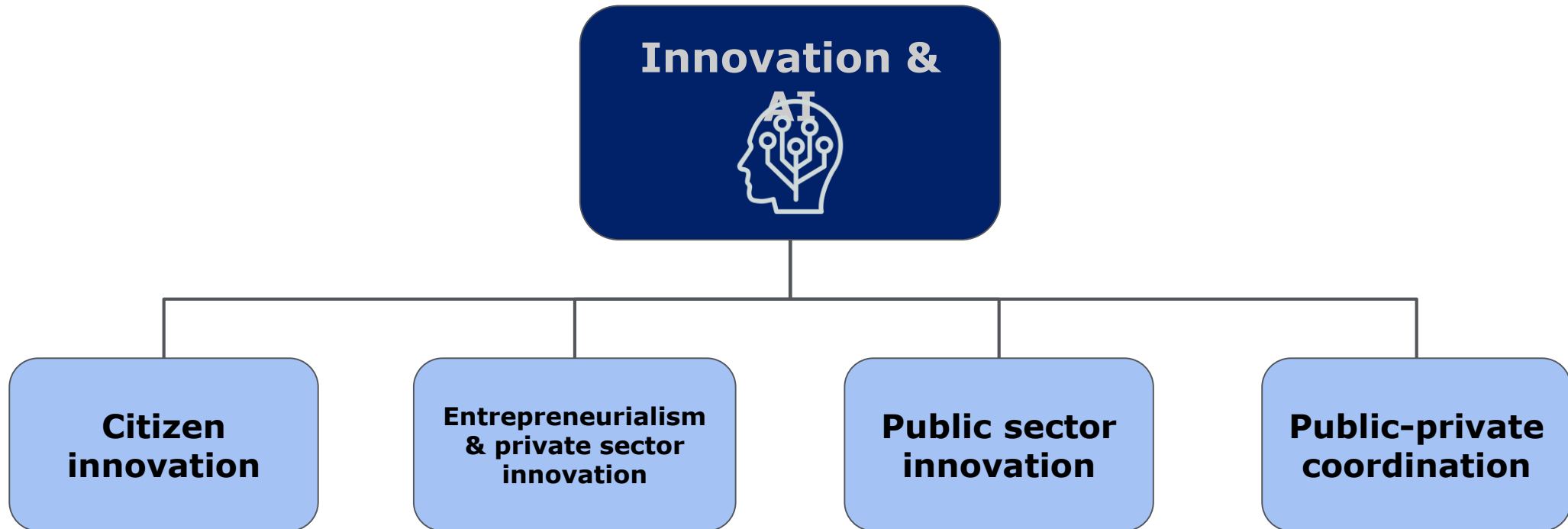
Finalised value framework for HVDs (5/9)

Framework



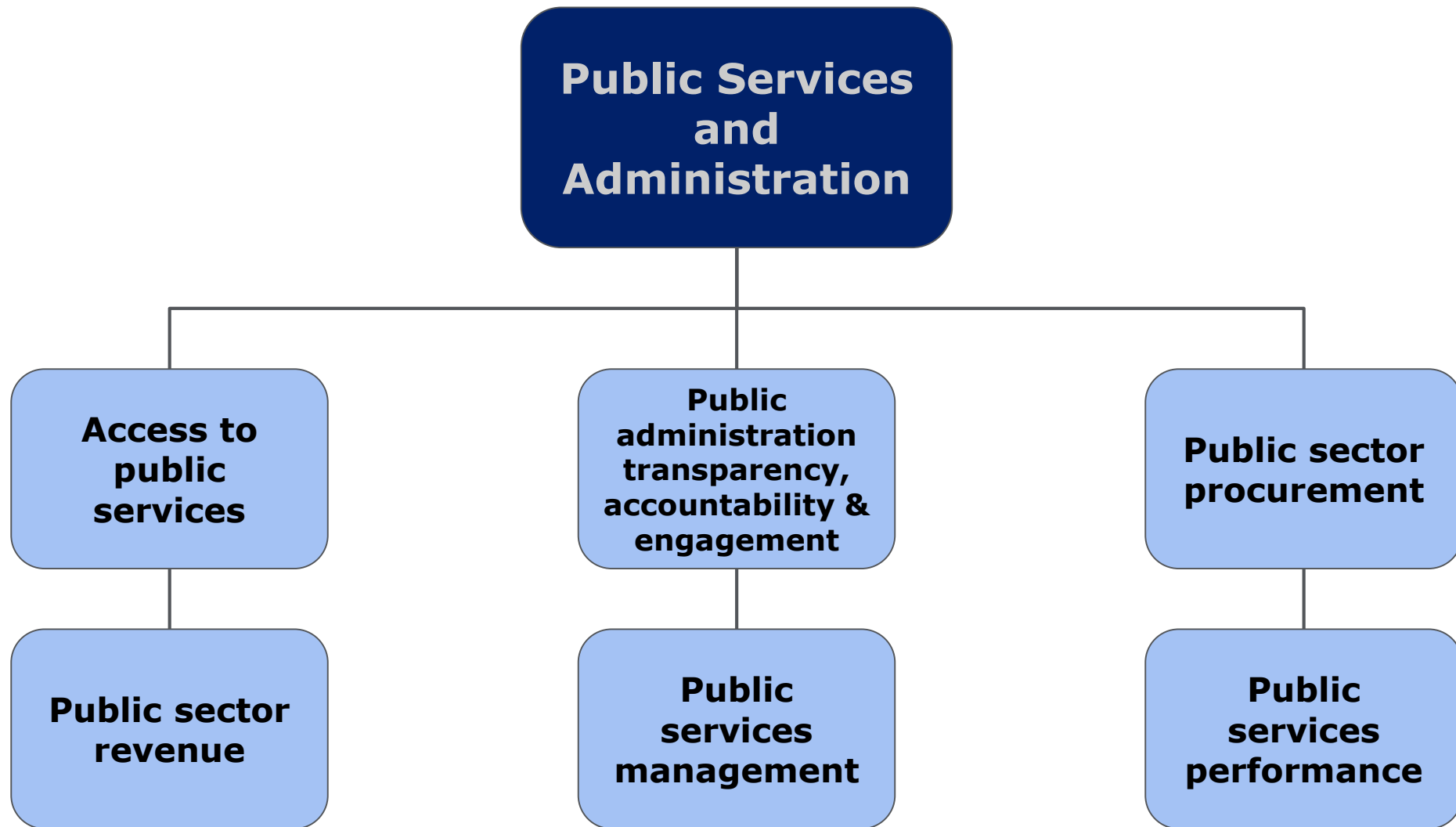
Finalised value framework for HVDs (6/9)

Framework



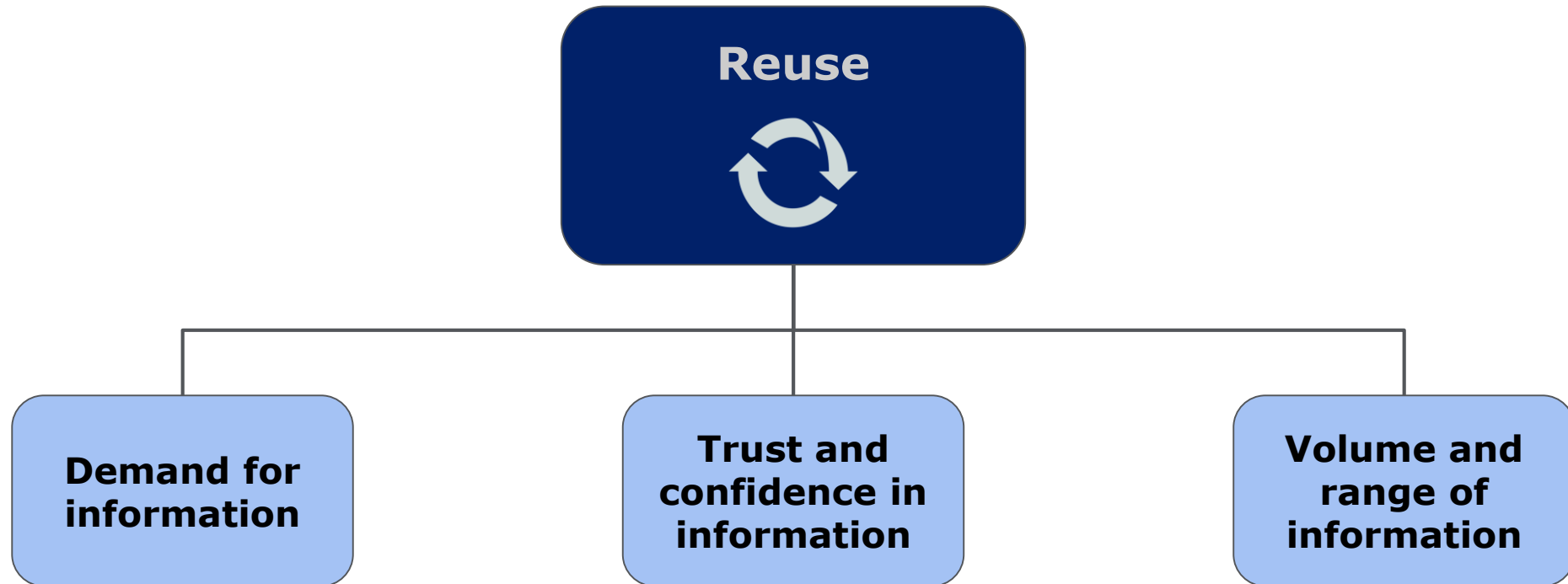
Finalised value framework for HVDs (7/9)

Framework



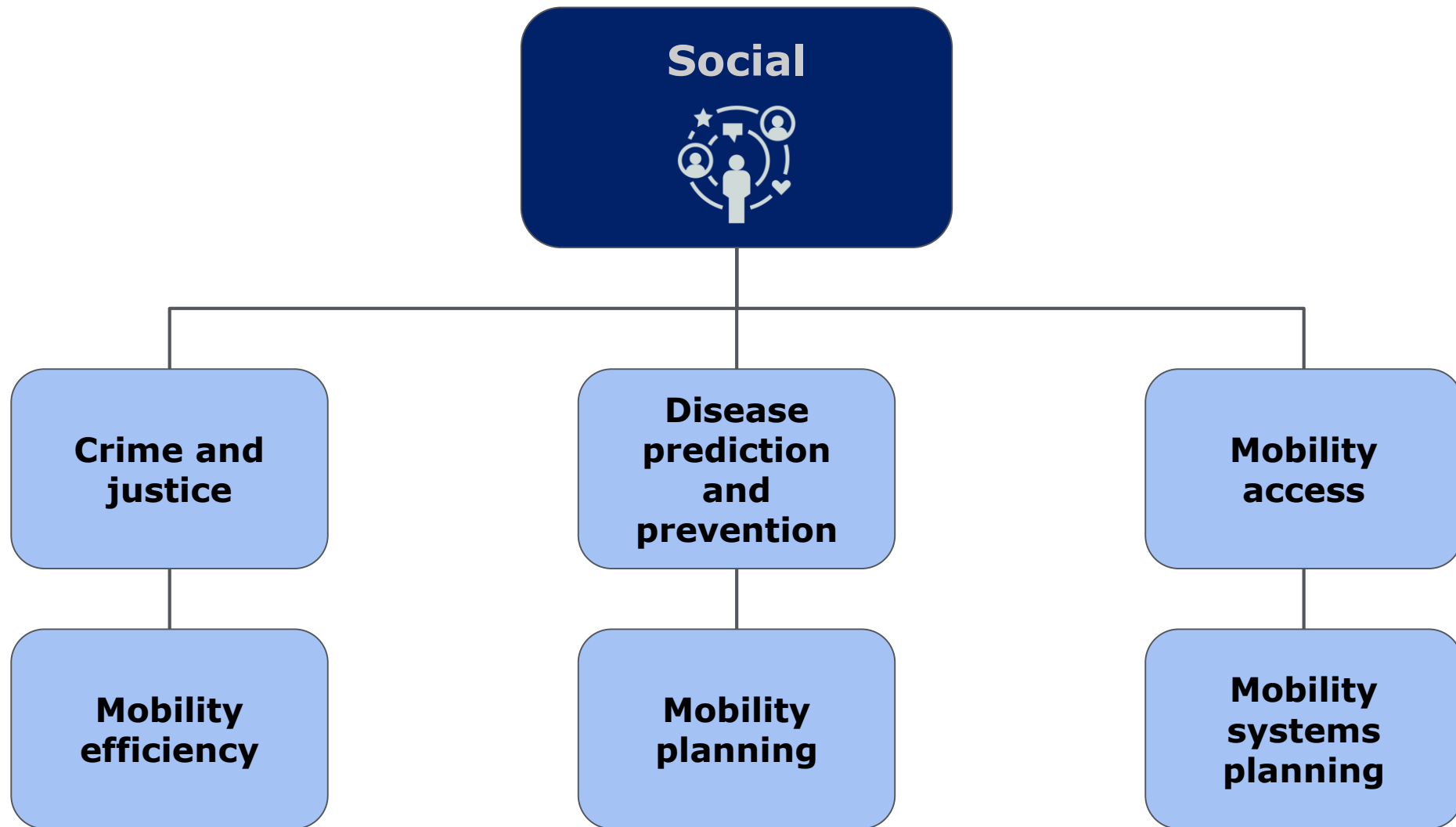
Finalised value framework for HVDs (8/9)

Framework



Finalised value framework for HVDs (9/9)

Framework








2. Policy options per thematic areas

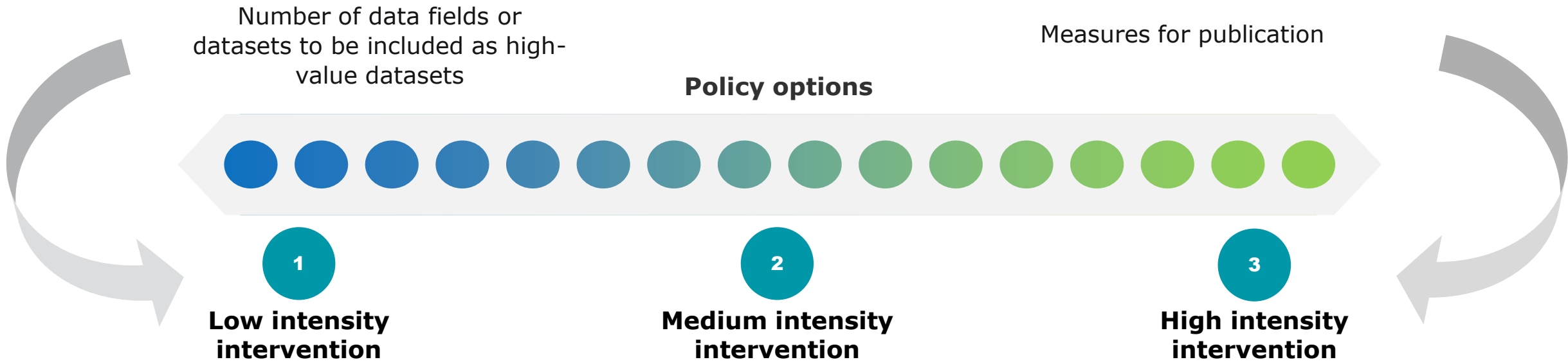


Introduction

Content of this session

-  Scope: datasets examined within each thematic area
-  High-level costs and benefits per thematic area
-  Policy option per thematic area

Parameters examined for policy option intervention



Company and company ownership

List of HVDs and their value

Basic information		Companies' documents and accounts	Companies ownership		Companies insolvency status
Non personal	Personal		Non personal	Personal	
<ul style="list-style-type: none"> • Name of the company (in different languages when applicable); • Company status (active, resolved, in liquidation, reconstruction, merger...) • Founding date; • Dissolution date (if applicable); • Historical names; • Addresses (i.e. legal, visiting postal); • Legal form; • Identifiers (registration number / company identifier / tax identification number / phone number / e-mail address); • Member State where registered; • NACE code; • Number of employees; • Capital; • All changes (to individual companies and list of companies dissolved), and date of the last update. 	<ul style="list-style-type: none"> • (Name(s) of company legal representative(s); • Name of company's directors ;) • The appointment, termination of office and particulars of the persons who either as a body constituted pursuant to law or as members of any such body: <ul style="list-style-type: none"> ✓ are authorised to represent the company in dealings with third parties and in legal proceedings; it shall be apparent from the disclosure whether the persons authorised to represent the company may do so alone or are required to act jointly; ✓ take part in the administration, supervision or control of the company • All changes (to individual companies and list of companies dissolved), and date of the last update. 	<ul style="list-style-type: none"> • Legal entities; • Accounting documents, incl. financial statements, non-financial statements, management reports, and other reports (e.g. financial reports, audit reports, corporate governance reports); • Date of the last update; • Other companies documents which are provided to the authority (i.e. companies' meeting minutes). 	<ul style="list-style-type: none"> • Percentage ownership, and nature and extent of Beneficial Interest held (in shareholding and/or voting rights) as well as legal ownership; • Capital links between companies; • Owner identifier; • All changes, and date of the last update. 	<ul style="list-style-type: none"> • Name of the owner; • Month and Year of birth; • Nationality; • Names of shareholder s. 	<ul style="list-style-type: none"> • Type of insolvency proceeding; • Time limit for lodging claims; • Date of closing main insolvency proceedings; • The court before which the decision opening insolvency proceedings is to be lodged; • All changes (i.e. to individual companies and list of companies dissolved), and date of the last update




Company and company ownership

Expected costs & benefits

Expected costs		Expected benefits	
Infrastructural costs	<ul style="list-style-type: none"> Costs related to infrastructural investments such as portals, APIs, Servers (could), etc. 	Increase in reuse benefits	<ul style="list-style-type: none"> Increase overall number of users
Data transformation	<ul style="list-style-type: none"> Costs related to data processing including data cleaning, preparation of metadata, aggregation, anonymisation, etc. 	Increase economic benefits	<ul style="list-style-type: none"> Companies' data hold significant economic value for reusers and constitute a considerable share of the information sector
Operational costs	<ul style="list-style-type: none"> Costs related to data updates, replies to user requests, corrections of errors in the datasets, etc. 	Increase in AI & innovation	<ul style="list-style-type: none"> Citizens' innovation, private sector and public sector innovation would all be fostered by the greater possibilities of reuse of these datasets
Other costs	<ul style="list-style-type: none"> Any other costs such as legal advice on GDPR, training costs, etc. 	Increased social benefits	<ul style="list-style-type: none"> Crime fight, public engagement and understanding, and government accountability
		Increased env. & climate change benefits	<ul style="list-style-type: none"> Information contained in companies' accounts and reports can be used to analyse their environmental impact and sustainability outlook, giving consumers better information for choosing their products & services

Company and company ownership

Low intensity intervention – Datasets in scope

Basic information		Companies' documents and accounts	Companies ownership		Companies insolvency status
Non personal	Personal		Non personal	Personal	
<ul style="list-style-type: none"> • Name of the company (in different languages when applicable); • Company status (active, resolved, in liquidation, reconstruction, merger...) • Founding date; • Dissolution date (if applicable); • Historical names; • Addresses (i.e. legal, visiting postal); • Legal form; • Identifiers (registration number / company identifier / tax identification number / phone number / e-mail address); • Member State where registered; • NACE code; • Number of employees; • Capital; • All changes (to individual companies and list of companies dissolved), and date of the last update. 	<ul style="list-style-type: none"> • (Name(s) of company legal representative(s); • Name of company's directors ;) • The appointment, termination of office and particulars of the persons who either as a body constituted pursuant to law or as members of any such body: <ul style="list-style-type: none"> ✓ are authorised to represent the company in dealings with third parties and in legal proceedings; it shall be apparent from the disclosure whether the persons authorised to represent the company may do so alone or are required to act jointly; ✓ take part in the administration, supervision or control of the company • All changes (to individual companies and list of companies dissolved), and date of the last update. 	<ul style="list-style-type: none"> • Legal entities; • Accounting documents, incl. financial statements, non-financial statements, management reports, and other reports (e.g. financial reports, audit reports, corporate governance reports); • Date of the last update; • Other companies documents which are provided to the authority (i.e. companies' meeting minutes). 			



Company and company ownership

Low intensity intervention – Recommended measures

Dimensions		Basic information (non-personal and personal)	Companies documents and accounts
Openness-data specification	License (terms of use)	Creative Common 0 (or equivalent open license) Terms of use concerning personal data and registration No database right	
	Format	XML	
	Machine-readability	Available	
	Availability of API, bulk download	Both API and bulk download	
Documentation	Metadata (dataset content description)	Complete (*.csv document available)	
	Data linking	No specific recommendation	
	Documentation (incl. structure and semantics)	Complete and web-available	
	Shared vocabularies	Not mandatory	
	Taxonomies	Not mandatory	
Completeness	Traceability	Not necessary	
	Update frequency and timeliness	When available (min. weekly)	
	Granularity	Individual company level (plus identifier)	
	Key attributes	Company code for disambiguation	

Company and company ownership

Medium intensity intervention – Datasets in scope

Basic information		Companies' documents and accounts	Companies ownership		Companies insolvency status
Non personal	Personal		Non personal	Personal	
<ul style="list-style-type: none"> • Name of the company (in different languages when applicable); • Company status (active, resolved, in liquidation, reconstruction, merger...) • Founding date; • Dissolution date (if applicable); • Historical names; • Addresses (i.e. legal, visiting postal); • Legal form; • Identifiers (registration number / company identifier / tax identification number / phone number / e-mail address); • Member State where registered; • NACE code; 	<ul style="list-style-type: none"> • (Name(s) of company legal representative(s); • Name of company's directors ;) 		<ul style="list-style-type: none"> • Percentage ownership, and nature and extent of Beneficial Interest held (in shareholding and/or voting rights) as well as legal ownership; 	<ul style="list-style-type: none"> • Name of the owner; 	
<ul style="list-style-type: none"> • Number of employees; • Capital; • All changes (to individual companies and list of companies dissolved), and date of the last update. 	<ul style="list-style-type: none"> • <i>The appointment, termination of office and particulars of the persons who either as a body constituted pursuant to law or as members of any such body:</i> ✓ <i>are authorised to represent the company in dealings with third parties and in legal proceedings; it shall be apparent from the disclosure whether the persons authorised to represent the company may do so alone or are required to act jointly;</i> ✓ <i>take part in the administration, supervision or control of the company</i> • All changes (to individual companies and list of companies dissolved), and date of the last update. 		<ul style="list-style-type: none"> • Capital links between companies; • Owner identifier; • All changes, and date of the last update. 	<ul style="list-style-type: none"> • Month and Year of birth; • Nationality; • Names of shareholders. 	





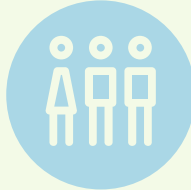

Company and company ownership

Medium intensity intervention – Recommended measures

Dimensions		Basic information (non-personal and personal)	Companies documents and accounts	Companies ownership	Companies status
Openness-data specification	License (terms of use)	Creative Common 0 (or equivalent open license) Terms of use concerning personal data and registration No database right			
	Format	XML - Json			
	Machine-readability	Available			
	Availability of API, bulk download	Both API and bulk download			
Documentation	Metadata (dataset content description)	Complete (*.csv document available)			
	Data linking	No specific recommendation			
	Documentation (incl. structure and semantics)	Complete and web-available			
	Shared vocabularies	ISA ² Core Vocabularies			
	Taxonomies	Recommended			
Completeness	Traceability	Not necessary			
	Update frequency and timeliness	Real time (minimum daily for insolvency data)			
	Granularity	Individual company level (plus identifier)	Individual owner (plus identifier)	Individual company level (plus identifier)	
	Key attributes	Company code for disambiguation	Beneficial owner code for disambiguation	Company code for disambiguation	

Company and company ownership

High intensity intervention – Datasets in scope

Basic information		Companies' documents and accounts	Companies ownership		Companies insolvency status
Non personal	Personal		Non personal	Personal	
					

Company and company ownership

High intensity intervention – Recommended measures

Dimensions		Basic information (non-personal and personal)	Companies documents and accounts	Companies ownership	Companies status
Openness-data specification	License (terms of use)	Creative Common 0 No terms of use No database right			
	Format	XML - Json			
	Machine-readability	Available			
	Availability of API, bulk download	Both API and bulk download			
Documentation	Metadata (dataset content description)	Complete (*.csv document available), DCAT-AP Complete (*.csv document available)			
	Data linking	No specific recommendation			
	Documentation (incl. structure and semantics)	Complete and web-available			
	Shared vocabularies	ISA ² Core Vocabularies			
	Taxonomies	Recommended			
Completeness	Traceability	Not necessary			
	Update frequency and timeliness	Real time (minimum daily for insolvency data)			
	Granularity	Individual company level (plus identifier)		Individual owner (plus identifier)	Individual company level (plus identifier)
	Key attributes	Company code for disambiguation		Beneficial owner code for disambiguation	Company code for disambiguation

Question #1, 2 & 3

Go to www.menti.com & enter 85 60 72

Geospatial

List of HVDs and their value

Datasets	Short description	Use Cases
Administrative Units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries. Land Administrative Units and Maritime Units are the basic units. Land Administrative Units are covering mostly land surface, while Maritime Units are covering territorial waters.	Mapping or use as statistical units, manage emergency rescue, waste management plans, protect water ecosystems, find responsible party for policy implementation and administration, forest management, subsidies for farmers, forecast agricultural production, spatial planning, monitoring of regional and urban policy implementation using territorial typologies based on administrative units, maritime spatial planning, integrated coastal management
Place Names	Geographical names or place names (or toponyms) are the proper nouns applied to topographical features and settled (and used) places and spaces on the earth's surface. Toponyms represent an important reference system used by individuals and societies throughout the world.	Emergency response Economic, social and environmental analysis Cultural identity and heritage Mapping and navigation Providing a link / index function to other spatial and aspatial data
Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code. The basic unit of addressing is a building; a permanent construction, intended or used for the shelter of people, having at least one entrance from publicly-accessible space.	Geocoding of statistical surveys, manage emergency rescue, locate where people are, accessibility studies, manage incidents; locate economic activities in ecosystem accounting
Buildings	Geographical location of buildings. Constructions above and/or underground, intended or used for the shelter of humans, animals, things, the production of economic goods or the delivery of services that refer to any structure permanently constructed or erected on its site [from INSPIRE Data Specifications on Buildings].	Buildings are 3D topographic objects and, as such, may influence the propagation of physical phenomena. These data are required for serving citizens (e.g. school, hospital), assessments for air and noise pollution or risk assessments to various kinds of risks (earthquake, fire, flood etc.), monitoring of land consumption, population concentration and access to services.
Cadastral Parcels	Single areas of Earth surface (land and/or water), under homogeneous real property rights and unique ownership, real property rights and ownership being defined by national law.	Protect state lands, reduce land disputes, facilitate land reform, agriculture, land management, taxation, disaster management, real Estate Market, Taxation, LPIS (Agriculture), Land consolidation, Infrastructure Management, Spatial Planning, Protection of Soil and Water, Statistics

Geospatial

Expected costs & benefits

Cost components	Cost components description	Magnitude of costs (range)
Infrastructural costs	Establishment of the API and bulk download, adaptation of the IT infrastructure to real time provision	Initial investment (one time only) depending on the solution, in between 250,000 and 3,000,000 EUR. For further developments, depending on the country and the size, an example is the costs for data storage device: 450,000 EUR (once off)
Data transformation costs	Costs related to data processing including data cleaning, preparation of metadata, aggregation, anonymisation, etc.	In between 100,000 and 200,000 EUR (yearly)
Operational costs	Costs related to data updates, replies to user requests, corrections of errors in the datasets, etc.	In between 150,000 and 350,000 EUR (yearly)
(Lost) income for data supplier	(Share of) revenue related to the provision of the HVD	Depending on country. (e.g. Sweden:90mIn SEK)
Other costs	Any other costs such as legal advice on GDPR, training costs, etc.	Not Available
Negative impact on competition	The estimated impact of competition distortion vis-à-vis private organisations active in the domain.	Not available

Geospatial Low intensity intervention

Dimensions		Administrative units	Place Names	Addresses	Buildings
Openness	License and terms of use	CC-BY 4.0			
	Format	GML; GeoPackage; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; CSV; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; CSV; GeoJSON; INSPIRE recommendations	GML; GeoPackage; GeoJSON; INSPIRE recommendations.
	Machine-readability	Recommended			
	Availability of API, bulk download	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API).			
Documentation	Metadata (dataset content description)	INSPIRE			
	Documentation (incl. structure and semantics)	INSPIRE; GeoDCAT-AP.			
	Data linking				
	Shared vocabularies/taxonomies	INSPIRE			
Completeness	Traceability	National geodata Catalog or open data catalog.			
	Update frequency and timeliness	Annual update	When necessary	When necessary	When necessary
	Granularity	Boroughs; municipalities; districts; provinces; regions; national borders; sea-frontiers.	National coverage	Partial National coverage (e.g. most populated cities)	Partial National coverage (e.g. most populated cities)
	Key attributes	National identification code; identification code of the upper administrative level; official name; short name; abbreviation; coordinate reference system used by the national government.	Name; category; latitude and longitude (WGS84) (INSPIRE).	Latitude and longitude (wgs84); house number; suffix of the number; name of the street; name of the municipality; national identification code of the municipality; last update; type of position.	Footprint of the building.

Geospatial

Low intensity intervention – Recommended measures

- Concerning **licences and terms of use**, the recommended licence for the low intensity intervention is the CC-BY 4.0. This recommended option will have no impact since this type of licences is widely used across Member States. In the same time, this type of licence is also preferred by re-users.
- When it comes to **formats**, an option for the publication of datasets is to follow INSPIRE recommendations. According to the stakeholders' suggestions, the recommendation is to use Geopackage and GeoJSON, which are two relatively recent open and low-cost formats. GeoJSON is commonly used, the reusers have shown a strong preference for new open standards like Geopackage. Using these formats increases the machine-readability of data.
- **Granularity:** concerning Addresses and Buildings datasets the recommendation is to guarantee at least a partial coverage (e.g. most populated cities). Based on our interviews, the findings already show a diversified situation across the MS and issues related to data ownership at local level, costs of management and update that strongly affect the lack of national coverage.
- The **metadata** should match the INSPIRE requirements as the transformation to geoDCAT-AP can be done automatically from this basis. It is important that the data are also displayed in geoDCAT-AP in order to integrate them automatically into national open data portals.
- When it comes to **key attributes**, the values identified correspond to the common characteristics available across the majority of the Member States, for each type of dataset in scope. This is due to the implementation of the INSPIRE directive. Therefore, the impact on the organisations will remain rather low and limited.

Geospatial Medium intensity intervention (including Cadastral Parcels)

Dimensions		Administrative units	Place Names	Addresses	Buildings	Cadastral parcels
Openness	License and terms of use	CC-BY 4.0				
	Format*	GML; GeoPackage; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; CSV; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; CSV; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; GeoJSON; INSPIRE recommendations.
	Machine-readability	Recommended and necessary				
	Availability of API, bulk download	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API).				Read-only mode (WMS service defined by INSPIRE).
Documentation	Metadata (dataset content description)	INSPIRE				
	Documentation (incl. structure and semantics)	INSPIRE; GeoDCAT-AP.				
	Data linking					
	Shared vocabularies/taxonomies	INSPIRE				
Completeness	Traceability	National geodata Catalog and /or open data catalog				
	Update frequency and timeliness	Annual update	When necessary	When necessary	When necessary	When necessary
	Granularity	Boroughs; municipalities; districts; provinces; regions; national borders; sea-frontiers.	National coverage	National coverage	National coverage ; Level of scale 1:10000	National coverage ; Level of scale 1:10000
	Key attributes	National identification code; identification code of the upper administrative level; official name; short name abbreviation; name in multiple languages ; coordinate reference system used by the national government.	Name; name in multiple languages ; category; latitude and longitude (WGS84) (INSPIRE)	Latitude and longitude (WGS84); house number; suffix of the number; name of the street; name of the municipality; national identification code of the municipality; last update	Footprint of the building; entrances ; levels ; type of destination .	Geometry of cadastral parcels; type of particle; particle code; references to the administrative area to which the particle belongs.

Geospatial

Medium intensity intervention – Recommended measures

The medium intensity intervention would be slightly more ambitious than the previous one. The datasets in scope include Cadastral parcels. The findings show that the access to the Cadastral parcels is guaranteed by many Member States, that, at least, adopt the solution of read-only mode access. Basically, the changes in this intervention apply to the different recommended measures for publication. The medium intensity intervention builds up on the low intensity intervention and the new elements added are displayed in the table below.

As displayed in the table, the medium intensity intervention updates slightly the previous type of intervention. The major change is the number of the datasets to be considered as HVDs, complemented by few adjustments to the modes of provisions. The justifications for each of these recommended measures are the following:

- *While the recommendations for **formats** do not change in the medium intensity intervention, the proposal of using dedicated services for automatic conversion is added.
- **APIs and bulk download:** for the newly added dataset – cadastral parcels - the recommendation is to ensure at least access through WMS service as defined by INSPIRE, in read-only mode, due to the difficulties in the release of this dataset. The WMS remains a data product which allows the creation of new georeferenced data; the view of the geo-data as a whole. The WMS protocol provides feature information (as XML) by identifying a point on a map. For the other datasets, the download through API, bulk download, OGC services listed by INSPIRE should be guaranteed.
- When it comes to **granularity**, there are no changes for administrative units and place names. However, for the rest of the datasets, the coverage is extended to full national coverage, and for buildings and cadastral parcels the recommended level of scale of 1:10000 is also added. The increase of detail in the level of scale corresponds to a raise in the costs of the dataset production.
- **Key Attributes:** the interviewed stakeholders highlighted the relevance of having names in multiple languages as a key attribute, because it significantly improves the reuse. Regarding the Buildings dataset, entrances and levels are recommended in the list of the key attributes, as based on these elements it's possible to calculate the height of the building. The type of destination could be generic and very basic. The recommended attributes for the Cadastral Parcels are the basic ones needed to release cadastral data with respect to the GDPR and to guarantee a good level of reusability.

Geospatial High intensity intervention

Dimensions		Administrative units	Place Names	Addresses	Buildings	Cadastral parcels
Openness	License and terms of use	CC0				
	Format	GML; GeoPackage; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; CSV; GeoJSON INSPIRE recommendations.	GML; GeoPackage; CSV; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; GeoJSON; INSPIRE recommendations.	GML; GeoPackage; GeoJSON; INSPIRE recommendations.
	Machine-readability	Recommended and necessary.				
	Availability of API, bulk download	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API); SPARQL end point .	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API); SPARQL end point .	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API); SPARQL end point .	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API); SPARQL end point .	Bulk download; INSPIRE distribution services; RestAPI (e.g. OGC API, ArcGIS RestAPI, Carto API); SPARQL end point .
Documentation	Metadata (dataset content description)	INSPIRE				
	Documentation (incl. structure and semantics)	INSPIRE / GeoDCAT-AP	INSPIRE / GeoDCAT-AP	INSPIRE / Geo DCAT-AP	INSPIRE / GeoDCAT-AP	INSPIRE / GeoDCAT-AP
	Data linking	To be considered				
	Shared vocabularies/taxonomies	INSPIRE				
Completeness	Traceability	National geodata Catalog and open data catalog .				
	Update frequency and timeliness	Annual update	When necessary	When necessary	When necessary	When necessary
	Granularity	Boroughs; municipalities; districts; provinces; regions; national borders; sea-frontiers.	National coverage	National coverage	National coverage; level of scale 1:5000	National coverage; level of Scale 1:5000
	Key attributes	National identification code; identification code of the upper administrative level; official name; short name abbreviation; name in multiple languages; coordinate reference system used by the national government.	Name; name in multiple languages; category; latitude and longitude (WGS84) (INSPIRE).	Latitude and longitude (WGS84); house number; suffix of the number; name of the street; zip code ; name of the municipality; national identification code of the municipality; last update; type of position.	Footprint of the building; height ; entrances; levels; type of destination.	Geometry of cadastral parcels; type of particle; particle code; references to the administrative area to which the particle belongs.

Geospatial

High intensity intervention – Recommended measures

The main differences with the medium intensity intervention refer to the licence, the APIs and few changes on granularity and key attributes options for the datasets in scope:

- Concerning **licences and terms of use**, the recommendation is the use of CC0. According to our research, this type of licence is already adopted for the datasets in scope across several Member States. However, it continues to be not applied because it implies legal issues of compatibility and raises a lot of scepticism in terms of lack of attribution, and charging of responsibility.
- When it comes to the availability through **APIs** and **bulk download**, the option for SPARQL Endpoint has been added. This implies a more accurate implementation in the use of sharing vocabularies and metadata. This is already available in the Netherlands. Also, the distribution and the download through APIs option is extended to include the Cadastral Parcels.
- For **granularity**, the recommended level of scale is changed to 1:5000, for buildings and cadastral parcels datasets. This is a step beyond the medium intensity intervention. Concerning administrative units and place names, the scale depends on what it has to be visualized.
- **Traceability:** The issues related to the interoperability between the geo-catalogs and open data catalogs can be solved by using the GEO-DCAT AP and DCAT-AP 1.0. However, the actual implementation of the open data catalogs encompasses the use of DCAT-AP 2.0, which results to be incompatible with the GEO-DCAT AP. This policy option should support a resolution of these challenges.
- **Key Attributes:** Concerning the Addresses in this intervention, the zip code is here added as a key attribute, although this information is privately owned in most of the cases and, could be significantly hard to obtain. Regarding the Buildings, the attribute of the height is fundamental and very relevant in terms of value and reuse scenarios. This information is costly for data holders, if not collected from the beginning. Alternatively, the number of floors (levels) should be guaranteed. The type of destination should be as more detailed as possible, at least the requirement should refer to the public/private nature of the building. In this case, please see INSPIRE recommendations, the information on the types of building are defined in the Annex III . The Cadastral Parcels' key attributes remain unchanged compared to the previous policy intervention – of medium intensity.

Question #4 & 5

Go to www.menti.com & enter 85 60 72

Meteorological

List of HVDs and their value

- Data holders and re-users see clear value chain for meteorological data
- Value created in large variety of sectors
- MS with open data policy show non-linear increase in demand as well as benefits generally outweighing costs / new tax revenue outweighing costs by multiples.
- High friction comes from fees and mixed licensing (also in comparison with more uniform open US market)

Data sets
Observations data
Climate data (incl. validated observations)
Radar data
Numerical Weather Prediction model data
Weather Alerts

Meteorological

Expected costs and benefits

Expected costs		Expected benefits	
Infrastructural costs	<ul style="list-style-type: none"> Costs related to infrastructural investments, specifically APIs, are main concern, next to timely provisioning. 	Increase in reuse benefits	<ul style="list-style-type: none"> Increase overall number of users, and volume per user. Removing fees leads to non-linear jump in re-use, and new commercial entrants.
Data transformation	<ul style="list-style-type: none"> Low costs expected related to data processing including data cleaning, preparation of metadata, aggregation, etc. unless uncommon file formats demanded 	Increase economic benefits	<ul style="list-style-type: none"> Wide variety of sectors re-use data, Singular use cases can be bigger than total cost of transition. Over time new tax revenue bigger than costs of provisioning.
Operational costs	<ul style="list-style-type: none"> Where third party cloud services are used, data volume and demand may mean increased marginal costs. 	Increase in AI & innovation	<ul style="list-style-type: none"> Re-use outside traditional meteorological value added services will grow. Novel uses emerge based on real-time data (e.g. IoT), or less used variables.
Other costs	<ul style="list-style-type: none"> Charging for data is a common practice (13 MS charge for observations data) Marginal costs models regularly lack transparency. Experience suggests compensating revenue loss from general budget. 	Increased social benefits	<ul style="list-style-type: none"> More consumer centric services, informing daily decisions (e.g. mobility, sports)
		Increased env. & climate change benefits	<ul style="list-style-type: none"> Growing citizen science communities w.r.t. climate adaptation. Strong role in green energy (planning, and operations) Usage in agriculture to reduce water and pesticide usage and climate adaptation.

Meteorological

Low intensity intervention

- High friction comes from fees, and dealing with loss of revenue is unavoidable even at low intensity interventions. 13 MS currently charge for observations data.
- Observations are the starting point of the meteo-data value chain
- Timeliness, completeness & highest available temporal/geographic resolution determine re-use value
- Weather alerts are at core of the public task, already published as information

Data sets
Observations data
Climate data (incl. validated observations)
Radar data
Numerical Weather Prediction model data
Weather Alerts

Meteorological

Low intensity intervention Recommended measures

Dimensions		Observations	Validated observations	Weather Alerts
<i>Openness-data specification</i>	<i>License (terms of use)</i>	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use
	<i>Format</i>	BUFR, NetCDF, ascii, JSON (for hourly)	NetCDF	XML (CAP and/or RSS-Atom)
	<i>Machine-readability</i>	Available	Available	Available
	<i>Availability of API, bulk download</i>	Both API and bulk download	Both API and bulk download	Both API and bulk download
<i>Documentation</i>	<i>Metadata (dataset content description)</i>	Complete (*.csv document available)	Complete (*.csv document available)	Complete (*.csv document available)
	<i>Documentation (incl. structure and semantics)</i>	Complete and web-available	Complete and web-available	Complete and web-available
<i>Completeness</i>	<i>Update frequency and timeliness</i>	Every 5-10 minutes in real time for automated stations, hourly unvalidated, for the last 24hrs	Daily validated hourly (and better temporal resolution) and daily average observations data ;	As issued, or hourly
	<i>Granularity</i>	Per weather station, full temporal resolution	Per weather station, full temporal resolution	48hrs ahead
	<i>Key attributes</i>	All observation variables measured	All validated observation variables measured	

Meteorological

Medium intensity intervention

- Adds radar data, which can be voluminous (depending on data format)
- Adds structured historical climate data
- European Meteorological Infrastructure (EMI) might play a role for data provision, in support of smaller NWSs

Data sets
Observations data
Structured historical Climate data (incl. validated observations)
Radar data
Numerical Weather Prediction model data
Weather Alerts

Meteorological

Medium intensity interventions Recommended measures

Dimensions		Observations	Climate	Weather Alerts	Radar
Openness- data specification	License (terms of use)	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use
	Format	BUFR, NetCDF, ascii, json (for hourly)	NetCDF	XML (CAP and/or RSS-Atom)	HDF5
	Machine-readability	Available	Available	Available	Available
	Availability of API, bulk download	Both API and bulk download	Both API and bulk download	Both API and bulk download	Both API and bulk download
Documentation	Metadata (dataset content description)	Complete (*.csv document available)	Complete (*.csv document available)	Complete (*.csv document available)	Complete (*.csv document available)
	Documentation (incl. structure and semantics)	Complete and web-available	Complete and web-available	Complete and web-available	Complete and web-available
Completeness	Update frequency and timeliness	Every 5-10 minutes in real time for automated stations, hourly unvalidated for the last 24hrs	Daily validated hourly (and better temporal resolution) and daily average observations data ; structured historic data	As issued, or hourly	Near real time in 5 minute intervals
	Granularity	Per weather station, full temporal resolution	Per weather station, full temporal resolution	48hrs ahead	Per radar station in the MS, and national composite
	Key attributes	All observation variables measured	All validated observation variables measured		Precipitation, wind and echo-tops

Meteorological

High intensity intervention

- Adds Numerical Weather Prediction model data
- High volume, especially NWP ensemble data (depending on data format)
- European Meteorological Infrastructure (EMI) might play a role for data provision
- Adds unstructured but digitised historical climate data (data transformation costs maybe involved)

Data sets
Observations data
Climate data (incl. validated observations)
Radar data
Numerical Weather Prediction model data
Weather Alerts

Meteorological

High intensity intervention Recommended measures

Dimensions		Observations	Climate	Weather Alerts	Radar	NWP model data
Openness-data specification	License (terms of use)	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use
	Format	BUFR, NetCDF, ascii, json (for hourly)	NetCDF	XML (CAP and/or RSS-Atom)	HDF5	GRIB (or NetCDF)
	Machine-readability	Available	Available	Available	Available	Available
	Availability of API, bulk download	Both API and bulk download	Both API and bulk download	Both API and bulk download	Both API and bulk download	Both API and bulk download
Documentation	Metadata (dataset content description)	Complete (*.csv document available)	Complete (*.csv document available)	Complete (*.csv document available)	Complete (*.csv document available)	Complete (*.csv document available)
	Documentation (incl. structure and semantics)	Complete and web-available	Complete and web-available	Complete and web-available	Complete and web-available	Complete and web-available
Completeness	Update frequency and timeliness	Every 5-10 minutes in real time for automated stations, hourly unvalidated for the last 24hrs	Daily validated hourly (and better temporal resolution) and daily average observations data ; historic data	As issued, or hourly	Near real time in 5 minute intervals	Last 24hrs, every 6hrs, or better temporal resolutions
	Granularity	Per weather station, full temporal resolution	Per weather station, full temporal resolution	48hrs ahead	Per radar station in the MS, and national composite	48hrs ahead in 1hr steps, national, at 2.5km/best available grid
	Key attributes	All observation variables measured	All validated observation variables measured		Precipitation, wind and echo-tops	Deterministic, and/or ensembles if available

Question #6 & 7

Go to www.menti.com & enter 85 60 72

Earth observation and environment

List of HVDs and their value

Earth Observation and Environmental extremely broad scope and fragmented (MS suggested hundreds of different datasets). Copernicus services depend on in-situ data from MS. Use cases broad across user groups and sectors, incl. public sector, but often hard to quantify (though many usage examples exist).

Main friction in fragmentation of data, diverse terms of use, fees.

All data within scope of INSPIRE and Environmental e-reporting priority data: adds open data requirement to INSPIRE / E-prio. Data features still to be further determined per INSPIRE theme.

Earth observation	Environmental data	
Coastal vulnerability (III)	Air quality (prio)	Noise (prio)
Digital elevation models (II)	Biodiversity (III, prio)	Soil (III)
Geology/geophysics (II)	Emissions (prio)	Waste (prio)
Hydrography (I)	Environmental monitoring (III, prio)	Water (prio)
Land parcels (I), cover (II), use (III)	Forestry (II / land use)	
Oceanography (III)	Natural hazards (III)	
Ortho-imagery (II)	Nature preservation (I, prio)	

Earth observation and environment

Expected costs and benefits

Extremely broad scope (MS suggested hundreds of different datasets), assessing costs and benefits hard to quantify. Re-use benefits often based on combinations of data from various subthemes, measurement data e.g. needs administrative data to be useful. No real 'hierarchy' of use value to be made.

Expected costs		Expected benefits	
Infrastructural costs	<ul style="list-style-type: none"> Costs related to infrastructural investments, specifically APIs, are main concern. 	Increase in reuse benefits	<ul style="list-style-type: none"> Increased demand from citizens, research, businesses, and public sector. Removing friction in access to in-situ data very important to improve services e.g. Copernicus
Data transformation	<ul style="list-style-type: none"> Low costs expected, compared to infrastructure, related to data processing including data cleaning, preparation of metadata, aggregation, etc. unless significantly different from INSPIRE requirements. Collating data from dispersed sources also a cost, yet its own benefit too. 	Increase economic benefits	<ul style="list-style-type: none"> Wider variety of sectors re-use data, (EARSC identified 100+ products and services in 22 market sectors).
Operational costs	<ul style="list-style-type: none"> Rarely made explicit. Rising demand may increase bandwidth costs. 	Increase in AI & innovation	<ul style="list-style-type: none"> New services mixing EO/environmental data. European Data Portal now lists over 40 such new services. Novel uses w.r.t. execution of public tasks.
Other costs	<ul style="list-style-type: none"> Charging for certain EO data is common, also between PSB's, with free data having re-use limitations applied. Experience suggests compensating revenue loss from general budget. 	Increased benefits for public services	<ul style="list-style-type: none"> Efficiency gains for public sector bodies, including data fees. Better public sector performance of PSB's other than dataholder.
		Increased social benefits	<ul style="list-style-type: none"> Reporting obligations create demand w.r.t. transparency and public engagement.
		Increased env. & climate change benefits	<ul style="list-style-type: none"> Growing citizen science communities. Strong role in energy, agriculture, environment management and climate adaptation.

Earth observation and environment

Low intensity intervention

Limits scope to Environmental e-reporting priority data (which includes environmental measurements). Reporting obligations create their own re-use demand, but mostly re-use depends on combinations with other data now outside this scope.

Adds open data obligation to e-reporting priority data, removing non-commercial restrictions mostly.

Earth observation	Environmental data	
Coastal vulnerability (III)	Air quality (prio)	Noise (prio)
Digital elevation models (II)	Biodiversity (III, prio)	Soil (III)
Geology/geophysics (II)	Emissions (prio)	Waste (prio)
Hydrography (I)	Environmental monitoring (III, prio)	Water (prio)
Land parcels (I), cover (II), use (III)	Forestry (II / land use)	
Oceanography (III)	Natural hazards (III)	
Ortho-imagery (II)	Nature preservation (I, prio)	

Earth observation and environment

Low intensity intervention Recommended measures

Dimensions		E-reporting priority data	
<i>Openness-data specification</i>	<i>License (terms of use)</i>	Creative Commons 0 or BY (or equivalent open license) No terms of use	
	<i>Format</i>	As prescribed in e-reporting priority data list	
	<i>Machine-readability</i>	Available	
	<i>Availability of API, bulk download</i>	Both API and bulk download, as prescribed in e-reporting priority list (wfs)	
<i>Documentation</i>	<i>Metadata (dataset content description)</i>	Complete (*.csv document available)	
	<i>Documentation (incl. structure and semantics)</i>	Complete and web-available	
<i>Completeness</i>	<i>Update frequency and timeliness</i>	As prescribed in e-reporting priority data list	
	<i>Granularity</i>	As prescribed in e-reporting priority data list	
	<i>Key attributes</i>	All attributes mentioned in e-reporting priority data list	

Earth observation and environment

Medium intensity intervention

Includes Environmental e-reporting priority data, as well as the listed INSPIRE themes. Adds open data requirements to INSPIRE (download) services. Allows combinations found across varied use cases.

Removes restrictive terms of use and fees. INSPIRE’s data harmonisation efforts extend to open data. (Data features still to be further determined per INSPIRE theme). Keeps following current INSPIRE standards.

Earth observation	Environmental data	
Coastal vulnerability (III)	Air quality (prio)	Noise (prio)
Digital elevation models (II)	Biodiversity (III, prio)	Soil (III)
Geology/geophysics (II)	Emissions (prio)	Waste (prio)
Hydrography (I)	Environmental monitoring (III, prio)	Water (prio)
Land parcels (I), cover (II), use (III)	Forestry (II / land use)	
Oceanography (III)	Natural hazards (III)	
Ortho-imagery (II)	Nature preservation (I, prio)	

Earth observation and environment

Medium intensity intervention Recommended measures

Dimensions		E-reporting priority data	INSPIRE themes
<i>Openness-data specification</i>	<i>License (terms of use)</i>	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use
	<i>Format</i>	As prescribed in e-reporting priority data list	INSPIRE recommendations
	<i>Machine-readability</i>	Available	Available
	<i>Availability of API, bulk download</i>	Both API and bulk download, as prescribed in e-reporting priority list (wfs)	INSPIRE distribution services (wfs) and bulk download
<i>Documentation</i>	<i>Metadata (dataset content description)</i>	Complete (*.csv document available)	INSPIRE
	<i>Documentation (incl. structure and semantics)</i>	Complete and web-available	INSPIRE
<i>Completeness</i>	<i>Update frequency and timeliness</i>	As prescribed in e-reporting priority data list	INSPIRE
	<i>Granularity</i>	As prescribed in e-reporting priority data list	INSPIRE
	<i>Key attributes</i>	All attributes mentioned in e-reporting priority data list	Not yet fully specified

Earth observation and environment

High intensity intervention

Covers INSPIRE themes in full.

Publishing dimensions (temporarily) moving ahead of current general INSPIRE standards, and following them thereafter. Adds additional costs for API development / data transformation.

Earth observation	Environmental data	
Coastal vulnerability (III)	Air quality (prio)	Noise (prio)
Digital elevation models (II)	Biodiversity (III, prio)	Soil (III)
Geology/geophysics (II)	Emissions (prio)	Waste (prio)
Hydrography (I)	Environmental monitoring (III, prio)	Water (prio)
Land parcels (I), cover (II), use (III)	Forestry (II / land use)	
Oceanography (III)	Natural hazards (III)	
Ortho-imagery (II)	Nature preservation (I, prio)	

Earth observation and environment

High intensity intervention Recommended measures

Dimensions		E-reporting priority data	INSPIRE themes
<i>Openness-data specification</i>	<i>License (terms of use)</i>	Creative Commons 0 or BY (or equivalent open license) No terms of use	Creative Commons 0 or BY (or equivalent open license) No terms of use
	<i>Format</i>	As prescribed in e-reporting priority data list	INSPIRE recommendations; xml/gml (geo)json
	<i>Machine-readability</i>	Available	Available
	<i>Availability of API, bulk download</i>	Both API and bulk download, as prescribed in e-reporting priority list (wfs)	OGC:API, then INSPIRE distribution services, and bulk download
<i>Documentation</i>	<i>Metadata (dataset content description)</i>	Complete (*.csv document available)	INSPIRE
	<i>Documentation (incl. structure and semantics)</i>	Complete and web-available	INSPIRE
<i>Completeness</i>	<i>Update frequency and timeliness</i>	As prescribed in e-reporting priority data list	INSPIRE
	<i>Granularity</i>	As prescribed in e-reporting priority data list	INSPIRE
	<i>Key attributes</i>	All attributes mentioned in e-reporting priority data list	All features within INSPIRE theme's scope

Question #8 & 9

Go to www.menti.com & enter 85 60 72

Statistics

List of HVDs and their value

Official statistics become high-value datasets based on their use - who needs them and why, how and where are they applied. In general, stakeholders and re-users agree that **all official statistics** should be considered high-value datasets. Due to the broad selection of datasets within the official statistics, and considering the inputs received from stakeholders, we propose a short list of datasets as potential high-value datasets.

Dataset	Description
Demographic	Constitute key statistics in understanding socio-economic development of countries; provide information on the overall structure and trend of population development and often they are available for longer periods of time (long time series). It is often used to provide background information for different macro characteristics categories.
Labour market	Complete picture of the socio-economic environment within a country. It helps identify economic needs and niches of opportunities. The employment and job vacancies underline the labour market dynamism, while unemployment rates show both development's hotspots and the structural issues within economies.
Gross Domestic Product (GDP)	Provides relevant information on the health of a country's economy as well as of its specific economic sectors. Often is used to measure of countries' economic performance. Its components provide insight on the financial performance and on the value added of the economy as a whole, but also at the level of specific activities, components and/or economic sectors.
Government finances	Help improve the transparency and accountability of the public spending, and provide information on efficiency and effectiveness use of public money. It contributes to the identification of spending patterns of public money, and pointing out to possible cases of misuse and waste.

Statistics

Expected costs and benefits

Expected costs

- It is difficult to identify specific costs for particular datasets as in most cases it is part of the regular activity of the organization
- **Infrastructural costs** (*related to portals, APIs, Servers (could), etc.*) depend significantly on the current IT development structure and country size. Often such an overall estimate will include both on-time investments (e.g. development and implementation of a solution), and yearly maintenance costs of the infrastructure itself. Exact values were difficult to gather.
- **Data transformation costs** (*related to data processing including data cleaning, preparation of metadata, aggregation, anonymisation, etc.*) are also part of current activities of an NSI, and often there are no breakdowns by datasets or parts of them.
- **Operational costs** (*related to data updates, replies to user requests, corrections of errors in the datasets, etc.*) are another category that is part of the day-by-day of the NSIs, and a breakdown by specific costs was difficult to provide.
- **Other costs** (*related to legal advice on GDPR, training costs, etc.*) were also difficult to quantify

Expected benefits

- Statistics have different types of users: media and general public, international policies and organisations, decision makers, analysts, non-governmental organisations (NGOs), the civil society, producers of statistics and the scientific community and researchers.
- Better outcomes from the **decision makers** (public sector, business sector or individuals) by making use of high-quality information to perform their function.
- Increase in transparency and improvement of the accountability of public and other bodies from the **citizens** side
- Better understanding of the society by providing relevant information while respecting the rights of people, at the same time
- Enabling new **research** and **analysis** on the basis of a comprehensive evidence-base, leading to innovation and improved economic and social outcomes.

Statistics

General context and datasets overview

As part of the European Statistical System, the statistics are both standardised and harmonised across Member States.

Also, the datasets in scope are freely available in all Member States.

Demography	Labour market	GDP	Government finances
Key attributes are gender, five years age groups, place of residence; births and deaths, life expectancy, crude rates for births and for deaths, fertility rates, citizenship, education level (specific datasets).	Key attributes are gender, five years age groups, place of residence, education level, duration of unemployment, employment rate, unemployment rate, job vacancies, occupations.	Key attributes include gross value-added, final consumption, exports and imports, taxes and subsidies, gross capital formation, compensation of employees.	Key attributes are revenues and expenditures (by specific categories) [e.g. expenditures by type of government functions (COFOG)].
Breakdowns include by regional level (NUTS 2), with NUTS 3 for specific sets.	Breakdowns include regional level (NUTS 2).	Breakdowns include economic sectors (NACE rev. 2) and regional level (NUTS 2 for specific datasets)	No specific breakdowns for this category.

The policy options will focus more on the measures for publication rather than the number of data fields and/or datasets to be included as high-value datasets.

Statistics

Low intensity intervention

	Description	Demography	Labour Market	GDP	Government finances
Openness	Licence and terms of use	CC BY 4.0			
	Format	CSV			
	Machine-readability	Available			
	Availability of API, bulk download	Low complexity APIs and partial bulk download available			
Documentation	Metadata (dataset content description)	Simple structured file (basic information only)			
	Documentation (incl. structure and semantics)	Complete and web available			
	Data linking	Not included			
	Shared vocabularies/taxonomies	Not included			

- Low impact on data holder organisations, as many of the recommendation are already available in the Member States
- CVS is one of the most commonly used formats by countries (22 out of 27 countries)
- The development of APIs will mostly impact the countries that do not provide them already (12 Member States)

Statistics

Medium intensity intervention

	Description	Demography	Labour Market	GDP	Government finances
Openness	Licence and terms of use	CC BY 4.0			
	Format	CSV, XML, JSON			
	Machine-readability	Available			
	Availability of API, bulk download	Low complexity APIs and partial bulk download available			
Documentation	Metadata (dataset content description)	Simple structured file (basic information only)			
	Documentation (incl. structure and semantics)	Complete and web available			
	Data linking	Not included			
	Shared vocabularies/taxonomies	ISA² core vocabulary (e.g. StatDCAT-AP)			

- The most important change is the inclusion of the development of controlled vocabularies and taxonomies, considering also the ISA2 standards
- Adding new open formats added widen the options for data re-use, and has a relatively low impact overall

Statistics

High intensity intervention

	Description	Demography	Labour Market	GDP	Government finances
Openness	Licence and terms of use	CC BY 4.0			
	Format	CSV, XML, JSON			
	Machine-readability	Available			
	Availability of API, bulk download	Complex APIs and bulk download available			
Documentation	Metadata (dataset content description)	Fully developed file (complete information on dataset included)			
	Documentation (incl. structure and semantics)	Complete and web available			
	Data linking	Available			
	Shared vocabularies/taxonomies	ISA ² core vocabulary (e.g. StatDCAT-AP)			

- Increase complexity of APIs and metadata files implies more effort in development and maintenance of the applications raising the impact on organisations
- Data linking makes it easier for developers to connect information from different sources, increasing the level of discoverability and re-use of the datasets. However, the implementation of this recommendation comes with relatively high costs for both development and maintenance

Question #10 & 11

Go to www.menti.com & enter 85 60 72

Mobility

List of HVDs and their value

Transport networks datasets published under INSPIRE and including the following features:

Common	Road	Rail	Water	Air	Cableways		
<ul style="list-style-type: none">• Access Restriction• Condition Of Facility• Maintenance Authority• Marker Post• Owner Authority• Restriction For Vehicles• Traffic Flow Direction• Transport Area• Transport Link• Transport Link Sequence• Transport Link Set• Transport Network• Transport Node• Transport Object• Transport Point• Transport Property• Vertical Position	<ul style="list-style-type: none">• E-Road• Form Of Way• Functional Road Class• Number Of Lanes• Road• Road Area• Road Link• Road Link Sequence• Road Name• Road Node• Road Service Area• Road Service Type• Road Surface Category• Road Width• Roundabout• Speed Limit• Vehicle Traffic Area	<ul style="list-style-type: none">• Design Speed• Nominal Track Gauge• Number Of Tracks• Railway Area• Railway• Railway Line• Railway Link• Railway Link Sequence• Railway Node• Railway Station• Railway Station Area• Railway Station Code• Railway Station Node• Railway Type• Railway Use• Railway Yard Area• Railway Yard Node	<ul style="list-style-type: none">• Beacon• Buoy• CEMT Class• Condition Of Water Facility• Fairway Area• Ferry Crossing• Ferry Use• Inland Waterway• Marine Waterway• Port Area• Port Node• Restriction For Water Vehicles• Traffic Separation Scheme• Traffic Separation Scheme Area	<ul style="list-style-type: none">• Traffic Separation Scheme• Crossing• Traffic Separation Scheme Lane• Traffic Separation Scheme• Traffic Separation Scheme Separator• Water Link Sequence• Water Node• Water Traffic Flow Direction• Waterway• Waterway Link• Waterway Node	<ul style="list-style-type: none">• Aerodrome Area• Aerodrome Category• Aerodrome Node• Aerodrome Type• Air Link• Air Link Sequence• Air Node• Air Route• Air Route Link• Airspace Area• Apron Area• Condition Of Air Facility• Designated Point• Element Length• Element Width	<ul style="list-style-type: none">• Field Elevation• Instrument Approach Procedure• Lower Altitude Limit• Navaid• Procedure Link• Runway Area• Runway Centreline Point• Standard Instrument Arrival• Standard Instrument Departure• Surface Composition• Taxiway Area• Touch Down Lift Off Area• Upper Altitude Limit• Use Restriction	<ul style="list-style-type: none">• Cableway Link• Cableway Link• Cableway Sequence• Cableway Link Set• Cableway Node

Mobility

List of HVDs and their value

Fairway and infrastructure-related data under the RIS Directive and its implementing legislation:

Static	Dynamic / Urgent	Inland electronic navigational charts (ECDIS)
<ul style="list-style-type: none"> Fairway characteristics (02 ILW/01-21 & 33) Long-time obstructions in the fairway and reliability (02 ILW/22-27) Rates of waterway infrastructure charges (02 ILW/34) Other physical limitations on waterways (03 LO/1; 04 LC/1-5 & 8-9; 05 BR/01-06) Regular lock and bridge operating times (03 LO/2 & 4-9; 04 LC/6-7; 05 BR/6) Location and characteristics of ports and transshipment sites (PO/3-65; 07 PT/1-2) List of navigation aids and traffic signs Navigation rules and recommendations 	<ul style="list-style-type: none"> Water depths contours in the navigation channel (02 ILW/14) Temporary obstructions in the fairway (02 ILW/22-25) Present and future water levels at gauges (02 ILW/15-16) State of the rivers, canals, locks and bridges (02 ILW; 03 LO; 04 LC; 05 BR) Restrictions caused by flood and ice (02 ILW/24-25; 03 LO/6-7) Meteorological data (incl. wind direction) Short term changes of lock and bridge operating times (03 LO/2; 05 BR/6) Short term changes of aids to navigation 	<ul style="list-style-type: none"> Waterway axis with kilometres indication (02 ILW/01-07) Links to the external xml-files with operation times of restricting structures (03 LO/2; 05 BR/6) Location of ports and transshipment sites (06 PO/58-59; 07 PT/1-2) Reference data for water level gauges relevant to navigation (02 ILW/15-16) Bank of waterway at mean water level Shoreline construction (02 ILW/9-12; 04 LC/1-4; 05 BR/3-6) Contours of locks and dams (02 ILW/15-16) Boundaries of the fairway/navigation channel (02 ILW) Isolated dangers in the fairway/navigation channel under and above water (02 ILW/22-25) Official aids-to-navigation (e.g. buoys, beacons, lights, notice marks)

Mobility

Expected costs & benefits

Expected costs


INLAND WATERWAYS


- Current modalities for the provision of inland waterway infrastructure data across the EU are fairly aligned with the *to be* recommendations
- Full harmonisation will be undertaken in the context of the CEF funded VisuRIS COMEX


TRANSPORT NETWORKS

- Currently, these datasets are generally available free of charge, in a harmonised format and provided through large scale IT infrastructure.
- The establishment of APIs and the updates of the datasets will be the main cost drivers.

Expected benefits

 **Complementing existing efforts in promoting the reuse of such data** through the obligation of providing these for free, in harmonised and machine readable formats and both through bulk download and APIs.

 • Complementing the RIS Directive which does not define a harmonised format, availability of API/bulk-download, timeliness of the data, etc.

 • Complementing the INSPIRE Directive by adding an 'Open Data' layer to its provisions, including the availability of APIs.

Mobility

Low intensity intervention – Datasets in scope



Inland waterway and river infrastructure data

- Static
- Dynamic/urgent
- Electronic navigational charts

Static	Dynamic / Urgent	Inland electronic navigational charts (ECDIS)
<ul style="list-style-type: none"> • Fairway characteristics (02 ILW/01-21 & 33) • Long-time obstructions in the fairway and reliability (02 ILW/22-27) • Rates of waterway infrastructure charges (02 ILW/34) • Other physical limitations on waterways (03 LO/1; 04 LC/1-5 & 8-9; 05 BR/01-06) • Regular lock and bridge operating times (03 LO/2 & 4-9; 04 LC/6-7; 05 BR/6) • Location and characteristics of ports and transshipment sites (PO/3-65; 07 PT/1-2) • List of navigation aids and traffic signs • Navigation rules and recommendations 	<ul style="list-style-type: none"> • Water depths contours in the navigation channel (02 ILW/14) • Temporary obstructions in the fairway (02 ILW/22-25) • Present and future water levels at gauges (02 ILW/15-16) • State of the rivers, canals, locks and bridges (02 ILW; 03 LO; 04 LC; 05 BR) • Restrictions caused by flood and ice (02 ILW/24-25; 03 LO/6-7) • Meteorological data (incl. wind direction)Short term changes of lock and bridge operating times (03 LO/2; 05 BR/6) • Short term changes of aids to navigation 	<ul style="list-style-type: none"> • Waterway axis with kilometres indication (02 ILW/01-07) • Links to the external xml-files with operation times of restricting structures (03 LO/2; 05 BR/6) • Location of ports and transshipment sites (06 PO/58-59; 07 PT/1-2) • Reference data for water level gauges relevant to navigation (02 ILW/15-16) • Bank of waterway at mean water level • Shoreline construction (02 ILW/9-12; 04 LC/1-4; 05 BR/3-6) • Contours of locks and dams (02 ILW/15-16) • Boundaries of the fairway/navigation channel (02 ILW) • Isolated dangers in the fairway/navigation channel under and above water (02 ILW/22-25) • Official aids-to-navigation (e.g. buoys, beacons, lights, notice marks)



Mobility

Low intensity intervention – Recommended modalities (*inland waterway infrastructure data*)

Dimensions		Static	Dynamic/Urgent	Electronic Navigational Charts
Openness-data specification	License (terms of use)	Creative Common 0 / CC-BY 4.0 No terms of use		
	Format	CSV, XML, (geo)JSON	CSV, XML, (geo)JSON	XML, .000, WMS
	Machine-readability	Available		
	Availability of API, bulk download	Bulk download (Webservices and API not entirely necessary)	Webservice, (OGC) API and bulk download	
Documentation	Metadata (dataset content description)	Complete		
	Data linking	N/A		
	Documentation (incl. structure and semantics)	RIS Index Encoding Guide 3.0 developed by the Joint Task Force on the RIS Index	Commission Implementing Regulation (EU) 2018/2032 of 20 November 2018 for NtS	Commission Implementing Regulation (EU) 2018/1973 of 7 December 2018 for Inland ECDIS
	Shared vocabularies	RIS Index Encoding Guide 3.0	NtS Standard 4.0	Inland ECDIS Standard 2.5
	Taxonomies	N/A		
Completeness	Traceability	N/A		
	Update frequency and timeliness	When necessary	Daily to (near) real time	Monthly (for shallow sections)
	Granularity	Individual waterway km level		National waterway network and cross-border nodes
	Key attributes	ISRS Location Code		

Mobility

Medium intensity intervention – Datasets in scope

Scope:



Inland waterways and river infrastructure data (cf. low option)



Transport network datasets (*INSPIRE datasets only*)

Common	Road	Rail	Water	Air	Cableways		
<ul style="list-style-type: none">• Access Restriction• Condition Of Facility• Maintenance Authority• Marker Post• Owner Authority• Restriction For Vehicles• Traffic Flow Direction• Transport Area• Transport Link• Transport Link Sequence• Transport Link Set• Transport Network• Transport Node• Transport Object• Transport Point• Transport Property• Vertical Position	<ul style="list-style-type: none">• E-Road• Form Of Way• Functional Road Class• Number Of Lanes• Road• Road Area• Road Link• Road Link Sequence• Road Name• Road Node• Road Service Area• Road Service Type• Road Surface Category• Road Width• Roundabout• Speed Limit• Vehicle Traffic Area	<ul style="list-style-type: none">• Design Speed• Nominal Track Gauge• Number Of Tracks• Railway Area• Railway• Electrification• Railway Line• Railway Link• Railway Link Sequence• Railway Node• Railway Station Area• Railway Station Code• Railway Station Node• Railway Type• Railway Use• Railway Yard Area• Railway Yard Node	<ul style="list-style-type: none">• Beacon• Buoy• CEMT Class• Condition Of Water Facility• Fairway Area• Ferry Crossing• Ferry Use• Inland Waterway• Marine Waterway• Port Area• Port Node• Restriction For Water Vehicles• Traffic Separation Scheme• Traffic Separation Scheme Area	<ul style="list-style-type: none">• Traffic Separation Scheme Crossing• Traffic Separation Scheme Lane• Traffic Separation Scheme• Traffic Separation Separator• Water Link Sequence• Water Node• Water Traffic Flow Direction• Waterway• Waterway Link• Waterway Node	<ul style="list-style-type: none">• Aerodrome Area• Aerodrome Category• Aerodrome Node• Aerodrome Type• Air Link• Air Link Sequence• Air Node• Air Route• Air Route Link• Airspace Area• Apron Area• Condition Of Air Facility• Designated Point• Element Length• Element Width	<ul style="list-style-type: none">• Field Elevation• Instrument Approach Procedure• Lower Altitude Limit• Navaid• Procedure Link• Runway Area• Runway Centreline Point• Standard Instrument Arrival• Standard Instrument Departure• Surface Composition• Taxiway Area• Touch Down Lift Off Area• Upper Altitude Limit• Use Restriction	<ul style="list-style-type: none">• Cableway Link• Cableway Link• Cableway Sequence• Cableway Link Set• Cableway Node



Mobility

Medium intensity intervention – Recommended modalities *(INSPIRE transport network data)*

Dimensions		Road transport	Rail transport	Water transport	Air transport	Cableways
Openness-data specification	License (terms of use)	Creative Common 0 / CC-BY 4.0 No terms of use				
	Format	GML; GeoPackage; GeoJSON; INSPIRE recommendations.				
	Machine-readability	Available				
	Availability of API, bulk download	Webservice, (OGC) API and bulk download				
Documentation	Metadata (dataset content description)	Complete (following INSPIRE recommendations)				
	Data linking	Links to national INSPIRE Geoportals and datasets				
	Documentation (incl. structure and semantics)	Complete and available				
	Shared vocabularies	Recommended INSPIRE data specifications				
	Taxonomies	N/A				
Completeness	Traceability	N/A				
	Update frequency and timeliness	When necessary				
	Granularity	From local to national, including links with cross-border networks.				
	Key attributes	Topographic areas, links, nodes, junctions, 'road' ends, points with specific functions.				

Mobility

High intensity intervention – Datasets in scope

Scope:



Inland waterways and river infrastructure data (cf. low and medium option)



Transport network datasets (*INSPIRE datasets only*) (cf. medium option)



Other national transport network datasets:

- *Land transport*
- *Waterborne transport*
- *Aviation and cableways transport networks*



Mobility

High intensity intervention – Recommended modalities (*other national transport network datasets*)

No specific measures for publication would be imposed, but INSPIRE specifications would be strongly recommended.

However, if included as HVDs, these datasets will have to be **PSI-compliant** in order to ensure their **reusability**:

- Open licenses
- No terms of reuse
- Bulk download and API

Question #12 & 13

Go to www.menti.com & enter 85 60 72



Break



4. Impact modelling

Macroeconomic impact assessment

Assumptions made by relevant literature

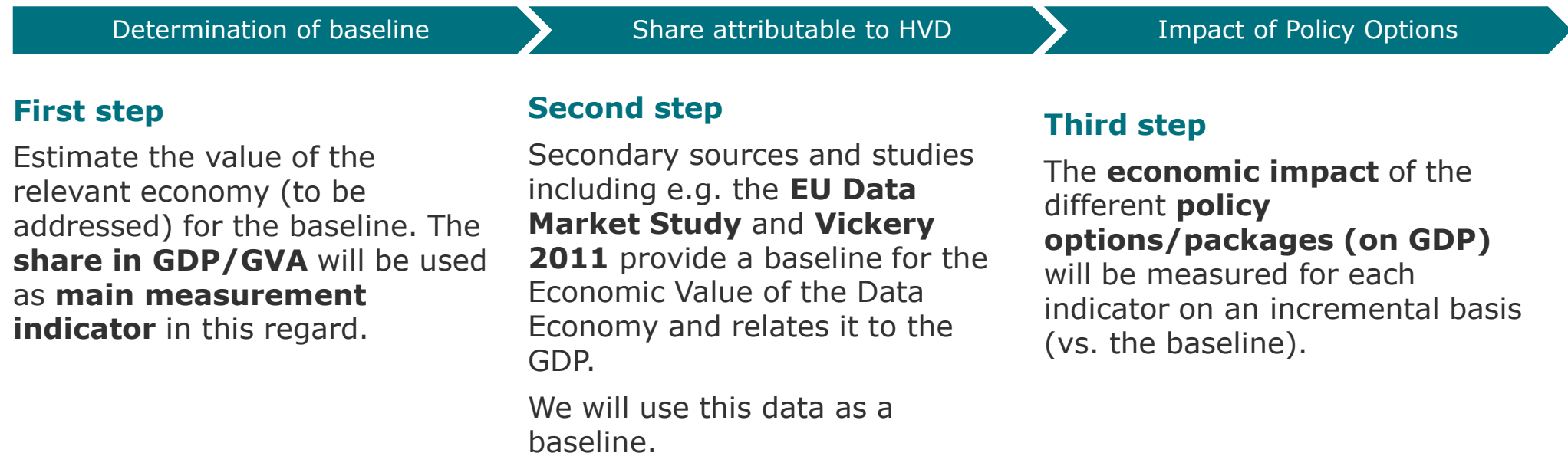
Study	Context	Assumptions about data economy/ open data
Vickery 2011 , Review of Recent Studies on PSI Re-Use and Related Market Developments	Part of the impact assessment of the first EU PSI Directive. Looks at the impact of the adoption of the PSI Directive in 2006, extrapolates sectoral + national impact research for the entire EU, based on GDP and ICT	Predicts a direct economic benefit of open data of 40 bio. EUR in the EU Predicts an indirect economic benefit of 140 bio. EUR in the EU. Predicts socio-economic benefits of 40 bio. EUR in the EU. Predicts EU market for government data in 2010 at about 32 bio. EUR.
EU 2015 , Creating Value through open data	Macro-economic research into economic potential in the EU for 2016-20, building on Vickery 2011.	Predicts a direct economic value of open data of 75.7 bio. EUR in 2020. Predicts public sector savings in the EU of 1.7 bio. In 2020. Predicts an indirect value of open data in the EU from 265-286 bio. EUR in 2020.
EU 2017 , Open Data Maturity in Europe	Yearly EU Data Portal Study	Predicted 325 bio. EUR of potential contribution of open data for 2016-2020 with 30.000 new jobs created in 2020.
Denmark 2017 , The impact of the open geographical data	Study looks at the impact of the release of open geographic data in Denmark 2012-2016.	Shows a total reported impact of 475 mio. EUR in 2016: 341 mio. EUR production effects, 134 mio. EUR efficiency effects
McKinsey 2013 , Open Data	Large scale report about the economic potential of data and open data with macro-economic estimates.	Estimates the total economic potential in the EU at 900 bio. Dollar
Deloitte 2018 , Reuse of Public Sector Information	Evaluation assessed the performance of the PSI Directive, whether it still responds to the stakeholders' needs and expectations and whether it fits the purpose of the next years.	Study based on the Vickery Study 2011 and assumptions of Eurostat and the Data Monitoring Tool. Assessment identified problem areas of re-use of PSI Data, among them costs of data re-use, availability, exclusive agreements

Macroeconomic impact assessment

Our method: Top-down approach

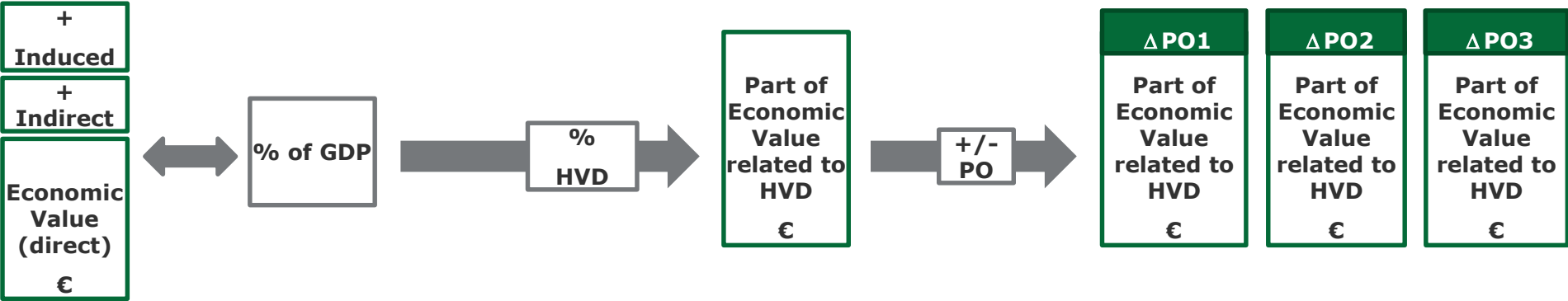
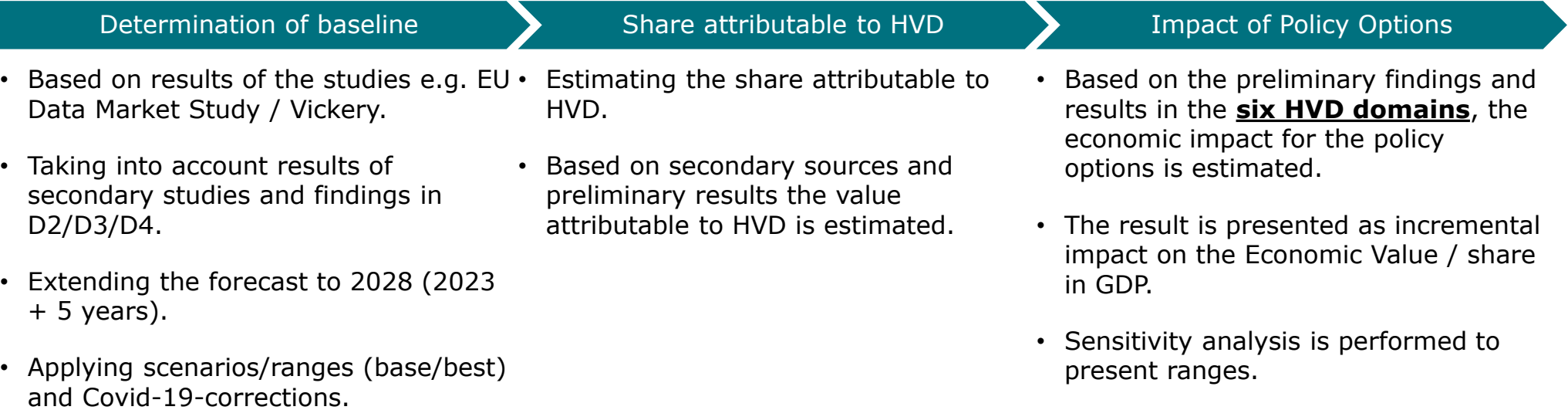
The Economic Impact of HVDs (it's contribution to GDP) will be estimated based on a [top-down approach](#).

A [Bottom-up validation based on costs and revenues](#) of different stakeholders could be conducted in a later stage.



Macroeconomic impact assessment

Our method: Top-down approach



Macroeconomic impact assessment– Baseline Scenario

Market size of PSI related to the Data Market Value of the EU Data Economy

EU Data market value and growth rate [%] according to the EU Data Monitoring Tool 2020 (until 2025), OECD estimates afterwards – **baseline scenario**

EU Data market value and growth rate [%] according to the EU Data Monitoring Tool 2020 (until 2025), OECD estimates afterwards – **high growth scenario**

HVD Inputs											
M€		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
EU Data Monitoring Tool 2020 - baseline											
Data revenues		64.262	71.050	75.866	81.008	86.499	92.362	98.623	100.144	101.711	103.321
Data market value		58.214	62.244	65.795	69.584	73.628	77.948	82.564	83.837	85.149	86.497
Data market value - direct impact		58.214	54.081	58.481	63.239	68.385	73.948	79.965	81.198	82.469	83.775
growth rate %		4,9%	(7,1%)	8,1%	8,1%	8,1%	8,1%	8,1%	1,5%	1,6%	1,6%
EU Data Monitoring Tool 2020 - high growth											
Data revenues		64.262	71.050	80.943	92.215	105.055	119.684	136.350	138.453	140.620	142.846
Data market value		58.214	62.244	69.320	77.236	86.097	96.020	107.139	108.791	110.494	112.243
Data market value - direct impact		58.214	54.081	62.005	71.090	81.505	93.447	107.139	108.791	110.494	112.243
growth rate %		4,9%	(7,1%)	14,7%	14,7%	14,7%	14,7%	14,7%	1,5%	1,6%	1,6%
% above baseline		-	-	6,0%	12,4%	19,2%	26,4%	34,0%	34,0%	34,0%	34,0%
Market size PSI - Vickery											
Assumption: baseline growth rate: 6,5% until 2025, OECD estimates afterwards		52.366	48.649	51.811	55.179	58.765	62.585	66.653	67.681	68.740	69.828
% PSI on data market value		90%	90%	89%	87%	86%	85%	83%	83%	83%	83%

Baseline scenario PSI growth: Estimated market size of the PSI sector based on Vickery 2011. Growth estimations until 2020 according to predictions of the EU Data Monitoring Tool.

Assumptions from 2021 onwards: **baseline growth rate of 6,5% in the PSI sector** according to relevant literature and findings in previous deliverables. From 2026, the PSI market size is estimated to follow the growth path in line with the OECD estimates.

Macroeconomic impact assessment – Baseline Scenario

Market shares (% of PSI market) and direct impact of the six thematic areas

Based on existing literature and on the study research so far, we estimated the **market share of the six thematic areas in % of the PSI Market for the baseline scenario**.

Consequently, we could estimate the **direct impact in Mio. EUR of each thematic sector for the years 2023-2028**.

HVD Inputs										
M€	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Market size PSI - Vickery	52.366	48.649	51.811	55.179	58.765	62.585	66.653	67.681	68.740	69.828
Assumption: baseline growth rate: 6,5% until 2025, OECD esti	4,9%	(7,1%)	6,5%	6,5%	6,5%	6,5%	6,5%	1,5%	1,6%	1,6%
% PSI on data market value	90%	90%	89%	87%	86%	85%	83%	83%	83%	83%
Market share [% of PSI Market]										
1. Company and company ownership	6,2%	6,2%	6,2%	6,2%	6,2%	6,2%	6,2%	6,2%	6,2%	6,2%
2. Geospatial	34,0%	34,0%	34,0%	34,0%	34,0%	34,0%	34,0%	34,0%	34,0%	34,0%
3. Meteorological data	20,0%	20,0%	20,0%	20,0%	20,0%	20,0%	20,0%	20,0%	20,0%	20,0%
4. Earth observation and environment	14,8%	14,8%	14,8%	14,8%	14,8%	14,8%	14,8%	14,8%	14,8%	14,8%
5. Statistics	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%	16,0%
6. Mobility	9,0%	9,0%	9,0%	9,0%	9,0%	9,0%	9,0%	9,0%	9,0%	9,0%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Market share										
1. Company and company ownership	3.247	3.016	3.212	3.421	3.643	3.880	4.132	4.196	4.262	4.329
2. Geospatial	17.805	16.541	17.616	18.761	19.980	21.279	22.662	23.011	23.372	23.742
3. Meteorological data	10.473	9.730	10.362	11.036	11.753	12.517	13.331	13.536	13.748	13.966
4. Earth observation and environment	7.750	7.200	7.668	8.166	8.697	9.263	9.865	10.017	10.174	10.335
5. Statistics	8.379	7.784	8.290	8.829	9.402	10.014	10.664	10.829	10.998	11.173
6. Mobility	4.713	4.378	4.663	4.966	5.289	5.633	5.999	6.091	6.187	6.285
Total	52.366	48.649	51.811	55.179	58.765	62.585	66.653	67.681	68.740	69.828

Economic impact assessment – Policy interventions: examples of two thematic areas

1. Company and company ownership



Assumptions on growth rates for low, medium and high intervention option for the thematic area company and company ownership for 2023-2028.

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028
Baseline Growth rate	(7,1%)	6,5%	6,5%	6,5%	6,5%	6,5%	1,5%*	1,6%*	1,6%*
Low intervention					7,4%	7,4%	7,4%	3,4%	3,4%
Medium intervention					7,9%	7,9%	7,9%	3,9%	3,9%
High intervention					8,2%	8,2%	8,2%	5,2%	5,2%

*The growth rates of the years 2026-2028 for the baseline scenario follow OECD and Eurostat estimates.

Reasoning for the assumptions

➤ *based on study findings, expert interviews and desktop research*

Low intervention: only bare minimum of the datasets would be considered as HVDs. Only 2 out of 4 datasets -> growth in this scenario would not be much different compared to baseline

Medium intervention: slightly more ambitious, as also categories of datasets on companies' ownership and solvency status included. All 4 datasets included -> growth expected to be higher.

High intervention: all data fields identified in scope, without exception -> highest growth rate expected

Economic impact assessment – Policy interventions: examples of two thematic areas

2. Geospatial



Assumptions on growth rates for low, medium and high intervention option for the thematic area geospatial 2023-2028.

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028
Baseline Growth rate	(7,1%)	6,5%	6,5%	6,5%	6,5%	6,5%	1,5%*	1,6%*	1,6%*
Low intervention					7,4%	7,4	7,4	3,4	3,4
Medium intervention					8,7%	8,7	8,7	5,7	5,7
High intervention					9,1%	9,1	9,1	6,1	6,1

*The growth rates of the years 2026-2028 for the baseline scenario follow OECD and Eurostat estimates.

Reasoning for the assumptions

➤ *based on study findings, expert interviews and desktop research*

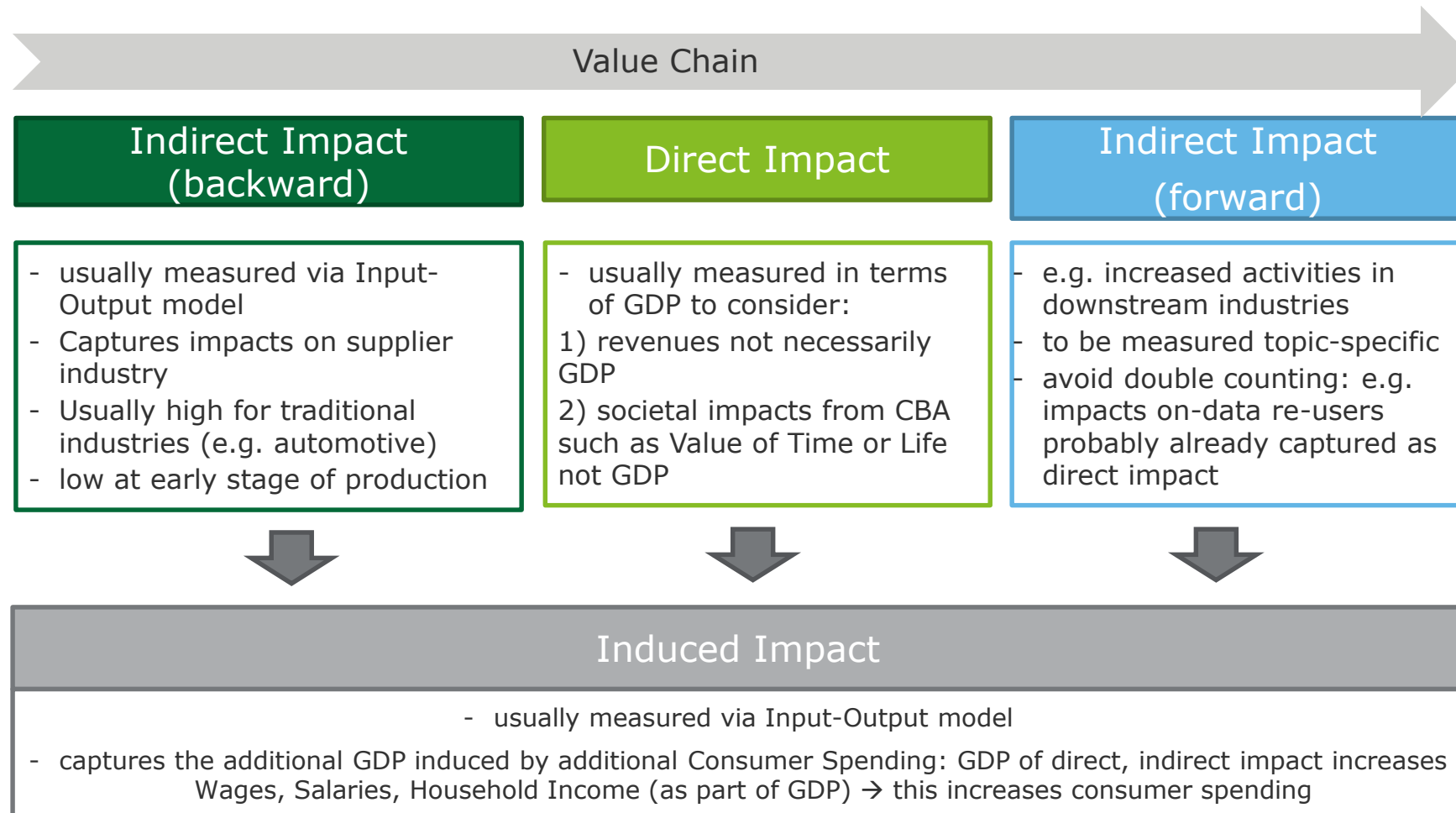
Low intervention: only bare minimum of the datasets as HDV. But geospatial datasets already in widely used in baseline scenario. Already more than half of the countries (57%) use types of open data licenses. Acc. To MCA, not really effective, but highly efficient option -> considerable growth can be expected from a low intervention.

Medium intervention: slightly more ambitious option. B/C-ratio slightly lower and would imply more infrastructural and data transformation costs. Wider in scope and therefore more effective -> higher growth than in the low intervention can be expected

High intervention: all data fields identified in scope, without exception. Highly efficient, but would imply a significantly lower B/C-ratio as compared to the other options -> highest growth rate expected

Macroeconomic impact assessment

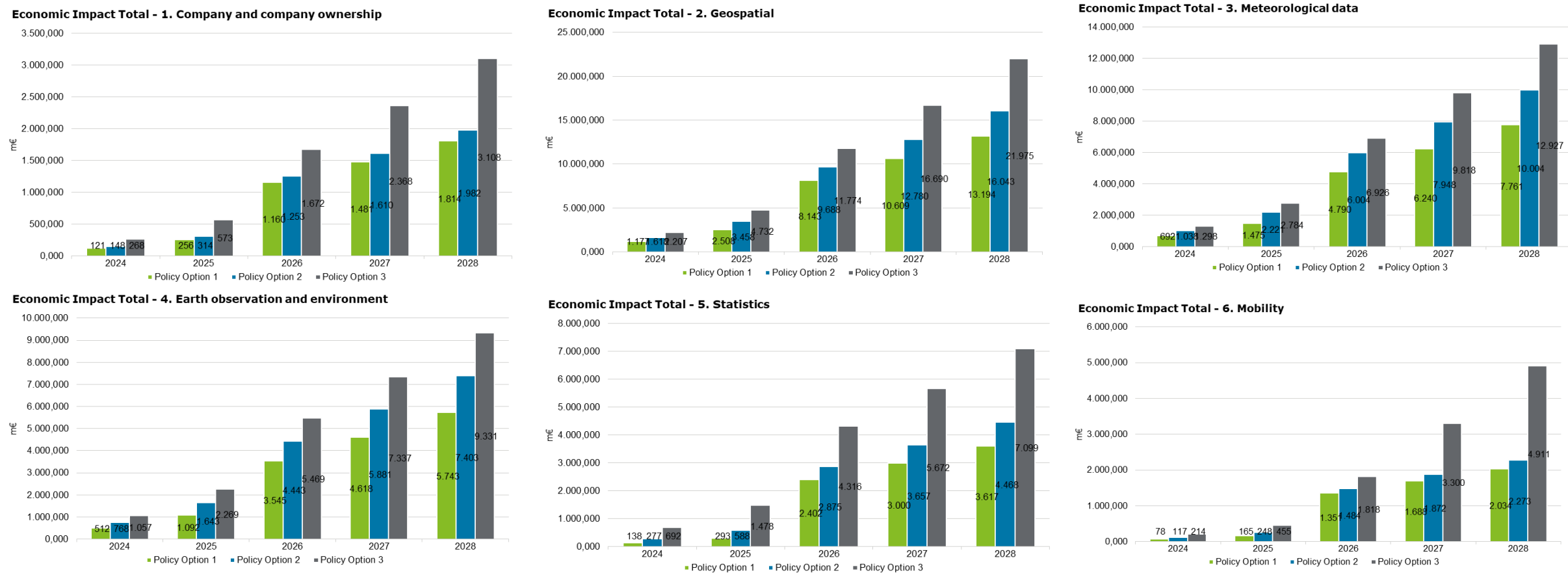
General methodology and indicators: Multipliers to measure indirect and induced impacts



Macroeconomic impact assessment

Preliminary results – total impact by policy option

Based on our top down-approach, the calculations yield the following **results for the total impact by thematic area and policy option for the years 2024-2028**:



Macroeconomic impact assessment

Preliminary results – Economic Impact GDP with pre Covid scenario and post Covid correction

The first two rows of the table present the **estimates of GDP – EDM pre Covid and post Covid** (according to the EIU/OECD correction) until 2028.

The last two rows present the **direct and the indirect impact of the PSI market** for the baseline scenario until 2028.

HVD Inputs										
M€	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
GDP - EDM pre Covid	12.515.078	12.707.241	12.897.850	13.091.317	13.287.687	13.487.002	13.690.074	13.901.151	14.118.796	14.342.287
GDP - EDM post Covid (EIU/OECD correction)	12.515.078	11.534.242	12.142.285	12.484.693	12.742.133	12.972.879	13.168.121	13.371.151	13.580.498	13.795.468
Baseline - direct	52.366	48.649	51.811	55.179	58.765	62.585	66.653	67.681	68.740	69.828
Baseline - indirect	139.780	135.731	143.129	150.930	159.157	167.832	176.979	179.708	182.522	185.411
	192.147	184.380	194.940	206.109	217.922	230.417	243.632	247.389	251.262	255.239

Social Impacts, Impact on Employment, Environmental of the HVD
- Results to be finalised upon further research and discussion -



3. Policy packages and analysis



Multi-Criteria Analysis (MCA)

Ranking the three intervention options with four assessment criteria

We used the MCA for two reasons:

First, due to the lack of data, it is an **alternative to the cost-benefit-analysis (CBA)**.

Second, it is particularly **relevant** at the following stages of our **Impact Modelling**:

- At the stage of **assessing the economic, social and environmental dimensions** of each of the three intervention options, including possible trade-offs between these dimensions
- At the stage of **comparing the policy options**: against the 3 main criteria of Effectiveness, Efficiency and Coherence as well as Relevance.

Multi-Criteria Analysis (MCA)

Explanation of the criteria

Effectiveness

Effectiveness looks at the extent to which different options would achieve the objectives of the intervention, looking for evidence of why, whether or how these changes are linked to the intervention.

Efficiency

Efficiency is defined at the costs and benefits of a policy option as they accrue to different stakeholders

Coherence

The coherence of each option with the overarching objectives of EU policies, both internally and with other EU interventions

Relevance

The relevance of each option is given if the objectives of the intervention being evaluated matches the current needs and problems

Source: Better Regulation Guidelines (European Commission, 2017)

Multi-Criteria Analysis (MCA)

Our non-compensatory approach

In our **input matrix** we used four criteria, each was weighted with 25% respectively.

Criteria	Weight	Direction	Performance Value
Effectiveness	0.25	1	-3 / 3
Efficiency (B/C-Ratio)	0.25	1	Benefit-/Cost-ratio or Score -3 / 3
Coherence of the policy options	0.25	1	-3 / 3
Relevance	0.25	1	-3/ 3

Multi-Criteria Analysis (MCA)

Our non-compensatory approach – Step 1: Weighted Performance

The weightings, direction and performance of the three intervention options was then determined separately by PSI-sector for each of the four criteria. The importance of the criteria is reflected in the respective weights.

Input matrix				Policy Options					
				1. Company and company ownership					
Criteria	Weight	Direction	Performance value	P1 (low intervention)		P2 (medium intervention)		P3 (high intervention)	
				Performance	Weighted performance	Performance	Weighted performance	Performance	Weighted performance
Effectiveness	0,25	1	-3/3	1,50	0,38	2,30	0,58	2,50	0,63
Efficiency (B/C-ratio)	0,25	1	Benefit/Cost-ratio or Score -3/ + 3	2,70	0,68	2,50	0,63	2,30	0,58
Coherence of the policy options	0,25	1	-3/3	2,00	0,50	2,30	0,58	2,50	0,63
Relevance	0,25	1	-3/3	1,00	0,25	2,00	0,50	2,30	0,58
				2. Geospatial					
Criteria	Weight	Direction	Performance value	P1 (low intervention)		P2 (medium intervention)		P3 (high intervention)	
				Performance	Weighted performance	Performance	Weighted performance	Performance	Weighted performance
Effectiveness	0,25	1	-3/3	1,75	0,44	2,00	0,50	2,75	0,69
Efficiency (B/C-ratio)	0,25	1	Benefit/Cost-ratio or Score -3/ + 3	3,00	0,75	2,75	0,69	1,75	0,44
Coherence of the policy options	0,25	1	-3/3	3,00	0,75	2,75	0,69	1,75	0,44
Relevance	0,25	1	-3/3	2,50	0,63	2,75	0,69	3,00	0,75
				3. Meteorological data					
Criteria	Weight	Direction	Performance value	P1 (low intervention)		P2 (medium intervention)		P3 (high intervention)	
				Performance	Weighted performance	Performance	Weighted performance	Performance	Weighted performance
Effectiveness	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,75	0,69
Efficiency (B/C-ratio)	0,25	1	Benefit/Cost-ratio or Score -3/ + 3	3,00	0,75	2,00	0,50	1,50	0,38
Coherence of the policy options	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,50	0,63
Relevance	0,25	1	-3/3	2,00	0,50	2,50	0,63	3,00	0,75

Multi-Criteria Analysis (MCA)

Our non-compensatory approach – Step 1: Weighted Performance

The weightings, direction and performance of the three intervention options was then determined separately by PSI-sector for each of the four criteria. The importance of the criteria is reflected in the respective weights.

				4. Earth observation and environment					
Criteria	Weight	Direction	Performance value	P1 (low intervention)		P2 (medium intervention)		P3 (high intervention)	
				Performance	Weighted performance	Performance	Weighted performance	Performance	Weighted performance
Effectiveness	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,75	0,69
Efficiency (B/C-ratio)	0,25	1	Benefit/Cost-ratio or Score -3/ + 3	3,00	0,75	2,00	0,50	1,50	0,38
Coherence of the policy options	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,50	0,63
Relevance	0,25	1	-3/3	2,00	0,50	2,50	0,63	3,00	0,75
				5. Statistics					
Criteria	Weight	Direction	Performance value	P1 (low intervention)		P2 (medium intervention)		P3 (high intervention)	
				Performance	Weighted performance	Performance	Weighted performance	Performance	Weighted performance
Effectiveness	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,50	0,63
Efficiency (B/C-ratio)	0,25	1	Benefit/Cost-ratio or Score -3/ + 3	1,10	0,28	2,00	0,50	2,90	0,73
Coherence of the policy options	0,25	1	-3/3	2,50	0,63	2,50	0,63	2,50	0,63
Relevance	0,25	1	-3/3	1,20	0,30	2,00	0,50	2,75	0,69
				6. Mobility					
Criteria	Weight	Direction	Performance value	P1 (low intervention)		P2 (medium intervention)		P3 (high intervention)	
				Performance	Weighted performance	Performance	Weighted performance	Performance	Weighted performance
Effectiveness	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,50	0,63
Efficiency (B/C-ratio)	0,25	1	Benefit/Cost-ratio or Score -3/ + 3	2,90	0,73	2,50	0,63	1,70	0,43
Coherence of the policy options	0,25	1	-3/3	2,00	0,50	2,50	0,63	2,50	0,63
Relevance	0,25	1	-3/3	1,50	0,38	2,00	0,50	2,50	0,63

Multi-Criteria Analysis (MCA)

Our non-compensatory approach – Step 2: Outranking Matrix

We prepared an “**outranking matrix**”: Options are compared pairwise. For each comparison, all weights are summed for the criteria where Option A is favoured over Option B as indicated by the weighted performance of each criterion.

1. Company and company o	P1	P2	P3
P1	0,00	0,25	0,25
P2	0,75	0,00	0,25
P3	0,75	0,75	0,00
2. Geospatial	P1	P2	P3
P1	0,00	0,50	0,50
P2	0,50	0,00	0,50
P3	0,50	0,50	0,00
3. Meteorological data	P1	P2	P3
P1	0,00	0,25	0,25
P2	0,75	0,00	0,25
P3	0,75	0,75	0,00
4. Earth observation and en	P1	P2	P3
P1	0,00	0,25	0,25
P2	0,75	0,00	0,25
P3	0,75	0,75	0,00
5. Statistics	P1	P2	P3
P1	0,00	0,00	0,00
P2	0,75	0,00	0,00
P3	0,75	0,75	0,00
6. Mobility	P1	P2	P3
P1	0,00	0,25	0,25
P2	0,75	0,00	0,25
P3	0,75	0,50	0,00

Multi-Criteria Analysis (MCA)

Our non-compensatory approach – Step 3: Policy Ranking permutation

The policy options were subsequently ranked in 3! (=6) different ways but the aim is to find the permutation with the maximum likelihood score. Hence, the optimal ranking is one with the maximum likelihood score.

Policy ranking permutation with the final scores (maximum likelihood score) per PSI sector

Rank #	Policy ranking permutation			Policy pairing			Coefficients of policy pairings			Final score
1. Company and company ownership										
6	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,25	0,25	0,25	0,75
4	P1	P3	P2	P1-P2	P1-P3	P3-P2	0,25	0,25	0,75	1,25
4	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,75	0,25	0,25	1,25
2	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,25	0,75	0,75	1,75
3	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,75	0,75	0,25	1,75
5	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
2. Geospatial										
5	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,50	0,50	0,50	1,50
5	P1	P3	P2	P1-P2	P1-P3	P3-P2	0,50	0,50	0,50	1,50
5	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,50	0,50	0,50	1,50
5	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,50	0,50	0,50	1,50
5	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,50	0,50	0,50	1,50
5	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,50	0,50	0,50	1,50
3. Meteorological data										
6	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,25	0,25	0,25	0,75
4	P1	P3	P2	P1-P2	P1-P3	P3-P2	0,25	0,25	0,75	1,25
4	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,75	0,25	0,25	1,25
2	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,25	0,75	0,75	1,75
3	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,75	0,75	0,25	1,75
5	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
4. Earth observation and environment										
6	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,25	0,25	0,25	0,75
4	P1	P3	P2	P1-P2	P1-P3	P3-P2	0,25	0,25	0,75	1,25
4	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,75	0,25	0,25	1,25
2	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,25	0,75	0,75	1,75
3	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,75	0,75	0,25	1,75
5	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
5. Statistics										
6	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,00	0,00	0,00	0,00
4	P1	P3	P2	P1-P2	P1-P3	P3-P2	0,00	0,00	0,75	0,75
4	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,75	0,00	0,00	0,75
2	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,00	0,75	0,75	1,50
3	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,75	0,75	0,00	1,50
5	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
6. Mobility										
6	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,25	0,25	0,25	0,75
5	P1	P3	P2	P1-P2	P1-P3	P3-P2	0,25	0,25	0,50	1,00
4	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,75	0,25	0,25	1,25
2	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,25	0,75	0,75	1,75
3	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,75	0,75	0,25	1,75
5	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,50	0,75	0,75	2,00

Whole policy ranking permutation with 24 policy pairings per sector and 6 final scores per sector

Rank #	Policy ranking permutation			Policy pairings			Coefficients of policy pairings			Final score
Rank #	A	B	C	AB	AC	BC	AB	AC	BC	
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
2. Geospatial										
1	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,50	0,50	0,50	1,50
1	P1	P3	P2	P1-P3	P1-P2	P3-P2	0,50	0,50	0,50	1,50
1	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,50	0,50	0,50	1,50
1	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,50	0,50	0,50	1,50
1	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,50	0,50	0,50	1,50
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,50	0,50	0,50	1,50
3. Meteorological data										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
4. Earth observation and environment										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
5. Statistics										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
6. Mobility										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,50	0,75	0,75	2,00

Multi-Criteria Analysis (MCA)

Results and Conclusions

According to the MCA, the best policy option – defined as the policy option with the maximum likelihood score – is in the Company & company ownership, Meteorological data, Environmental & Earth Observation, Statistics and in the Mobility sector the ***Policy Option 3***. This option is the **heavy intervention option**.

In the **geospatial sector**, each policy pairing receives the **same final score**.

Rank #	Policy ranking permutation			Policy pairings			Coefficients of policy pairings			Final score
Rank #	A	B	C	AB	AC	BC	AB	AC	BC	
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
2. Geospatial										
1	P1	P2	P3	P1-P2	P1-P3	P2-P3	0,50	0,50	0,50	1,50
1	P1	P3	P2	P1-P3	P1-P2	P3-P2	0,50	0,50	0,50	1,50
1	P2	P1	P3	P2-P1	P2-P3	P1-P3	0,50	0,50	0,50	1,50
1	P2	P3	P1	P2-P3	P2-P1	P3-P1	0,50	0,50	0,50	1,50
1	P3	P1	P2	P3-P1	P3-P2	P1-P2	0,50	0,50	0,50	1,50
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,50	0,50	0,50	1,50
3. Meteorological data										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
4. Earth observation and environment										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
5. Statistics										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,75	0,75	0,75	2,25
6. Mobility										
1	P3	P2	P1	P3-P2	P3-P1	P2-P1	0,50	0,75	0,75	2,00



5. Q&A



Question #14, 15 & 16

Go to www.menti.com & enter 85 60 72

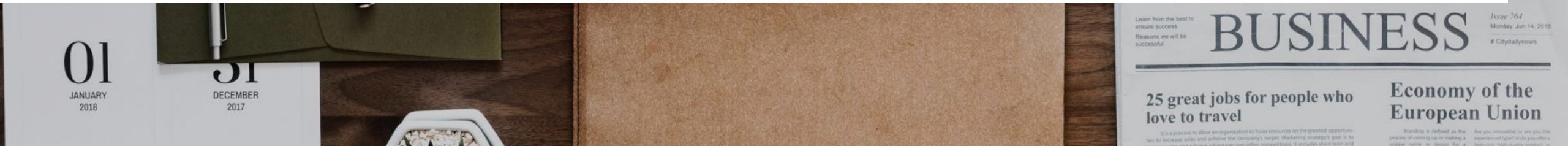


Q&A

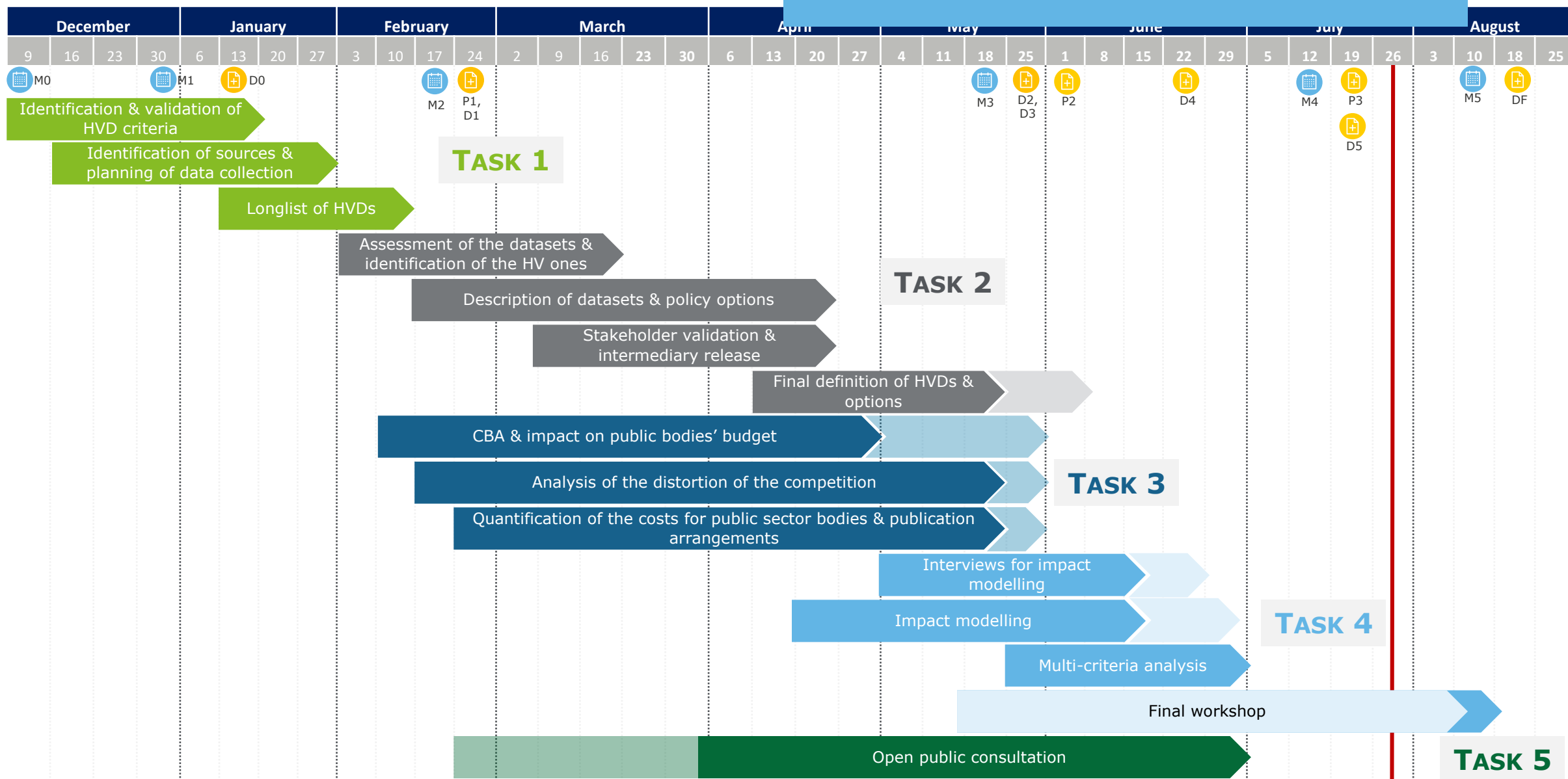


CALENDAR						
SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27

Wrap-up and next steps



Timeline and planning



**Thank
you!**



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited ("DTTL"), its global network of member firms, and their related entities. DTTL (also referred to as "Deloitte Global") and each of its member firms are legally separate and independent entities. DTTL does not provide services to clients. Please see www.deloitte.com/about to learn more.

Deloitte is a leading global provider of audit and assurance, consulting, financial advisory, risk advisory, tax and related services. Our network of member firms in more than 150 countries and territories serves four out of five Fortune Global 500® companies. Learn how Deloitte's approximately 286,000 people make an impact that matters at www.deloitte.com.

